

May 19, 1960.

Geocor, Limited,
14 Haas Road,
Rexdale, Ontario.

Attention: Mr. V. Milligan.

Re: - Chedoke Expressway --
Ramp 'G' - W.P. 231-58-3
District 4.

Dear Sir:-

Please consider this your authorization to carry out an investigation at the above location, with a view to advising the Department with respect to the properties of the upper clay layer.

It is understood that this work will be carried out under the technical advice of Dr. H. Q. Golder, who will report to the Department.

Ten copies of the completed report should be submitted to this Section.

Charges for the work performed, will be in accordance with your Schedule of Rates, dated March 4, 1960. Please address invoices to the attention of the undersigned.

JB/MdeF

Yours very truly,

cc: Mr. S. McCombie
" I. Campbell
" H. E. Richardson
" P. F. Weber
" N. D. Smith
Foundations Office
Gen. Files (2)

A. Rutka,
A/MATERIALS & RESEARCH ENGINEER

September 12th, 1962.

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

Attention: Mr. Nixon.

Dear Sir: Re: Hwy. #403, Cont. #61-174, *Anchor*
 Extension of Surcharged Area.

The northern end of the present surcharge is Station 390+00. Highly compressible soils strata extend further north under Longwood Road. This was confirmed by recent additional borings.

The provision of a surcharge in this section of the Expressway, between Station 390+00 and Station 386+50 is now recommended. It should be placed as soon as Longwood Road is closed which will be after completion of the relocated Old Guelph Road and York Boulevard Access Ramps. Since this will not be the case before December 1/62, the placing of embankment fill and surcharge will be further delayed until spring 1963 when the weather will permit grading operations.

The recommended height of surcharge is 10' of which the lower 3' should be compacted since part of the surcharge will form the upper portion of the embankment after settlement has taken place.

Settlement plates will be supplied and installed by the Foundations Section.

RS/h1

c.c. J.C. Thatcher,
L.R. Radie,
A. Stermac,
T.J. Kovich (2),
Files.

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

Mr. H. Greenland,
District Engineer,
Hamilton (District #4).

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

Attention: Mr. R. Britton,
Construction Engr.

July 28, 1965

Cracking of Channel Lining at Chedoke Storm Sewer,
near Westinghouse Plant - (Site Visit July 23/65).

At your verbal request, a visit was paid by the writer to the above site on July 23, 1965. This memo summarizes the observations made at the site and the recommendations for remedial measures.

Cracking of the channel lining is at present, limited to the south side and starts at the wing wall of the culvert on the west side to the Y-junction on the east side. The crack runs as an irregular but approximately horizontal continuous line about one-third distance from the bottom of the channel. A few wash-out holes are present on the surface behind the channel lining.

The ground surface behind the lining is swampy and soft and indicates that surface water must be staying in the depression for most part of the year. Behind this depression, a creek runs to a pipe discharging into the channel. This creek probably maintains a high water table in the area. The water percolates behind the channel lining, causing erosion, and a permanent hydrostatic pressure acting on the channel lining results from the high water table. Elsewhere, where there is no evidence of surface and ground water, the channel lining performs satisfactorily.

The above evidence indicates that the cracking of the concrete slabs is a result of hydrostatic pressure aggravated by erosion due to surface water. The proper remedial measure is therefore, a drainage system by which the detrimental effect of the ground and surface water may be eliminated. It is recommended that the soil behind the channel lining be excavated down to the bottom of the channel for a width of three feet and for the whole length where cracking has occurred. The material should be replaced with granular material and a perforated pipe be installed at the bottom at a grade so that the water collected may be discharged into the channel.

It may also be pointed out that on the opposite side of the channel lining that has cracked and beneath the main embankment, a pipe is discharging water into the area and this surface water is

July 28/65

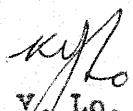
is at present not controlled. Some means of control should be provided for this run-off.

We believe that the above recommendations are sufficient for your purposes. If you have any further queries, please do not hesitate to call us.

KYL/MdeF

cc: Mr. R. Schonfeld

Foundations Office
Gen. Files


K. Y. Lo,
SUPERVISING FOUNDATION ENGR.
Fox
A. G. Stermac,
PRINCIPAL FOUNDATION ENGR.

MEMORANDUM

To: Mr. A. Stermac,
Principal Foundations Engr.

FROM: R. Schonfeld.

DATE: May 6th, 1964.

OUR FILE REF.

IN REPLY TO

SUBJECT: Hwy. #403, Chedoke Expressway, Contract #63-116,
Slope Failure at Storm Sewer, Stas. 105+25 to 106+50.

Please refer to Foundation Investigation W.J. 60-F-14,
(W.P. #231-58-3).

Topography of Failure Location: The channel is close to the toe of a natural slope, approx. 70' high, with dwelling houses at the top. The slope inclination is about $2\frac{1}{2}$ hor. to 1 vert. near the bottom, increasing about $1\frac{1}{2}$:1 in the upper half of the slope.

The length of the slope failure is 125'.

Proximity of Sanitary Sewer: A 36" diameter sanitary sewer is located 20' (horizontally) above the top of the channel slope.

Date of Slide: This sewer was excavated on October 15th, 1963, and the channel was excavated on February 28th.

The exact date of the slide is not known, but it appears to have happened last month (April) when the ground was thawing up.

Possible Damage to Sewer: The sewer is now being inspected for any sign of damage. The ground above the sewer does not appear to be disturbed.

Slope Design (See attached Sketch): The channel slope was $1\frac{1}{2}$:1. The slope between top of channel and sewer was 2:1. The top of the sewer trench was to be flat for a minimum width of 12 feet. The slope above the sewer was $1\frac{1}{2}$:1 at the bottom, changing gradually in to the existing slope which, in places, is steeper.

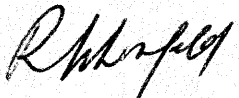
The channel invert which is $1\frac{1}{2}$ ' above the excavated elevation, is 269.3. The sewer elevation is 278.9.

Soils: The nearest borehole is at Sta. 105/00, just outside the failure section. It indicates the presence of a stiff organic silt of low plasticity, and a stiff clay of low plasticity between the ground level 276.0 and 266.0. Below it, down to 241.0 is a soft to medium stiff clay of low plasticity the moisture content of which, in places, appeared to be close to the liquid limit.

Suggested Action: Borings to investigate the failure section seem to be indicated, in order to better assess the nature of the failure which seems to be deep-seated (possibly on the lines of a slip circle). The appearance of several seepage patches on the slope may possibly be related to drainage from dwellings on top of the slope.

The substitution of a Box Sewer Section for the present Open Channel Section may have to be considered.

RS/hl
c.c. T.J. Kovich (2),
Files.


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

T.J. Kovich,
Regional Soils Engineer.

R. Schonfeld,
Project Soils Engineer.

January 14th, 1963.

Hwy. #403, Contract #62-109,
Earth Borrow from Channel Cut Sta. 204 to 434.

60F-14
W.P. 231-58-3

The Contractor had requested that a meeting be held in order to discuss his difficulties of the above mentioned operations. The meeting was held on January 11th, 1963, at C.C. Parkers' main office. The following were present:

Mr. H.C. Nixon (C.C. Parker)
Mr. D.S. Patterson (C.C. Parker)
Mr. W. Jenner (C.C. Parker)
Mr. J. McNally (Dundurn Construction)
Mr. P. McNally (Dundurn Construction)
Mr. W. Edgerley (Dundurn Construction)
Mr. H. Tregaskes (D.H.O.)
Mr. D. Panter (D.H.O.)
Mr. H. Greenland (D.H.O.)
Mr. B. Smith (D.H.O.)
Mr. G.A. Wrong (D.H.O.)
Mr. R. Schonfeld (D.H.O.)

Mr. Nixon opened the meeting outlining that the Contractor was advised to suspend grading operations because the borrow material could not be handled in unfavourable weather conditions.

Mr. P. McNally interjected that the weather was not the cause for the difficulties, but that the earth borrow was unsuitable for embankment fill. His expert's opinion is that the material is too wet for compaction in any weather, and that it is "impervious". The latter, according to the Contractor, was proved by the fact that he was able to resume grading operations after showers much sooner than normally possible which, he believed, was caused by the material being singularly unaffected by moisture from the outside.

When Mr. Tregaskes pointed out that up to the time of suspension of grading operations the scheduled quantity had been exceeded, the Contractor contended that this was achieved because of the efficiency of his grading crew, that he was skimming the cream of the available earth borrow and that this had increased his cost of operations.

The Contractor further stated that the soils information from the D.H.C. had indicated excavation in sand whilst, in fact, clay layers were encountered, so far, at two elevations. Mr. Schonfeld pointed out that in the soils profile, a large proportion of the cut is described as "sand with excessive fines". Pockets of clay (of low plasticity and high moisture content) are shown in the borehole logs attached to the profile.

Mr. Panter suggested that the encountered clay strata could have been more efficiently incorporated in the preponderantly sandy cut material by cutting on a slope instead of horizontally. To this the Contractor replied that the soft clay strata seemed to be of irregular shape and probably sloping themselves. Detailed soils borings are at present in progress. These will assist in defining the slope of intermittent layers.

Mr. Panter further suggested that the possibility of draining the central portion of the proposed S.W. channel be investigated. This would enable the Contractor to proceed with the channel excavation which can be carried out most advantageously in winter. This will be explored immediately.

Mr. Nixon drew attention to the fact that grading operations in the material in question were carried out at the end of the season and were frequently interrupted by periods of wet weather. The total working days were 87 out of which 28 were rained out. It is obvious that the weather contributed to the Contractor's difficulties.

A further meeting will be held as soon as the additional extensive borings, now in progress, are completed. This will be in about two weeks' time.

RS/hl

c.c. H. Greenland,
R. Panter,
L.R. Radic,
H.C. Nixon,
A. Sternac,
Files.


R. Schonfeld,
Project Soils Engineer.

February 4th, 1963.

Hwy. #403, Contract #62-109, S.W. Channel
Excavation and Earth Borrow, Detailed Soils
Investigation with Continuous Sampling.

Purpose of Investigation.

Borings were carried out in the two cut section in which about 30' remain to be excavated. In the larger cut (Stations 19+00 to 27+00) up to 50' had been taken off to-date, and in the smaller cut (stations 40+00 to 43+00) up to about 20' had been taken off.

Questions to be answered are:

- (a) What kind of material will be encountered in the remaining cut?
- (b) Will the excavated material be suitable for embankment construction?
- (c) Will soft clay layers be encountered? What is their thickness and their slope? Can they, by cross-cutting, be mixed with the cut material above and below, to provide acceptable borrow?
- (d) Will drainage trenches reduce the moisture of wet material that will be encountered?

Investigation.

One boring rig was operating on two days (January 10 and 11) and two boring rigs on five days (January 14 to 18, 1963). The weather was cold, with temperatures between 10 and 20°F.

Pondrills were used. Samples were taken by Split Spoon, and BK casing had to be used in all but three boreholes.

Sampler was practically continuous, one 18" sample being taken every two feet.

11 boreholes, each 30' deep, were made. 160 samples were taken and laboratory tested. Each sample was inspected in the field, and apparent moisture (dry, moist or wet), plasticity, dilatancy and number of blows on a split spoon were recorded. Plasticity indices, grain size distribution (hydrometer or sieve analyses) and field moistures were determined in the laboratory. All data are shown on the enclosed profile.

Materials in Remaining Cut.

Stations 19/00 to 27/00: Silty Clay, Clay Silt and Silt, all of low plasticity, in individual layers 2' to 6' thick, extend from the present cut elevation down to a depth of 6' to 12'. The Liquid Limit is generally between 16% and 26% and the Plasticity Index is around 6%, the lowest being 1.7% and the highest 9%.

The field moisture content varies a great deal. Although the liquidity of the material is in some cases zero (i.e. the moisture is below the Plastic Limit), it is in other instances 1.0% (i.e. above the Liquid Limit). It should, however, be born in mind that often only one or two percentage points of moisture separate this material at its wet consistency from a dry consistency. In most cases the liquidity appears to be over 50% (i.e. nearer the L.L. than the P.L.).

Hydrometer analyses show that these materials contain some 50% to 70% very fine sand and silt.

Silty Sands, Fine Sands and non-plastic sandy silts extend from 6' to 12' below the present surface to a depth of about 30' (end of proposed excavation), and are also present between the above mentioned clay layers.

The very fine sand and silt content of the silty sands and sandy silts varies from 35% to 83%.

The field moisture content varies from 10% to 26%.

Stations 40/00 to 43/00: Silty Clay, Clay Silt and Silt, all of low plasticity, as described before, make up most of the remaining cut.

Silty sands, Fine Sands and non-plastic sandy silts occur in tapered seams of up to 8' in thickness.

Suitability of Earth Borrow from Remaining Cut.

The "Engineering use chart" of the U.S. Bureau of Reclamation lists silty sands and poorly graded sand-silt mixtures as "fair" with regard to workability as construction material. Inorganic silts and very fine sands, silty or clayey fine sands with slight plasticity are also listed as "fair." Inorganic clays and silty clays of low plasticity are listed as "good to fair".

With the exception of the exposed top foot or two and of the Soft Clay layers mentioned in the following paragraph, the silty clays and clayey silts have a moisture content of between zero and about five percent above the Plastic Limit. The optimum moisture for maximum Proctor dry density for this material is about 1% lower than the P.L. On this basis, it is assumed that, following the Proctor curve, not more than 90% to 92% of maximum dry density will be obtained at the in-situ moisture content. Under drying weather conditions this percent compaction can certainly be bettered.

Presence of Soft Clay Layers.

Stations 19+00 to 27+00: A soft silty clay layer, 2' to 4' thick is located between Stations 22+30 approx. and 25+50 approx., at a depth of about 2' to 4' below the present elevation. This seam is horizontal and tapers down in the direction towards Station 25+00. It may amount to about 1500 c.y. (300' x 90' x ave. 1'6"). The materials below this soft clay, to a depth of over 20', are silty sands and sandy silts which are above optimum moisture and blending of the clay with the silty sand does not appear to be advisable. The soft material may have to be wasted unless, of course, particularly warm weather brings down the moisture content by two or three percentage points.

There was no further evidence, from the split spoon penetration resistance, of soft clay in this cut section.

Stations 40+00 to 43+00: Nowhere in this section was the split spoon penetration resistance less than 7 blows per foot as compared with 4 blows which is taken as indication of soft clay. However, clay pockets of a high moisture content will be encountered during excavation in thicknesses of 2 to 3 feet (latter is located at Station 42+00, 50' St. of centerline). The excess moisture over optimum in these clay pockets is 6 to 7% which, for a low-plasticity clay, is considerable. The possibility cannot be excluded that some of this material will be difficult to excavate by scrapers and also difficult to place in fill, and that it may have to be wasted. These pockets cannot be delineated from the borings and the quantity involved is only roughly estimated at about 1500 c.y. of waste material (300' x 100' x 2' thick).

Feasibility of Drainage Trenches.

Stations 19/00 to 27/00: Down to approx. 12' below the present cut elevation the soils are of low permeability and a deep cut-off trench would probably not materially assist in draining the sandy silts and low plasticity clays. It is, of course, good practice at all times to have a shallow trench, say 3' deep, on the up hill side of a sidehill cut in order to prevent access of surface water to the cut material. This is particularly called for when dealing, as in this case, with materials of very low plasticity.

When the excavation proceeds beyond 12' below the present cut elevation, a deep cut-off trench in the free-draining sandy material will be needed.

Stations 40/00 to 43/00: Sandy seams are sandwiched between clay layers. Trenching of the sand layers is advisable, the depth of the cut-off trench depending on the thickness of the sand seam.

Summary and Recommendations.

- (1) The soils in the two cut locations, Station 22 $\frac{1}{2}$ and Station 42 $\frac{1}{2}$ cannot be adequately compacted at a moisture content exceeding their in-situ moisture. Fill operations should, therefore, be carried out in favourable weather, i.e. in late spring, summer and early fall.
- (2) Judicious trenching, especially of sandy seams in these sidehill cuts, to assist in the draining of the cut material is necessary.

RS/h1

c.c. H. Tregaskes,
R. Panter,
L.R. Radie,
H.C. Nixon (2),
T.J. Kovich (2),
Files.

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



ONTARIO
DEPARTMENT OF HIGHWAYS

60-F-14

Memo to Mr. A. Stermac, Date September 7th, 1962.
Principle Foundations Engr. Subject Hwy. #403, Contract #62-109,
From R. Schonfeld, Pre-loading of temporary
30" C.I.P. Sewer.

This sewer crosses Ramp "G" at Station approx. 15+00 and the Main Lanes at Station approx. 430+10. The height of fill embankment over the sewer is 30' (2/3 of which is slag) at Ramp "G" and 6' at the Main Lanes.

The predicted settlement is 2'6" under Ramp "G" and 1'6" under the Main Lanes.

This 30" C.I.P. will be replaced in the next (paving) contract by an encased pressure concrete pipe.

The present understanding is that the temporary C.I.P. is to be pre-loaded. This entails trench excavation through a high embankment.

The 30" C.I.P. will replace an existing 24" diameter City of Hamilton sewer. Since the C.I.P. is only a temporary measure, it is here suggested that the preloading need only apply to the future permanent drain and that the temporary drain should be cambered 20" under Ramp "G" and 12" under the Main Lanes.

Would you agree?

RS/hl
c.c. T.J. Kovich (2),
Files.

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

The above proposal seems to be logical and should be carried out. 1.6" of settlement under 6' of fill doesn't make sense and the figure should be revised. The whole cross section should be drawn and cambering decided upon. Care should be taken because the catch basin in the middle (between the main lanes and ramp E) is also going to settle.
Discussed with R. Schonfeld *Sep. 11, 1962* *A. J. Stermac*

September 5th, 1962.

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

Attention: Mr. D. Patterson.

Dear Sir: Re: Hwy. #403, Contract #62-109,
 Slope Failure North of Box
 Sewer Outlet.

On Friday, August 24th, a slide occurred on the approx. 15' high west slope of the open channel section. It seems that it was caused by intense seepage with erosion of a sandy silt stratum in the lower half of the slope.

The following recommendation was made in the field on Monday, August 27th:

1. Remove material from existing slope below crack directly north of the slide, where a state of incipient failure exists.
2. Widen berm, proceeding in a northerly direction, to enable truck access to failure area.
3. Excavate and remove fallen material.
4. Simultaneously with (3) form new slope using a coarsely graded G.B.C. Class "B" or, if obtainable, a coarse Sand Cushion.
5. Ensure that the slope during construction is not steeper than the specified 2:1 with berm.
6. The min. thickness of Sand Cushion under the concrete lining to be increased from 6" to 12" in order to ensure the presence of filter media throughout the rough surface.

.../2

The failure area will be kept under observation for signs of weakness at the base of the slope. Should heaving occur inside the channel during the slide removal, operations should be stopped immediately. In this event, it will be necessary to unload the present slope by reducing its height within the right-of-way, and detailed recommendations will be issued.

RS/hl

c.c. J.C. Thatcher,
A. Stermac, ✓
T.J. Kovich (2),
Files.

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

R. Schonfeld

July 30th, 1962.

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

Attention: Mr. C.K. Moulson.

Dear Sir: Re: W.P. #140-57-1, Pile Foundation
 to Wingfalls, Box Culvert #2 & #3.

At your request, the required length of 12" ϕ friction timber piles was calculated by Mr. M. Devata of the Foundation Section. Applicable soils data are those of Boreholes #63 and #65 in Foundation Report W.J. 60-F-14 for the proposed Box Culvert (West Hamilton Storm Sewer).

For a design load of 15 Tons p. pile the driven length would have to be 40 feet.


A design load of 11 Tons p. pile will require a driven length of 27 feet.

Timber piles above ground water level should, of course, be treated.

Yours truly,

RS/hl

c.c. A. Stermac,
T.J. Kovich (2),
Files.


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

Materials and Research Section

November 28, 1960.

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

Attention: Mr. J. E. Disbar.

Re: Foundation Investigation,
Proposed West Hamilton
Storm Sewer, District 4.
W.P. 231-58-2, W.P. 231-58-3
W.P. 140-57-1, W.J. 60-7-14.

Dear Sir:-

This letter accompanies our formal report containing the factual data obtained from the results of field and laboratory work carried out in this investigation.

All the details contained in this report have been discussed with you during the progress of the job, and have been considered in your design to date.

If you have any questions pertaining to the data presented in this report, we would be pleased to discuss them with you.

Yours very truly,

L. G. Fodderman

L. G. Fodderman,

Principal Foundation Engineer

WJF/MSF

Attach.

cc: C.C. Parker & Assoc. (3)

A. E. Teye (2)

R. A. Irogaskas

T. G. Macsey

I. C. Campbell

E. W. Richardson

C. C. Levich

A. Watt

Foundations Office

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FOUNDATION INVESTIGATION

For

West Hamilton Storm Sewer,
Hwy. Chedoke Expressway,
Dist. #4, W.J. 60-F-14(A),
W.P.140-57-1; 231-58-2&3.

1. INTRODUCTION:

A detailed subsoil investigation was carried out for the location of the West Hamilton storm sewer in conjunction with the proposed expressway. This project requires construction of a series of open channels and culverts.

Numerous borings were carried out in order to determine the subsoil conditions existing at the site of the proposed culverts and the open sewer. Results of this investigation carried out by the Dept. of Highways and also by E. M. Peto & Associates are included in this report. Drawing No. 60-F-14 (B) showing the details of the subsoil stratigraphy is included in this report.

The proposed west Hamilton storm sewer generally runs parallel to the new expressway. The west portion of this project is located on the low grounds of the meandering Chedoke Creek, and the east portion on undulating ground on the west side of the Hamilton city dump.

The recommendations for the solution of various problems in connection with the sewer construction as well as culverts are contained in this report.

Cont'd /2 ...

2. DESCRIPTION OF SITE & GEOLOGY:

The eastern portion of this project is located on gently undulating ground which also contains a number of Steep-sided Valleys, generally covered with hardwood trees. The western portion of the site generally hilly and is intersected by several Steep-sided ravines. The general area of this section is geologically known as the "Iroquois plain".

3. FIELD & LABORATORY WORK:

In order to obtain sufficient information on the types and properties of the subsoil, sampled boreholes supplemented by the same number of dynamic cone penetration tests were carried out. The density of cohesionless material was determined in the field by means of the Standard penetration test. Samples recovered in the split spoon were used for classification purposes. In cohesive organic and inorganic clay, 2" \varnothing thin-walled Shelby tube samples were taken at required depths. In all cases the Shelby tubes were pushed by hand. In addition, wherever possible, in-situ vane tests were carried out in order to determine the field shear strength values of both organic and inorganic clay deposits. Tests were carried out in the Laboratory on selected representative samples to determine:-

- 1) Moisture Content.
- 2) Natural Density.
- 3) Atterberg Limits.
- 4) Undrained Shear Strength.

3. FIELD & LABORATORY WORK: (Cont'd) ...

Laboratory and field test results have been summarized in Table #1 and are included under Appendix I. The location of the boreholes is shown on Drawing No. 60-F-14 (B).

4. SUBSOIL CONDITIONS:

4.1 General.

A detailed description of the various soil types encountered in each boring is shown in Appendix I of this report. The estimated stratigraphical profile of Drawing No. 60-F-14 (B) is based upon this information. In order to make it simpler, the profile was subdivided into three convenient portions and described in detail.

4.2 Stratigraphy of Subsoil between Sta. 10+00 and Sta. 49+75.

The subsoil stratification mainly consists of the following:

Fill material (ashes, cinders and sand)

Organic silt-clay

Sand with excess of fines

Clay of low plasticity and silt with fine sand

4.2.1 Fill Material.

This material was observed in various portions of this site, especially in the floor of the Valleys. These valleys once were covered with swamps or streams and were later filled with fill material such as ashes, cinders, decomposed refuse and sand. This material extends below ground level in borings 6, 7, 8, 605, 607 & 609, with an average thickness

Cont'd /4 ...

4.2.1 Fill Material. (Cont'd) ...

of 10ft. These deposits are generally loose with an average penetration resistance of 3 blows/ft. The laboratory tests indicate that the moisture content varies from 34% to 75%.

4.2.2 Organic silt clay.

Generally this deposit is covered by the fill material, whereas in B. H. #9, 13, 510 & 512 the organic silt-clay was found at the ground surface. Some of the boreholes carried out in the low lying areas did not reveal any organic matter. (B.H. #2, 3, 5, 7, 11, 12 & 606).

The top layers are generally of organic silt of low plasticity containing large amounts of silt and fine sand, while the bottom layers consist primarily of organic clay of high plasticity. These deposits occasionally contain fragments of partially decayed wood. The consistency of organic silt of low plasticity is soft, whereas that of the organic clay of high plasticity varies from soft to medium stiff. Values of some of the physical properties of the organic clay of high plasticity as determined from the field and laboratory tests are as follows:

Moisture Content = 34% - 194%

Liquid Limit = 62% - 287%

Plastic Limit = 36% - 185%

Shear Strength (in-situ vane) = 400 - 640 p.s.f.

4.2.3 Sand with excess of fines.

Natural deposits of sand with excess of fines extend in depth below the organic clay stratum in most of the borings, whereas boreholes carried out on the ridges overlooking the plains, indicate

Cont'd /5 ...

4.2.3 Sand with excess of fines. (Cont'd)...

that the natural sand deposits are found at the surface. Occasional seams of silt with fine sand or well graded sand were observed in these deposits. Pockets and layers of clay, silt and sand were observed between Elev. 266.0 to 257.0 in B. H. #12. Boreholes carried out on the low side of the Valley indicate that this deposit contains some organic matter in the top layers. The density of this material varies from Loose to Dense, the moisture content from 12% to 30%, and the penetration resistance from 2 blows/ft. in the loose deposits to a maximum of 120 blows/ft. in the dense material.

4.2.4 Silt with fine sand and clay of low plasticity.

These deposits were encountered immediately below the stratum of organic silt-clay or sand in most of the boreholes. Non-cohesive deposits of silt with fine sand were observed in borings carried out between Sta. 10/00 and Sta. 28/00, whereas the cohesive deposits of clay of low plasticity were observed between Sta. 29/00 and Sta. 49/00 of the proposed sewer.

The density of silt with fine sand deposits varies from medium dense to dense i.e., the penetration resistance varies from 18 to 54 blows/ft.

The consistency of the clay of low plasticity is medium stiff to very stiff.

Cont'd /6 ...

4.2.4 Silt with fine sand and clay of low plasticity. (Cont'd)...

Some of the values of the physical properties of this material are as follows:

Natural Unit Weight	125 - 131 p.s.f.
Moisture Content	17% - 23%
Plastic Limit	12% - 19%
Liquid Limit	23% - 34%
Shear Strength (in-situ vane tests)	1400 p.s.f. to >2000 p.s.f.

4.3 Stratigraphy of Subsoil between Sta. 49+75 and Sta. 100+18.

In this section, only a limited number of borings were carried out in order to determine the subsoil conditions at various culvert locations. Therefore it is not possible to describe the subsoil conditions for the entire site except at specific locations as described below:-

4.3.1 Subsoil conditions @culvert location between Sta. 49+75 and Sta. 62+00.

The stratigraphy of subsoil generally consists of the following:

Fill material

Organic silt-clay of low to Intermediate plasticity

Inorganic clay of low plasticity

4.3.1.1 Fill material.

This material covers almost the entire site and extends to a depth of 22 ft. at B.H. #17 but decreases in thickness to zero in B.H.#20.

Cont'd /7 ...

4.3.1.1 Fill material. (Cont'd)...

This deposit consists of an irregular mixture of sand, gravel, ashes, rubble and organic matter. In B.H. #20 this deposit was not encountered. Here the top layer below the ground surface consists of clay of low plasticity with organic matter, and the consistency, in general, is medium stiff.

The density of the fill material is generally loose and its moisture content varies from 13% to 58%.

4.3.1.2 Organic Silt-clay of low to Intermediate plasticity.

Immediately below the fill material in B.H. # 17, 18 & 19 and below the clay with organic matter in B.H.#20, the deposits of organic silt-clay of low to intermediate plasticity were encountered. In B.H. #18, 19 & 20 the material is generally organic silt of low plasticity whereas in B.H. #17 it is predominantly organic clay of Intermediate plasticity. These deposits have some fine sand and fragments of decayed wood.

In general, the consistency of these organic deposits of low to intermediate plasticity varies from soft to medium stiff.

4.3.1.3 Inorganic clay of low plasticity.

This material immediately underlies the organic silt-clay deposits in all the borings. In B.H. #19 a thin pocket of sand and gravel of medium density was encountered in between the layers of organic and inorganic clay. Occasional pockets of sand were also observed in these deposits. The consistency of the clay of low plasticity is generally medium stiff to stiff in the upper layers and increases to

4.3.1.3 Inorganic clay of low plasticity. (Cont'd)...

very stiff in the lower layers. Values of the physical properties of this deposit are as follows:

Natural Moisture Content	26% - 32%
Natural Unit Weight	125 p.c.f.
Liquid Limit	28% - 32%
Plastic Limit	14% - 18%
Shear Strength (in-situ vane)	960 - 1920 p.s.f.

4.3.2. Subsoil conditions for various culvert locations between Sta. 82+50 and Sta. 100+00.

The stratigraphy of the subsoil is generally as follows:

Clay with organic matter

Alluvial deposits - clay, sand and gravel

Clay of low plasticity

Shale bedrock

4.3.2.1 Clay with organic matter.

This material covers most of the site and is about 4' in thickness. It consists of clay of low plasticity with a high content of partially decayed vegetation. In B.H. #68 & 69 (not shown on the profile but which were carried out for the culvert location which crosses the expressway at Sta. 449+50) this material reaches a maximum depth of 14.0'. The consistency of this deposit is generally soft to medium stiff and it is red in colour. Boreholes #61, 62 & 66 do not indicate any presence of organic matter.

Cont'd /9 ...

4.3.2.1 Clay with organic matter.

Some of the physical properties of this material are given below:-

Natural Unit Weight	118 - 123 p.c.f.
Natural Moisture Content	26% - 33%
Plastic Limit	19% - 23%
Liquid Limit	32% - 44%
Shear Strength (in-situ vane)	400 - 1000 p.s.f.

4.3.2.2 Alluvial deposits-clay, sand & gravel.

This material is about 1.5 ft. in thickness and underlies the red clay with organic matter. It consists of irregular deposits of clay, gravel and sand mixtures, and presumably has been deposited in an old river or stream bed.

4.3.2.3 Clay of low plasticity.

This material covers the entire site and lies directly beneath the alluvial deposit of clay, sand and gravel. In B.H.#61 the thickness of this material is about 45' and in B.H.#64, it is approximately 50' thick. In other locations the actual thickness is not known as boring operations were not continued right through this stratum. The shear strength of this material increases with depth from the top for a distance of about 30', from then on it decreases. This phenomenon is probably due to the presence of an artesian head on the

4.3.2.3 Clay of low plasticity. (Cont'd)...

surface of the bedrock located in B.H.#61 & 62. Some of the physical properties of this material are as follows:

Natural Density	125.0 - 135.0 p.c.f.
Natural Moisture Content	20% - 28%
Plastic Limit	16% - 18%
Liquid Limit	29% - 30%
Undrained Shear Strength	400 - 1920 p.s.f.

4.2.2.4 Bedrock.

The shale bedrock was encountered immediately below the deposits of clay. It was drilled and proved as sound shale only in borings # 61 & #62.

4.4 Stratigraphy of Subsoil between Sta. 100+18 Sta. 133+00.

In this portion the borings were limited, because the outcrop of shale bedrock could be seen at most of the locations. All the boreholes except B.H. #701 & #702 indicate the presence of shale bedrock at very shallow depth, approximately 3 to 4 ft. below the ground surface. The overburden material is clay of low plasticity and its consistency varies from very stiff to hard. It contains a high percentage of fragmented shale.

Borings were not carried beyond Sta. 116+00 (E of channel), but the information available from the subsoil investigation for the proposed underpass T.H. & B Railway (59-F-109) was used in order to determine the bedrock elevations in this portion.

Cont'd /11 ...

4.4 Stratigraphy of subsoil between Sta. 100/18 & Sta. 133/00. (Cont'd)...

B.H.#702 (@ Sta. 105/00 of channel) was somewhat different from other borings. This borehole was advanced to 44 ft. and even at this depth, bedrock was not contacted. The stratigraphy of the subsoil at this portion consists of the following:

0'-4.0'	Organic silt of low plasticity.
4.0'-10.0'	Clay of low plasticity with organic matter and gravel.
10.0'-44.0'	Clay of low plasticity.

The consistency of the organic silt of low plasticity is medium stiff, whereas, the consistency of the clay of low plasticity with organic matter, is stiff. From 10.0' below surface the clay deposit does not contain any organic matter. The consistency of the clay of low plasticity varies from soft to medium stiff. Some of the physical properties of this material is as follows:

Natural Moisture Content	23% - 30%
Natural Unit Weight	123 - 130 p.c.f.
Liquid Limit	26% - 31%
Plastic Limit	15% - 17%
Undrained Shear Strength	430 - 800 p.s.f.

In order to determine the stability of the slopes of the cuts of the channel, a boring (B.H.#701) was carried out. The clay deposit is generally of low plasticity and its consistency varies from medium stiff to hard.

5. GROUND WATER OBSERVATIONS:

Water level observations were taken in each boring as the

5. GROUND WATER OBSERVATIONS: (Cont'd)...

work progressed and the water level recorded at the end of the boring, and also, some fourteen days after. They are shown in Appendix #1 of this report.

Due to the extreme length of this project, it is very difficult to describe the ground water conditions over the entire area and so these were described for each portion.

5.1 Channel Sta. 10/00 to Sta. 49/75.

In this portion up to channel Sta. 20/00, all the borings were carried very close to the existing sewer. The water level in the open sewer at the time of investigation was approx. at elev. 244.7 and it is assumed to be the water table in this portion.

Between Sta. 20/00 to 49/75 most of the borings were carried on the high side of the steep-sided valleys. Ground water observations indicate that the water table is approx. at Elev. 256.0 to 258.0.

5.2 Channel Sta. 49/75 to 100/18.

Several borings carried out between King and Main Streets at the location of the proposed culvert (Sta. 49/75 to Sta. 62/00) indicate that the ground water level is approx. at Elev. 261.0 to 268.0. Neither artesian nor water-bearing sand seams were encountered in this portion.

Between channel Sta. 62/00 to Sta. 100/18, most of the borings were carried out in the bottom of the Valley, and the ground is

5.2 Channel Sta. 49+75 to 100+18. (Cont'd)...

saturated to within a few inches from the surface; consequently, the elevation of the water in a small creek which flows through the area is assumed to be the water table in that location. An artesian head was encountered in B.H.#61, #62 and #64 just about bedrock elevation and a flow of water of about 20 gallons per minute came out of the boreholes with an estimated head of about 25' above ground level. This, in all probability, accounts for the low shear strength of the lower clay stratum. The presence of this artesian head is not likely to cause any construction problems, as no excavations to bedrock will occur. Shallow excavations in the upper clay layers should present no significant dewatering problems owing to the relative impermeability of the material.

5.3 Channel Sta. 100+18 to Sta. 129+00.

Due to the relative impermeability of clay stratum, precise ground water levels were not established. However, it is quite safe to assume the ground water table will be the same as the creek in this vicinity.

6. DISCUSSION & RECOMMENDATIONS:

6.1 General.

The drawings submitted by C. C. Parker indicated that the proposed sewer ends with chainage 10+00, and begins with chainage 129+00. Therefore the discussions and recommendations will follow the same order.

6.2 Sewer between Sta. 10+00 to Sta. 49+75.

6.2.1 Channel from Sta. 10+00 to Sta. 15+00.

The Consulting Engineers' drawings indicate a new alignment between Sta. 10+00 and Sta. 15+00, which requires filling the existing open sewer and also excavating another channel very close and parallel to the existing sewer. It is therefore recommended to follow the existing sewer within this portion. This will require shifting the proposed Service Rd., so that there will be a minimum clearance of approx. 75 ft. between the Service Rd. and open sewer. This recommendation will confirm the earlier proposal made by our engineers to the Consultant.

6.2.2 Between Sta. 15+00 and 18+00.

The proposed sewer will be located very close to the existing one. Subsoil investigation in this vicinity indicates the presence of a soft organic silt-clay stratum which extends approximately 10 ft. below the invert elevation of the proposed sewer. It is recommended that the soft material at the top, approximately 3 to 4 ft., shall be excavated and backfilled to the required grade with acceptable earth borrow.

The materials excavated in this section of the sewer do not comply with the D.H.O. Standard requirements for earth borrow and must not, therefore, be used as fill material.

In this portion the water table is slightly higher than the invert elevation of the proposed channel. The seepage into the channel excavation will vary with seasonal precipitations prior to and during the construction period. Shoring and dewatering operations

6.2.2 Between Sta. 15/00 and 18/00. (Cont'd)...

would seem to be necessary during construction.

6.2.3 Sta. 18/00 to Sta. 49/75 of the proposed sewer.

Due to the presence of a Med. Dense to Dense stratum of sand within the invert elevation of the proposed sewer, no excavation problems are anticipated. A thin layer of organic silt-clay was encountered in B.H.# 6, 8 & 9 at elev. 226.0 and above. It is understood that the invert elevation of the proposed sewer will be within this material in the vicinity of Sta. 36/00 & Sta. 46/00. Excavation should be carried below the organic material from approx. Sta. 36/00 to Sta. 37/00 and also from approx. Sta. 45/00 to Sta. 47/00 and should be backfilled with acceptable earth borrow to the required grade.

Seepage inflow in this portion could be readily handled by low capacity pumps.

The excavated material from Sta. 18/00 to Sta. 49/75 excluding the deposits containing organic matter, can be used for earthfill.

6.2.4 Culvert between Sta. 26/00 and Sta. 27/00.

The invert of the culvert will be within dense stratum of sand. In view of this fact it is not anticipated that any major construction problems will occur in connection with the above-mentioned box culvert. However, some seepage inflow during trench excavation can be anticipated, but it could be controlled by ordinary pumping methods.

6.3 Sewer from Sta. 49+75 to Sta. 100+18.

In this portion numerous culverts have to be constructed and this leaves only a small length of channel construction. The recommendations associated with the proposed channel are given below.

6.3.1 Channel for the sewer between 62+00 to 98+00.

At the invert elevation of the proposed sewer the subsoil consists mainly of fill material (ashes, cinders & sand) or clay of low plasticity with organic material. No major excavation problems are anticipated. Seepage inflow during channel excavation will be of a minor quantity and could be readily handled by low capacity pumps.

In order to determine the stability of the cuts of the proposed channel with side slopes of $1\frac{1}{2}:1$ three boreholes (B.H.#51, 52 & 53) were drilled on the top of the cuts. The proposed $1\frac{1}{2}:1$ side slope for the right side of the channel extends from Sta. 65+00 to 74+00 approximately and also in the vicinity of Sta. 78+00. The borings carried out between Sta. 65+00 to 74+00 indicated that the subsoil consists of 6 to 10 ft. of granular fill material followed by sandy silt or sand which is Med. Dense to Dense. In the vicinity of Sta. 78+00 the subsoil consists of clay of low plasticity and its consistency is hard. Therefore no stability problems for the proposed $1\frac{1}{2}:1$ side slopes can be anticipated.

6.3.2 Culvert between Sta. 49+75 to Sta. 62+00.

The subsoil at the invert elevation of this culvert consists of fill material of ashes, cinders and sand. This culvert

6.3.2 Culvert between Sta. 49+75 to Sta. 62+00. (Cont'd)...

will be situated partially under the proposed approach fill of the new main street. In view of this fact it is anticipated that some differential settlements will occur due to the above-mentioned approach fill. Settlement calculations indicate that the differential settlement between channel Sta. 59+90 and Sta. 61+00, i.e., below the middle and the end of the embankment will be in the order of 0.4 ft.

Due to the permeable nature of the subsoil and also of the presence of high water table, excessive seepage can be anticipated. Therefore it is recommended that preparations for the dewatering operations during construction be made.

It was already mentioned that the subsoil consists of granular fill material and therefore it is recommended that the side slopes of the excavation for the culvert be 1 horizontal to 1 vertical.

6.3.3 Culvert crossing the expressway @ Sta. 44+50.

In order to determine the properties of the subsoil at the location of the above-mentioned culvert two borings (B.H.#68 & #69) were carried out. In this area the clay of low to intermediate plasticity has a strength of about 700 p.s.f., which increases with depth. In view of this fact it is not anticipated that any major problems will be encountered during construction of the above-mentioned box culvert. Problems associated with the embankments are discussed in separate reports.

6.3.4 Three culverts crossing expressway at Sta. 469+10
E.B.L., 475+50 E.B.L. and Sta. 8+30 Ramp 'D'.

The dimensions of the proposed box culverts at the above-mentioned location are as indicated below:

Sewer Sta.	Expressway crossing	Size of culvert
Sta. 82+40 to Sta. 85+70	Sta. 469+10 (E.B.L)	2-12'x10'
Sta. 89+50 to Sta. 96+60	Sta. 475+50 (E.B.L)	18'x7'
Sta. 98+00 to Sta. 100+00	Sta. 8+30 (Ramp 'D')	16'x7'

In this portion seven sampled borings were carried out to determine the subsoil conditions. The subsoil conditions are generally very similar to that of the previously mentioned culvert location describer under 6.3.3 except in B.H.#61, 62 & 64. In these borings the shear strength of clay increases with depth from the top for a distance of about 30.0', from then onwards it decreases. This phenomenon is probably due to the presence of an artesian head on the surface of the bedrock. However, this will not effect the shallow excavation for the proposed box culverts. In this vicinity the ground water level was two to three feet below ground level and the excavation may not be dry but the slow seepage can be controlled by sump-pumps. At this location the embankment height varies from 16 to 40 ft. and the problems associated with stability are discussed in report 60-F-88.

6.4 Sewer between Sta. 100+18 to 129+00.

In this portion it is proposed to construct a channel from Sta. 100+18 to Sta. 120+50 and also from Sta. 123+00 to the end.

6.4 Sewer between Sta. 100/18 to 129/00. (Cont'd)...

This will also include construction of two box culverts, one at the expressway crossing @ Sta. 492/30 and the other between Sta. 120/50 to 123/00 of the channel.

6.4.1 Channel between 100/18 to 120/50 and 123/00 to the end.

Very few borings were carried out because of the presence of shale at a very shallow depth. The elevation of shale bedrock was not established in the vicinity of the channel between Sta. 100/18 to Sta. 108/00 but was determined in all the borings beyond Sta. 108/00. The subsoil at the invert elevation and above consists mainly of stiff clay or shale bedrock. The observed water table is below the invert elevation, and therefore no problems are anticipated for the channel excavation. In order to determine the stability of side slopes of the channel, between Sta. 100/18 and 104/50 B.H.#701 was carried out on the top of the proposed cut. At this location the top clay layers are generally medium stiff to stiff and as the depth increases the strength also increases. Therefore no stability problems are anticipated for the proposed cuts.

6.4.2 Culvert crossing expressway at Sta. 492/30.

The subsoil information obtained from the two borings (B.H.#703, 704) indicate that the shale bedrock is at approx. elev. 282.0 with a shallow overburden of hard clay with fragments of shale. No problems are anticipated for the above-mentioned culvert.

6.4.3 Culvert between channel Sta. 120~~50~~ to Sta. 123~~00~~.

No borings were carried at the above-mentioned culvert site but the bedrock elevations obtained for the subsoil investigation W.J.59-F-109 (T.H & B Railway structure) were used here. This indicates that bedrock is at approx. elev. 289.0, whereas the invert of the culvert is at approx. elev. 285.0. The invert of the culvert will be within shale bedrock, and no construction problems are anticipated.

7. SUMMARY:

Sewer from Sta. 0~~00~~ to 49~~75~~.

Channel alignment between stations 10~~00~~ and 15~~00~~ should follow the existing sewer which would also require shifting of the service Rd. towards the west to give a minimum clearance of approx. 75 ft. between the channel and the service Road.

Subexcavation of soft organic material for a depth of 3 to 4 ft. and backfilling with acceptable earth borrow shall be required from Sta. 15~~00~~ to Sta. 18~~00~~. Shoring and dewatering operations seems to be necessary during construction in this portion.

No excavation problems are anticipated from Sta. 18~~00~~ to 49~~75~~ however any pockets of soft material encountered from channel Sta. 36~~00~~ to Sta. 37~~00~~ and Sta. 45~~00~~ to Sta. 47~~00~~ should be subexcavated and filled with acceptable earth borrow. In this portion seepage inflow could be controlled by using low capacity pumps.

The box culvert between channel Sta. 26~~00~~⁵ to Sta. 27~~00~~

7. SUMMARY: (Cont'd)...

Sewer from Sta. 0+00 to 49+75.

will be within the dense stratum of sand and therefore no problems related to the culvert instalation can be anticipated.

Cross-sections @ Sta. 405+00, 414+00, 420+00 and Sta. 431+00 indicate that no stability problems should be anticipated due to the proposed excavation of the channel. Therefore it is recommended that the alignment of the proposed sewer from Sta. 15+00 to Sta. 49+75 should not be changed.

The excavated material from 18+00 to Sta. 49+75 excluding the deposits containing organic matter, can be used for earthfill.

Sewer from Sta. 49+75 to Sta. 100+18.

The invert elevation of the proposed culvert from Sta. 49+75 to Sta. 62+00 will be within fill material. The culvert from channel Sta. 59+00 to 61+00 will be under the proposed main street approach. Settlement calculations indicate that the differential settlements between Sta. 59+90 and Sta. 61+00, i.e. below the middle and end of the embankment will be in the order of 0.4 ft. In this portion excessive seepage can be anticipated and dewatering operations would seem to be necessary during construction. It is also recommended that the side slopes of the excavation for this culvert be 1 horizontal to 1 vertical.

No channel excavation problems are anticipated from Sta. 62+00 to 98+00. Seepage inflow during excavation will be of a minor quantity and could be readily handled by sump pumps.

Sewer from Sta. 49/75 to Sta. 100/18. (Cont'd)...

No stability problems are anticipated for the proposed 1½:1 side slopes for the channel from Sta. 65/00 to Sta. 74/00 and also in the vicinity of Sta. 78/00.

In this portion it is proposed to construct 4 box culverts and their locations with respect to Expressway are as follows:

Expressway Crossing		Size of the Culvert
Sta. 449/90	E.B.L.	10'x 6'
Sta. 469/10	E.B.L.	2-12'x 10'
Sta. 475/50	E.B.L.	18'x 7'
Sta. 8/30	Ramp 'D'	16'x 7'

At the above-mentioned locations embankment height are 8', 16', 8' and 40' respectively. Over most of this area the clay of low plasticity has a shear strength of 700 p.s.f. which increases with depth. In view of this fact it is not anticipated that any construction problems will occur in connection with the above proposed box culverts. It is anticipated that the upper 4.0 ft. of material will be removed during excavation for the culverts. Shallow excavations in the upper clay layers should present no significant dewatering problems owing to the relative impermeability of the material.

Sewer from Sta. 100/18 to Sta. 129/00.

No excavation problems for the channel can be anticipated due to the presence of shallow overburden of hard clay over shale bedrock.

Sewer from Sta. 100/18 to Sta. 129/00.

The two box culverts located one under the expressway at Sta. 492/30 and the other between channel Sta. 120/50 and Sta. 123/00 will not create any problems due to the presence of shale bedrock at the invert elevation of the proposed culverts.

8. MISCELLANEOUS:

The field investigation was carried out during the period of April to May 1960, under the supervision of Messrs I. Johnston, F. Norman, B. Ghadiali, K. Selby and M. Devata, Project Foundation Engineers of the Dept. of Highways. Part of the work was carried out using hired equipment from Johnston drilling company and Canadian Longyear Co. Ltd., and the remainder using the Dept. of Highways equipment.

Report prepared by: *M. Devata*
.....
M. Devata
Project Foundation Engr.

NOVEMBER, 1960.

Report approved by: *A. Stermac*
.....
A. Stermac
Foundation Office Engr.

APPENDIX I.

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 1

JOB 60-F-14

STATION 408+58 (160' Rt)

DATUM 286.0'

COMPILED BY B.K.

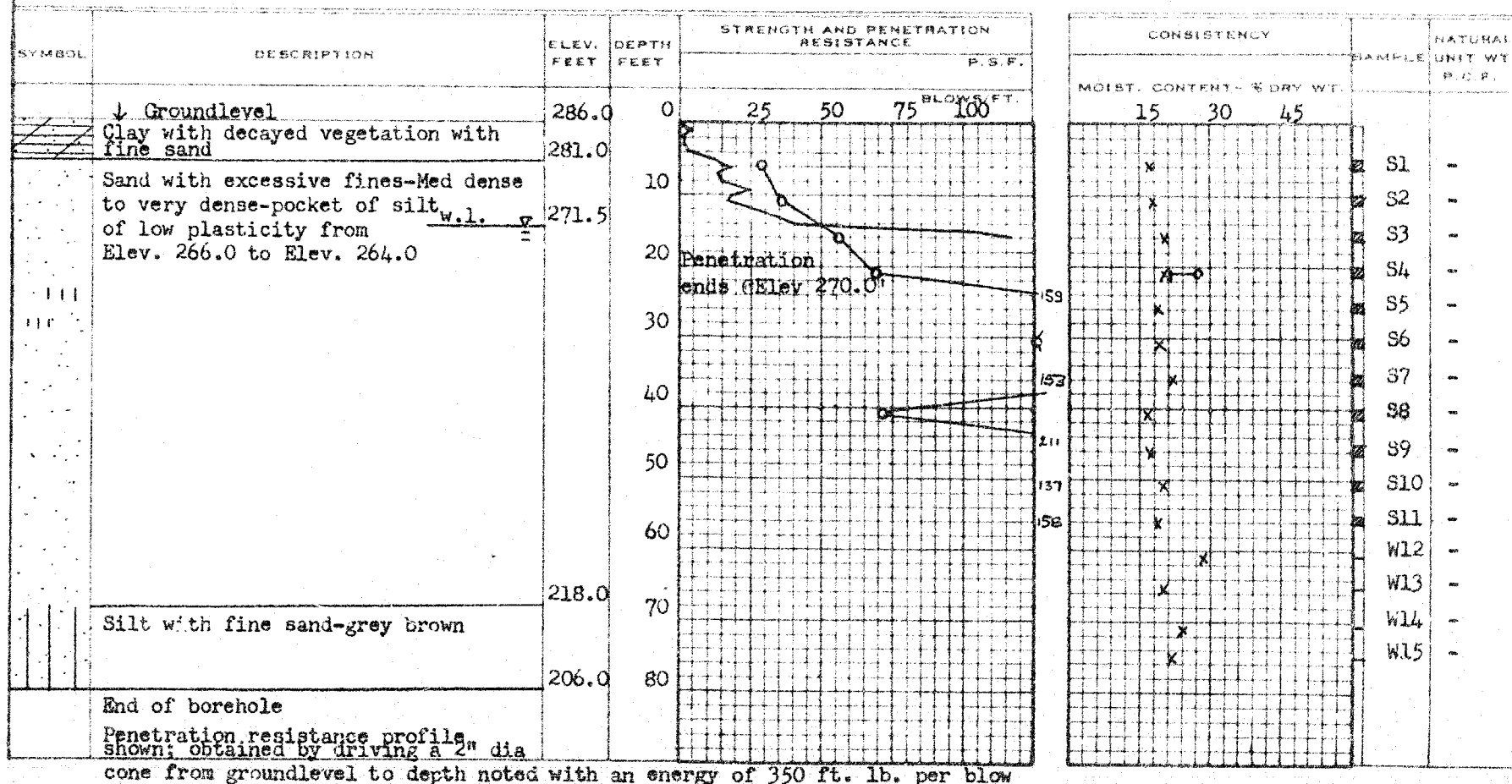
BORING DATE Mar. 30/60

CHECKED BY M.D.

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

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 2

JOB 60-F-14

STATION 410+70 (160' Rt)

DATUM 261.0'

COMPILED BY B.K.

BORING DATE Mar. 30/60

CHECKED BY M.D.

2" DIA. SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

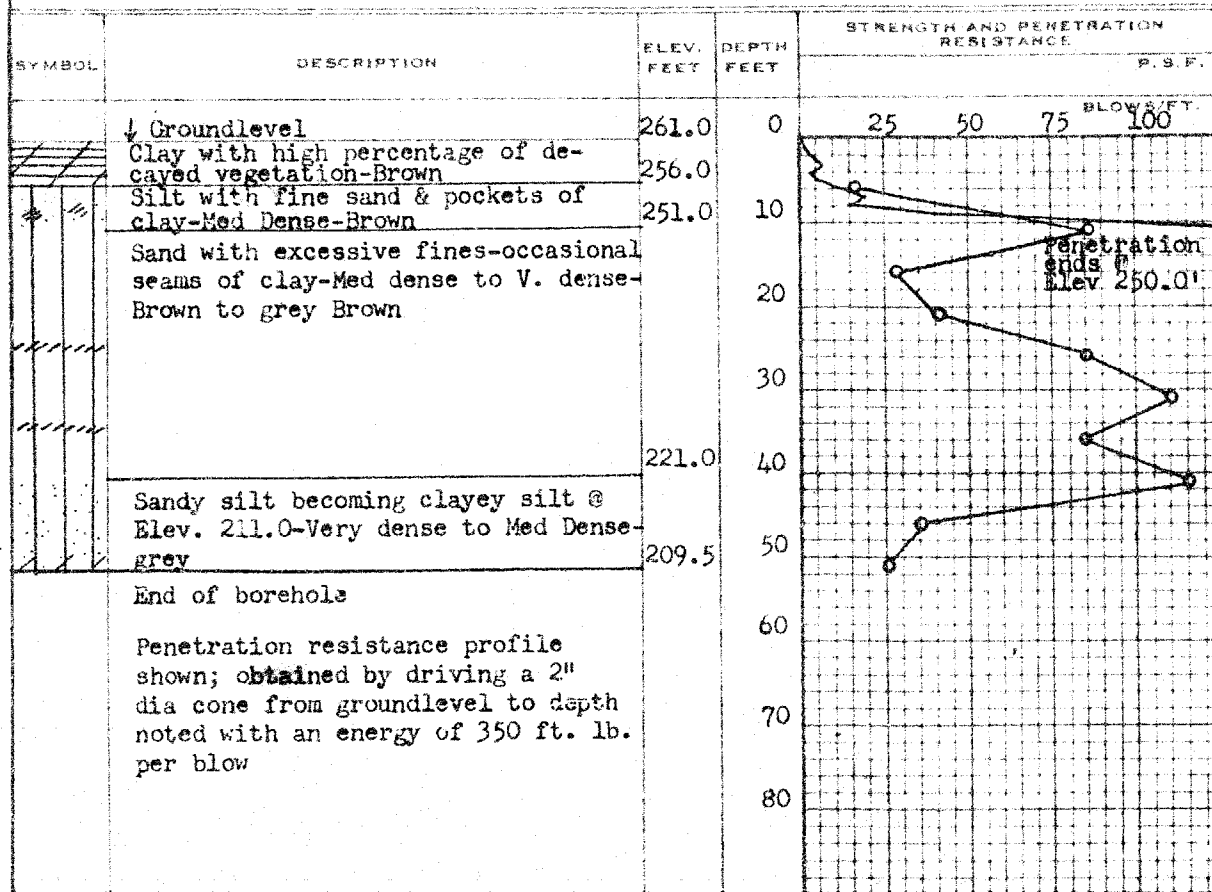
2" DIA. CONE

2" SHELBY

CASING

LEGEND

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



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

140-57-1

231-58-2

W. P. 231-58-3

BORE HOLE NO. 3

JOB 60-F-14

STATION 409#30(160' Rt)

DATUM 262.0'

COMPILED BY B.K.

BORING DATE Apr. 5/60

CHECKED BY M.D.

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

LEGEND

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

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE					CONSISTENCY			SAMPLE	NATURAL UNIT WT P.C.K.	
				500	1000	1500	2000	P.S.F.	MOIST. CONTENT	CLAY WL.				
	Groundlevel	262.0	0											
	Top Soil	260.0												
	Gravelly sand, well graded- loose Brown	w.l. ▽ 255.0 = 252.0												
	Sand with excessive fine-occasional seams of clay in the top layers- Med dense to V. dense-Brown to grey													
		214.0												
	Sandy silt with clay-Dense-grey	210.5												
	End of borehole													
	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													

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W. P. 231-58-3

BORE HOLE NO. 4

JOE 60-F-14

STATION 414+75 160' Rt

DATUM 251.0'

COMPILED BY B.K.

BORING DATE Apr. 11/60

CHECKED BY M.D.

2" DIA. SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2" DIA. CONE

2" SHELBY...

CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) _____ 0

VANE TEST(C) AND SENSITIVITY(S) +55

NATURAL MOISTURE AND

LIQUIDITY INDEX X

LIQUID LIMIT _____

PLASTIC LIMIT									
DATE	TIME	WIND	TEMP	HUMID	WIND	TEMP	WIND	TEMP	WIND
10/10/50	1400	10	65	75	10	65	10	65	10
10/11/50	1400	10	65	75	10	65	10	65	10
10/12/50	1400	10	65	75	10	65	10	65	10
10/13/50	1400	10	65	75	10	65	10	65	10
10/14/50	1400	10	65	75	10	65	10	65	10
10/15/50	1400	10	65	75	10	65	10	65	10
10/16/50	1400	10	65	75	10	65	10	65	10
10/17/50	1400	10	65	75	10	65	10	65	10
10/18/50	1400	10	65	75	10	65	10	65	10
10/19/50	1400	10	65	75	10	65	10	65	10
10/20/50	1400	10	65	75	10	65	10	65	10
10/21/50	1400	10	65	75	10	65	10	65	10
10/22/50	1400	10	65	75	10	65	10	65	10
10/23/50	1400	10	65	75	10	65	10	65	10
10/24/50	1400	10	65	75	10	65	10	65	10
10/25/50	1400	10	65	75	10	65	10	65	10
10/26/50	1400	10	65	75	10	65	10	65	10
10/27/50	1400	10	65	75	10	65	10	65	10
10/28/50	1400	10	65	75	10	65	10	65	10
10/29/50	1400	10	65	75	10	65	10	65	10
10/30/50	1400	10	65	75	10	65	10	65	10
10/31/50	1400	10	65	75	10	65	10	65	10

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE			
				500	1000	1500	P.S.F. 2000
	↓ Groundlevel	251.0	0	25	50	75	100
	Decomposed sanitary fill (ashes, sand, cinders)-Loose	250.5 246.0					BLOWS/FT
	Ashes, cinders with very high content of organic matter		10				
		229.0	20				
	Sand with excessive clay particles, fragments of wood-dense-grey Brown	224.0	30				
	Sand well graded-Dense-grey	218.0	40				
	Clay of low plasticity-Very stiff-grey		50				
		194.5	60				
	End of borehole		60				
	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		70				
			80				

Consistency

Moist Content - % Dry Wt.

15 30 45

NATURAL UNIT WT P.C.P.	SAMPLE	DEPTH
-	S1	0
-	S2	1
-	S3	2
-	S4	3
-	S5	4
-	S6	5
-	S7	6
129	T8	7
120	T9	8
-	S10	9
131	T11	10

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 5

JOB 60-F-14

STATION 413+15 (160' Rt)

DATUM 262.0'

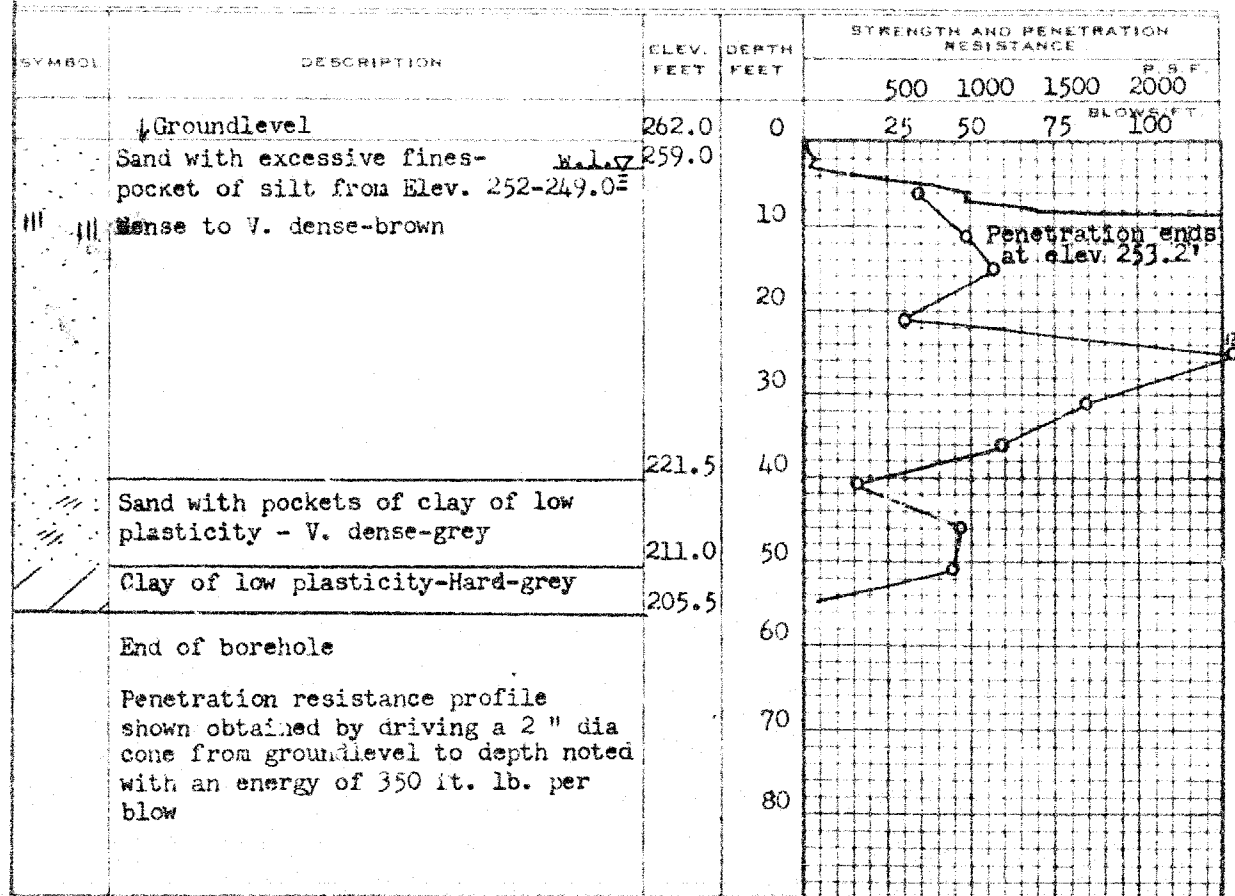
COMPILED BY B.K.

BORING DATE Apr. 12/60

CHECKED BY H.D.

LEGEND

1/2 UNCONFINED COMPRESSION (QU) \bigcirc
VANE TEST (C) AND SENSITIVITY (S) \times
NATURAL MOISTURE AND
LIQUIDITY INDEX \sim
LIQUID LIMIT \sim
PLASTIC LIMIT \sim



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	-
			T11	131

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 6

JOB 60-F-14 STATION 416+50 (150' Rt.)

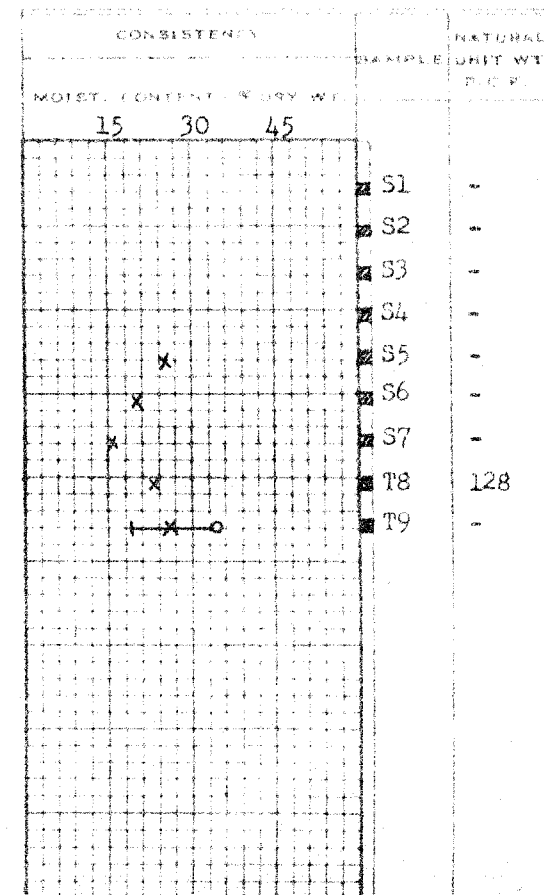
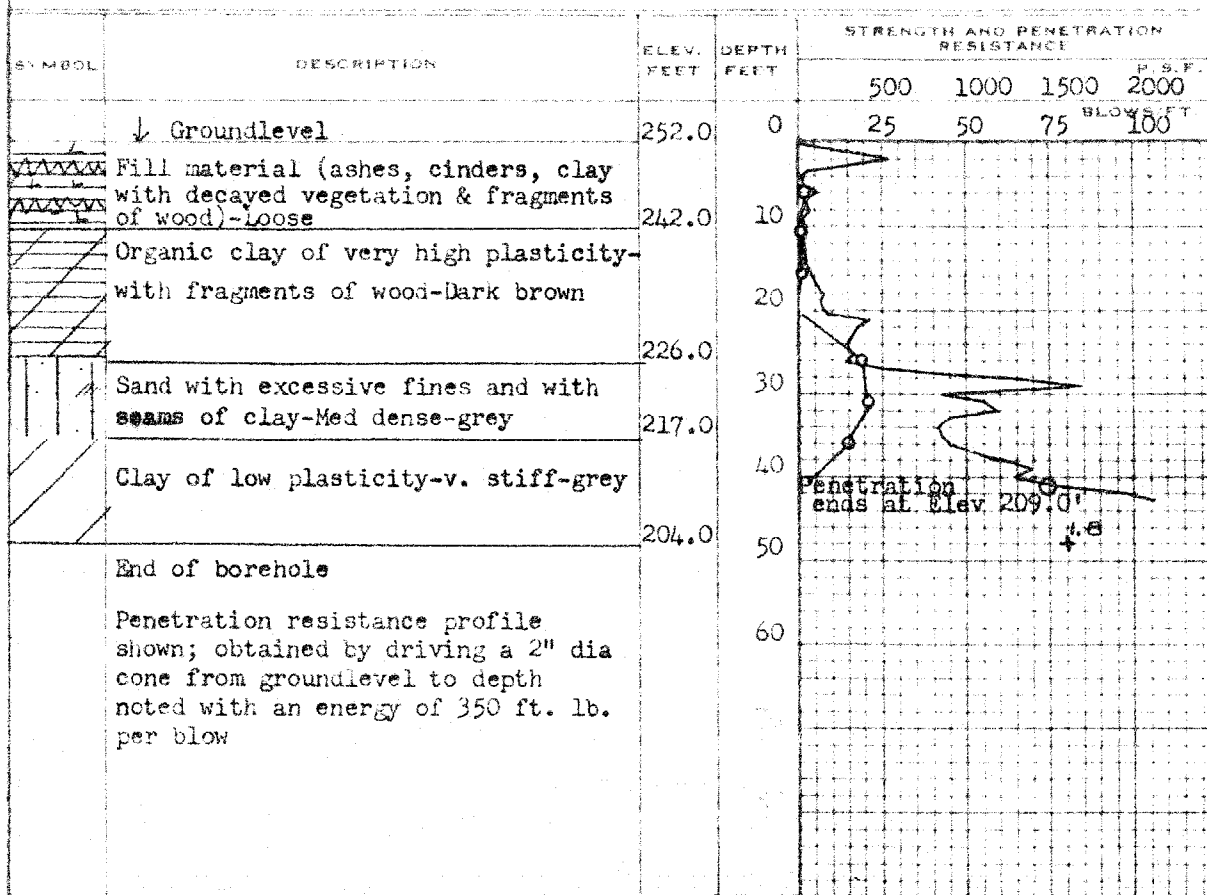
DATUM 252.0' COMPILED BY B.K.

BORING DATE Apr. 12/60 CHECKED BY H.D.

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

LEGEND

1/2 UNCONFINED COMPRESSION (QU) \circ
VANE TEST (C) AND SENSITIVITY (S) \times
NATURAL MOISTURE AND LIQUIDITY INDEX \square
LIQUID LIMIT \sim
PLASTIC LIMIT \sim



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 7

JOB 60-F-14

STATION 419+00 (160' RL)

DATUM 258.0'

COMPILED BY B.K.

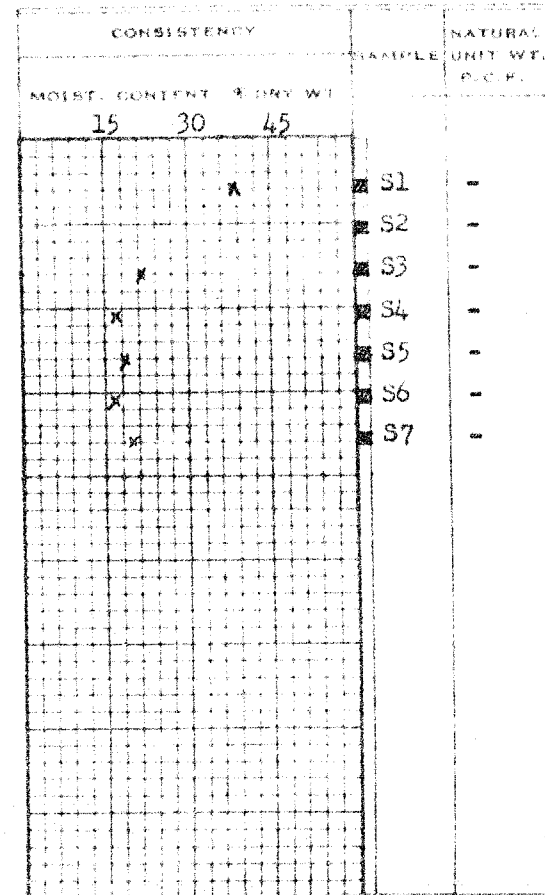
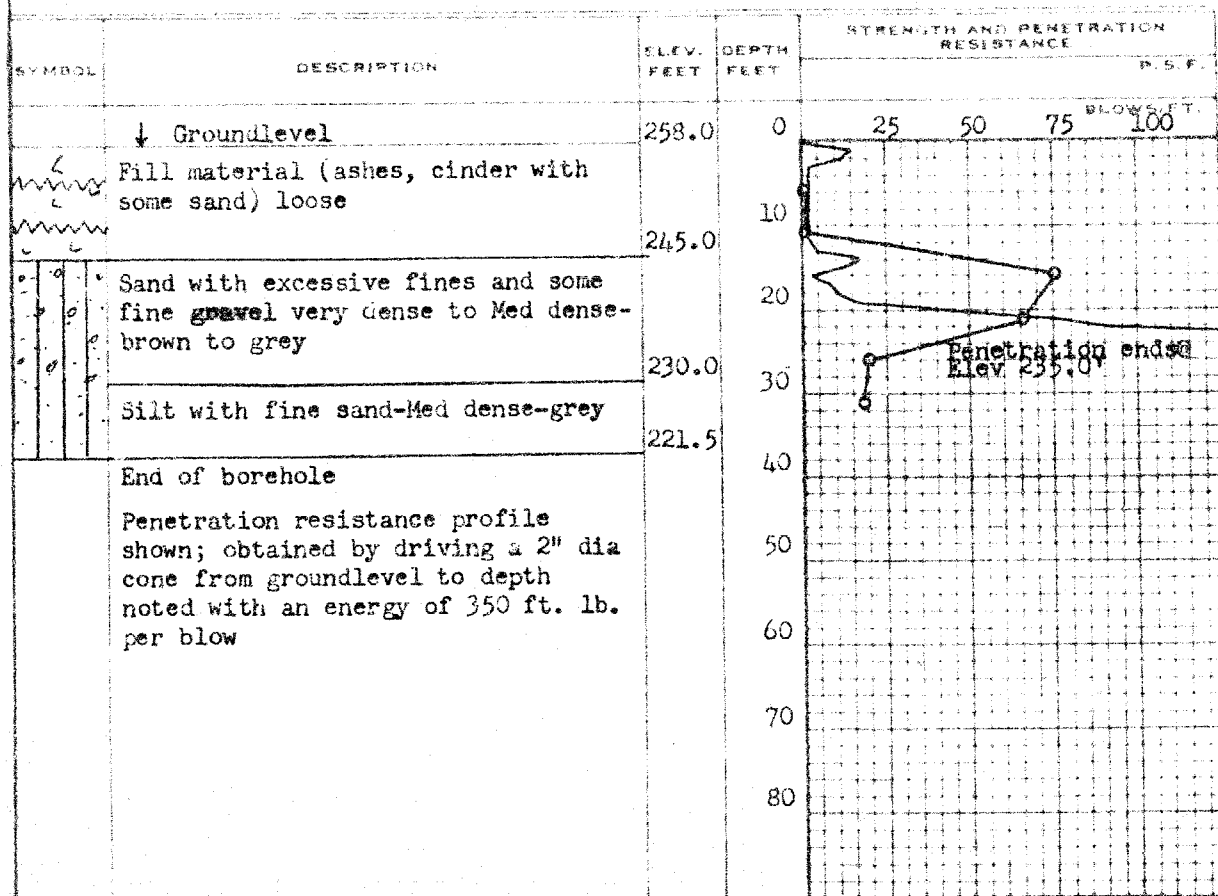
BORING DATE Apr. 13/60

CHECKED BY A.D.

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

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 8

JOB 60-F-14

STATION 421+50 (180' Rt.)

DATUM 258.5'

COMPILED BY B.K.

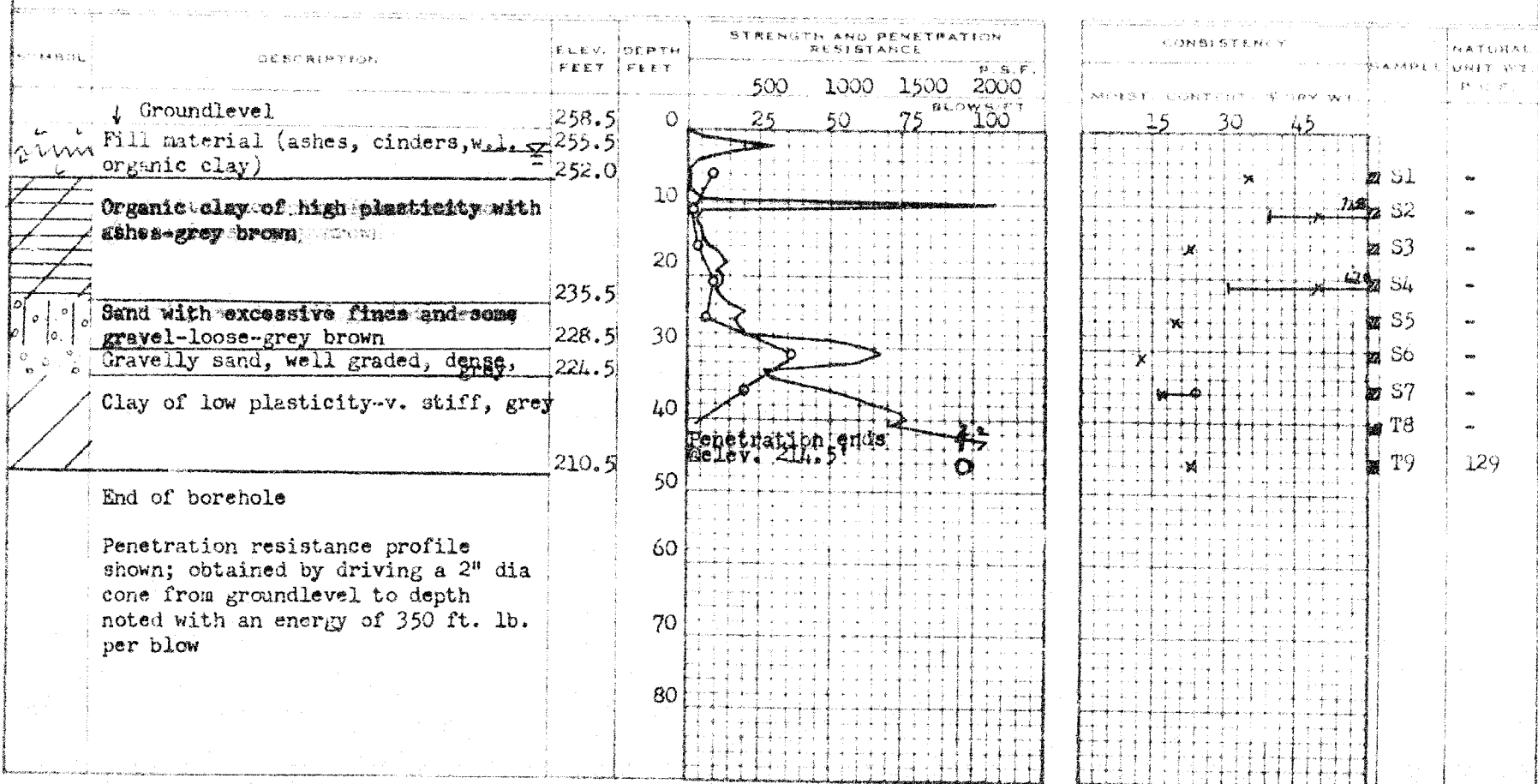
BORING DATE Apr. 13/60

CHECKED BY M.D.

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

140-57-1

23-58-2

W.P. 231-58-3

BORE HOLE NO. 9

JOB 60-F-14

STATION 423+00 (200' Rt)

DATUM 261.0'

COMPILED BY B.K.

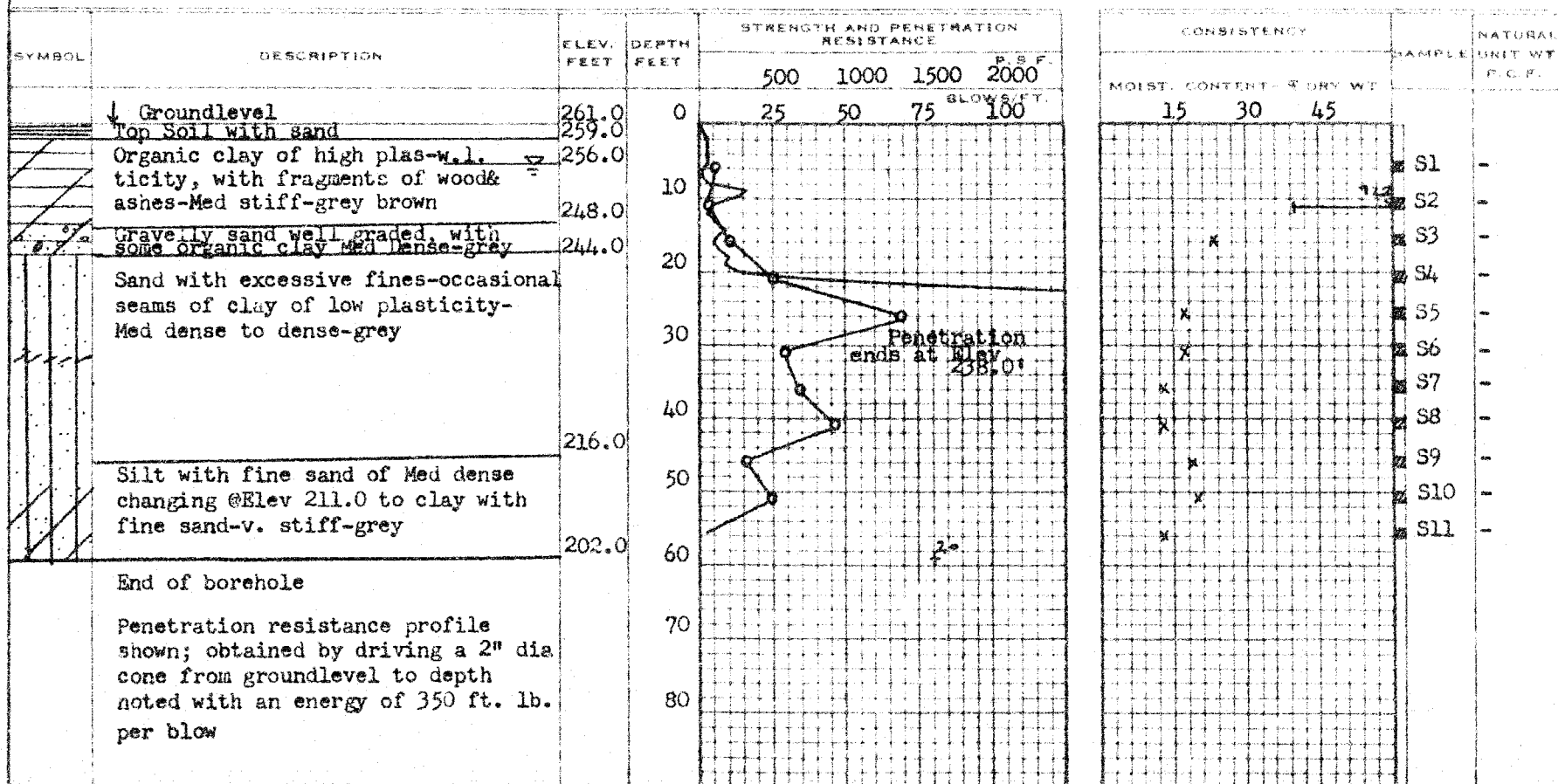
BORING DATE Apr. 19/60

CHECKED BY M.D.

2" DIA. SPLIT TUBE _____ 0
 2" SHELBY TUBE _____ 1
 2" SPLIT TUBE _____ 2
 2" DIA. CONE _____ 3
 2" SHELBY _____ 4
 CASING _____ 5

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) _____ 0
 VANE TEST (C) AND SENSITIVITY (S) _____ +S
 NATURAL MOISTURE AND LIQUIDITY INDEX _____ LI
 LIQUID LIMIT _____ L
 PLASTIC LIMIT _____ P



DEPARTMENT OF HIGHWAYS - ONTARIO

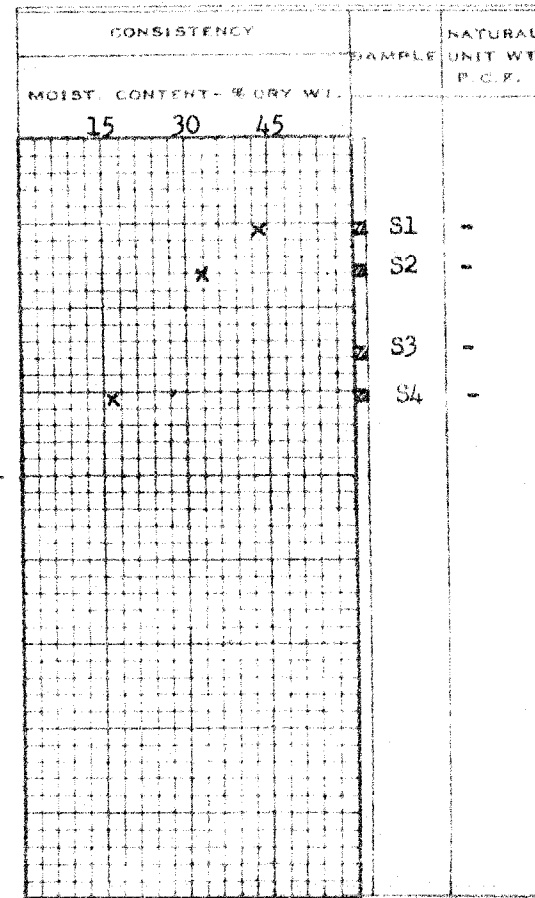
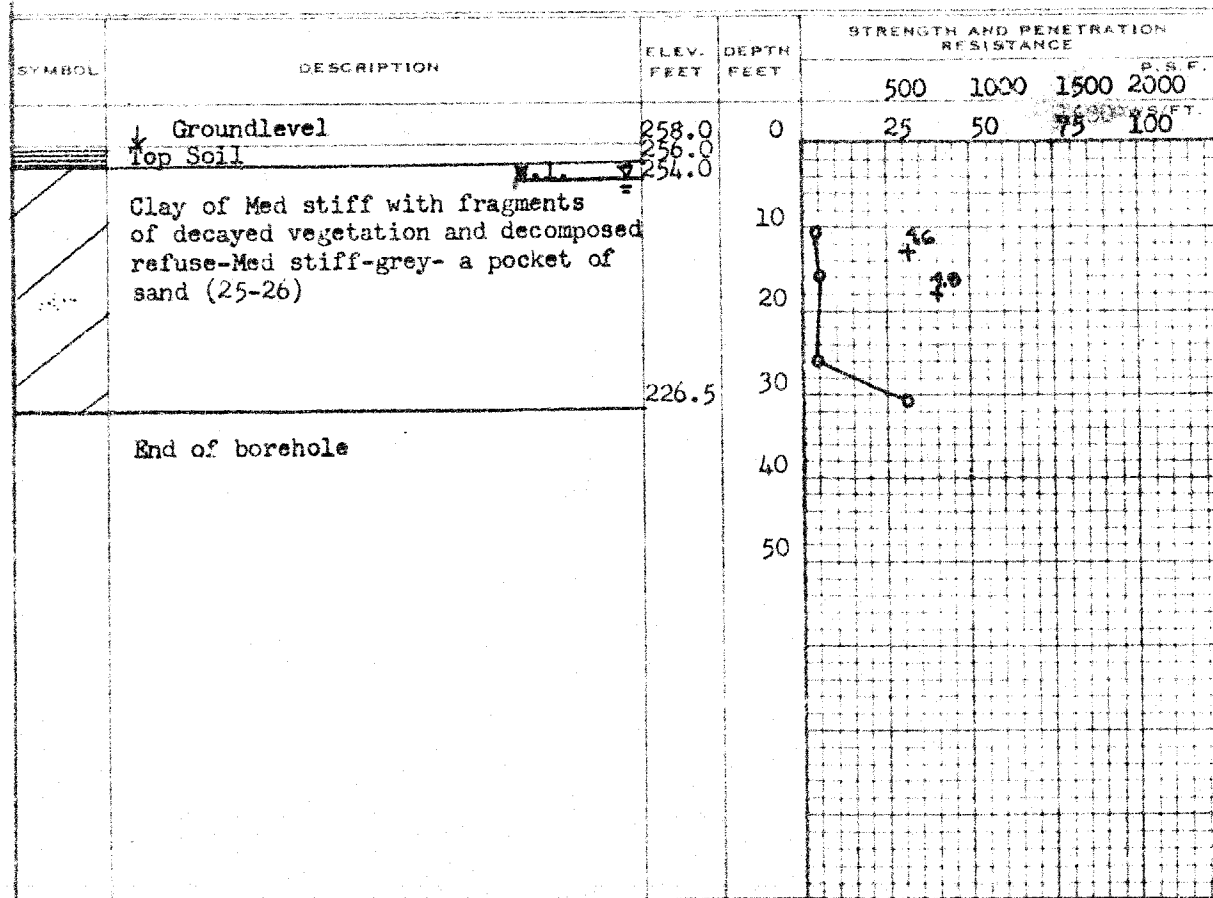
MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3 BORE HOLE NO. 10
JOB 60-F-14 STATION 430+25 (50' Rt)
DATUM 258.0' COMPILED BY B.K.
BORING DATE Dec. 31/59 CHECKED BY M.D.

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

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 11

JOB 60-F-14

STATION 426/50 (250' Rt)

DATUM 286.0'

COMPILED BY B.K.

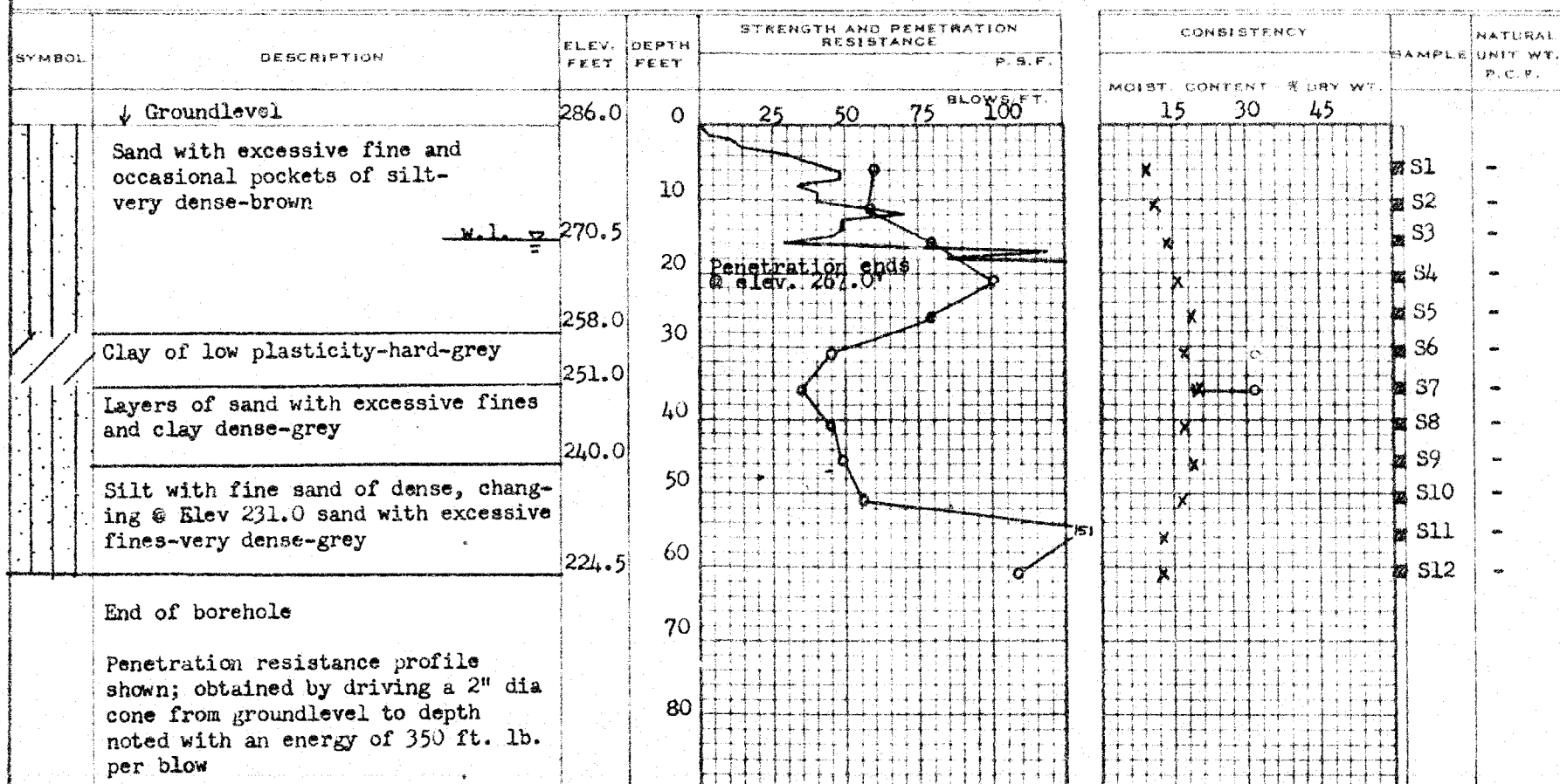
BORING DATE Apr. 21/60

CHECKED BY M.D.

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

LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

JOB 60-F-14

DATUM 285.0'

BORING DATE Apr. 21/60

BORE HOLE NO. 12

STATION 425+00 (225' Rt)

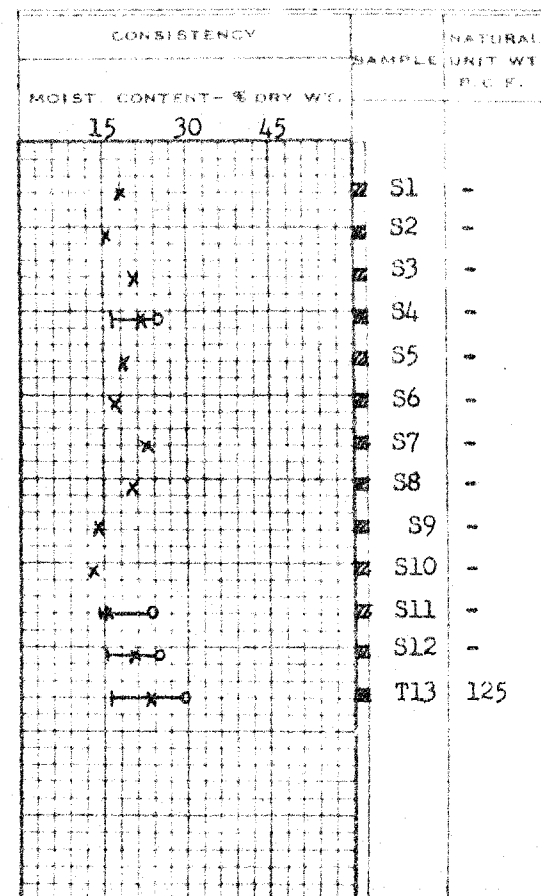
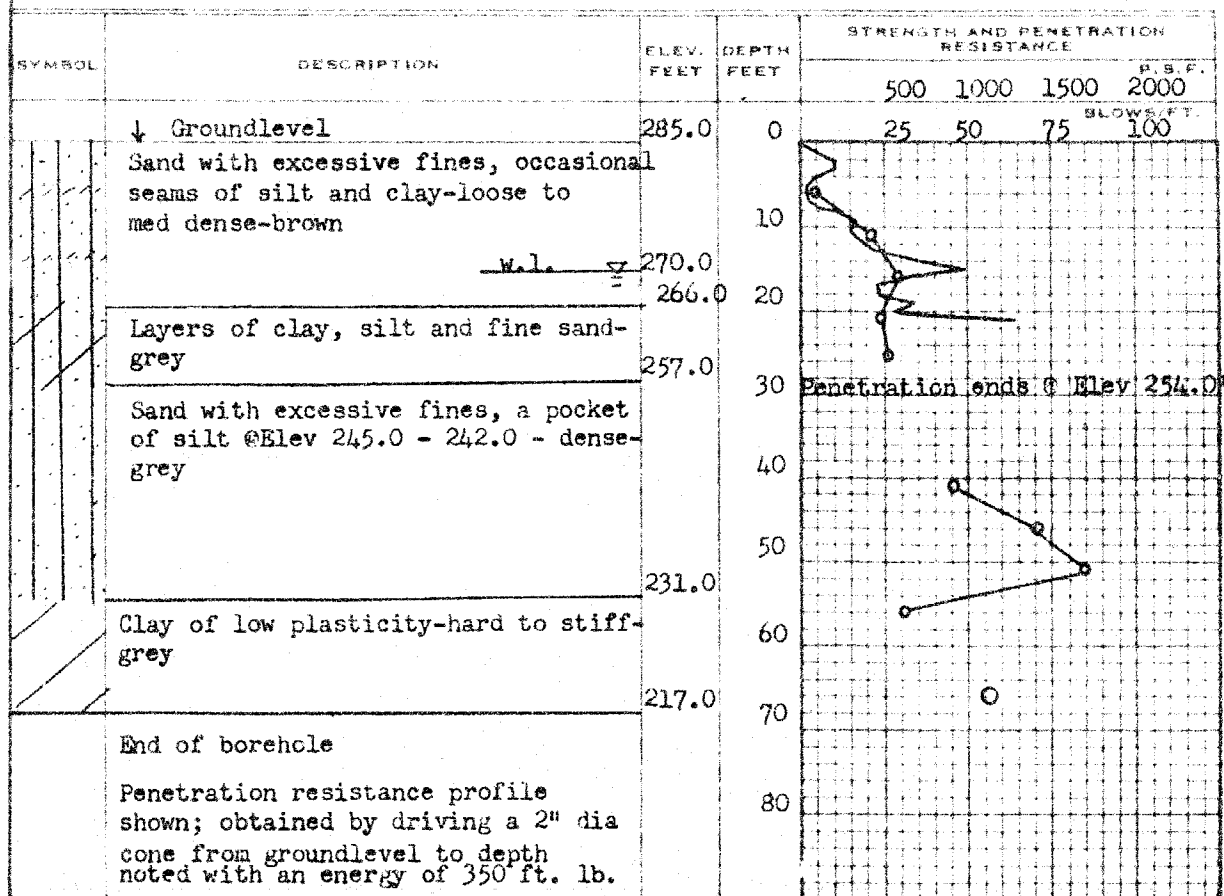
COMPILED BY B.K.

CHECKED BY M.D.

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

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 13

JOB 60-F-14

STATION 430+00 (290' Rt)

DATUM 259.0'

COMPILED BY B.K.

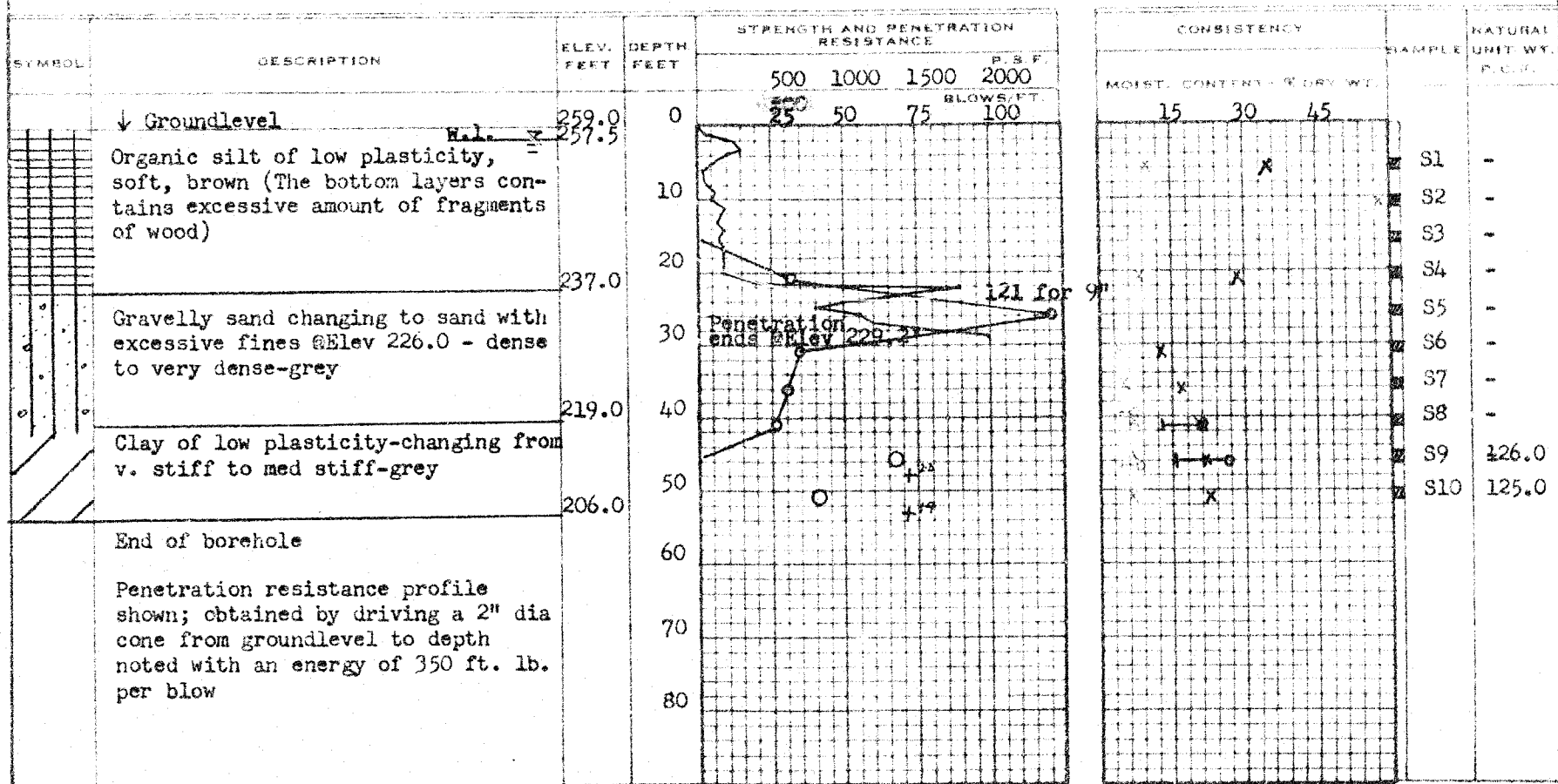
BORING DATE Apr. 27/60

CHECKED BY M.D.

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

140-57-1

231-58-2

231-58-3

W.P. BORE HOLE NO. 14

JOB 60-F-14 STATION 430+00 (200' Rt.)

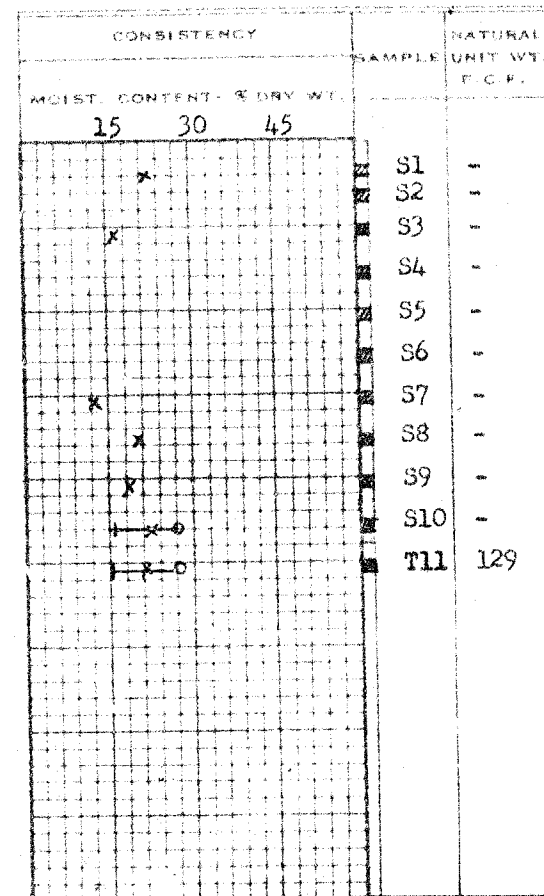
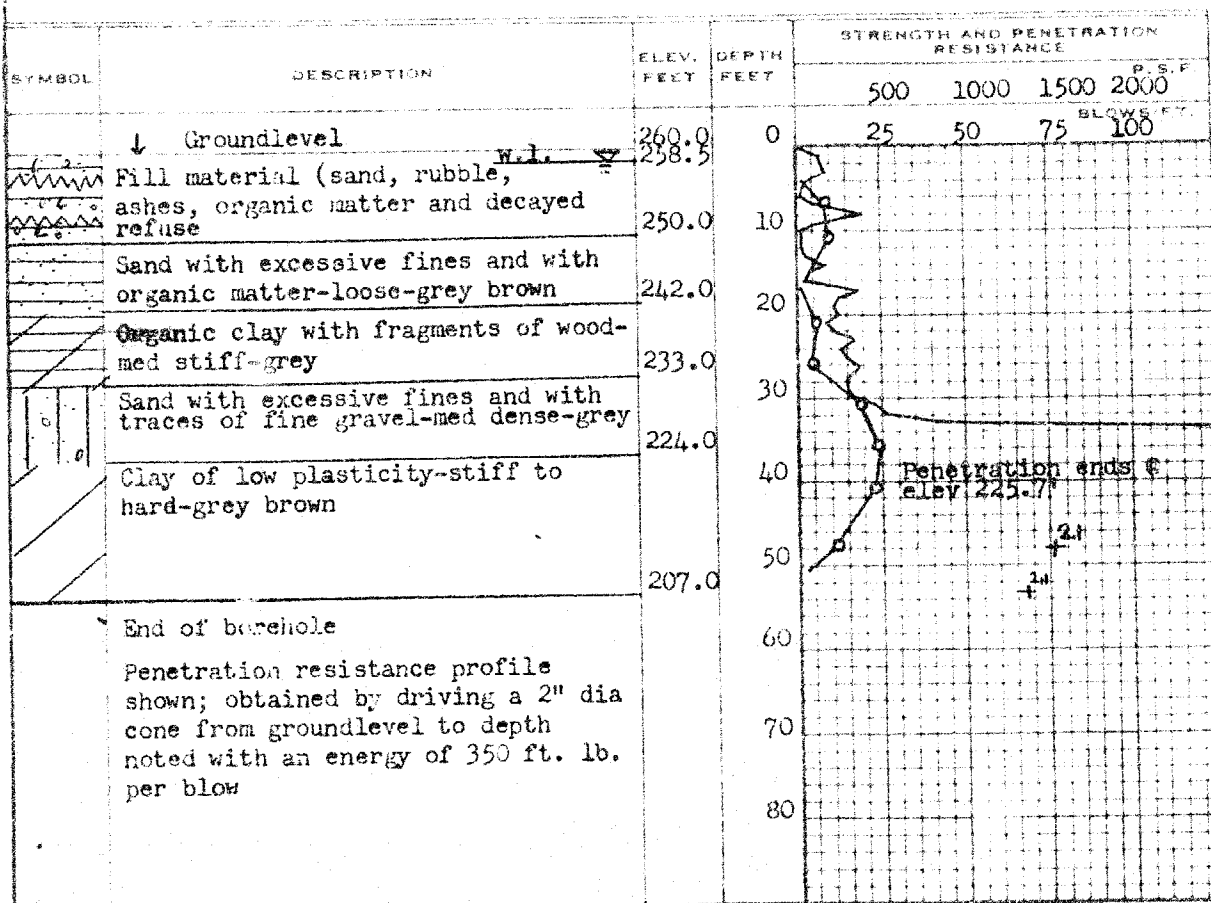
DATUM 260.0' COMPILED BY B.K.

BORING DATE Apr. 28/60 CHECKED BY M.D.

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 — Δ
 PLASTIC LIMIT — ∇



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 15

JOB 60-F-14

STATION 432+10 (210 ft. of E)

DATUM 262.0'

COMPILED BY B.K.

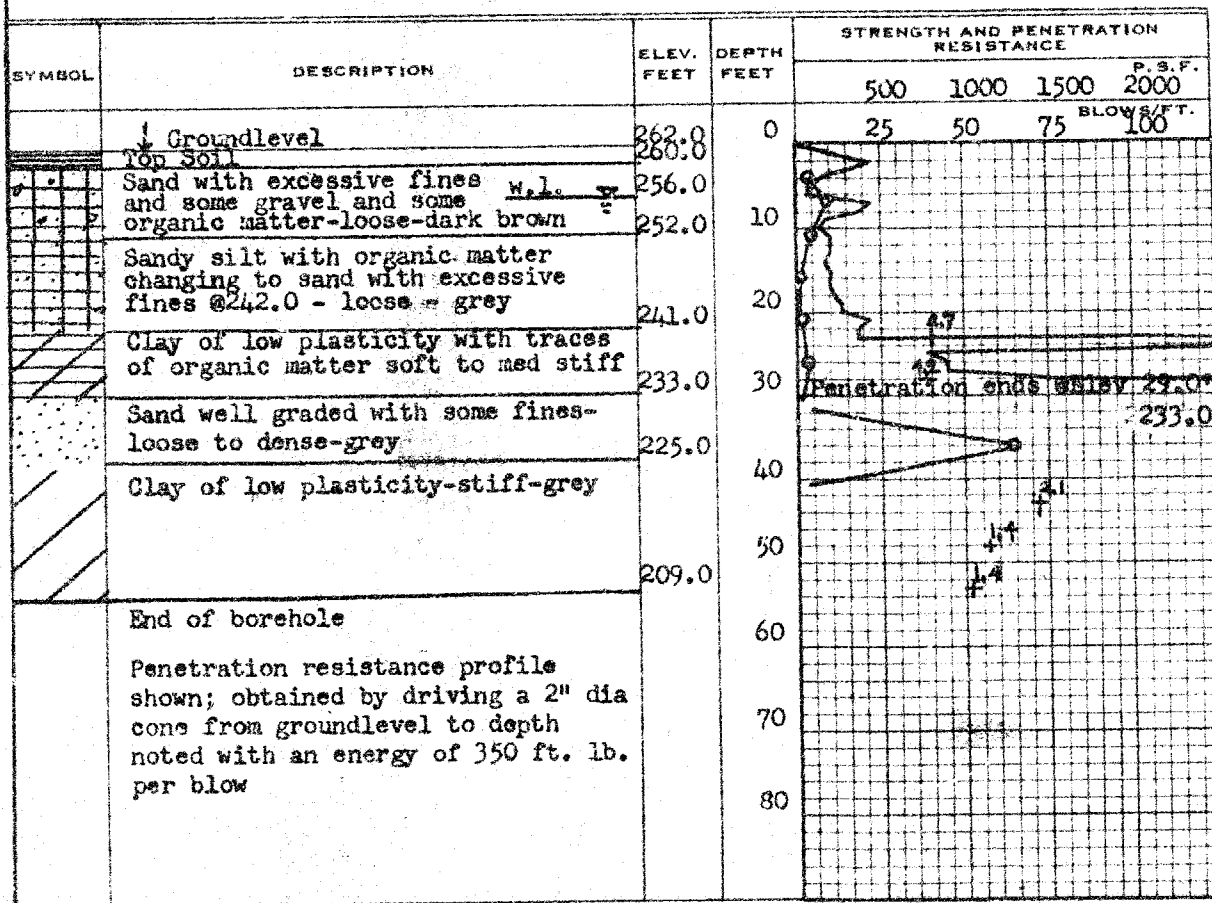
BORING DATE May 2/60

CHECKED BY M.D.

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 — X
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	-
			T7	-
			S8	-
			T9	-
			T10	-
			T11	-

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 16

JOB 60-F-14

STATION 432/25 (310 Rt.)

DATUM 268.0'

COMPILED BY B.K.

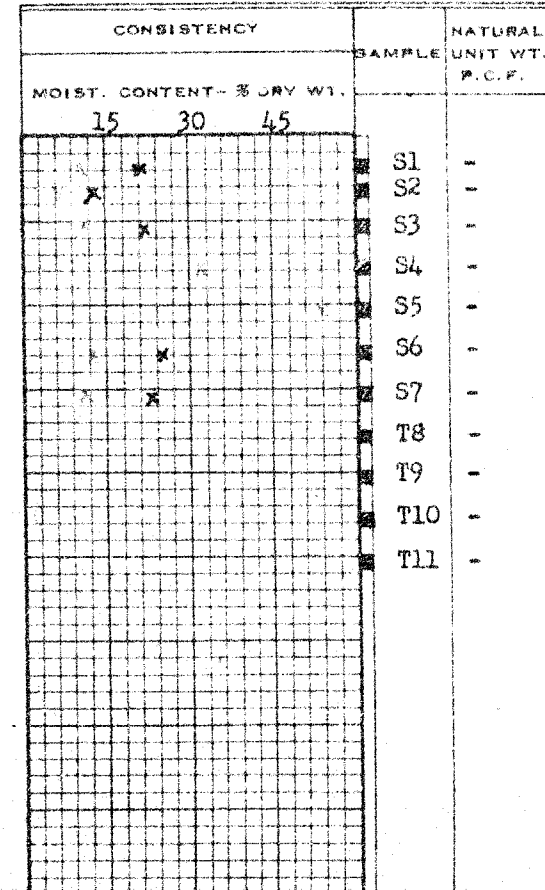
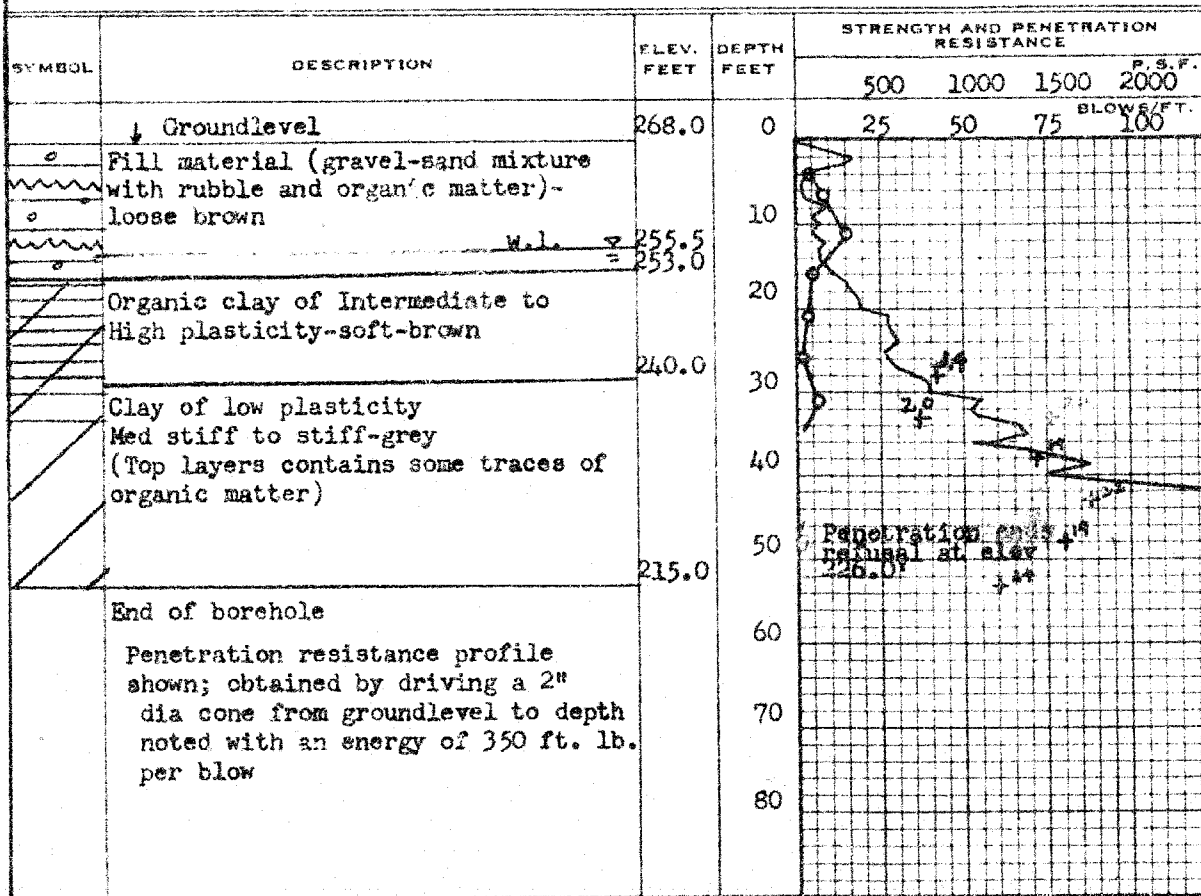
BORING DATE May 4/60

CHECKED BY M.D.

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 -----



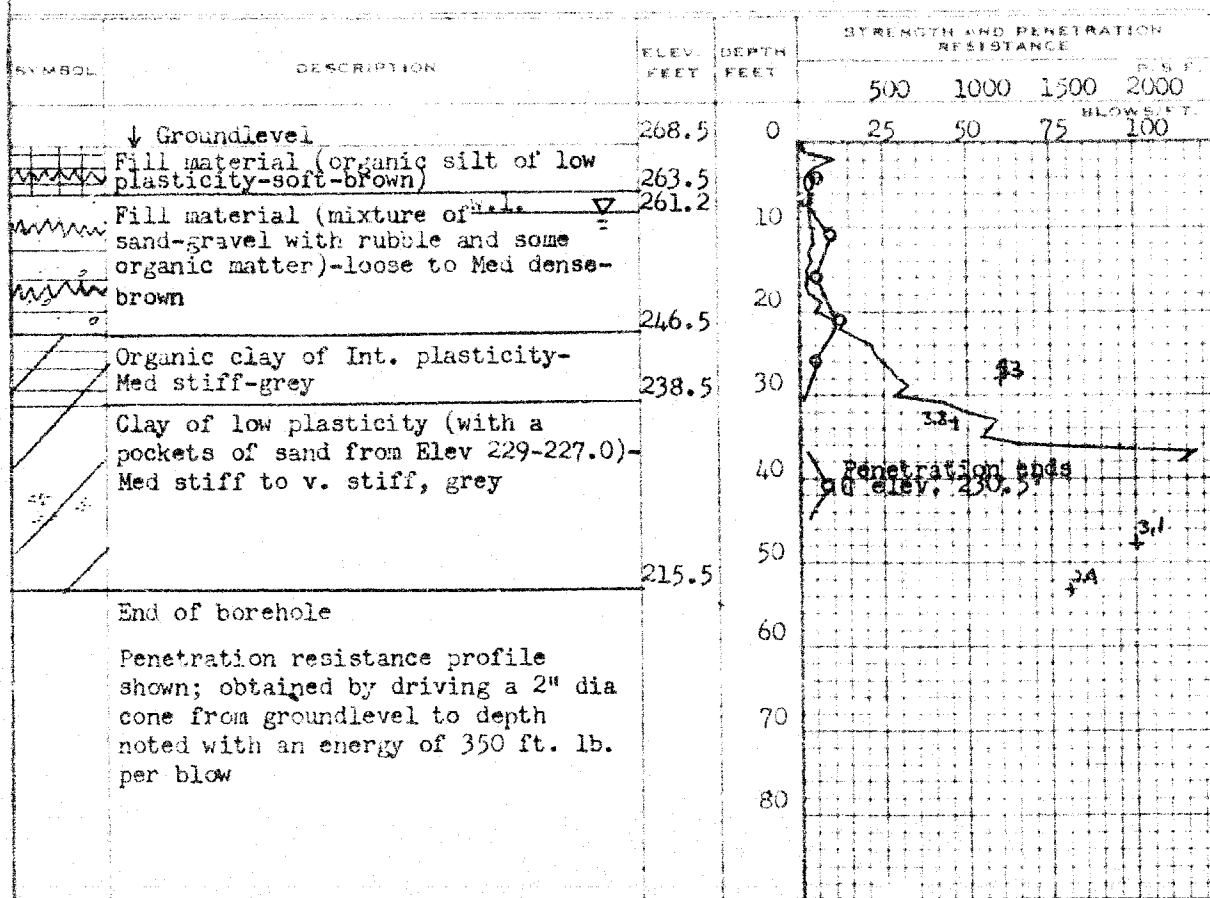
DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3 BORE HOLE NO. 17
JOB 00-F-14 STATION 434+00 (200' at)
DATUM 263.5' COMPILED BY B.K.
BORING DATE May 6/60 CHECKED BY H.D.

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 NO.	NATURAL UNIT WT. P.C.P.
MOIST. CONTENT (%)	LIQUIDITY INDEX	PLASTICITY INDEX		
15	30	45		
			S1	-
			S2	-
			S3	-
			S4	-
			S5	-
			S6	-
			T7	-
			T8	-
			S9	-
			T10	-
			T11	-

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 18

JOB 60-F-14

STATION 434/10 (200ft of 2)

DATUM 261.5'

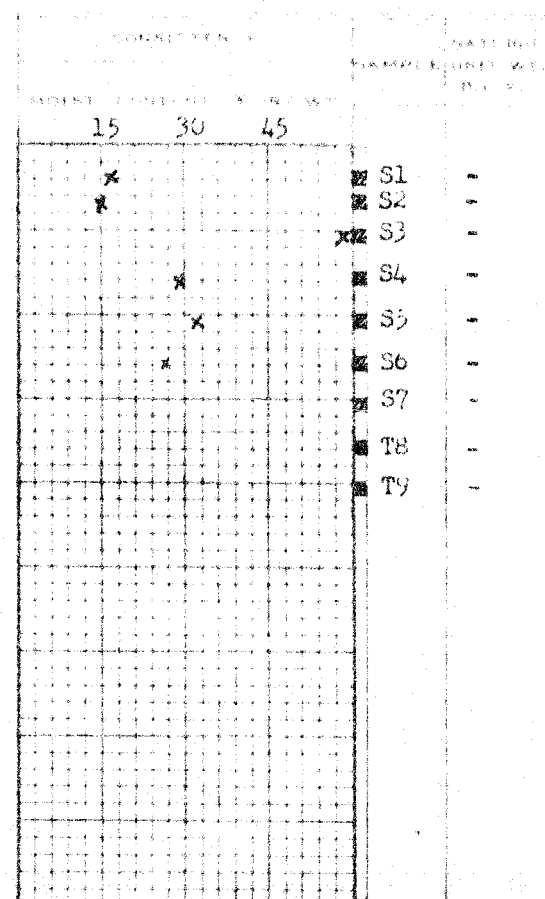
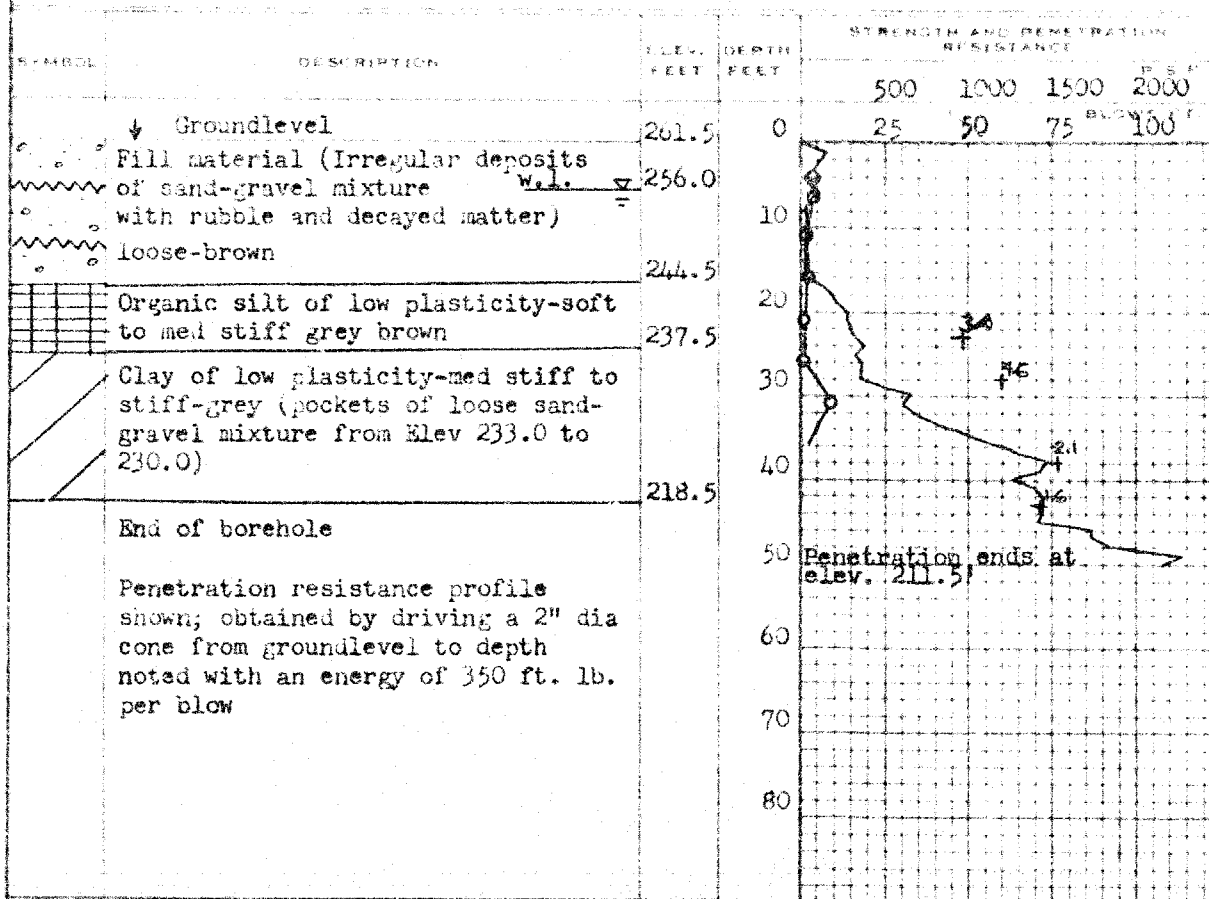
COMPILED BY B.K.

BORING DATE May 10/60

CHECKED BY M.D.

LEGEND

UNCONFINED COMPRESSION (Q_u)
 VANE TEST (C) AND SENSITIVITY (S)
 NATURAL MOISTURE AND
 LIQUID LIMIT
 PLASTIC LIMIT



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 19

JOB 60-7-14

STATION 436+00 (175Rt of E) 2" DIA. SPLIT TUBE

DATUM 271.8'

COMPILED BY B.K.

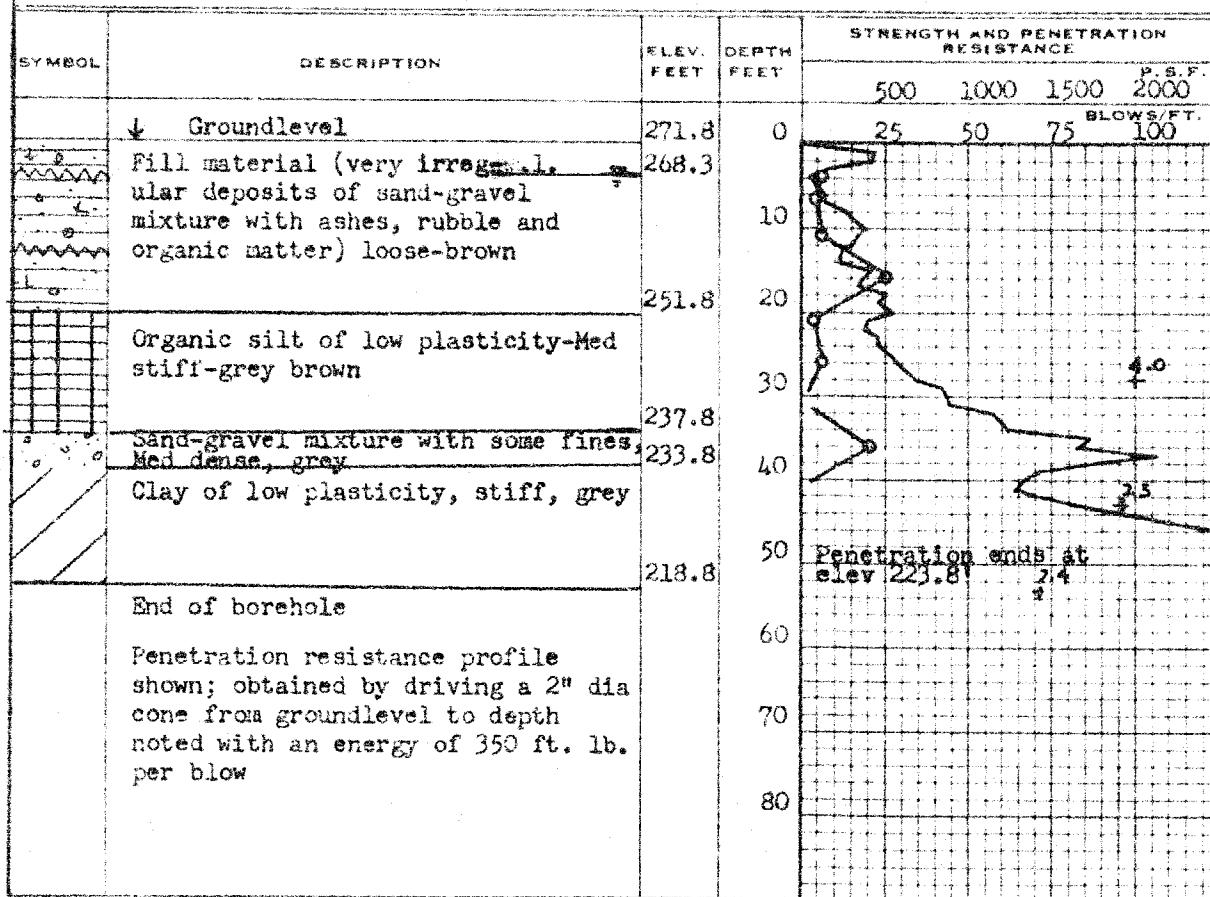
BORING DATE May 10/60

CHECKED BY M.D.

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		
	X		S1	-
	X		S2	-
	X		S3	-
			S4	-
			S5	-
		X	S6	-
			T7	-
			S8	-
			T9	-
			T10	-
			T11	-

MATERIALS AND RESEARCH SECTION

BORING DATE May 12/60

CHECKED BY M.D.

CASING

PLASTIC LITHO 1 10 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1

CONSISTENCY		NATURAL
MOIST. CONTENT - % DRY WT.		UNIT WT.
15	30	P.C.P.
<p>The flowchart consists of a grid with vertical lines at 15, 30, and 45% moisture content. On the left side, there are points labeled S1 through S4 and T5 through T9. S1, S2, S3, and S4 are located between the 15% and 30% lines. T5, T6, T7, T8, and T9 are located between the 30% and 45% lines. A horizontal line connects the group of S samples to the group of T samples.</p>		S1 S2 S3 S4 T5 T6 T7 T8 T9
		S10

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

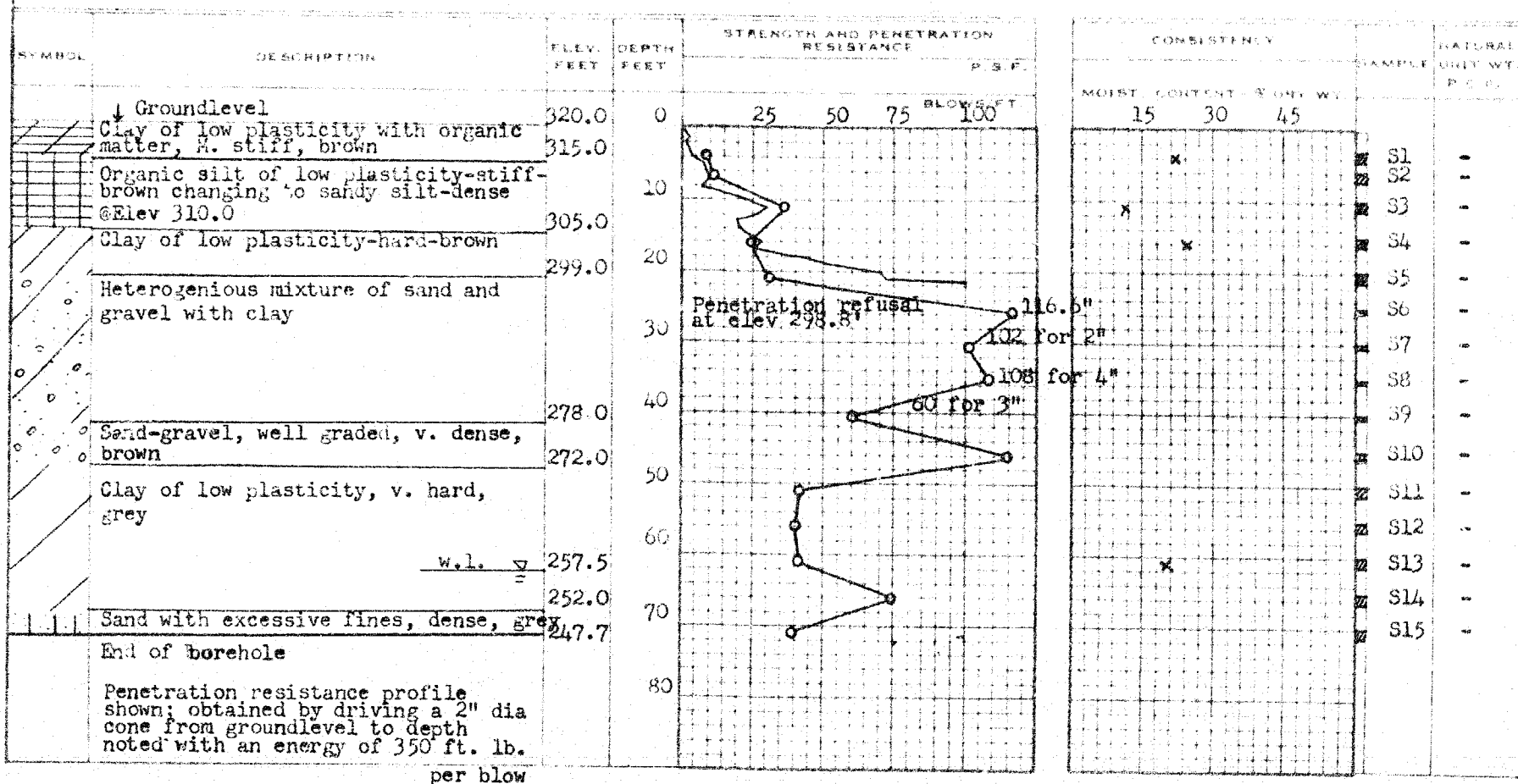
140-57-1
231-58-2
231-58-3

W.P. 231-58-3 BORE HOLE NO. 51
JOB 60-F-14 STATION 463+85 (250' ht.)
E.E.B.L.
DATUM 320.0' COMPILED BY B.K.
BORING DATE May 18/60 CHECKED BY M.D.

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

LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 52

JOB 00-F-14

STATION 460+00 (220' Rt.)
E.E.B.L.

DATUM 282.5'

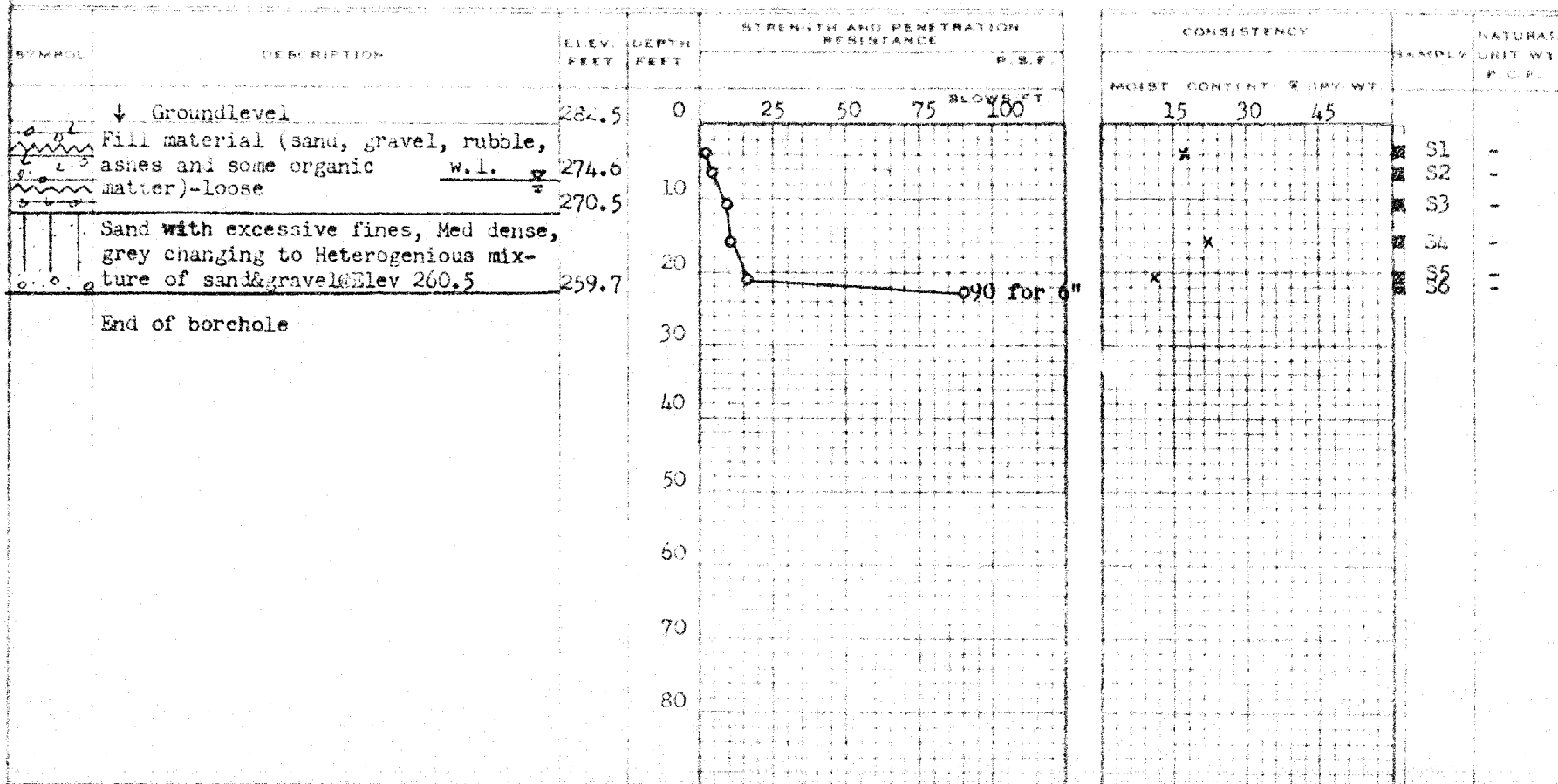
COMPILED BY B.K.

BORING DATE May 17/60

CHECKED BY H.D.

LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1
 231-58-2
 W.P. 231-58-3

BORE HOLE NO. 53

JOB 60-F-14

STATION 456+00 (180' Rt.)
 E.B.L.

DATUM 262.0'

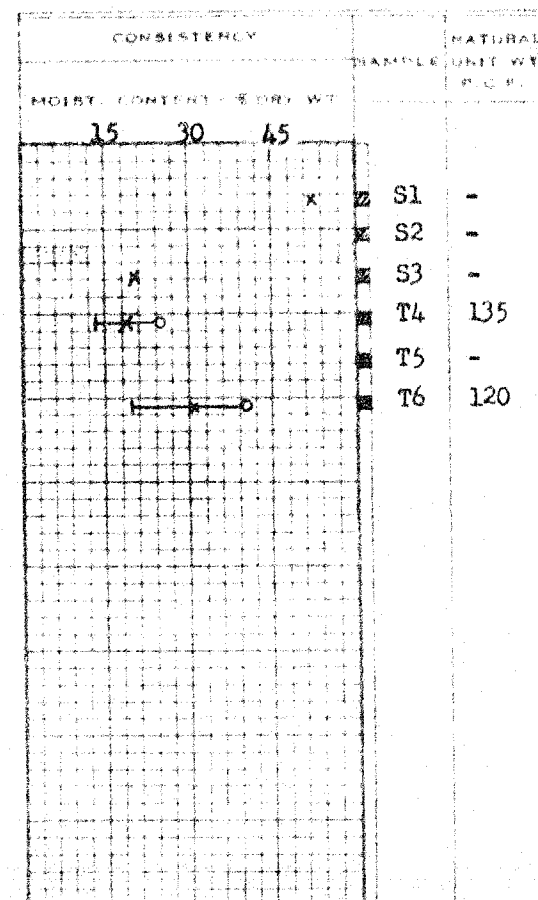
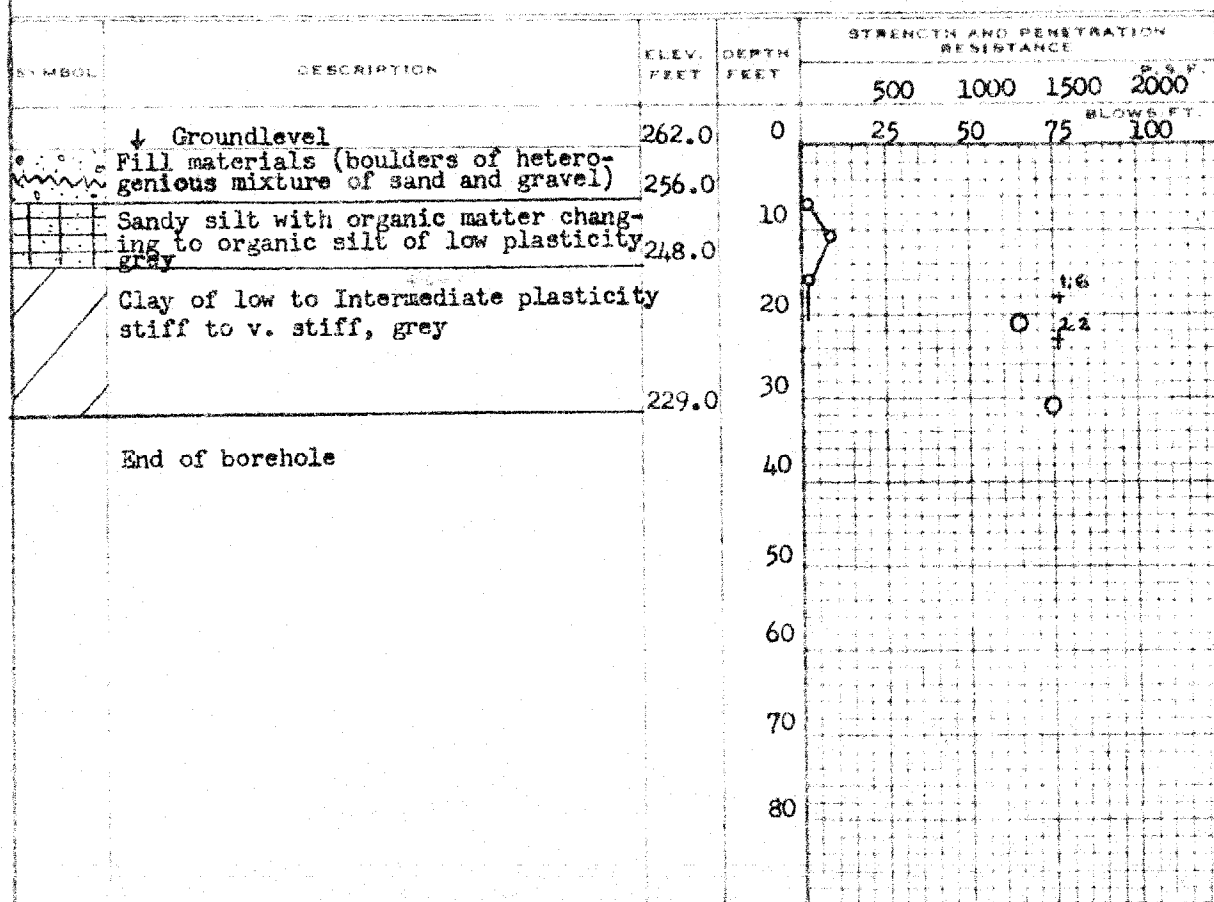
COMPILED BY B.K.

BORING DATE May 16/60

CHECKED BY M.D.

LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 61

JOB 60-F-14

STATION 8+35 Ramp 'D' 20' Rt

DATUM G.S.C.

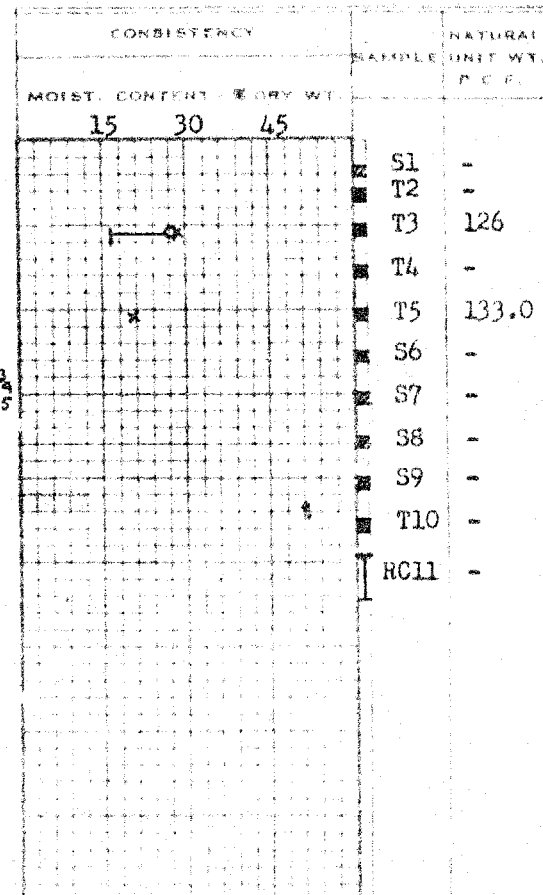
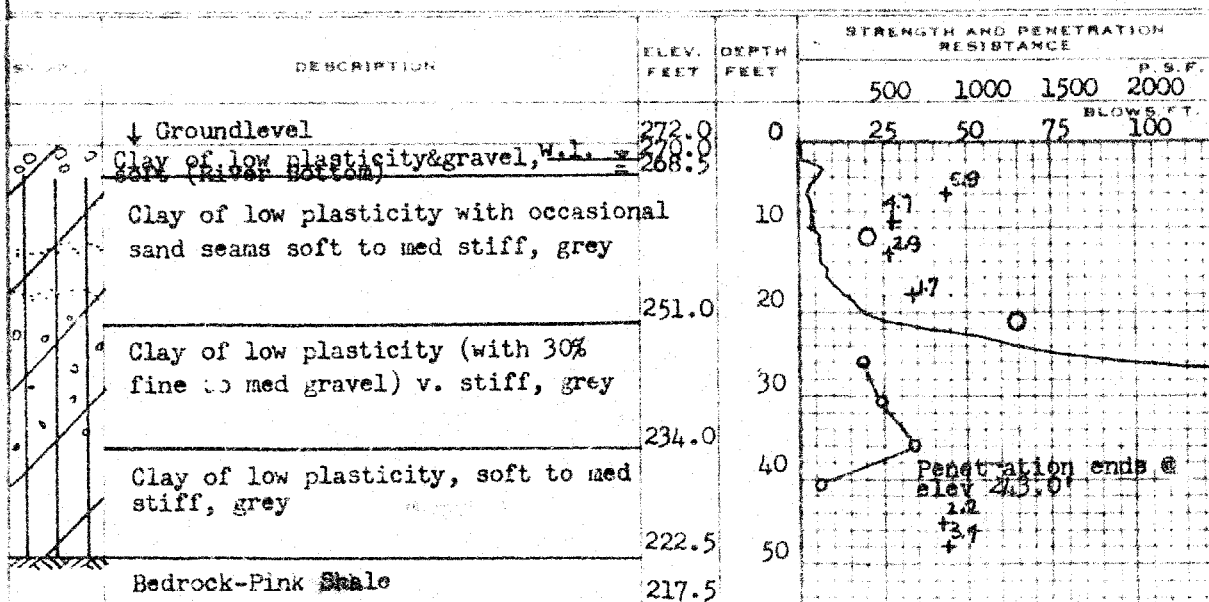
COMPILED BY B.K.

BORING DATE Apr. 4/60

CHECKED BY K.S. & MD

LEGEND

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



End of borehole

Note: Artesian Head at 222.5
approx. 20' head at G.L.

Normal water table = 270.0

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

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-3
W.P. 231-58-2

BORE HOLE NO. 62

JOB 60-F-14

STATION 9+00 Ramp 'D' 90' Lt 2" DIA. SPLIT TUBE

DATUM G.S.C.

COMPILED BY B.K.

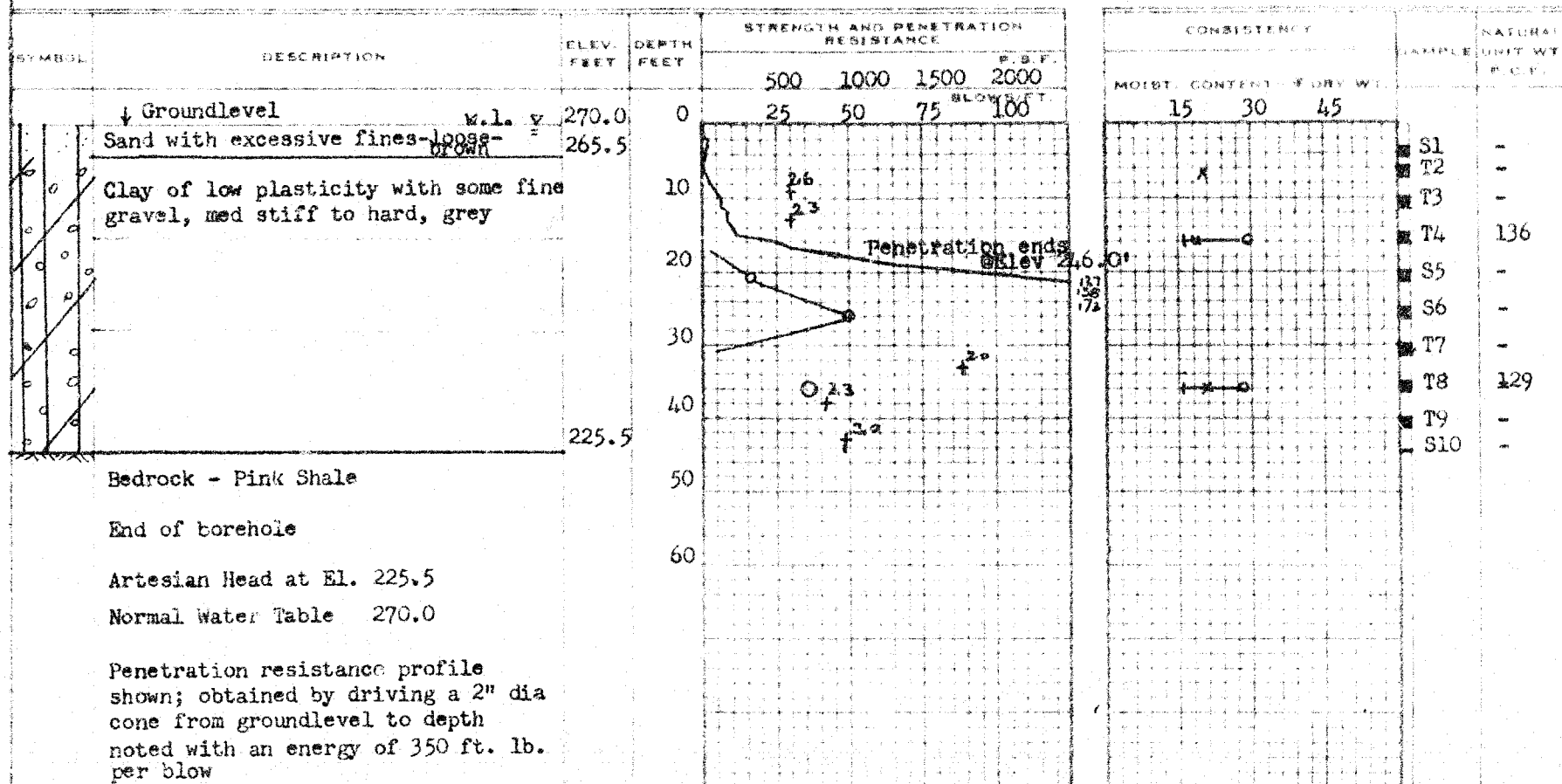
BORING DATE Apr. 7/60

CHECKED BY M.D.

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

140-57-1

231-58-3

W.P. 231-58-2

BORE HOLE NO. 63

JOB 60-F-14

STATION 478+80 E.B.L. 130' Rt. 2" DIA. SPLIT TUBE

DATUM G.S.C.

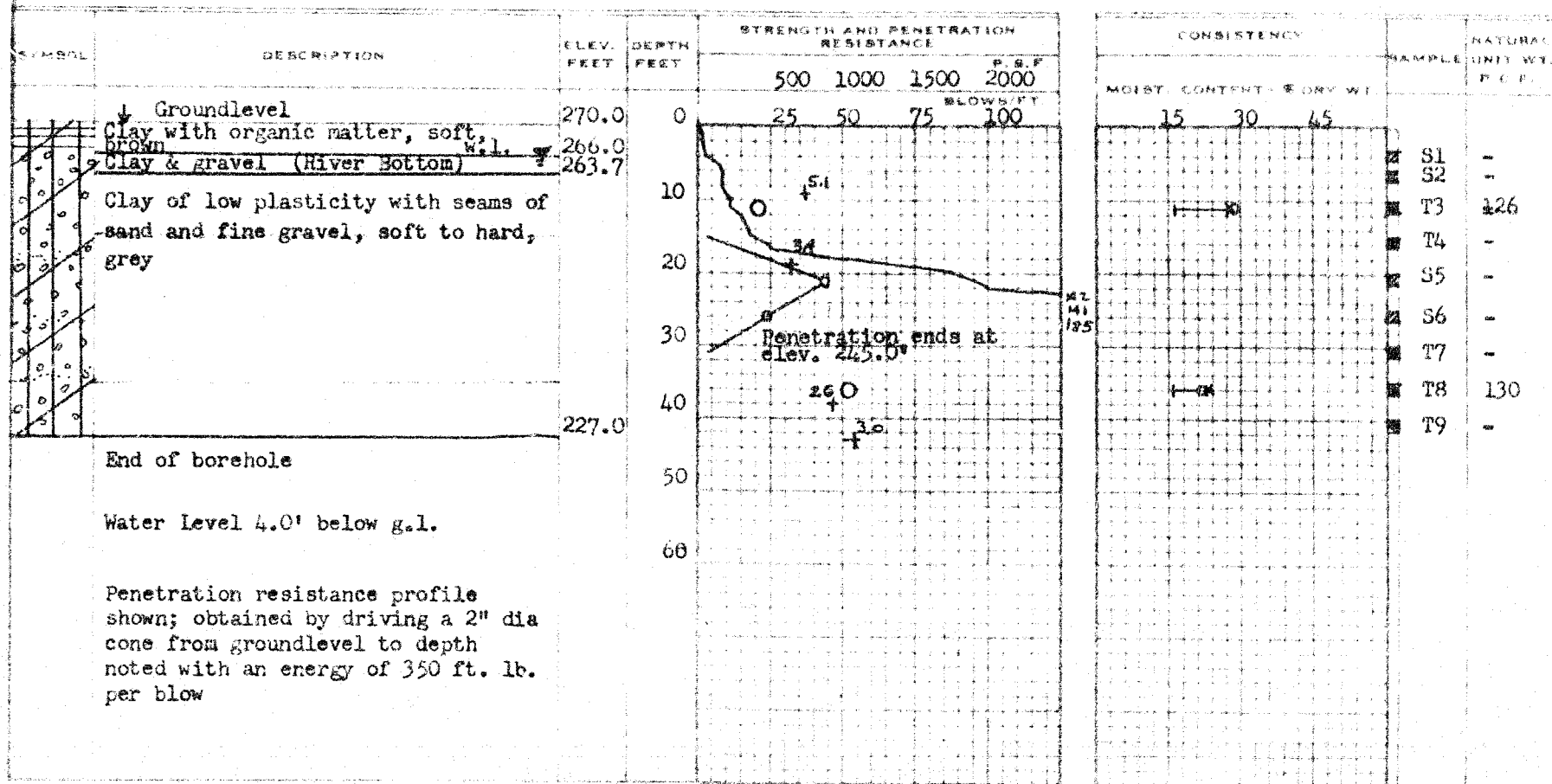
COMPILED BY B.K.

BORING DATE Apr. 19/60

CHECKED BY K.S. & M.D.

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) \bigcirc
 VANE TEST (C) AND SENSITIVITY (S) \dagger
 NATURAL MOISTURE AND LIQUIDITY INDEX \square
 LIQUID LIMIT \sim
 PLASTIC LIMIT \cdot



DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS AND RESEARCH SECTION

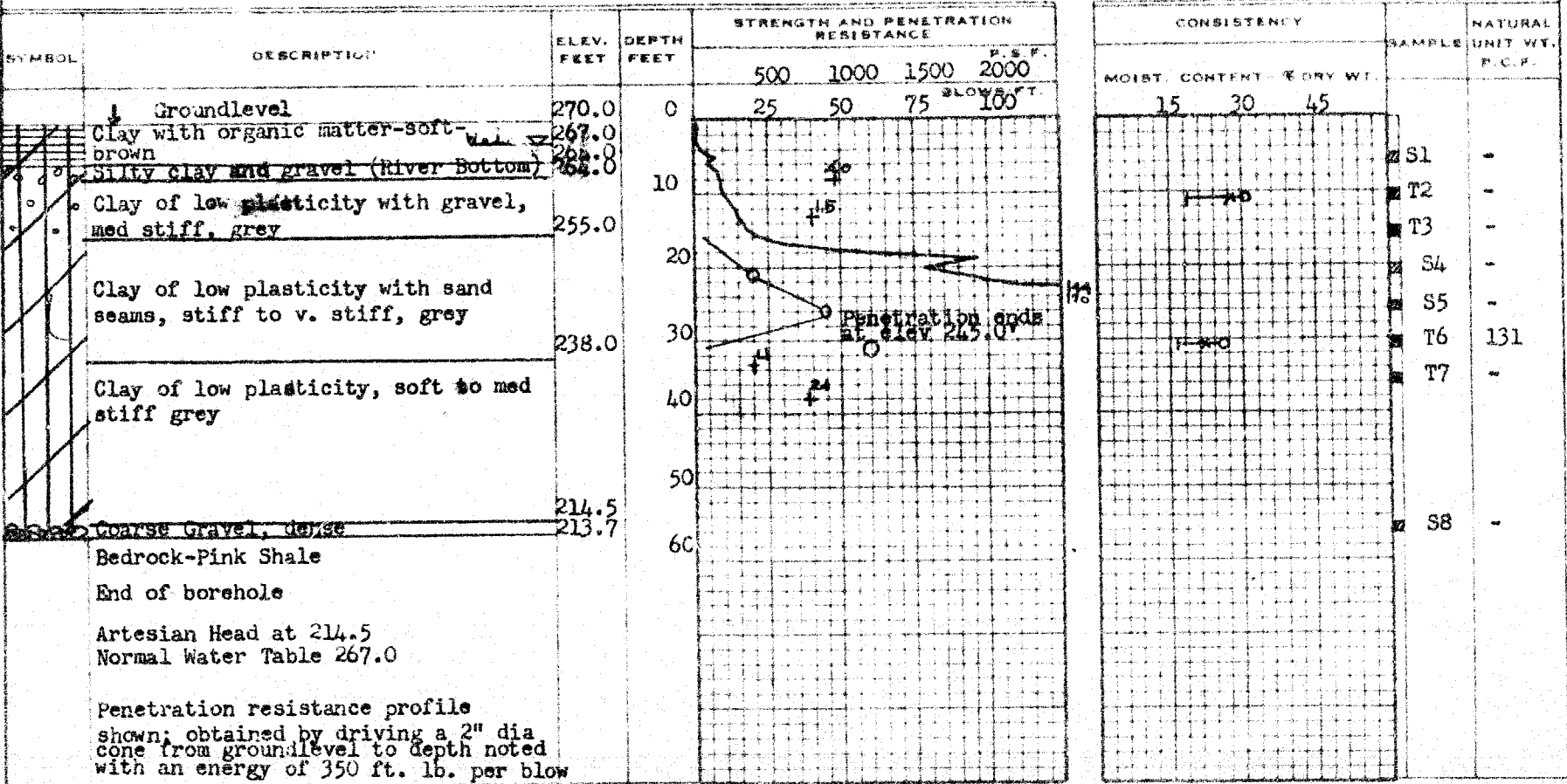
140-57-1
231-58-2
W.P. 231-58-3
JOB 60-F-14
DATUM G.S.C.
BORING DATE Apr. 22/60

BORE HOLE NO. 64
STATION 476+60 E.B.L. 40' Rt
COMPILED BY B.K.
CHECKED BY M.D. & K.S.

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

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 65

JOB 60-F-14

STATION 474+30 E.B.L. 60' LT

DATUM G.S.C.

COMPILED BY B.K.

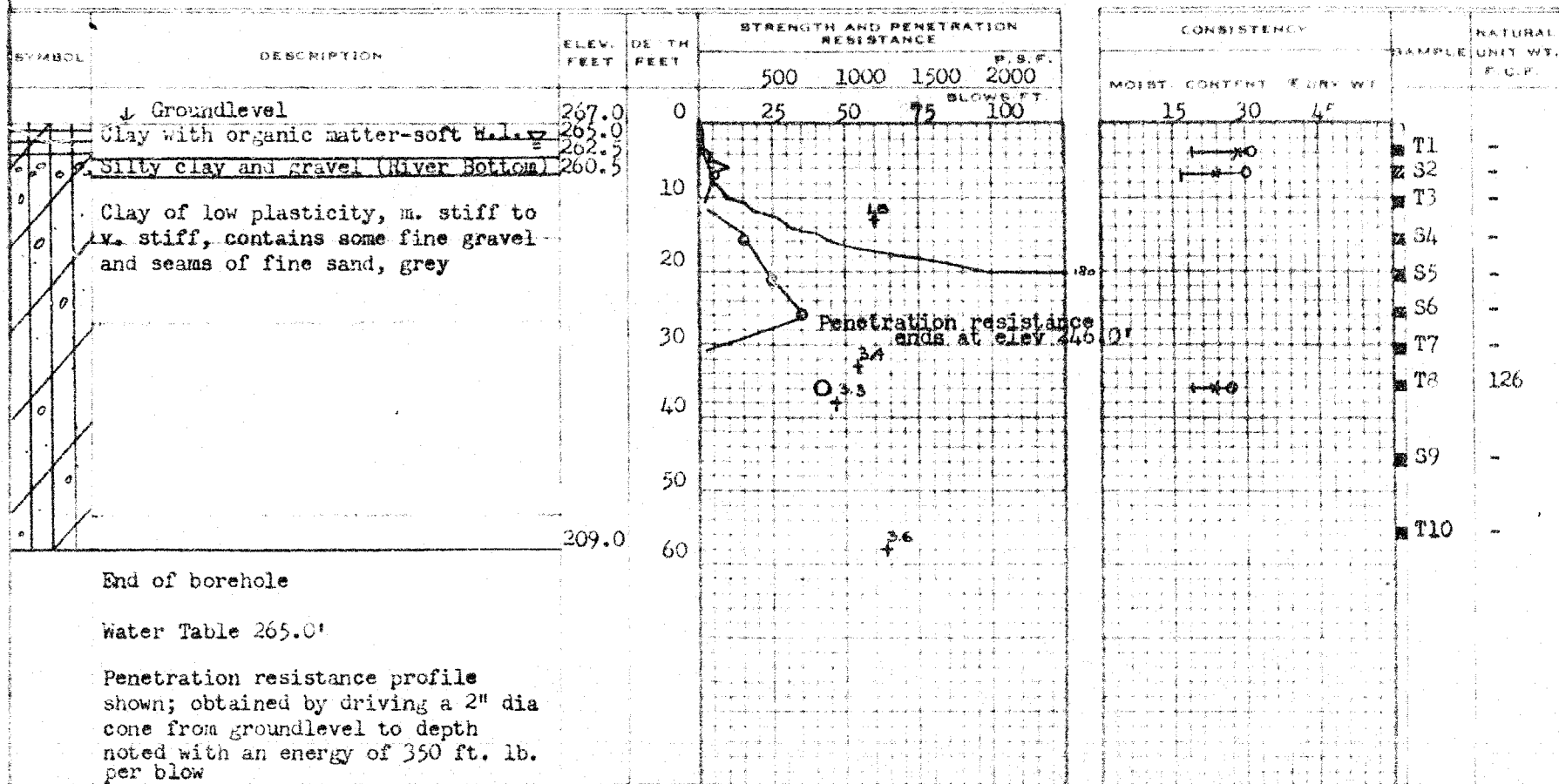
BORING DATE Apr. 20/60

CHECKED BY M.D. & K.S.

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



140-57-1

231-58-2

W.F. 231-58-3

BORE HOLE NO. 66

JOB 60-F-14

STATION 469/80E.B.L. 60' Lt

DATUM C.S.C.

IMPILED BY B.K.

EXPIRATION DATE Apr. 22/60

CHECKED BY M.D. & K.S.

2" DIA. SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2º DIA. CONE

2nd SHELF

CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) 0

WANE TEST(C) AND SENSITIVITY(S) +

NATURAL MOISTURE AND

LIQUIDITY INDEX _____ X

LIQUID LIMIT

[illegible]

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	264.0	0	25	50	75	100
	Clay of Intermediate plasticity with seams of fine sand, Med stiff to stiff	254.0	10				
	Clay of low plasticity with fine gravel and fragments of shale-m. stiff to v. stiff grey	227.5	36.5				
	End of borehole		40				
	Water Table : 264.0						
	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						

CONSISTENCY		SAMPLE	NATURAL
MOIST. CONTENT - % DRY WT.			UNLY WY. P.C.P.
15	30	45	
		T1	125
		S2	-
		T3	-
		T4	-
		T5	-
		S6	-
		T7	-
		S8	-

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

JOB 60-F-14

DATUM G.S.C.

BORING DATE Apr. 25/60

BORE HOLE NO. 67

STATION 468+70 E.B.L. 60' Rt

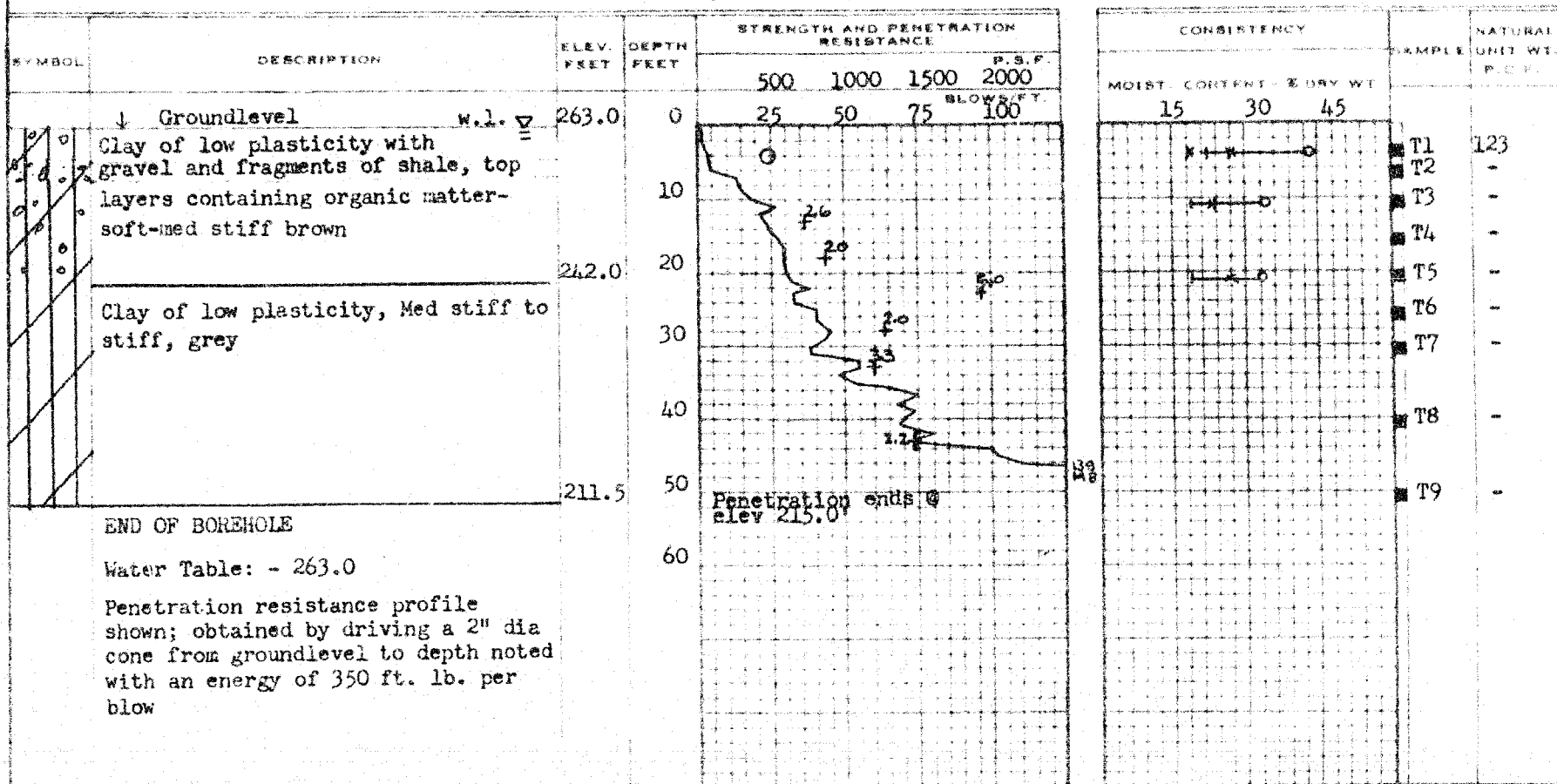
COMPILED BY B.K.

CHECKED BY M.D.

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

140-57-1

231-58-2

W.F. 231-58-3

BORE HOLE NO. 68

JOB 60-F-14

STATION 449/90 E.B.L. C

DATUM G.S.C.

COMPILED BY B.K.

BORING DATE May 4/60

CHECKED BY M.D.&K.S.

2" DIA. SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2^o DIA. CONE.

2nd SHELBY

CASING ...

LEGEND

1/2 UNCONFINED COMPRESSION (Qu) 0

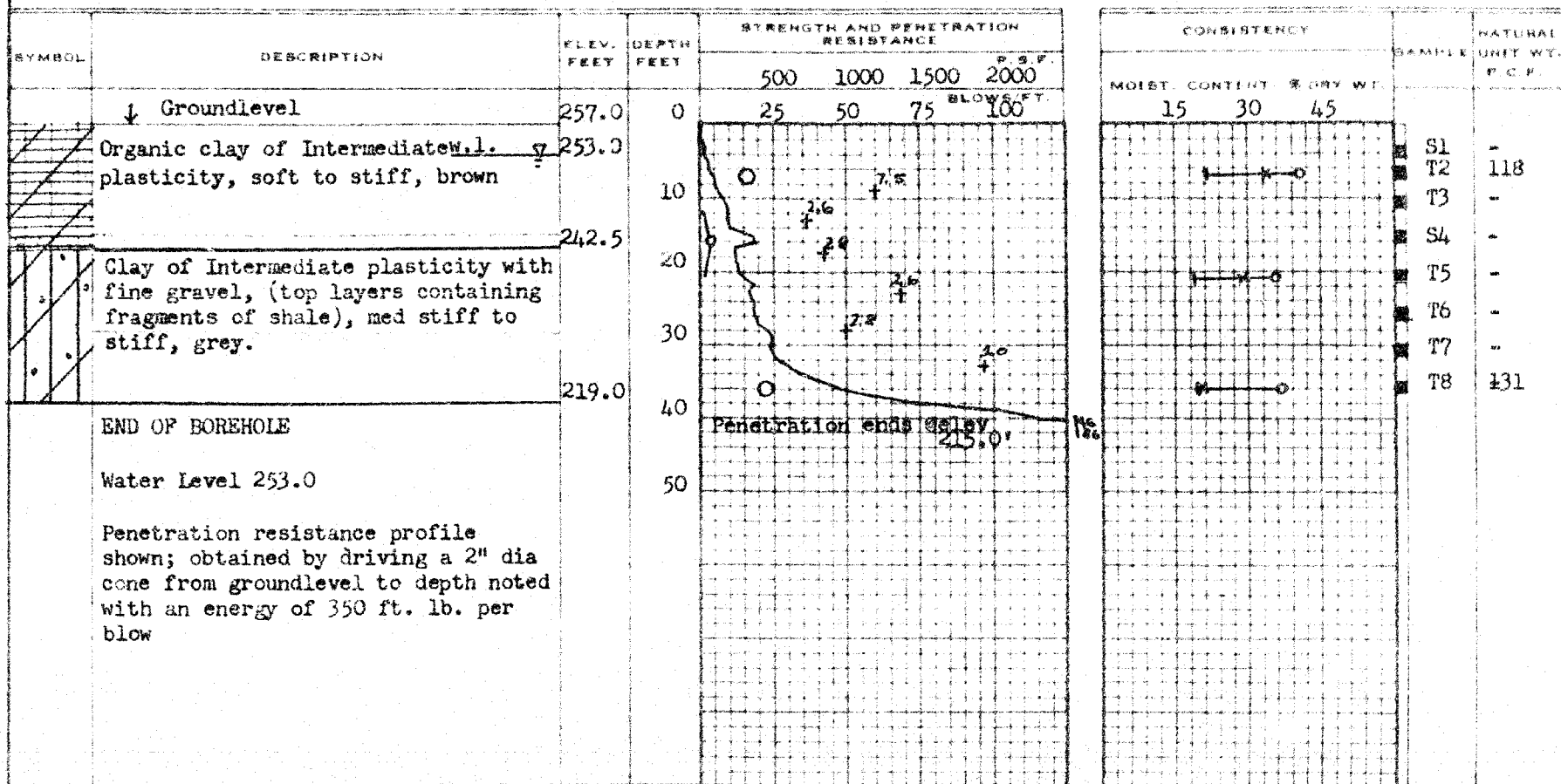
WANE TEST(C) AND SENSITIVITY(S)

NATURAL MOISTURE AND

LIQUIDITY INDEX

LIQUID LIMIT											
Sample	Moisture	Wet Weight	Wet Volume	Wet Density	Wet Weight	Wet Volume	Wet Density	Wet Weight	Wet Volume	Wet Density	Wet Weight
1	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
2	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
3	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
4	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
5	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
6	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
7	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
8	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
9	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
10	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
11	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
12	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
13	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
14	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
15	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
16	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
17	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
18	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
19	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
20	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
21	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
22	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
23	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
24	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
25	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
26	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
27	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
28	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
29	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0	100.0	1.000	100.0
30	20	100.0	100.0	1.000	100.0	100.0	1.000	100.0			

PLASTIC LIMIT



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 69

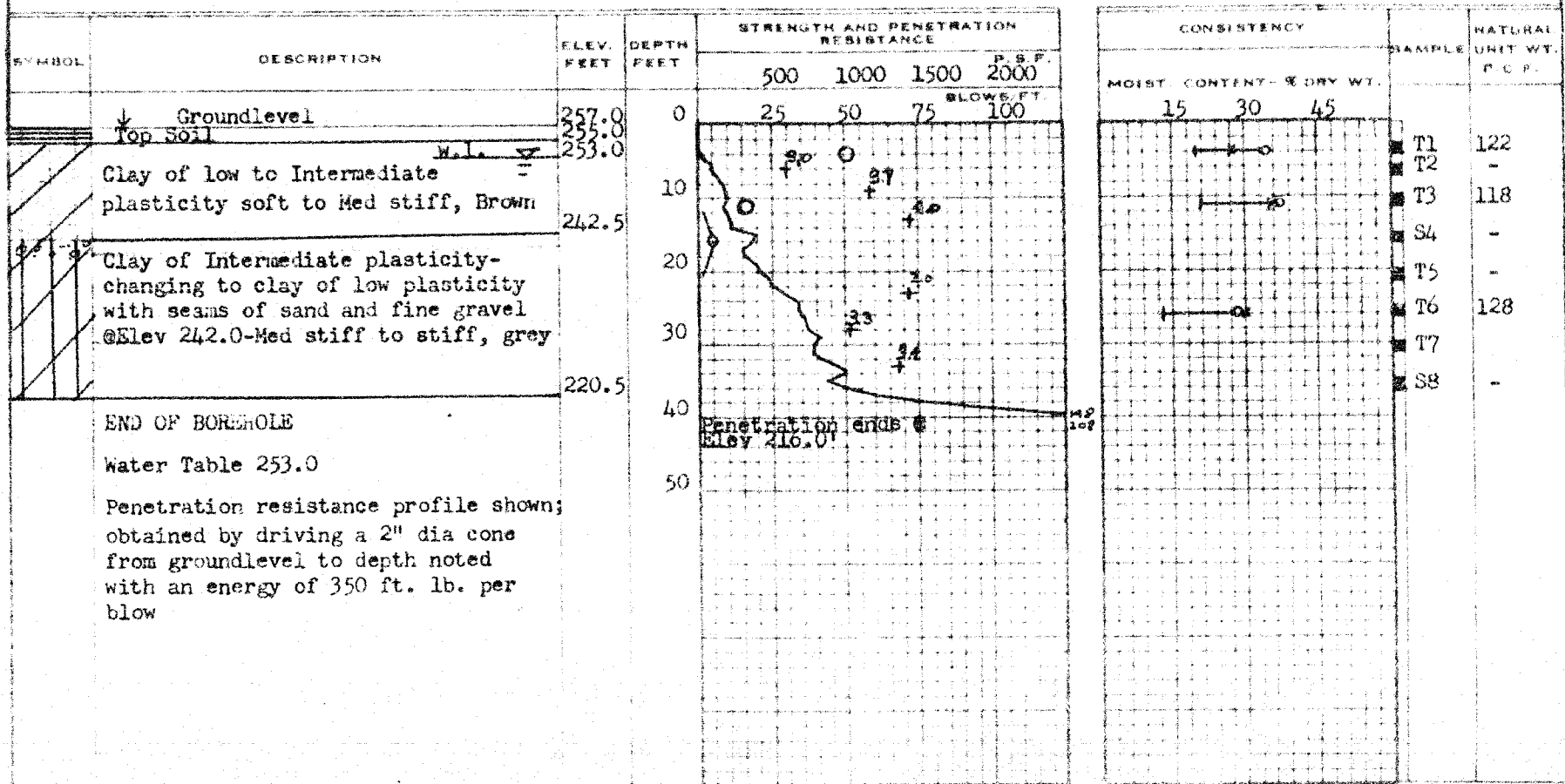
JOB 60-F-14 STATION 449+50 E.B.L. 75' R/L

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

BORING DATE May 5/60 CHECKED BY M.D.&K.S.

LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

W.P. 140-57-1
 231-58-2
 231-58-3

JOB 60-F-14

DATUM 255.0'

BORING DATE Jan 28/60

BORE HOLE NO. 500

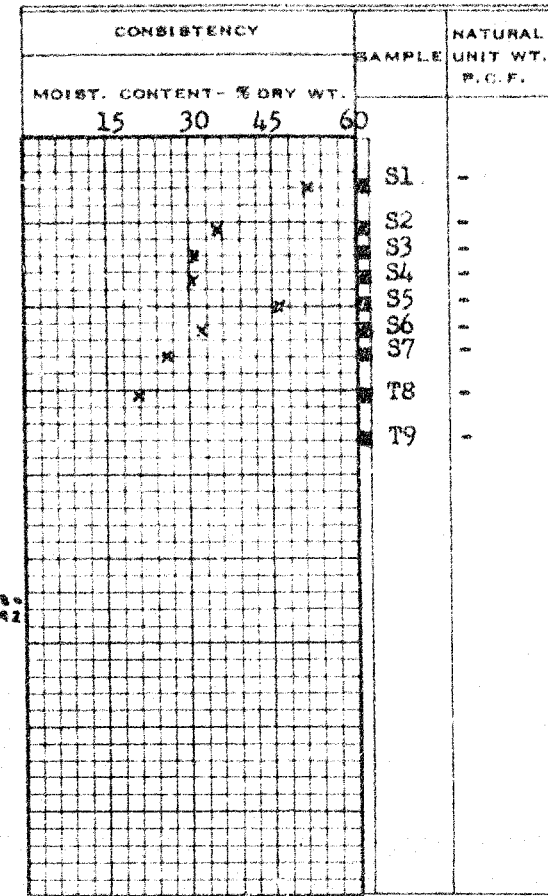
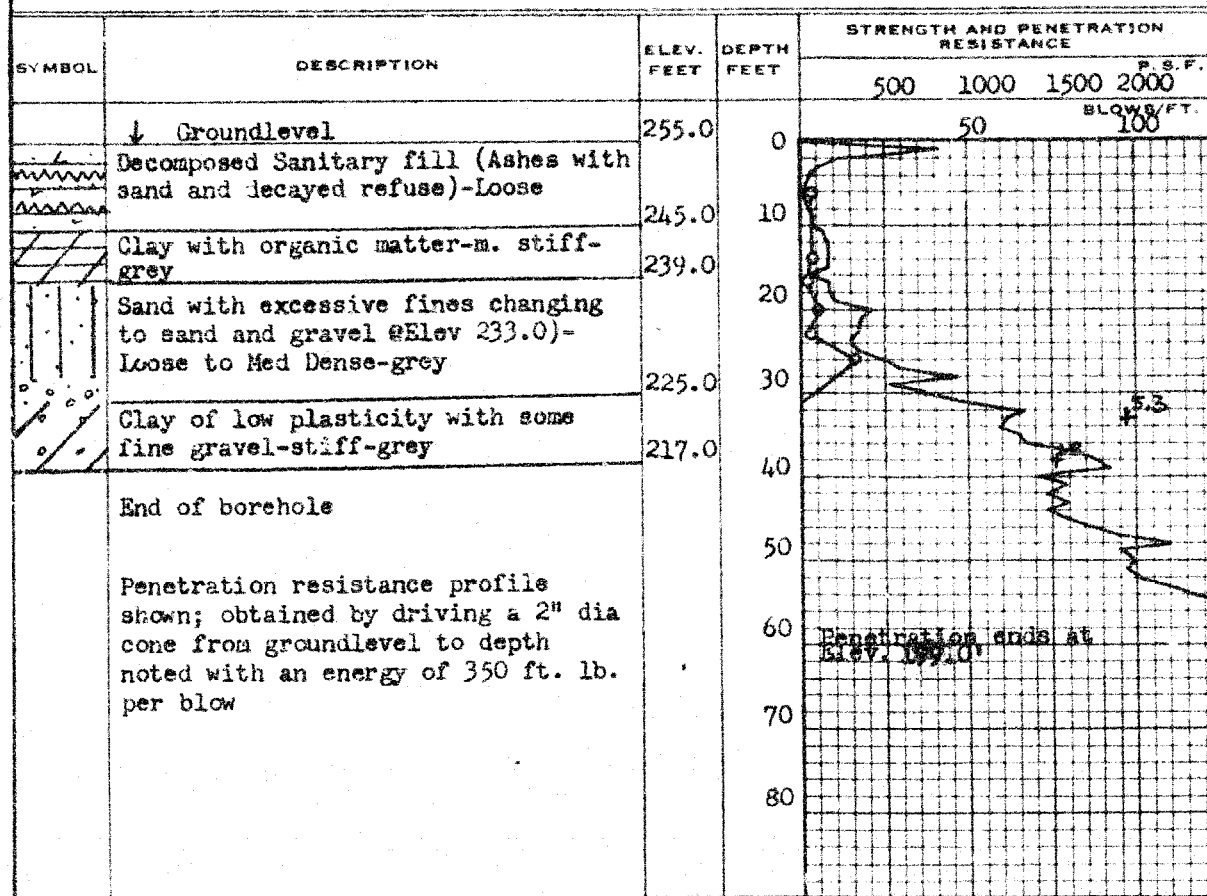
STATION 429+42 E

COMPILED BY B.K.

CHECKED BY M.D.

LEGEND

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



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

JOB 60-F-14

DATUM 249.0'

BORING DATE May 12/60

BORE HOLE NO. 605

STATION 401+10 (140' Rt)

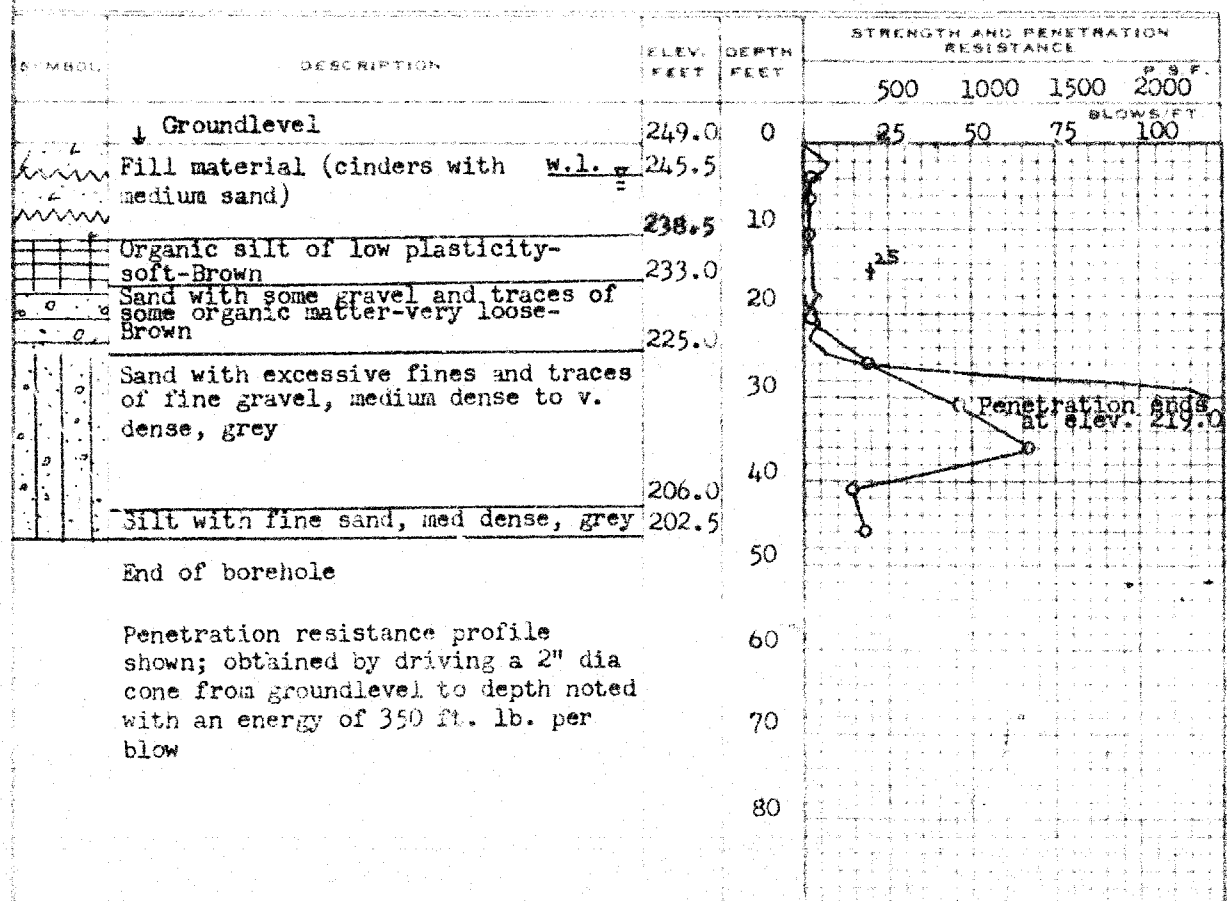
COMPILED BY B.K.

CHECKED BY M.D.

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 \square
LIQUID LIMIT \square
PLASTIC LIMIT \square



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

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 606

JOB 60-F-14

STATION 404+95 (153Rt)

DATUM 311.0'

COMPILED BY B.K.

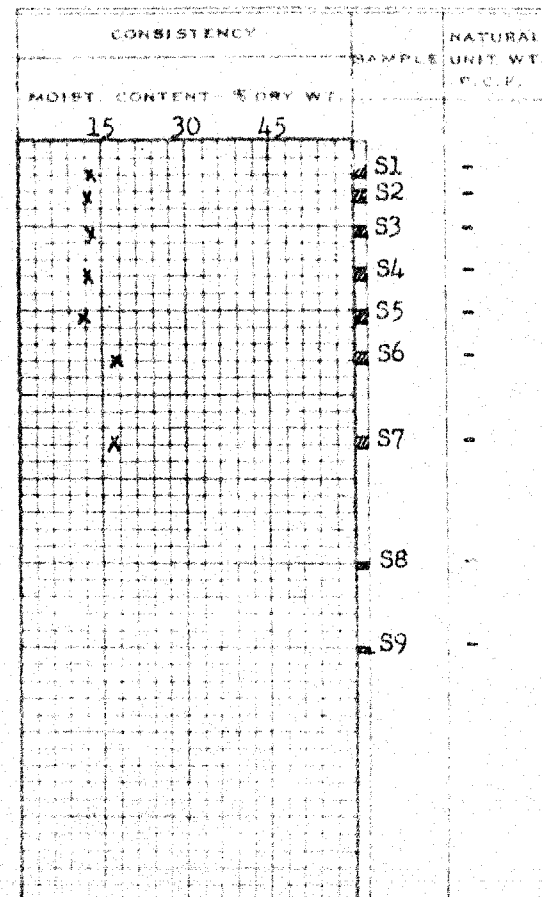
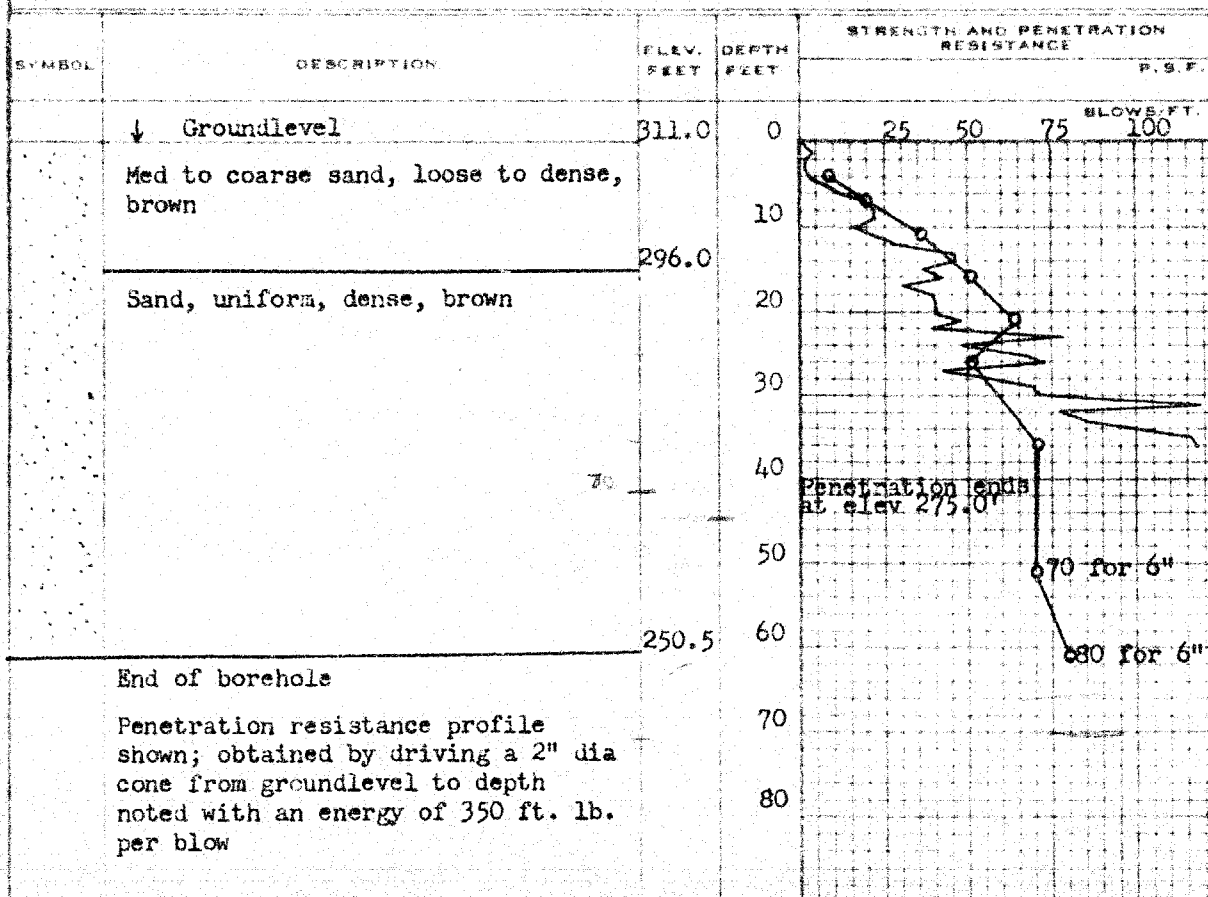
BORING DATE May 12/60

CHECKED BY M.D.

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 11
LIQUID LIMIT
PLASTIC LIMIT



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1
231-58-2
W.P. 231-58-3

JOB 60-F-14

DATUM 251.0'

BORING DATE May 16/60

BORE HOLE NO. 607

STATION 407+30 (135 ft. Rt.)

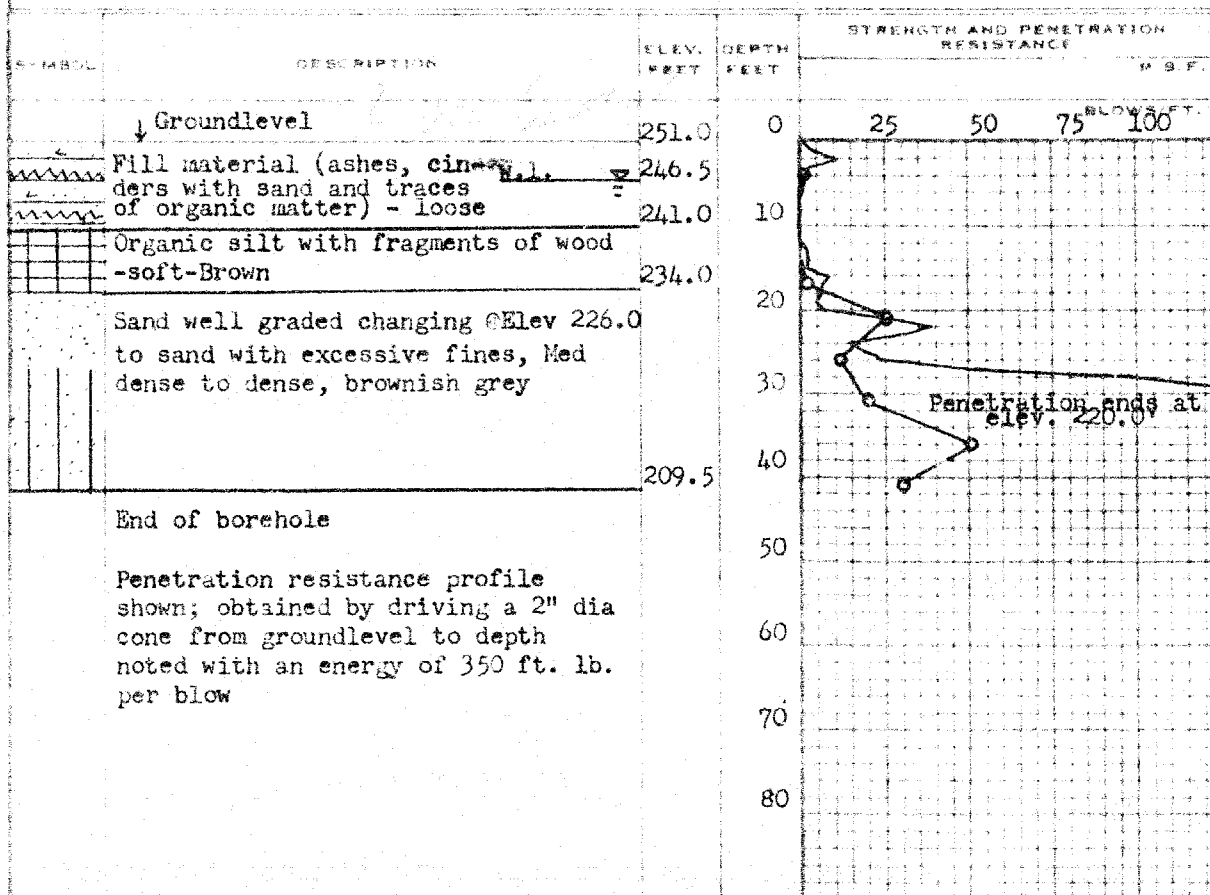
COMPILED BY B.K.

CHECKED BY K.D.

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) 1/2
NATURAL MOISTURE AND LIQUIDITY INDEX 11
LIQUID LIMIT 100
PLASTIC LIMIT 1



CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT	FLUIDITY	W.T.		
15	30	45		
			S1	-
			S2	-
			S3	-
			S4	-
			S5	-
			S6	-
			S7	-
			S8	-
			S9	-

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 609

JOB 60-F-14

STATION 398+56 (200ft)

DATUM 251.0'

COMPILED BY B.K.

BORING DATE May 17/60

CHECKED BY M.D.

2" DIA. SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

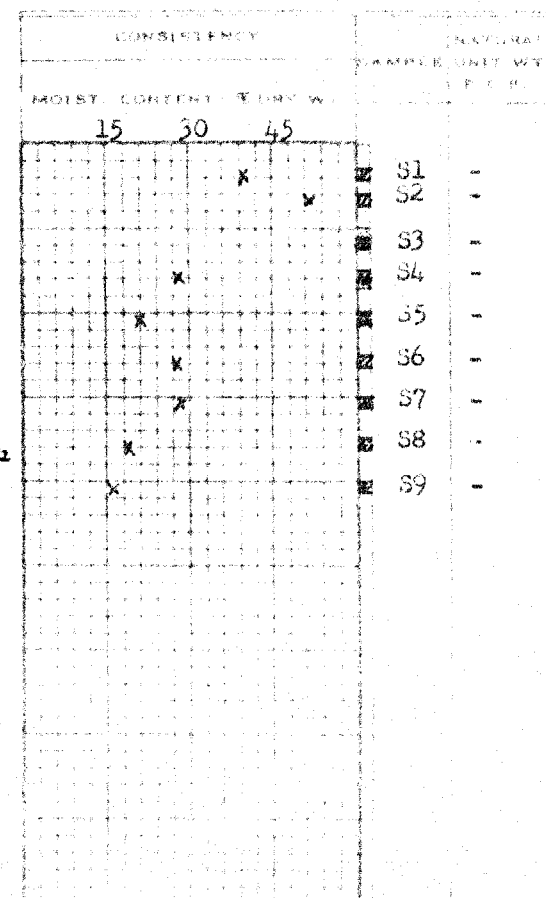
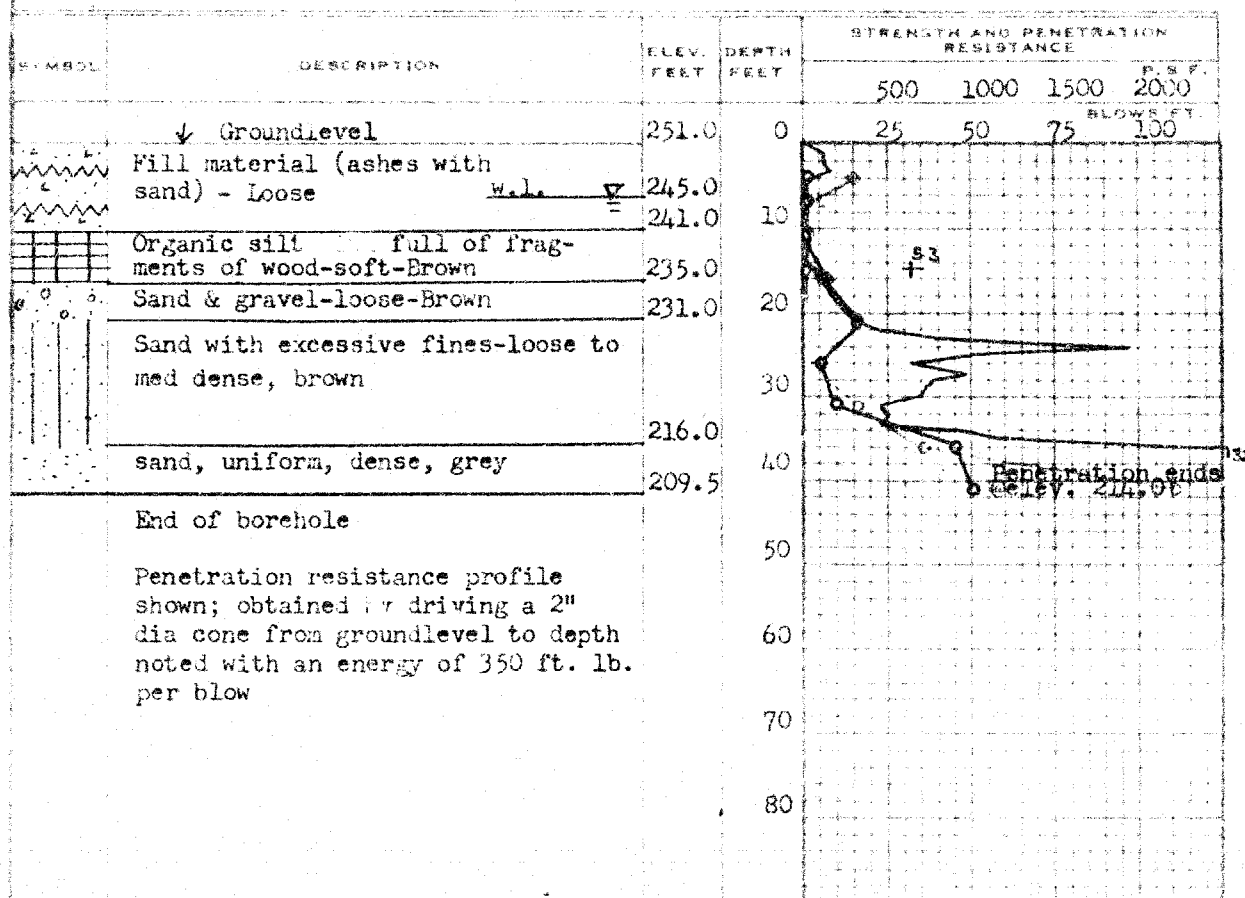
2" DIA. CONE

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 —



DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

231-58-3

BORE HOLE NO. 610

JOB 60-F-14

STATION 404+95 (30Rt)

DATUM 252.0'

COMPILED BY B.K.

BORING DATE May 18/60

CHECKED BY M.D.

2" DIA. SPLIT TUBE _____

2" SHELBY TUBE _____

2" SPLIT TUBE _____

2" DIA. CONE _____

2" SHELBY _____

CASING _____

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) _____ 0

VANE TEST (C) AND SENSITIVITY (S) _____ 4%

NATURAL MOISTURE AND LIQUIDITY INDEX _____ 11

LIQUID LIMIT _____ 0

PLASTIC LIMIT _____ 1

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P S F	BLOWS FT.
	↓ Groundlevel	252.0	0		
	Fill material (ashes)-loose	247.5			
	Organic clay-soft-changed @ Elev 244.0 sand with excessive fines	242.5	10		
	End of borehole		20		

CONSISTENCY			SAMPLE	NATURAL UNIT WT. P.C.P.
MOIST. CONTENT	DRY WT.			
15	30	45		
*			Sl	-

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1

231-58-3

231-58-2

BORE HOLE NO. 611

STATION 398+60 (198ft. Rt. E)

COMPILED BY B. K.

CHECKED BY M. D.

JOB 60-F-14

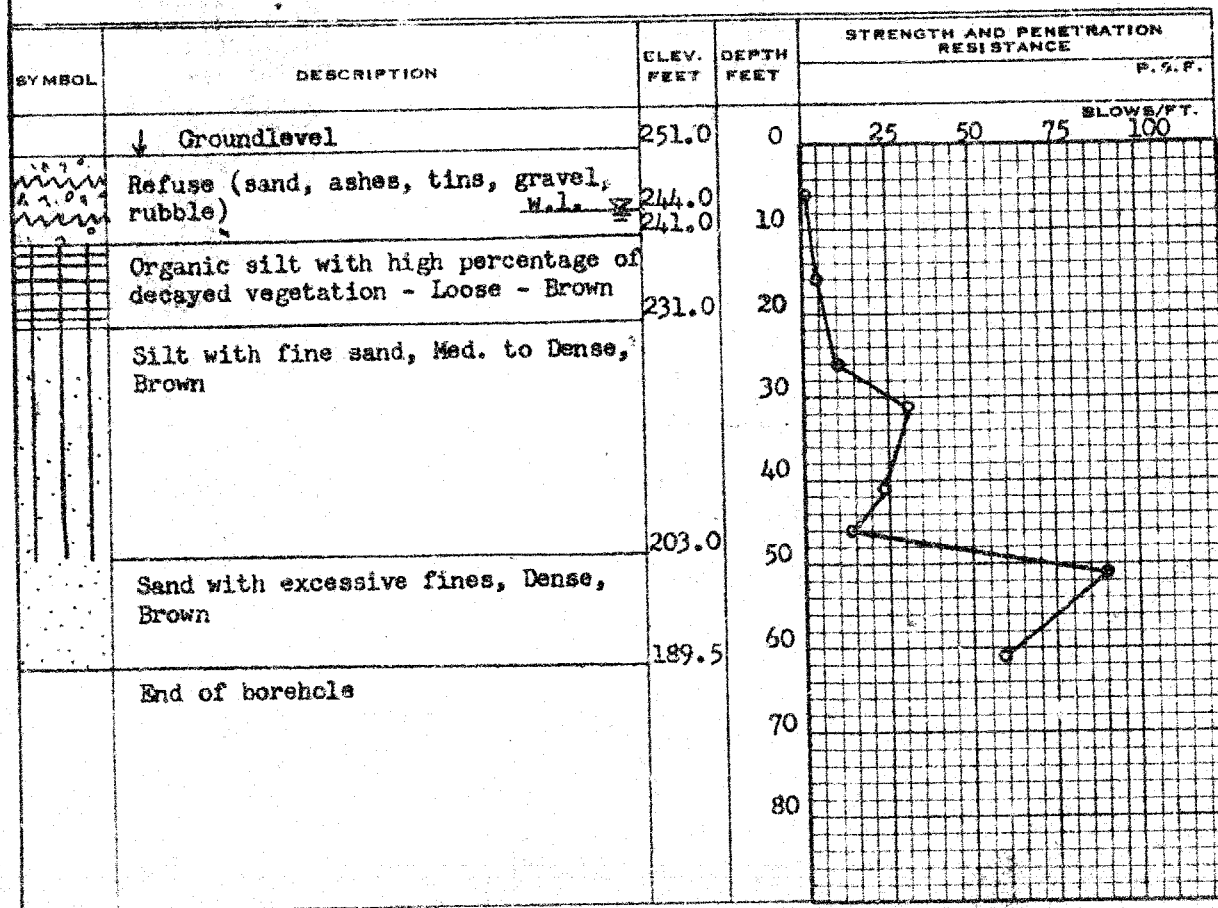
DATUM 251.0'

BORING DATE Feb. 3/60

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 --- X
 LIQUID LIMIT --- \circ
 PLASTIC LIMIT --- |



CONSISTENCY	SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT - % DRY WT.		
20 40 60 80		
	S1	-
	S2	-
	S3	-
	S4	-
	S5	-
	S6	-
	S7	-
	S8	-

DEPARTMENT OF HIGHWAYS - ONTARIO MATERIALS AND RESEARCH SECTION

140-57-1

231-58-3

W.P. 231-58-2

BORE HOLE NO. 512

JOB 60-F-14

STATION 400/65 (155ft Rt of E)

DATUM 251.0'

COMPILED BY B. K.

BORING DATE Dec. 22/60

CHECKED BY M. D.

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 — —

SYMBOL	DESCRIPTION	ELEV. FEET	DEPTH FEET	STRENGTH AND PENETRATION RESISTANCE	
				P.S.F.	BLOWS/FT.
	Groundlevel	251.0	0		
	Ashes, sand, gravel & Refuse - Loose	244.0	7		
	Organic silt with high percentage of decayed vegetation - Loose - Brown	233.0	18		
	Silt with fine sand and with pockets of clay, loose to Dense, Gray Brown	191.0	60		
	Sand with excessive fines and with pockets of clay, Med. Dense, Gray	184.5	66		
	End of borehole		80		

CONSISTENCY				SAMPLE	NATURAL UNIT WT. P.C.F.
MOIST. CONTENT- % DRY WT.					
20	40	60	80		
				S1	-
				S2	-
				S3	-
				S4	-
				S5	-
				S6	-
				S7	-
				S8	-
				S9	-

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

JOB 60-F-14

DATUM 260.0'

BORING DATE June 24/60

BORE HOLE NO. 624

STATION 411+75 (185' Rt.)

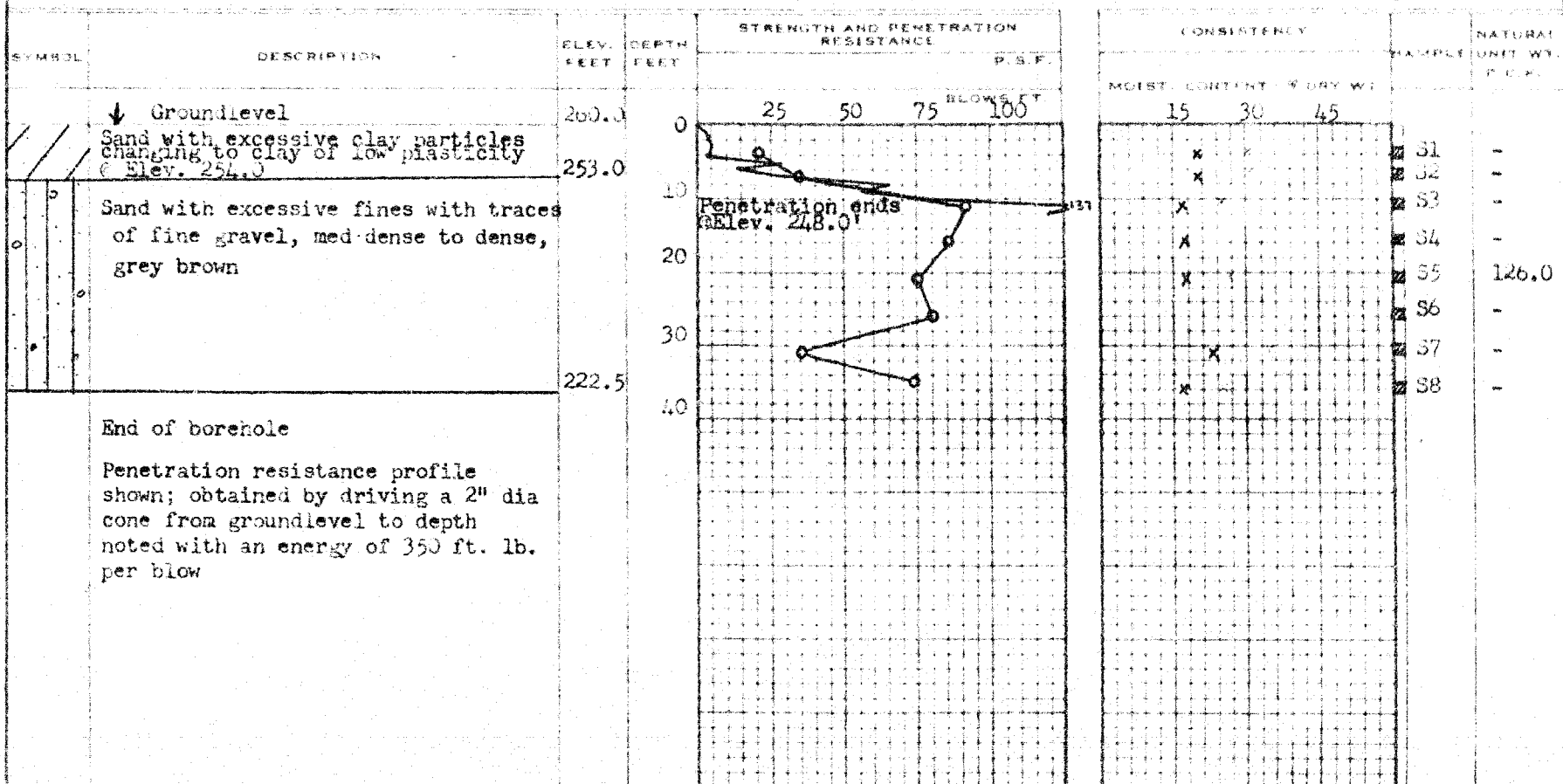
COMPILED BY B.K.

CHECKED BY M.D.

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

140-57-1
231-58-2
W.P. 231-58-3

BORE HOLE NO. 701

JOB 60-F-14

STATION 19+00 (160ft Rt of E)
Ramp B

DATUM 294.5'

COMPILED BY B.K.

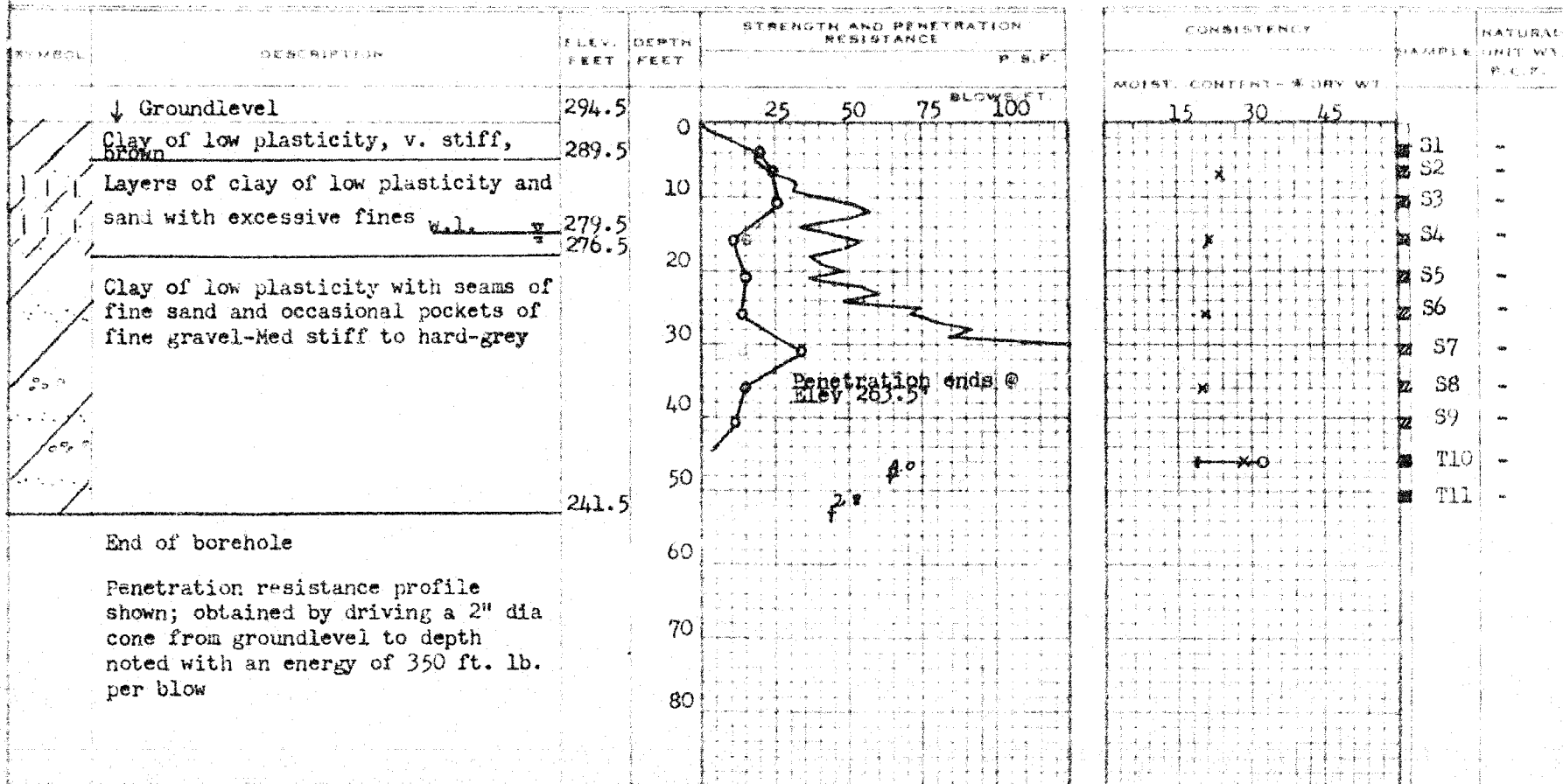
BORING DATE May 25/60

CHECKED BY M.D.

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

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 702

JOB 60-F-14

STATION 20+45 (80' RT of E
Ramp B)

DATUM 276.0'

COMPILED BY B.K.

BORING DATE May 26/60

CHECKED BY M.D.

2" DIA SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2" DIA CONE

2" SHELBY

CASING

LEGEND

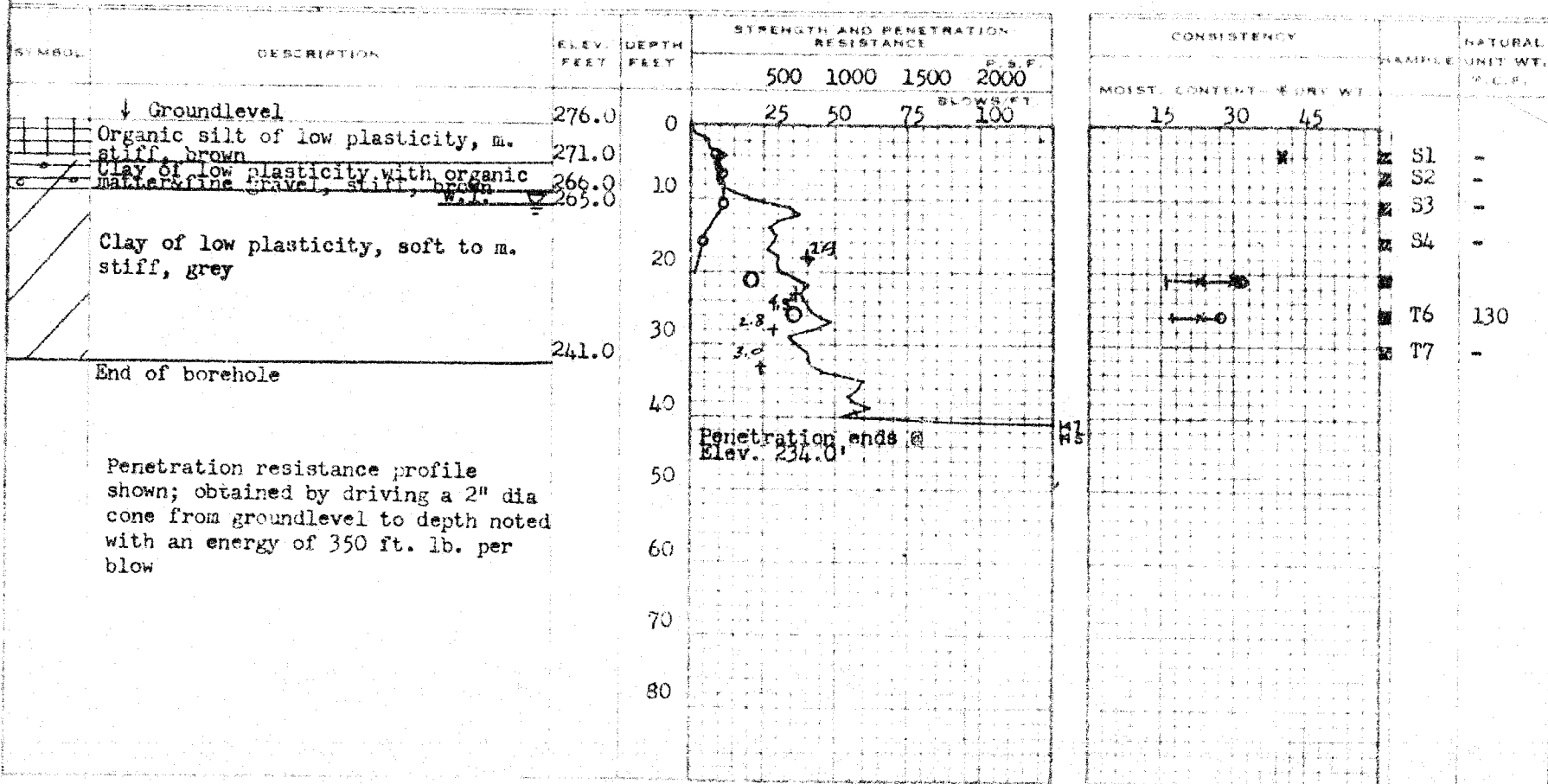
1/2 UNCONFINED COMPRESSION (Qu) O

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

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 703

JOB 60-F-14

STATION 492+30 (30 ft. of EE.B. 1" DIA. SPLIT TUBE

DATUM 288.0'

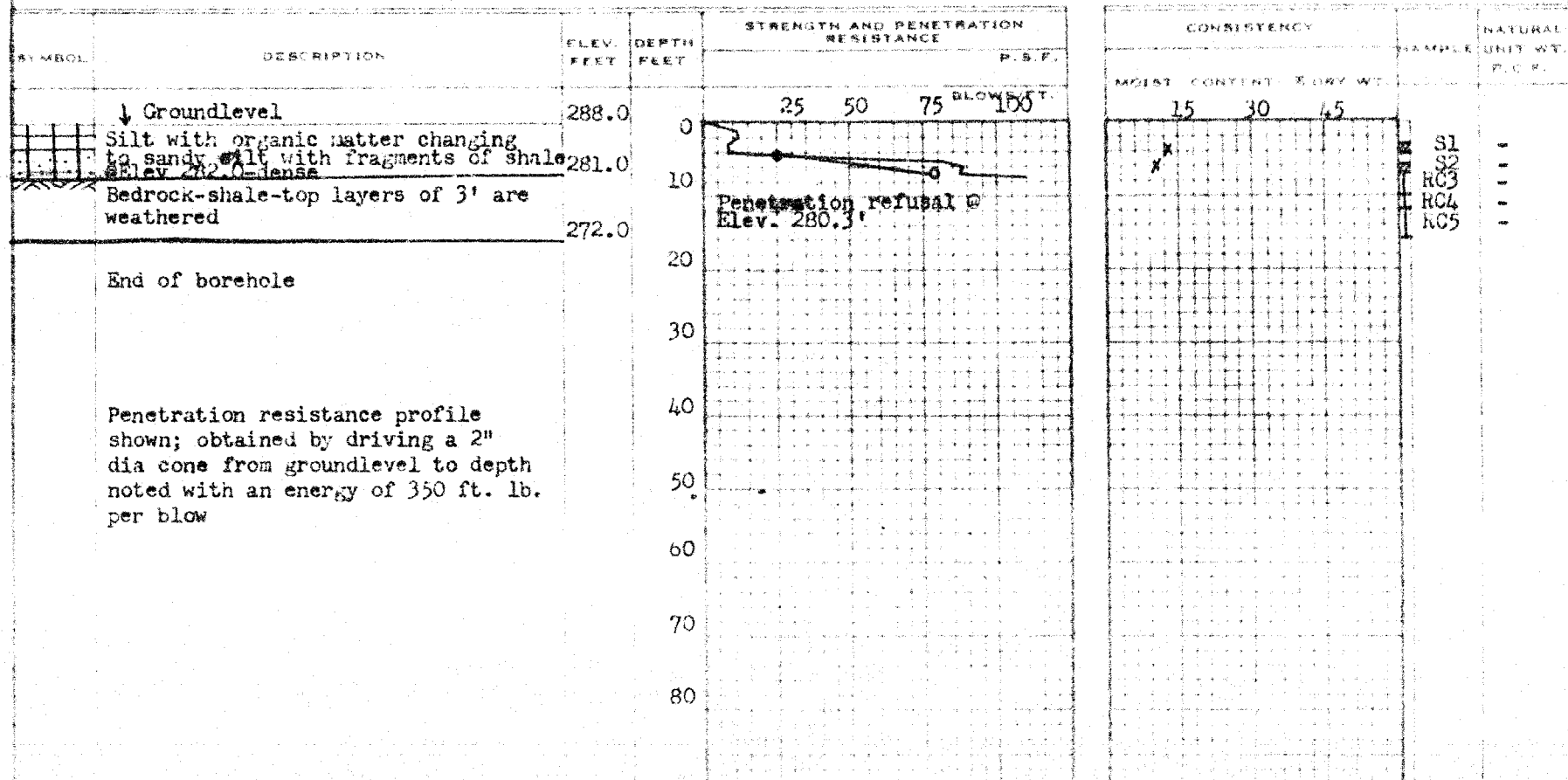
COMPILED BY B.K.

BORING DATE May 28/60

CHECKED BY M.D.

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u) — 0
 VANE TEST (C) AND SENSITIVITY (S) — +
 NATURAL MOISTURE AND LIQUIDITY INDEX — 11
 LIQUID LIMIT — 11
 PLASTIC LIMIT — 11



OFFICE REPORT ON SOIL EXPLORATION

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

JOB 60-F-14

DATUM 289.0'

BORING DATE May 30/60

BORE HOLE NO. 704

STATION 25+70 (Port of E
Ramp 'B')

COMPILED BY B.K.

CHECKED BY H.D.

2" DIA SPLIT TUBE

2" SHELBY TUBE

2" SPLIT TUBE

2" DIA CONE

2" SHELBY

CASING

LEGEND

1/2 UNCONFINED COMPRESSION (Q_u)

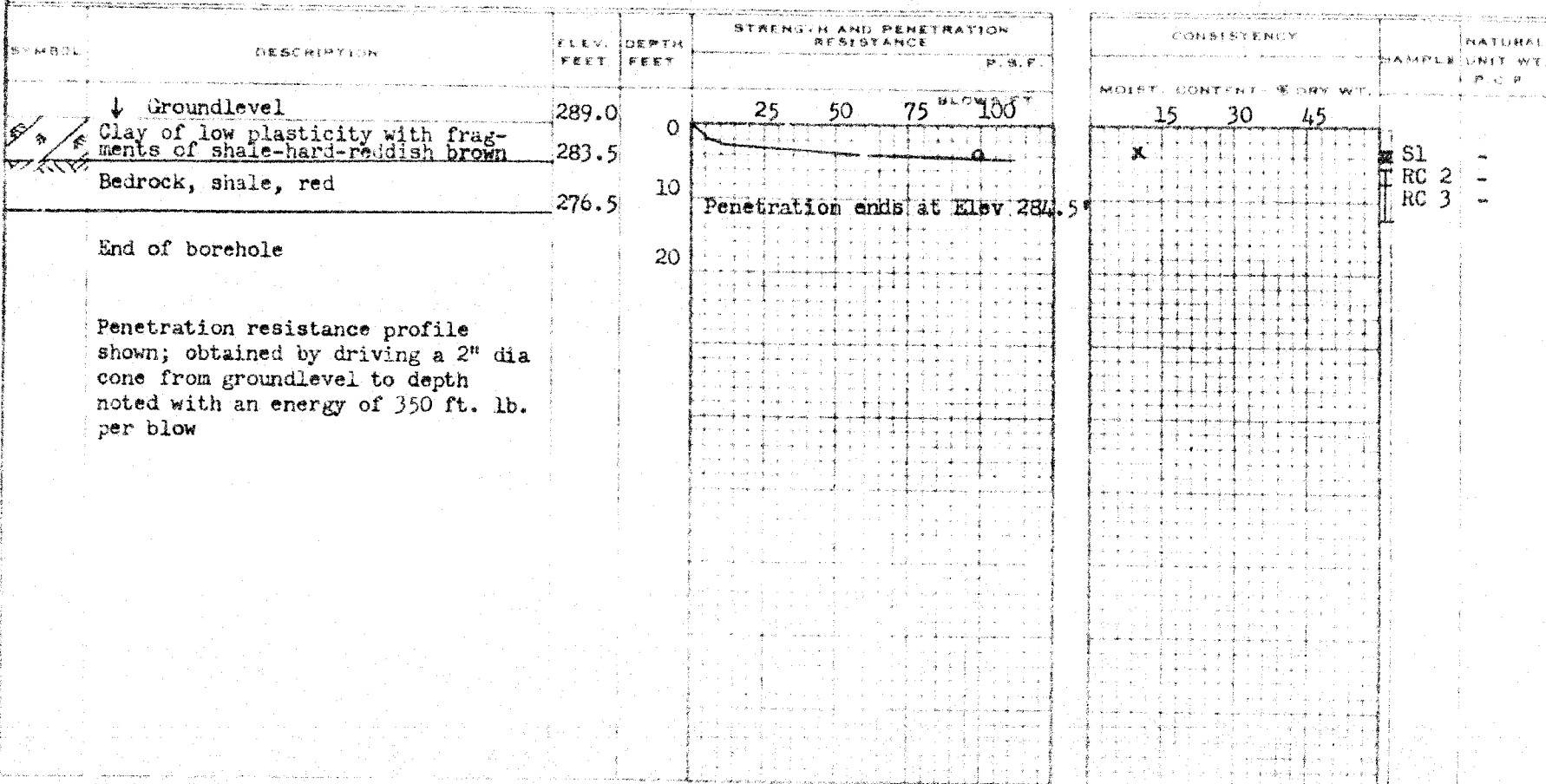
VANE TEST (C) AND SENSITIVITY (S)

NATURAL MOISTURE AND

LIQUIDITY INDEX

LIQUID LIMIT

PLASTIC LIMIT



DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS AND RESEARCH SECTION

140-57-1

231-58-2

W.P. 231-58-3

BORE HOLE NO. 705

JOB 60-F-14

STATION 497+20 (170' R.C.E.B.L.)

DATUM 291.0'

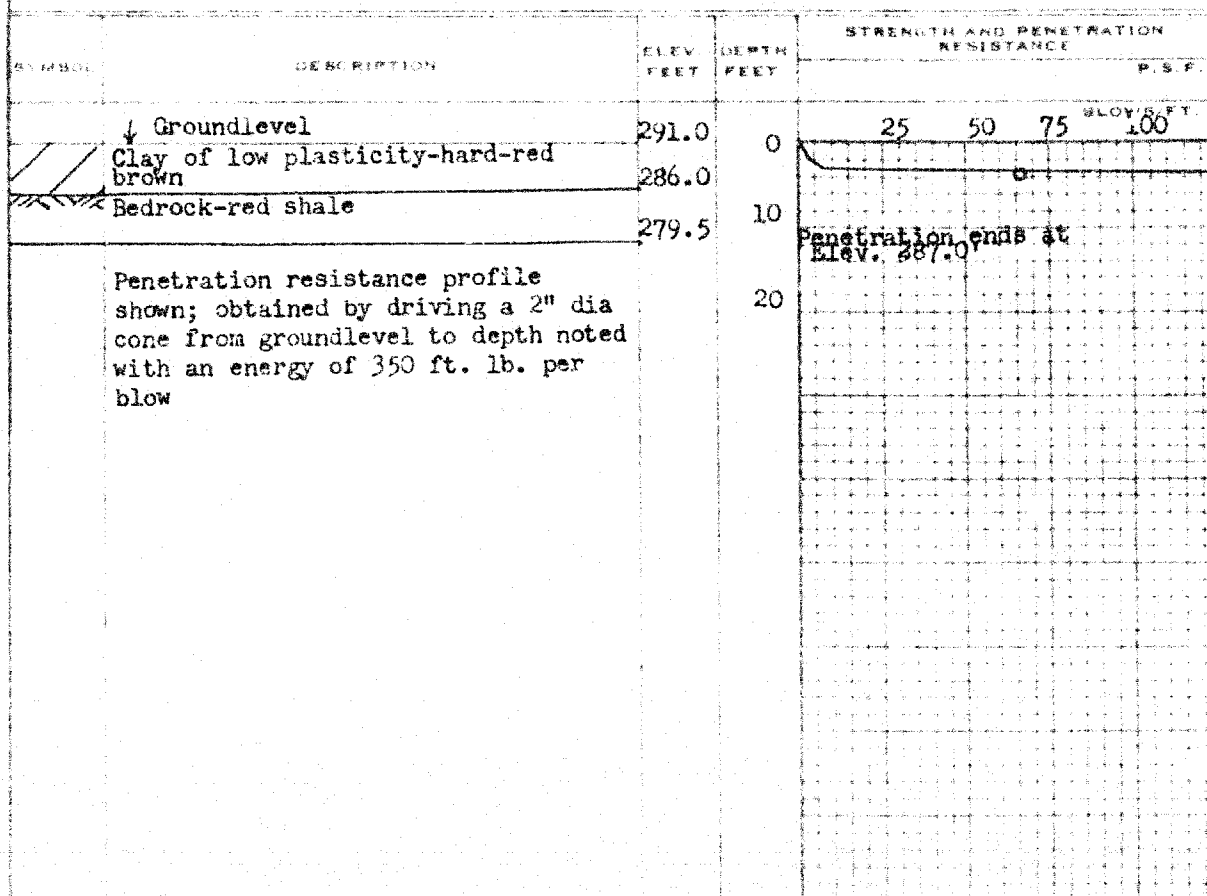
COMPILED BY B.K.

BORING DATE May 31/60

CHECKED BY H.D.

LEGEND

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



CONSISTENCY	SAMPLE	NATURAL UNIT WT P.C.P.
MOIST. CONTENT - % DRY WT		
	S1	-
	RC2	-

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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.I.	UNIT WEIGHT P.C.F.	REMARKS
1	S1	5'-6.5'	Sand with excessive fines, Med Dense brown	28	16.6	-	-	-	-	
	S2	10'-11.5'	" " , Dense , Brown	36	17.4	-	-	-	-	
	S3	15'-16.5'	Sand with excessive fines with seams of clay-very dense-Brown	56	20.2	-	-	-	-	
	S4	20'-21.5'	Silt of low plasticity with fine sand-Hard Brown	69	20.0	21.3	27.6	-	-	
	S5	25'-26.5'	Sand with excessive fines-very Dense-Brown	>100	18.5	-	-	-	-	
	S6	30'-31.5'	" " " "	>100	19.4	-	-	-	-	
	S7	35'-36.5'	" " " "	>100	21.2	-	-	-	-	
	S8	40'-41.5'	" " " "	72	16.2	-	-	-	-	
	S9	45'-46.5'	" " " "	>100	16.5	-	-	-	-	
	S10	50'-51.5'	" " " "	>100	19.6	-	-	-	-	
	S11	55'-56.5'	Sand with excessive fines-very Dense-grey brown	>100	18.3	-	-	-	-	
	W12	60'-61.5'	" " " "	-	28.0	-	-	-	-	
	W13	65'-66.5'	Sand with excessive fines-grey Brown	-	20.0	-	-	-	-	
	W14	70'-71.5'	Silt with fine sand-grey Brown	-	24.5	-	-	-	-	
	W15	75'-76.5'	" " " "	21.8	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
2	S1	5'-6.5'	Silt with fine sand and with pockets of clay-Med Dense-Brown	17	19.3	-	-	-	-	
	S2	10'-11.5'	Sand with excessive fine-Very Dense Brown	86	18.4	-	-	-	-	
	S3	15'-16.5'	Sand with excessive fines-Med Dense Brown	28	26.6	-	-	-	-	
	S4	20'-21.5'	Sand with excessive fines-pockets of clay-Dense-Brown	42	20.3	-	-	-	-	
	S5	25'-26'	Sand with excessive fines-Very Dense grey brown	85	20.9	-	-	-	-	
	S6	30'-31.5'	Sand with excessive fines-Very Dense grey brown	110	19.3	-	-	-	-	
	S7	35'-36.5'	" " " "	84	19.0	-	-	-	-	
	S8	40'-41.5'	Sandy Silt-Very Dense-grey	116	20.2	-	-	-	-	
	S9	45'-46.5'	Sandy Silt-Dense-grey	36	19.8	-	-	-	-	
	S10	50'-51.5'	Clayey Silt-Very stiff-grey	26	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-2

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	5'-6.5'	Gravelly sand, well graded with some fines-Very loose-Brown	2	20.5	-	-	-	-	
	S2	10'-11.5'	Sand with excessive fines with seams of clay-Med Dense-Brown	28	20.9	-	-	-	-	
	S3	15'-16.5'	Sand with excessive fines with seams of clay-Very Dense-Brown	76	18.3	-	-	-	-	
	S4	20'-21.5'	Sand with excessive fines-Very Dense Brown	70	19.3	-	-	-	-	
	S5	25'-26.5'	" " " "	110	18.6	-	-	-	-	
	S6	30'-31.5'	" " " "	121	20.1	-	-	-	-	
	S7	35'-36.5'	" " " "	114	16.5	-	-	-	-	
	S8	40'-41.5'	" " " "	>100	20.8	-	-	-	-	
	S9	45'-46.5'	Sand with excessive fines-Very Dense grey	67	20.2	-	-	-	-	
	S10	50'-51.5'	Sandy Silt with clay-Dense-grey	59	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
231-58-2
W.P. 231-58-3
140-57-1

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	S1	5'-6.5'	Decomposed Sanitary fill (Ashes, cinders sand & refuse)	P	-	-	-	-	-	
	S2	10'-11.5'	Organic matter (Peat) mixed with ashes & cinders.	P	164.0	-	-	-	-	
	S3	15'-16.5'	" " "	1	181.0	-	-	-	-	
	S4	20'-21.5'	" " "	2	247.0	-	-	-	-	
	S5	25'-26.5'	Sand with excessive clay particles and fragments of wood-Dense-grey Brown	39	25.4	-	-	-	-	
	S6	30'-31.5'	Sand well graded - Dense-grey	32	13.1	-	-	-	-	
	S7	35'-36.5'	Clay of low plasticity-Very stiff-grey	16	22.7	14.4	23.1	-	-	
	T8	40'-41.5'	" " " "	P	22.8	15.7	26.9	1930	129	
	VANE	43'		-	-	-	-	1440	-	Sens: 3.3
	T9	45'-46.5'	" " " "	P	35.0	-	-	1700	120	
	S10	50'-51.5'	" " " "	12	20.5	17.1	32.4	-	-	
	VANE	53'		-	-	-	-	1630	-	Sens: .1
	T11	55'-56.5'	" " " "	P	22.3	16.9	28.9	2120	131	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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	S1	5'-6.5'	Sand with excessive fines-Dense-Brown	34	18.6	-	-	-	-	
	S2	10'-11.5'	Sandy Silt-Dense-Brown	48	19.9	-	-	-	-	
	S3	15'-16.5'	Sand with excessive fines-V. Dense Brown	57	18.2	-	-	-	-	
	S4	20'-21.5'	" " -Dense-Brown	30	21.6	-	-	-	-	
	S5	25'-26.5'	Sand with excessive fines-V. Dense-Brown	>100	17.4	-	-	-	-	
	S6	30'-31.5'	" " "	83	20.0	-	-	-	-	
	S7	35'-36.5'	" " "	59	18.8	-	-	-	-	
	S8	40'-41.5'	40-40.5 Sand with excessive fines-Brown							
			40.5-41.5 Clay - V. stiff	16	23.2	-	-	-	-	
	S9	45'-46.5'	Sand with excessive fines-Dense-grey	47	17.5	-	-	-	-	
	S10	50'-51.5'	50-51.0 Sand with excessive fines-Dense-grey							
			51.0-51.5 Clay of low plasticity-Hard-grey	44	18.7	14.7	25.0	-	-	
	T11	55'-56.5'	Clay of low plasticity-V. stiff-grey	P	22.1	-	-	-	131	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 211-58-2
211-58-3

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
6	S1	5'-6.5'	Fill material (ashes, cinders, clay with decayed vegetation & fragments of wood)	2	-	-	-	-	-	
	S2	10'-11.5'	" " " "	1	101.0	-	-	-	-	
	S3	15'-16.5'	Organic clay of high plasticity with fragments of wood-Dark brown	1	150.0	-	-	-	-	
	S4	20'-21.5'	" " "	P	203.0	185.0	264.0	-	-	
	S5	25'-26.5'	25-26.0 Organic clay of high plasticity 26-26.5 Sand with excessive fines	19	25.4	160.0	287.0	-	-	
	S6	30'-31.5'	Sand with excessive fines and with seams of clay-Med Dense-grey brown	22	20.4	-	-	-	-	
	S7	35'-36.5'	Clay of low plasticity-V. stiff-grey	15	15.1	-	-	-	-	
	T8	40'-41.5'	Clay of low plasticity-V. stiff-grey	P	23.2	-	-	1480	128	
	T9	45'-46.5'	Clay of low plasticity-V. stiff-grey	P	25.1	19.3	34.7	-	-	
	VANE	48'		-	-	-	-	1600	-	Sens: 1.8

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14

140-57-1

W.P. 231-58-2

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
7	S1	5'-6.5'	Fill material (ashes, cinders, sand) Loose	1	38.8	-	-	-	-	
	S2	10'-11.5'	" " " "	1	-	-	-	-	-	
	S3	15'-16.5'	Sand with excessive fines, and with some gravel very Dense-Brown	76	21.9	-	-	-	-	
	S4	20'-21.5'	" " " "	67	17.1	-	-	-	-	
	S5	25'-26.5'	Sand with excessive fines-Med Dense-Brown	20	18.1	-	-	-	-	
	S6	30'-31.5'	Silt with fine sand-Med Dense-grey	18	16.9	-	-	-	-	
	S7	35'-36.5'	" " " "	-	19.9	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
170-57-1
W.P. 231-58-2
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'	Fill material (ashes, organic clay, cinders)	8	34.9	-	-	-	-	
	S2	10'-11.5'	Organic clay of high plasticity with ashes-grey brown	2	50.0	39.4	72.3	-	-	
	S3	15'-16.5'	" " "	3	23.6	-	-	-	-	
	S4	20'-21.5'	" " "	9	50.0	31.3	62.0	-	-	
	S5	25'-26.5'	Sand with excessive fines and with some gravel-Loose grey brown	7	19.7	-	-	-	-	
	S6	30'-31.5'	Gravelly sand, well graded-Dense-grey	37	13.4	-	-	-	-	
	S7	35'-36.5'	Clay of low plasticity-V. stiff-grey	20	17.6	16.8	24.8	-	-	
	T8	40'-41.5'	" " "	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1920	-	Sens: 2.2
	T9	45'-46.5'	" " " "	P	23.5	-	-	1930	129	
	VANE	48'		-	-	-	-	>2000	-	Sens: -

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
9	S1	5'-6.5'	Organic clay of high plasticity-Med stiff-grey brown	6	-	-	-	-	-	
	S2	10'-11.5'	Organic clay of high plasticity, with fragments of wood, ashes-Med stiff-grey brown	3	60.9	40.6	72.2	-	-	
	S3	15'-16.5'	Gravelly sand, well graded, with some clay particles and some organic matter	10	23.6	-	-	-	-	
	S4	20'-21.5'	Sand with excessive fines and with slight traces of gravel-Med Dense-grey	25	-	-	-	-	-	
	S5	25'-26.5'	Sand with excessive fines-Dense-grey	69	17.4	-	-	-	-	
	S6	30'-31.5'	Sand with excessive fines, seams of clay-Med Dense-grey	29	17.3	-	-	-	-	
	S7	35'-36.5'	35-35.5 Clay of low plasticity-grey 35.5-36.5 Sand with excessive fines-Med Dense-grey	33	13.4	-	-	-	-	
	S8	40'-41.5'	Sand with excessive fines-Dense-grey	47	13.5	-	-	-	-	
	S9	45'-46.5'	Silt with fine sand-Med Dense-grey	16	18.5	-	-	-	-	
	S10	50'-51.5'	Clay with fine sand-V. stiff-grey	24	19.3	-	-	-	-	
	T11	55'-56.5'	" " " "	P	13.7	-	-	-	-	
	VANE	59'		-	-	-	-	1600	-	Sens: 2.0

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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	S1	10'-11.5'	Clay with organic matter including fragments of wood-Med stiff-grey	3	44.6	-	-	-	-	
	VANE	13'		-	-	-	-	640	-	Sens: 4.6
	S2	15'-16.5'	" " " "	5	33.1	-	-	-	-	
	VANE	18'		-	-	-	-	800	-	Sens: 4.4
	S3	25'-26.5'	25-26.0 Coarse sand-grey brown 26-26.5 Clay with organic matter and decayed refuse.	4	-	-	-	-	-	
	S4	30'-31.5'	Clay with fine sand-Hard-grey	32	16.1	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-3

HOIE 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	S1	5'-6.5'	Sand with excessive fines, V. dense, brown	60	9.5	-	-	-	-	
	S2	10'-11.5'	" " " "	58	11.2	-	-	-	-	
	S3	15'-16.5'	" " " "	78	14.0	-	-	-	-	
	S4	20'-21.5'	" " " "	101	15.9	-	-	-	-	
	S5	25'-26.5'	Sand with excessive fines and seams of silt-very dense-brown	79	18.2	-	-	-	-	
	S6	30'-31.5'	Clay with fine sand of low plasticity Hard-brown	45	17.5	-	-	-	-	
	S7	35'-36.5'	Clay with fine sand of low plasticity-Hard grey	34	20.7	18.5	32.6	-	-	
	S8	40'-41.5'	Sand with excessive fines-Dense-grey	44	17.7	-	-	-	-	
	S9	45'-46.5'	Sand with alternative layers of clay-Dense-grey	48	18.7	-	-	-	-	
	S10	50'-51.5'	Silt with fine sand-Dense-grey	56	16.6	-	-	-	-	
	S11	55'-56.5'	Sand with excessive clay particles-Dense-grey	100	12.9	-	-	-	-	
	S12	60'-61.5'	Sand with excessive fines-Dense-grey	109	12.7	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14

E40-57-1

W.P. 231-58-2

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 PSI	UNIT WEIGHT pcf	REMARKS
12	S1	5'-6.5'	Sand with excessive fines-Loose-Brown	4	18.0	-	-	-	-	
	S2	10'-11.5'	" " " "-Med Dense-Brown	22	15.2	-	-	-	-	
	S3	15'-16.5'	" " " " " "	28	20.4	-	-	-	-	
	S4	20'-21.5'	Clay of low plasticity, Hard, grey	24	21.8	16.6	25.6	-	-	
	S5	25'-26.5'	Layers of clay, silt & fine sand-grey	27	18.2	-	-	-	-	
	S6	30'-31.5'	Alternate layers of silt & fine sand-grey	-	16.9	-	-	-	-	
	S7	35'-36.5'	Sand with excessive fines-grey	-	22.8	-	-	-	-	
	S8	40'-41.5'	Silt-Dense-grey	45	20.6	-	-	-	-	
	S9	45'-46.5'	Sand with excessive fines-Dense-grey	71	14.5	-	-	-	-	
	S10	50'-51.5'	" " " "	84	13.7	-	-	-	-	
	S11	55'-56.5'	Clay of low plasticity-Hard-grey	31	15.4	14.4	23.0	-	-	
	S12	60'-61.5'	" " " "	-	20.4	15.1	25.2	-	-	
	T13	65'-66.5'	Clay of low plasticity-stiff-grey	P	23.1	16.3	29.2	1150	125	
	VANE	68'		-	-	-	-	1920	-	Sens: 1.7

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
13	S1	5'-6.5'	Silt with organic matter-soft-Brown	P	34.3	-	-	-	-	
	S2	10'-11.5'	" " " " "	P	194.0	-	-	-	-	
	S3	15'-16.5'	No Recovery of sample	P	-	-	-	-	-	Probably saturated silt with organic matter.
	S4	20'-21.5'	Very poor recovery	32	28.0	-	-	-	-	Probably same as above but with fragments of wood.
	S5	25'-26.5'	Gravelly sand, very dense-grey	121-9"	-	-	-	-	-	
	S6	30'-31.5'	Sand with excessive fines, some fine gravel-dense-grey	34	12.6	-	-	-	-	
	S7	35'-36.5'	Sand with excessive fines-dense-grey	30	16.3	-	-	-	-	
	S8	40'-41.5'	Clay of low plasticity-hard-grey	27	22.6	12.9	22.3	-	-	
	T9	45'-46.5'	Clay of low plasticity-v. stiff-grey	P	21.9	15.2	26.6	1350	126.0	
	VANE	48'		-	-	-	-	1440	-	Sens: 2.3
	T10	50'-51.5'	Clay of low plasticity-Med stiff-grey	P	22.6	-	-	820	125.0	
	VANE	53'		-	-	-	-	1440	-	Sens: 1.9

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
14	S1	3'-4.5'	Fill material (sand, rubble, organic matter)	P	22.6	-	-	-	-	
	S2	6'-7.5'	" " (ashes, rubble, sand with decayed refuse)	8	-	-	-	-	-	
	S3	10'-11.5'	Sand with excessive fines and some organic matter-loose-grey brown	9	16.5	-	-	-	-	
	S4	15'-16.5'	No Recovery of sample	P	-	-	-	-	-	Probably loose sand with organic matter
	S5	20'-21.5'	Organic clay with fragments of wood, Med stiff grey brown	6	74.5	-	-	-	-	
	S6	25'-26.5'	Organic clay, Med stiff, dark brown	5	132.0	-	-	-	-	
	S7	30'-31.5'	Sand with excessive fines, with traces of gravel Med Dense, grey	19	12.4	-	-	-	-	
	S8	35'-36.5'	35-36.0 Sand with excessive fines-Med Dense, grey 36.0-36.5 Clay of low plasticity-Hard-grey brown	24	20.8	-	-	-	-	
	S9	40'-41.5'	Clay of low plasticity-Hard-grey Brown	23	18.6	-	-	-	-	
	VANE 43'			-	-	-	-	>2000	-	Sens: >1.7
	S10	45'-46.5'	Clay of low plasticity-stiff-grey	12	22.8	15.5	27.0	-	-	
	VANE 48.0'			-	-	-	-	1520	-	Sens: 2.1
	T11	50'-51.5'	" " " " "	P	21.4	15.3	27.2	785	129.0	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
14	VANE	53'		-	-	-	-	1360	-	Sens: 2.1

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
15	S1	3'-4.5'	Sand with excessive fines, and some gravel and organic matter-Loose-dark brown	3	14.8	-	-	-	-	Probably sat. sand and gravel
	S2	6'-7.5'	" " " "	9	19.0	-	-	-	-	
	S3	10'-11.5'	No Recovery of sample	4	-	-	-	-	-	
	S4	15'-16.5'	Sandy silt with organic matter-Loose-grey	2	29.2	-	-	-	-	
	S5	20'-21.5'	20-21.0 Sand with excessive fines and some gravel 21-21.5 Clay of low plasticity, soft, grey	2	28.6	-	-	-	-	Sens: 2.7
	VANE	23'		-	-	-	-	800	-	
	S6	25'-26.5'	Clay of low plasticity with traces of organic matter-Med stiff-grey	3	26.5	-	-	-	-	
	VANE	28'		-	-	-	-	760	-	
	T7	30'-31.5'	Sand well graded with some clay particles-Loose-grey	P	-	-	-	-	-	Sens: 4.2
	S8	35'-36.5'	Sand well graded-V. dense-grey	64	-	-	-	-	-	
	T9	40'-41.5'	Clay with traces of fine gravel-stiff-grey	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1440	-	
	T10	45'-46.5'	Clay with traces of fine sand and some gravel stiff-grey	P	-	-	-	-	-	Sens: 2.1

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-3
231-58-2

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
15	VANE	48'		-	-	-	-	1120	-	Sens: 1.4
	T11	50'-51.5'	Clay with traces of fine sand and some gravel stiff-grey	P	-	-	-	-	-	
	VANE	53'	" " " " "	-	-	-	-	1040	-	Sens: 1.4

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
16	S1	3'-4.5'	Fill material (gravel, sand and organic matter) loose-Brown	4	21.2	-	-	-	-	
	S2	6'-7.5'	Fill material (mixture of gravel-sand with some fines)-loose-brown	8	13.3	-	-	-	-	
	S3	10'-11.5'	Fill material (crushed rubble, gravel & sand mixed with fines)-Med Dense-grey	15	22.2	-	-	-	-	
	S4	15'-16.5'	Organic clay of high plasticity-soft-brown	5	64.0	-	-	-	-	
	S5	20'-21.5'	" " " "	3	108.0	-	-	-	-	
	S6	25'-26.5'	Organic clay of high plasticity-contains some fine sand and gravel-soft-brown	2	25.2	-	-	-	-	
	VANE	28'		-	-	-	-	840	-	Sens: 8.4
	S7	30'-31.5'	Clay with slight traces of organic matter Med stiff, grey	7	23.0	-	-	-	-	
	VANE	33'		-	-	-	-	720	-	Sens: 2.0
	T8	35'-36.5'	Clay, stiff, grey	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	1440	-	Sens: 1.9
	T9	40'-41.5'	Clay with traces of some fine gravel-stiff grey	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1760	-	Sens: 2.2
	T10	45'-46.5'	" " "	P	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
16	VANE	48'	Clay with traces of some fine gravel-stiff, grey	-	-	-	-	1600	-	Sens: 1.9
	T11	50-51.5'		P	-	-	-	-	-	
	VANE	53'		-	-	-	-	1200	-	Sens: 2.9

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
17	S1	3'-4.5'	Organic silt of low plasticity-soft-brown	5	19.0	-	-	-	-	
	S2	6'-7.5'	Fill material (mixture of sand-gravel and-some organic matter)-loose-brown	2	14.3	-	-	-	-	
	S3	10'-11.5'	Fill material (rubble sand-gravel and-decayed refuse)-loose-brown	9	21.0	-	-	-	-	
	S4	15'-16.5'	No Recovery of sample	5	-	-	-	-	-	Washings indicate same material as above, i.e. fill material
	S5	20'-21.5'	Fill material (gravel, broken bricks & sand) Med Dense, brown	12	-	-	-	-	-	
	S6	25'-26.5'	Organic clay of Intermediate plasticity-Med stiff-grey	5	-	-	-	-	-	
	VANE	28'		-	-	-	-	1200	-	Sens: 4.3
	T7	30'-31.5'	Clay of low plasticity-Med stiff-grey	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	920	-	Sens: 3.8
	T8	35'-36.5'	Clay of low plasticity-Med stiff-grey	P	-	-	-	-	-	
	S9	40'-41.5'	Sand with excessive fines, loose, grey	8	-	-	-	-	-	
	T10	45'-46.5'	Clay of low plasticity-v. stiff-grey	P	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-3

HOLE 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
17	WANE	48'	Clay of low plasticity-v. stiff-grey	-	-	-	-	2000	-	Sens: 3.1
	T11	50'-51.5'		P	-	-	-	-	-	
	WANE	53'		-	-	-	-	1600	-	Sens: 2.4

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
18	S1	3'-4.5'	Fill material (sand with excessive fines, rubble and decomposed refuse)-Loose	3	17.1	-	-	-	-	
	S2	6'-7.5'	Fill material (sand-gravel mixture with rubble and organic matter)-Loose	3	15.1	-	-	-	-	
	S3	10'-11.5'	Fill material (ashes, sand, gravel with decayed matter)-Loose	1	58.7	-	-	-	-	
	S4	15'-16.5'	Fill material (gravel, sand and fines mixture with organic matter)-Loose	2	29.6	-	-	-	-	
	S5	20'-21.5'	Organic silt of low plasticity-soft-grey brown	1-18"	32.6	-	-	-	-	
	VANE	23'		-	-	-	-	960	-	Sens: 3.4
	S6	25'-26.5'	Clay of low plasticity, Med stiff, grey	1	26.0	-	-	-	-	
	VANE	28'		-	-	-	-	1200	-	Sens: 4.6
	S7	30'-31.5'	Sand-gravel mixture with some fines-Loose grey	8	-	-	-	-	-	
	T8	35'-36.5'	Clay of low plasticity-stiff-grey	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	1520	-	Sens: 2.1
	T9	40'-41.5'	Clay of low plasticity-stiff-grey	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1440	-	Sens: 1.6

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
19	S1	3'-4.5'	Fill material (mixture of clay and gravel with traces of organic matter) -Loose	7	24.4	-	-	-	-	
	S2	6'-7.5'	Fill material (mixture of clay and gravel with decayed organic matter) -Loose	4	25.0	-	-	-	-	
	S3	10'-11.5'	Fill material (gravel with organic silt) loose, Brown	7	25.2	-	-	-	-	
	S4	15'-16.5'	Fill material (mixture of sand and gravel with rubble, ashes and fragments of wood)-Med Dense	25	-	-	-	-	-	
	S5	20'-21.5'	No Recovery of sample	3	-	-	-	-	-	Probably saturated organic silt
	S6	25'-26.5'	Organic silt of low plasticity-Med stiff grey brown	7	40.5	-	-	-	-	
	VANE	28'		-	-	-	-	2800	-	Sens: 4.0
	T7	30'-31'	" " " " "	P	-	-	-	-	-	
	S8	35'-36.5'	Sand-gravel mixture with some fines Med Dense, grey	21	-	-	-	-	-	
	T9	40'-41.5'	Clay of low plasticity, stiff-grey	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1920	-	Sens: 2.3
	T10	45'-46'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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.T.	REMARKS
19	T11 VANE	50'-51.5' 53'	Clay of low plasticity, stiff, grey	P -	- -	- -	- -	- 1440	- -	Sens: 2.4

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-1

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH Dbf	UNIT WEIGHT Dbf	REMARKS
20	S1	3'-4.5'	Clay of low plasticity with slight traces of organic matter-Med stiff-brown	5	27.6	19.4	31.5	-	-	
	VANE	6'		-	-	-	-	1360	-	Sens: 8.5
	S2	6'-7.5'	Organic silt of low plasticity-Med stiff brown	5	-	-	-	-	-	
	S3	10'-11.5'	Organic silt of low plasticity-soft-brown	2	32.0	-	-	-	-	
	S4	15'-16.5'	Clay of low plasticity, V. stiff, grey	12	31.8	14.2	28.0	-	-	
	T5	20'-21.5'	" " , stiff, grey	P	-	-	-	-	-	
	VANE	23'		-	-	-	-	1200	-	Sens: 1.9
	T6	25'-26.5'	" " " "	P	-	-	-	-	-	
	VANE	28'		-	-	-	-	1280	-	Sens: 1.8
	T7	30'-31.5'	" " " "	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	1600	-	Sens: 2.7
	T8	35'-36.5'	" " " "	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	1440	-	Sens: 2.3
	T9	40'-41.5'	" " " "	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1520	-	Sens: 2.4

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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 PSI	UNIT WEIGHT P.C.F.	REMARKS
20	T10	50'-51.5'	Clay of low plasticity-stiff-grey	6	-	-	-	-	-	
	S11	50'-51.5'	Clay of low plasticity-Hard-grey	23	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-3

HOLE NO	SAMP NO	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENETN RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH PSI	UNIT WEIGHT P.C.T.	REMARKS
51	S1	3'-4.5'	Clay of low plasticity with organic matter stiff-brown	8	22.1	-	-	-	-	
	S2	6'-7.5'	Organic silt of low plasticity-stiff-brown	12	-	-	-	-	-	
	S3	10'-11.5'	Sandy silt, dense, brown	36	11.7	-	-	-	-	
	S4	15'-16.5'	Clay of low plasticity, hard, brown	24	24.2	-	-	-	-	
	S5	20'-21.3'	20-21.0 Clay of low plasticity, hard, brown 21.0-21.3 Heterogenous material of sand, and gravel	31	-	-	-	-	-	
	S6	25'-25.5'	Heterogenous material of sand and gravel	116-6"	-	-	-	-	-	
	S7	30'-30.5'	No Recovery of sample	102-6"	-	-	-	-	-	
	S8	35'-35.3'	Heterogenous material of sand and gravel	108-4"	-	-	-	-	-	
	S9	40'-40.3'	Heterogenous material of gravel and sand	60-3"	-	-	-	-	-	
	S10	45'-46'	Sand-gravel well graded, V. dense, brown	114	-	-	-	-	-	
	S11	50'-51.5'	Clay of low plasticity, hard, brown	42	-	-	-	-	-	
	S12	55'-56.5'	" " " , grey brown	40	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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 PSI	UNIT WEIGHT PCF	REMARKS
51	SL3	60'-61.5'	Clay of low plasticity, hard, grey	42	20.5	-	-	-	-	
	SL4	65'-66.5'	Clay of low plasticity, V.-hard, grey	74	-	-	-	-	-	
	SL5	70'-71.5'	Sand with excess of fines, dense, grey	39	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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 psf	UNIT WEIGHT pcf	REMARKS
52	S1	3'-4.5'	Fill material (sand, gravel, rubble) -Loose	2	17.2	-	-	-	-	
	S2	6'-7.5'	Fill material (sand, gravel with organic silt) loose	4	-	-	-	-	-	
	S3	10'-11.5'	Fill material (ashes, sand, gravel with organic matter)-loose	9	-	-	-	-	-	
	S4	15'-16.5'	Sand with excessive fines and some fine gravel, Med dense, grey	10	21.4	-	-	-	-	
	S5	20'-21.5'	" " " "	17	11.4	-	-	-	-	
	S6	22'-22.5'	Heterogenous mixture of sand and gravel	90-6"	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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 PSI	UNIT WEIGHT PCF	REMARKS
53	S1	6'-7.5'	Sandy silt with traces of organic matter-loose	2	52.7	-	-	-	-	
	S2	10'-11.5'	Organic silt of low plasticity, Med stiff, grey	8	-	-	-	-	-	
	S3	15'-16.5'	Clay of low plasticity, stiff, grey	2	20.6	-	-	-	-	
	VANE	18'		-	-	-	-	1520	-	Sens: 1.6
	T4	20'-21.5'	Clay of low plasticity, stiff, grey	P	18.3	13.8	25.1	1290	135	
	VANE	23'		-	-	-	-	1520	-	Sens: 2.2
	T5	25'-26.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	T6	30'-31.5'	Clay of Intermediate plasticity, stiff, grey	P	31.0	19.7	40.8	1490	120	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
61	S1	3'-4.5'	Clay of low plasticity, with thin seams of sand-M stiff-grey	P	-	-	-	-	-	
	VANE	6'		-	-	-	-	880	-	Sens: 5.9
	T2	6'-7.5'	Clay of low plasticity, soft, grey	P	-	-	-	-	-	
	VANE	9'		-	-	-	-	560	-	Sens: 4.7
	T3	10'-11.5'	Clay of low plasticity, soft, grey	P	28.2	16.2	27.7	410	126	
	VANE	13'		-	-	-	-	520	-	Sens: 2.9
	T4	15'-16.5'	" " " "	P	-	-	-	-	-	
	VANE	18'		-	-	-	-	680	-	Sens: 1.7
	T5	20'-21.5'	Clay of low plasticity, Med stiff, grey	P	20.5	-	-	1290	133	
	S6	25'-26.5'	Clay of low plasticity containg some fine gravel V. stiff, grey	19	-	-	-	-	-	
	S7	30'-31.5'	" " " "	23	-	-	-	-	-	
	S8	35'-36.5'	" " " "	33	-	-	-	-	-	
	S9	40'-41.5'	Clay of low plasticity, med stiff, grey	7	-	-	-	-	-	
	VANE	43'		-	-	-	-	860	-	Sens: 2.2
	T10	45'-46.5'	Clay of low plasticity, med stiff, grey	P	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
61	VANE	48'		-	-	-	-	880	-	Sens: 3.4
	RC11	49.5'-54.5'	Axt core:-Shale bed Rock	-	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14

140-57-1

W.P. 231-58-2

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
62	S1	3'-4.5'	Sand with excessive fines and traces of organic matter-loose-brown	P	-	-	-	-	-	
	T2	6'-7.5'	Clay of low plasticity, Med stiff, grey	P	20.2	-	-	-	-	
	VANE	9'		-	-	-	-	600	-	Sens: 2.6
	T3	10'-11.5'	" " " "	P	-	-	-	-	-	
	VANE	13'		-	-	-	-	600	-	Sens: 2.3
	T4	15'-16.5'	Clay of low plasticity, with some fine gravel V. stiff, grey	P	18.2	16.3	29.5	3740	136	
	S5	20'-21.5'	" " " "	17	-	-	-	-	-	
	S6	25'-26.5'	Clay of low plasticity, hard, grey	50	-	-	-	-	-	
	T7	30'-31.5'	Clay of low plasticity with traces of fine gravel, stiff, grey	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	1760	-	Sens: 2.0
	T8	35'-36.5'	Clay of low plasticity, med stiff, grey	P	20.8	16.0	28.1	730	128	
	VANE	38'		-	-	-	-	840	-	Sens: 2.3
	T9	40'-41.5'	" " " "	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	960	-	Sens: 3.0
	S10	44.5'-44.6'	Weathered shale, red	Refusal	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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 psf	UNIT WEIGHT pcf	REMARKS
63	S1	3'-4.5'	Clay of low plasticity containg 50% gravel	P	-	-	-	-	-	
	S2	6'-7.5'	Clay of low plasticity with some fine gravel med stiff, grey	P	-	-	-	-	-	
	VANE	9'		-	-	-	-	720	-	Sens: 5.1
	T3	10'-11.5'	Clay of low plasticity with some fine gravel, soft, grey	P	26.6	16.2	28.1	420	126	
	VANE	19'		-	-	-	-	680	-	Sens: 3.4
	T4	15'-16.5'	Clay of low plasticity with seams of sand, med stiff, grey	P	-	-	-	-	-	
	S5	20'-21.5'	Clay of low plasticity with pockets of silt, hard, grey	43	-	-	-	-	-	
	S6	25'-26.5'	Clay of low plasticity, v. stiff, grey	23	-	-	-	-	-	
	T7	30'-31.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	T8	35'-36.5'	" " " "	P	23.8	15.9	22.8	1040	130	
	VANE	38'		-	-	-	-	920	-	Sens: 2.6
	T9	40'-41.5'	Clay of low plasticity, med stiff, grey	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1080	-	Sens: 3.0

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
64	S1	5'-6.5'	Clay with organic matter and some fine sand, (River Alluvium)-soft	P	-	-	-	-	-	
	VANE	8'		-	-	-	-	960	-	Sens: 4.0
	T2	10'-11.5'	Clay of low plasticity, med stiff, grey	P	27.1	18.7	30.7	-	-	
	VANE	13'		-	-	-	-	800	-	Sens: 1.5
	T3	15'-16.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	S4	20'-21.5'	Clay of low plasticity, v. stiff, grey	20	-	-	-	-	-	
	S5	25'-26.5'	" " " "	44	-	-	-	-	-	
	T6	30'-31.5'	Clay of low plasticity, stiff, grey	P	21.6	16.2	25.3	1180	131	
	VANE	33'		-	-	-	-	400	-	Sens: 1.1
	T7	35'-36.5'	Clay of low plasticity, med stiff, grey	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	760	-	Sens: 2.1
	S8	55.5'-56.3'	Coarse gravel, dense	10 to refusal	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
65	T1	3'-4.5'	Clay with organic matter-soft-brown (River bottom)	P	28.8	18.8	31.2	-	-	
	S2	6'-7.5'	Clay of low plasticity with traces of fine sand gravel and fragments of shale-m. stiff brown (River bottom)	6	24.3	17.2	30.0	-	-	
	T3	10'-11.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	VANE	13'		-	-	-	-	1200	-	Sens: 1.5
	S4	15'-16.5'	" " " "	15	-	-	-	-	-	
	S5	20'-21.5'	Clay of low plasticity, v. stiff with traces of fine gravel, grey	24	-	-	-	-	-	
	S6	25'-26.5'	" " " "	35	-	-	-	-	-	
	T7	30'-31.5'	Clay of low plasticity, m. stiff, grey	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	1080	-	Sens: 3.4
	T8	35'-36.5'	" " " "	P	23.2	18.2	26.7	840	126	
	VANE	38'		-	-	-	-	920	-	Sens: 3.3
	S9	45'-46.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	T10	55'-56.5'	" " " "	P	-	-	-	-	-	
	VANE	58'		-	-	-	-	1280	-	Sens: 3.6

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
66	T1	3'-4.5'	Clay of Intermediate plasticity with seams of fine sand, stiff, brown	P	24.2	22.7	41.1	-	125	
	S2	6'-7.5'	" " "	9	-	-	-	-	-	
	VANE	9.0'		-	-	-	-	1120	-	Sens: 5.6
	T3	10'-11.5'	Clay of low plasticity with fragments of shale, m. stiff, brown	P	27.6	17.8	32.6	-	-	
	VANE	13'		-	-	-	-	720	-	Sens: 6.0
	T4	15'-16.5'	Clay of low plasticity with traces of fine gravel, m. stiff, grey	P	-	-	-	-	-	
	VANE	18'		-	-	-	-	800	-	Sens: 2.9
	T5	20'-21.5'	Clay of low plasticity, stiff, grey	P	21.0	16.6	28.9	-	-	
	VANE	23'		-	-	-	-	1920	-	Sens: 1.5
	S6	25'-26.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	T7	30'-31.5'	" " " "	P	-	-	-	-	-	
	S8	35'-36.5'	Clay of low plasticity with fine to med gravel, v. stiff, grey	26	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENEY'N RESIST. BLOWS/FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHRIMP STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
67	T1	3'-4.5'	Clay of Intermediate plasticity with fragments of shale & gravel and also some organic matter-soft to med stiff brown	P	26.1	22.6	43.8	470	123	
	T2	6'-7.5'	Clay of Intermediate plasticity-soft grey	P	-	-	-	-	-	
	T3	10'-11.5'	" " " "	P	22.8	18.5	35.5	-	-	
	VANE	13'		-	-	-	-	720	-	Sens: 2.6
	T4	15'-16.5'	" " " "	P	-	-	-	-	-	
	VANE	18'		-	-	-	-	880	-	Sens: 2.0
	T5	20'-21.5'	Clay of low plasticity, med stiff, grey	P	27.5	18.2	33.1	-	-	
	VANE	23'		-	-	-	-	1920	-	Sens: 6.0
	T6	25'-26.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	VANE	28'		-	-	-	-	1280	-	Sens: 2.0
	T7	30'-31.5'	" " " " "	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	1200	-	Sens: 3.3
	T8	40'-41.5'	" " " " "	P	-	-	-	-	-	
	VANE	43'		-	-	-	-	1420	-	Sens: 2.2
	T9	50'-51.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENET'N RESIST. BLOWS/FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH PSI	UNIT WEIGHT PCF	REMARKS
68	S1	3'-4.5'	Organic clay of Intermediate plasticity soft, brown	P	-	-	-	-	-	
	T2	6'-7.5'	" " " "	P	33.7	21.5	41.5	322	118	
	VANE	9'		-	-	-	-	1200	-	Sens: 7.5
	T3	10'-11.5'	Organic clay of Intermediate plasticity stiff, grey	P	-	-	-	-	-	
	VANE	13'		-	-	-	-	720	-	Sens: 2.6
	S4	14.5'-16'	Clay of Intermediate plasticity with fragments of shale and some fine gravel-med stiff-grey	3	-	-	-	-	-	
	VANE	17.5'		-	-	-	-	840	-	Sens: 2.8
	T5	20'-21.5'	Clay of Intermediate plasticity with some fine gravel, stiff, grey	P	29.4	18.7	35.5	-	-	
	VANE	23'		-	-	-	-	1360	-	Sens: 2.6
	T6	25'-26.5'	" " " "	P	-	-	-	-	-	
	VANE	28'		-	-	-	-	1000	-	Sens: 2.8
	T7	30'-31.5'	" " " "	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	1920	-	Sens: 2.0
	T8	35'-36.5'	Clay of Intermediate plasticity, stiff, grey	P	20.3	19.4	37.3	-	131	
	VANE	38'		-	-	-	-	>2000	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
69	T1	3'-4.5'	Clay of low plasticity with organic matter, stiff, brown	P	27.3	20.4	34.8	1020	122	
	VANE 6'			-	-	-	-	600	-	Sens: 9.0
	T2	6'-7.5'	Clay of Intermediate plasticity with organic matter, m. stiff, brown	P	-	-	-	-	-	
	VANE 9'			-	-	-	-	1160	-	Sens: 9.7
	T3	10'-11.5'	Clay of Intermediate plasticity, stiff, m. stiff	P	35.9	21.0	38.9	-	118	
	VANE 13'			-	-	-	-	1440	-	Sens: 4.0
	S4	15'-16.5'	Clay of low plasticity with seams of fine sand and gravel, m. stiff, grey	5	-	-	-	-	-	
	T5	20'-21.5'		P	-	-	-	-	-	
	VANE 23'			-	-	-	-	1440	-	Sens: 2.0
	T6	25'-26.5'	Clay of low plasticity, m. stiff, grey	P	30.0	12.6	28.1	890	128	
	VANE 28'			-	-	-	-	1040	-	Sens: 3.3
	T7	30'-31.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	VANE 33'			-	-	-	-	1360	-	Sens: 3.4
	S8	35'-36.5'	Clay of low plasticity with some fine gravel, stiff, grey	12	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
605	S1	3'-4.5'	Fill material (cinders with sand) - Loose	2	34.2	-	-	-	-	
	S2	6'-7.5'	" " (sand) - Loose	2	-	-	-	-	-	
	S3	10'-11.5'	" " (cinders with sand) - Loose	2	-	-	-	-	-	
	S4	12'-13.5'	Organic silt of low plasticity, soft, brown	P	109.0	-	-	-	-	
	VANE	15'		-	-	-	-	400	-	Sens: 2.5
	S5	16'-17.5'	Med sand with traces of organic matter loose-brown	P	18.7	-	-	-	-	
	S6	20'-21.5'	sand, uniform with fine gravel-loose-brown	2	23.1	-	-	-	-	
	S7	25'-26.5'	Sand with excessive fines, med dense, brown	18	23.8	-	-	-	-	
	S8	30'-31.5'	Sand with excessive fines with fine gravel dense, brown	47	15.7	-	-	-	-	
	S9	35'-36.5'	Sand with excessive fines, v. dense grey	67	21.2	-	-	-	-	
	S10	40'-41.5'	Sand with excessive fines, med dense grey	14	25.6	-	-	-	-	
	S11	45'-46.5'	Silt with fine sand, med dense, grey	18	20.4	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
606	S1	3'-4.5'	Med to coarse sand, loose, brown	8	13.2	-	-	-	-	
	S2	6'-7.5'	Med to coarse sand, med dense, brown	20	12.3	-	-	-	-	
	S3	10'-11.5'	Med to coarse sand, dense, brown	36	13.3	-	-	-	-	
	S4	15'-16.5'	Sand uniform, dense, brown	52	12.7	-	-	-	-	
	S5	20'-21.5'	" " " "	64	11.9	-	-	-	-	
	S6	25'-26.5'	" " " "	52	17.5	-	-	-	-	
	S7	35'-36.5'	" " " "	72	17.4	-	-	-	-	
	S8	50'-50.5'	" " " "	70-6"	-	-	-	-	-	
	S9	60'-60.5'	" " " "	80-6"	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
607	S1	3'-4.5'	Fill material (ashes, cinders with sand) Loose-Brown	1-18"	34.2	-	-	-	-	
	S2	6'-7.5'	" " " "	P	75.5	-	-	-	-	
	S3	10'-11.5'	Fill material (ashes with fragments of wood and organic matter)-V. loose-brown	P	119.0	-	-	-	-	
	S4	16'-17.5'	16-17.0 Organic silt with full of fragments of wood 17-17.5 Sand with excessive fines, V. loose	2	49.5	-	-	-	-	
	S5	20'-21.5'	Sand, well graded, Med dense, Brown	25	14.6	-	-	-	-	
	S6	25'-26.5'	Sand with excessive fines and some fine gravel-Med dense-brown	12	19.8	-	-	-	-	
	S7	30'-31.5'	" " " "	20	19.9	-	-	-	-	
	S8	35'-36.5'	Sand with excessive fines, dense, grey	51	20.8	-	-	-	-	
	S9	40'-41.5'	" " " "	30	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
609	S1	3'-4.5'	Fill material (ashes)-loose	2	40.3	-	-	-	-	
	S2	6'-7.5'	Fill material (ashes with sand)-Loose	2	52.8	-	-	-	-	
	S3	11'-12.5'	Organic silt with full of fragments of wood-soft-grey	P	80.0	-	-	-	-	
	VANE	14.5'	15-16.0 Organic silt-soft	-	-	-	-	640	-	Sens: 5.3
	S4	15'-16.5'	16-16.5 Sand and gravel-loose-Brown	6	28.9	-	-	-	-	
	S5	20'-21.5'	Sand with excessive fines-Med dense brown	16	21.0	-	-	-	-	
	S6	25'-26.5'	Sand with excessive fines, loose-brown	6	27.1	-	-	-	-	
	S7	30'-31.5'	" " , Med Dense-Brown	10	28.1	-	-	-	-	
	S8	35'-36.5'	Sand, uniform, dense, grey	45	18.9	-	-	-	-	
	S9	40'-41.5'	" " " "	51	16.7	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
610	VANE	7'		-	-	-	-	200	-	Sens: 5.0
	Sl	4.5'-5.9'	Organic clay, soft, grey	-	24.2	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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 psi	UNIT WEIGHT pcf	REMARKS
624	S1	3'-4.5'	Sand with excessive clay particles Med dense-Brown	22	20.4	-	-	-	-	
	S2	6'-7.5'	6-7.0 Clay of low plasticity, V. stiff 7-7.5 Sand with excessive fines, Med dense	34	20.4	-	-	-	-	
	S3	10'-11.5'	Sand with excessive fines-Dense-Brown	92	16.8	-	-	-	-	
	S4	15'-16.5'	" " " " "	86	17.2	-	-	-	-	
	S5	20'-21.5'	Sand with excessive fines, Dense, Brown	75	17.7	-	-	-	126.0	
	S6	25'-26.5'	Sand with excessive fines and some fine gravel, dense, brown	80	-	-	-	-	-	
	S7	30'-31.5'	Sand with excessive fines, dense, Brown	35	23.0	-	-	-	-	
	S8	35'-36.5'	" " " " "	74	16.5	-	-	-	-	
			S denotes split spoon T " shelly tube							

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
701	S1	3'-4.5'	Clay of low plasticity, v. stiff, brown	20	-	-	-	-	-	
	S2	6'-7.5'	Layers of clay of low plasticity & sand with excessive fines	24	21.5	-	-	-	-	
	S3	10'-11.5'	Layers of clay of low plasticity & sand with excessive fines	26	-	-	-	-	-	
	S4	15'-16.5'	Layers of clay of low plasticity & sand with excessive fines	11	23.2	-	-	-	-	
	S5	20'-21.5'	Clay of low plasticity with traces of organic matter, stiff, grey	15	-	-	-	-	-	
	S6	25'-26.5'	Clay of low plasticity with seams of fine sand & gravel-stiff, grey	13	21.6	-	-	-	-	
	S7	30'-31.5'	Clay of low plasticity, hard, grey	33	-	-	-	-	-	
	S8	35'-36.5'	Clay of low plasticity with traces of fine gravel, stiff, grey	14	20.4	-	-	-	-	
	S9	40'-41.5'	Clay of low plasticity, stiff, grey	12	-	-	-	-	-	
	T10	45'-46.5'	Clay of low plasticity, stiff, grey	P	27.2	18.2	32.0	-	-	
	VANE	48'		-	-	-	-	1280	-	Sens: 4.0
	T11	50'-51.5'	Clay of low plasticity, med stiff, grey	P	-	-	-	-	-	
	VANE	53'		-	-	-	-	880	-	Sens: 2.8

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
702	S1	3'-4.5'	Organic silt of low plasticity, m. stiff brown	9	40.3	-	-	-	-	
	S2	6'-7.5'	Clay of low plasticity with traces of fine gravel and some organic matter-stiff-brown	11	-	-	-	-	-	
	S3	10'-11.5'	Clay of low plasticity, stiff, brown	11	-	-	-	-	-	
	S4	15'-16.5'	Clay of low plasticity, m. stiff, grey	4	-	-	-	-	-	
	VANE	18'		-	-	-	-	800	-	Sens: 2.9
	T5	20'-21.5'	Clay of low plasticity, soft, grey	P	30.0 23.6	15.3	31.0	430	123	
	VANE	23'		-	-	-	-	720	-	Sens: 4.5
	T6	25'-26.5'	Clay of low plasticity, m. stiff, grey	P	23.9	17.9	26.1	705	130	
	VANE	28'		-	-	-	-	560	-	Sens: 2.8
	T7	30'-31.5'	Clay of low plasticity, soft, grey	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	480	-	Sens: 3.0

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
231-58-3

HOLE NO.	SAMP NO.	SAMPLE DEPTH (FEET)	MATERIAL DESCRIPTION	PENEY'N RESIST. BLOWS FT	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH p.s.f.	UNIT WEIGHT p.c.f.	REMARKS
703	S1	3'-4.5'	Silt with organic matter, sand and fine gravel, med dense, brown	25	12.7	-	-	-	-	
	S2	6'-7'	Sandy silt with fragments of shale-v. dense brown	78	10.2	-	-	-	-	
	RC 3	7'-10'	Weathered shale	-	-	-	-	-	-	
	RC 4	10'-12'	Sound shale	-	-	-	-	-	-	
	RC 5	12'-16'	" "	-	-	-	-	-	-	
704	S1	3'-4.5'	Clay of low plasticity with fragments of shale-hard-brownish red	99	10.7	-	-	-	-	
	RC 2	5.5'-7.5'	Bedrock-shale, red	-	-	-	-	-	-	
	RC 3	7.5'-12.5'	" " "	-	-	-	-	-	-	
705	S1	3'-4.5'	Clay of low plasticity with fragments of shale-hard-red	66	-	-	-	-	-	
	RC 2	6'-11.5'	Bedrock-shale, red	-	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
501	S1	5'-6.5'	Decomposed Sanitary fill(Ashes, cinders sand and decomposed refuse)-loose	3	29.0	-	-	-	-	
	S2	10'-11.5'	Clay of low plasticity containing ashes and fragments of wood	P	35.9	-	-	-	-	
	S3	13'-14.5'	Organic clay of Intermediate plasticity-soft Brown	P	45.1	-	-	-	-	
	S4	16'-17.5'	Clay with organic matter and sand seams med stiff-brown	5	-	-	-	-	-	
	S5	19'-20.5'	Clay with decomposed refuse, gravel and sand	P	-	-	-	-	-	
	VANE	22'		-	-	-	-	1360	-	Sens: 4.9
	S6	22'-23.5'	Clay of low plasticity with organic matter stiff, grey	3	31.9	-	-	-	-	
	S7	25'-26.5'	Sand and gravel with some fines-med dense, grey	24	11.4	-	-	-	-	
	T8	30'-31.5'	Clay of low plasticity with some fine gravel, stiff, grey	P	-	-	-	-	-	
	VANE	33'		-	-	-	-	>2000	-	Sens: -
	T9	35'-36.5'	" " " "	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	2000	-	Sens: 1.8

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
140-57-1
W.P. 231-58-2
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
500	S1	5'-6.5'	Decomposed Sanitary fill(Ashes, sand and decayed refuse)-Loose	3	51.5	-	-	-	-	
	S2	10'-11.5'	Clay with organic matter-med stiff grey brown	P	36.4	-	-	-	-	
	S3	13'-14.5'	Clay with ashes and decayed vegetation med stiff-grey	3	31.3	-	-	-	-	
	S4	16'-17.5'	Sand with excessive fines-loose-grey	2	30.7	-	-	-	-	
	S5	19'-20.5'	Sand with excessive fines and fragments of decayed timber-loose-grey brown	5	46.3	-	-	-	-	
	S6	22'-23.5'	" " "	3	32.9	-	-	-	-	
	S7	25'-26.5'	Sand and gravel, med dense, grey	16	25.7	-	-	-	-	
	T8	30'-31.2'	Clay of low plasticity with fine gravel, stiff, grey	P	20.8	-	-	-	-	
	VANE	33'		-	-	-	-	1920	-	Sens: 5.3
	T9	35'-36.5'	Clay of low plasticity, stiff, grey	P	-	-	-	-	-	
	VANE	38'		-	-	-	-	1520	-	Sens: 1.6

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14
W.P. 231-58-2&3
6140-57-1

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
611	S1	5'-6.5'	Ashes, sand, gravel, refuse, very loose	1	42.2	-	-	-	-	
	S2	15'-16.5'	Silt with organic matter, loose, Brown	4	224.0	-	-	-	-	
	S3	25'-26.5'	Silt with fine sand, Med Dense, Brown	10	-	-	-	-	-	
	S4	30'-31.5'	Silt " Dense, Brown	31	-	-	-	-	-	
	S5	40'-41.5'	" " Med Dense, "	23	-	-	-	-	-	
	S6	45'-46.5'	" " Med Dense "	14	-	-	-	-	-	
	S7	50'-51.5'	Sand with excessive fines, Dense, Brown	90	-	-	-	-	-	
	S8	60'-61.5'	Sand " Dense, Brown	59	19.4	-	-	-	-	
612	S1	5'-6.5'	Ashes, Refuse, Sand & gravel, Loose	1-18"	44.3	-	-	-	-	
	S2	10'-11.5'	Silt with organic matter, very loose, Brown	2-18"	179.5	-	-	-	-	
	S3	15'-16.5'	Layers of silt with organic matter and Sand, Loose, Brown	3	148.5	-	-	-	-	
	S4	20'-21.5'	Sandy silt with pockets of clay and with organic matter, loose, brown	6	17.7	-	-	-	-	
	S5	25'-26.5'	Silt with fine sand, loose, brown	8	-	-	-	-	-	
	S6	35'-36.5'	Silt with fine sand, loose, brown	8	-	-	-	-	-	

SUMMARY OF FIELD & LABORATORY TESTS

JOB 60-F-14

W.P. 231-58-2&3
8140-57-1

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
12	S7	45'-46.5'	Silt Sand, Dense, Gray	79	-	-	-	-	-	
	S8	55'-56.5'	Silt Sand, Dense, Gray	54	-	-	-	-	-	
	S9	65'-66.5'	Sand with excessive fines and with pockets of clay, med Dense, gray	29	21.3	-	-	-	-	
			S denotes split spoon T " shelby tube W " wash sample							

JOB 6035-E.M. Peto
JOB ~~60-7-14~~ D.H.O.(P)
W.P. 231-58-2

SUMMARY OF FIELD & LABORATORY TESTS

CARRIED OUT BY E.M. PETO

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
10	1	7'6"-8'0"	s.l.	-	103.8	50.2	66.6	-	-	Too disturbed for triaxial testing - Placed in Jar.
10	2	8'0"-8'6"	s.s.	-	65.0	-	-	180	89	Placed in Jar
10	3	15'6"-16'0"	s.l.	-	82.5	-	-	-	-	Non Plastic - Placed in Jar
10	3	16'0"-16'6"	s.l.	-	77.5	-	-	-	-	
10	7	36'0"-36'6"	s.l.	-	17.0	-	-	-	-	Olive brown fine sand- Placed in Jar
12	4	15'0"-15'6"	s.l.	-	123.0	-	-	-	81	Non plastic
12	4	15'6"-16'0"	s.l.	-	97.4	-	-	-	88	Placed in Jar
12	4	16'0"-16'6"	s.l.	-	80.0	-	-	-	91	Non plastic
12	7	25'0"-25'6"	s.l.	-	45.0	23.3	35.8	-	-	Too disturbed for triaxial
12	7	25'6"-26'0"	s.l.	-	30.8	-	-	-	-	Placed in Jar
12	7	26'0"-26'6"	s.l.	-	27.1	20.1	31.6	830	123	Grey-brown organic clayey silt with roots and some fine sand
12	19	80'6"-81'0"	s.l.	-	-	-	-	-	-	Placed in Jar
12	21	85'0"-85'6"	s.l.	-	-	-	-	-	-	
12	21	85'6"-86'0"	s.l.	-	-	-	-	-	-	
12	21	86'0"-86'6"	s.l.	-	-	-	-	-	-	Placed in Jar
12	25	100'6"-101'6"	s.l.	-	-	-	-	-	-	Placed in Jar

JOB 6035-E.M. Peto

JOB 60-F-14 R.H.O.

W.P. 231-58-2

SUMMARY OF FIELD & LABORATORY TESTS

CARRIED OUT BY E. M. PETO

CARRIED OUT BY E. M. PETO										
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
512	27	105'6"-106'6"	s.l.	-	-	-	-	-	-	Placed in jars
512	30	115'6"-116'6"	s.l.	-	-	-	-	-	-	Placed in jars
512	32	120'6"-121'6"	s.l.	-	-	-	-	-	-	Placed in jars
512	34	125'6"-126'6"	s.l.	-	-	-	-	-	-	Placed in jars
512	36	135'6"-136'6"	s.l.	-	-	-	-	-	-	Placed in jars
512	39	146'0"-146'6"	s.l.	-	-	-	-	-	-	Placed in jars
			s.s. split spoon sample s.l. split spoon with liners							

SAMPLE CONDITION

SAMPLE TYPE

ABBREVIATIONS

A.S. AUGER SAMPLE
C.S. CASING SAMPLE
S.S. 2" STANDARD SPLIT TUBE SAMPLE
S.L. SPLIT BARREL WITH LINERS
S.T. THIN-WALLED SHELBY TUBE SAMPLE
W.S. WASH SAMPLE
R.C. ROCK CORE

V.T. IN SITU VANE SHEAR TEST
C. SOIL SHEAR STRENGTH LBS/SQ.FT.
W.L. WATER LEVEL IN CASING
W.T. GROUND WATER TABLE IN SOIL
W.T.P.L. WETTER THAN PLASTIC LIMIT
D.T.P.L. DRIER THAN PLASTIC LIMIT

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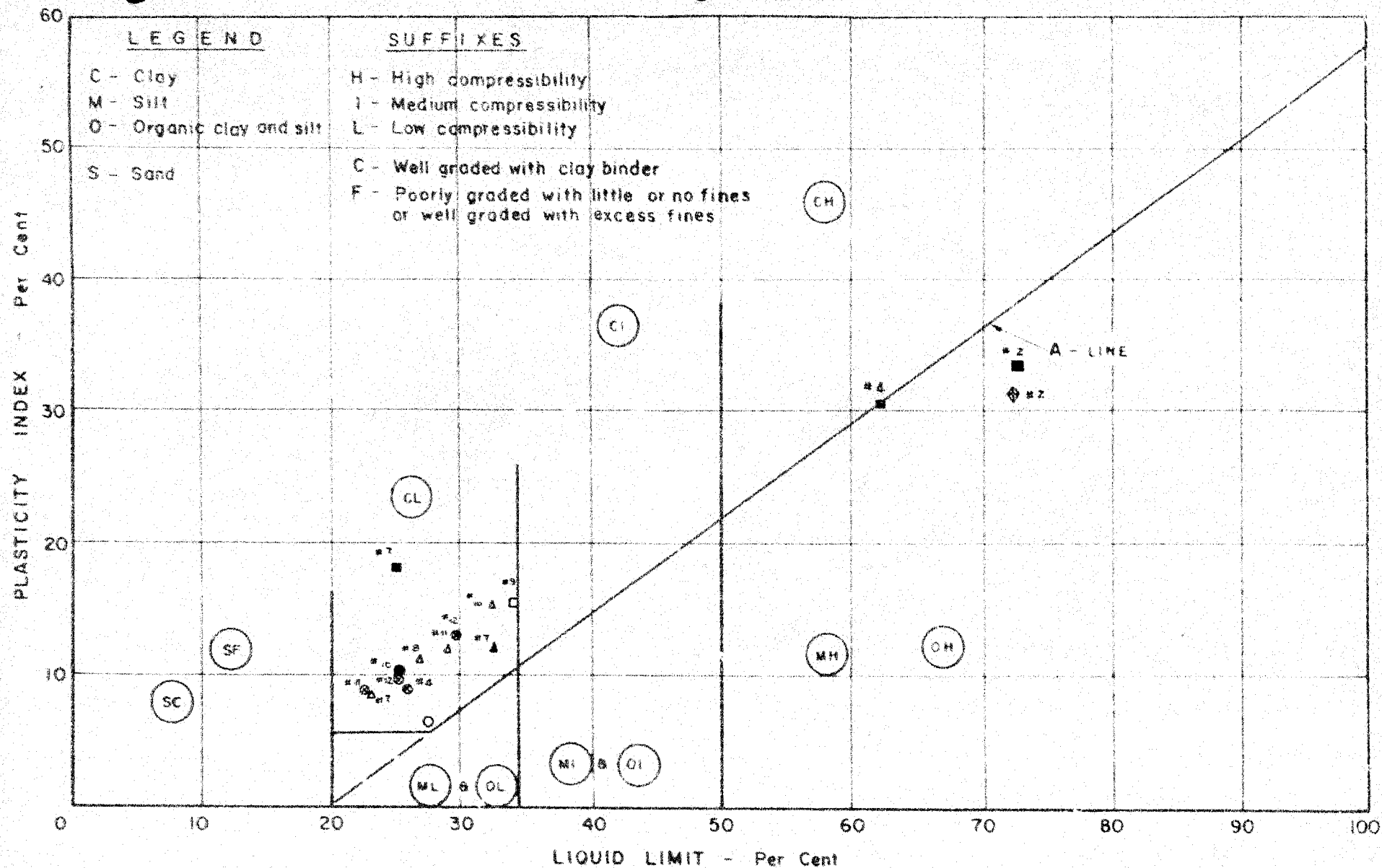
SUMMARY OF FIELD & LABORATORY TESTS

JOB 6035 E.H. PETO
W.P.

SOLE NO.	SAMP. NO.	SAM. DEPTH (FEET)	MATERIAL DESCRIPTION TYPE	PENET. M. RESIST. SLOWS/FT.	MOIST. CONT. %	PLASTIC LIMIT %	LIQUID LIMIT %	SHEAR STRENGTH psf.	UNIT WEIGHT p.c.f.	REMARKS
510	1	7'6"-8'0"	2" s.l.		103.8	50.2	66.6			Too disturbed for triaxial testing - Placed in Jar.
	2	8'1"-8'6"	s.s.		65.0			100	89	Placed in Jar.
	3	15'6"-16'0"	2" s.l.		82.5					Non Plastic - Placed in Jar.
	3	16'0"-16'6"	2" s.l.		77.5					
	7	36'0"-36'6"	2" s.l.		17.0					Olive brown fine sand - Placed in Jars.

WF

[illegible]



NOTES

B.H. # 1 → ○
B.H. # 4 → △
B.H. # 5 → ●
B.H. # 6 → □

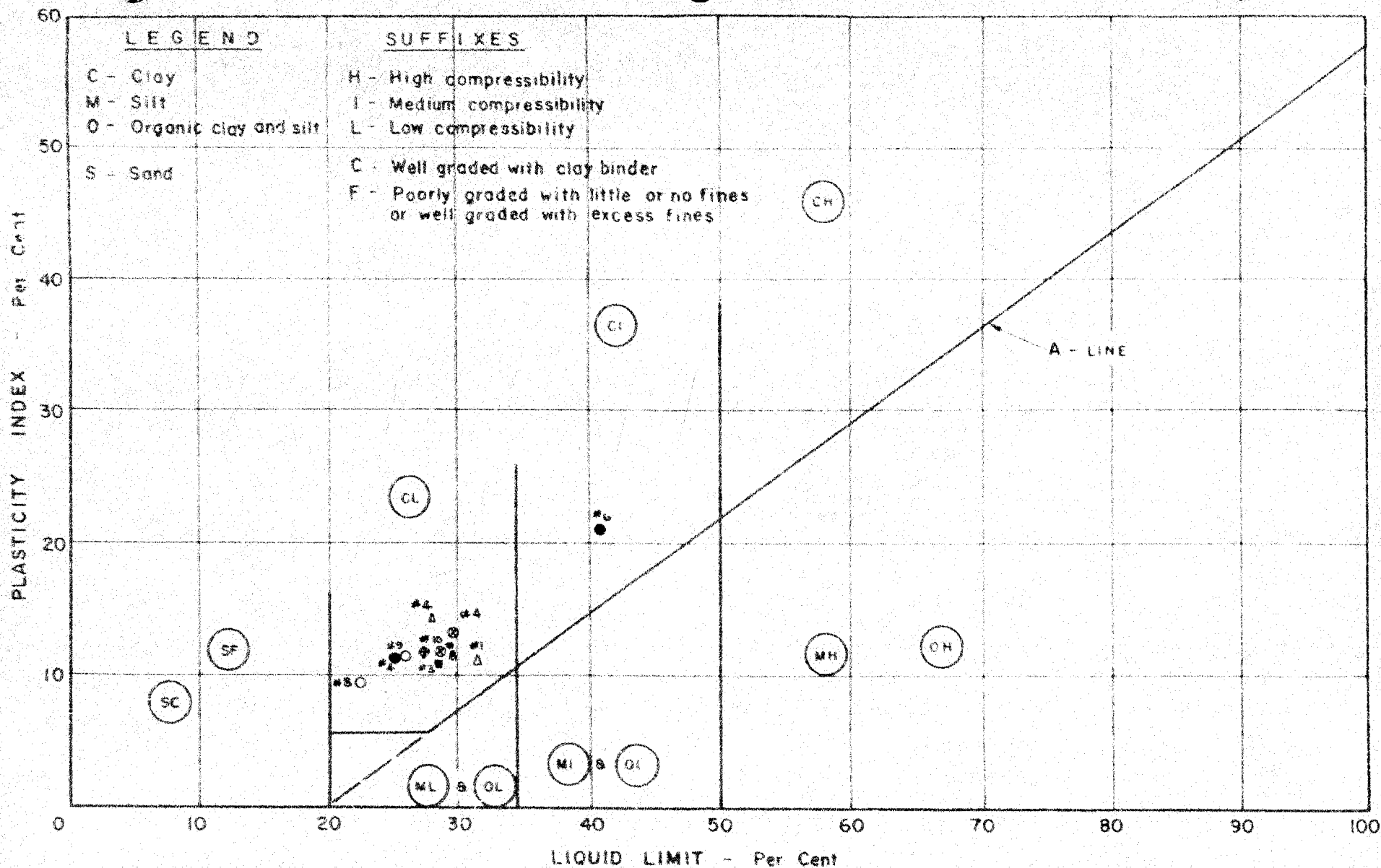
B.H. # 8 → ■
B.H. # 9 → ◆
B.H. # 11 → ▲
B.H. # 12 → ⊙

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
PLASTICITY CHART

Job No. 60-F-14

WP No.

Location CHEDOKE STORM SEWER



NOTES

B.H. # 13 → ○

B.H. # 14 → ⊕

B.H. # 20 → △

B.H. # 53 → ●

B.H. # 61 → ■

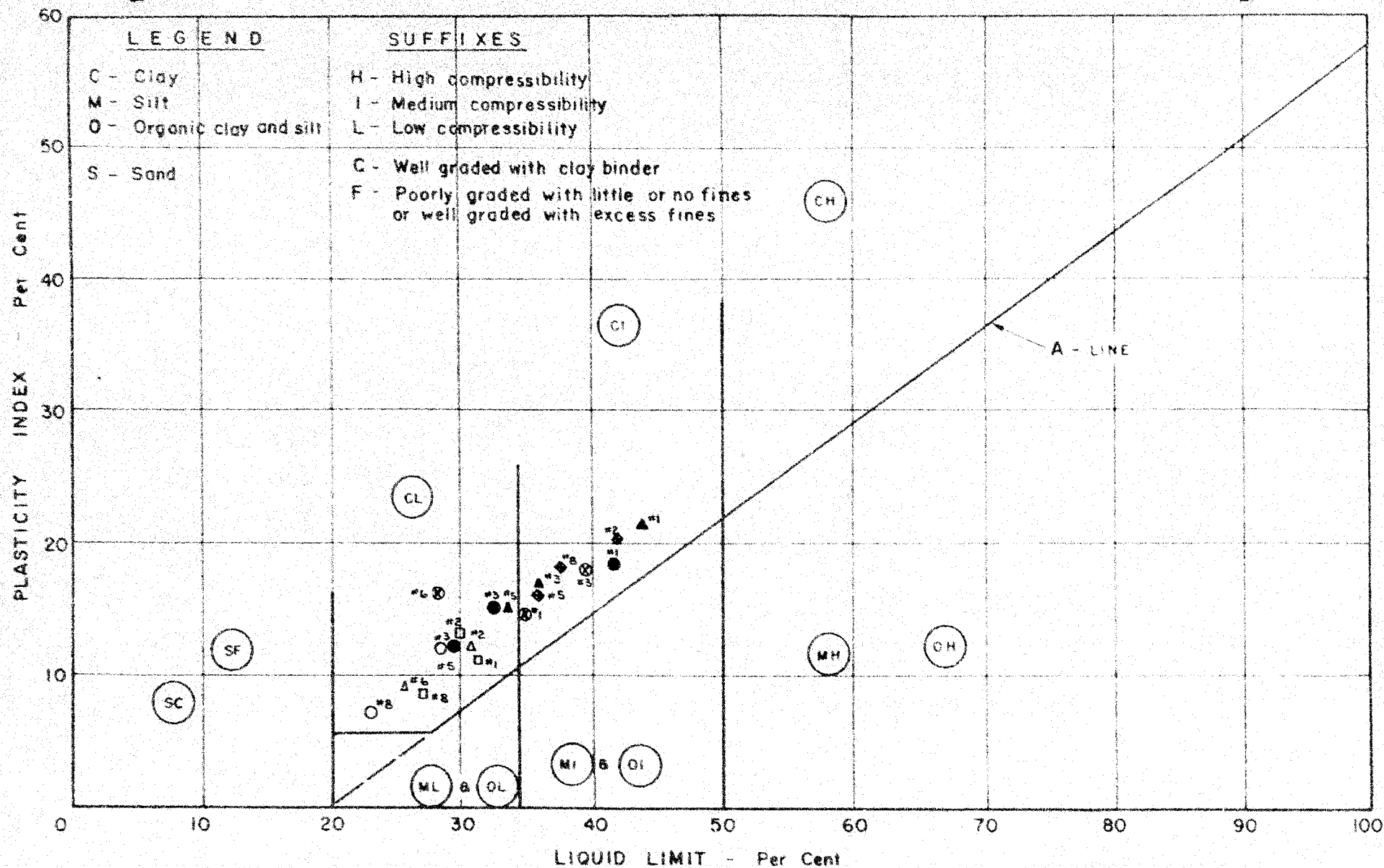
B.H. # 62 → ⊗

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
PLASTICITY CHART

Job No. 60-F-14

W.P. No.

Location CHEDOKE STORM SEWER



NOTES

B.H. # 63 → ○
B.H. # 64 → △
B.H. # 65 → □
B.H. # 66 → ●

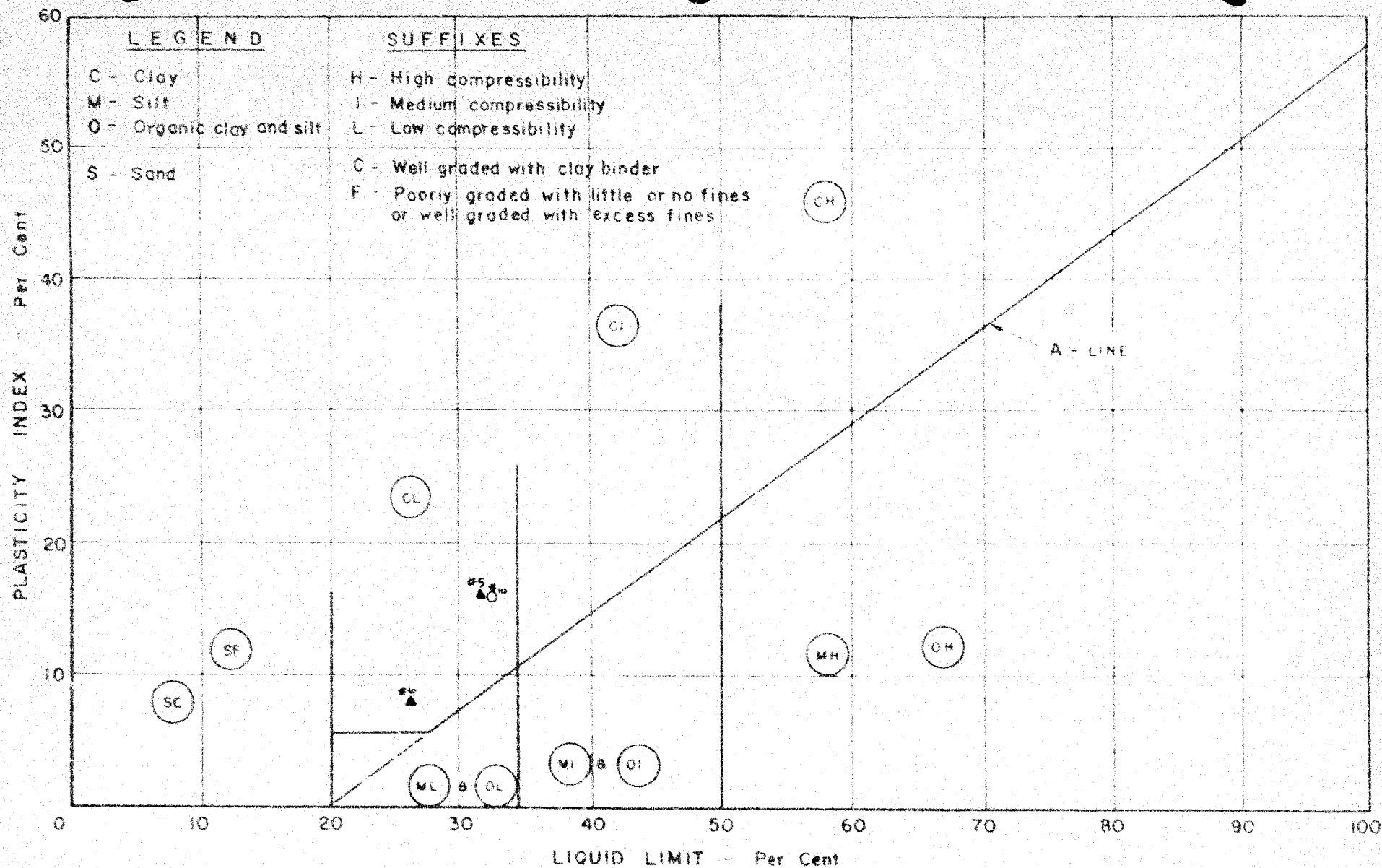
B.H. # 67 → ▲
B.H. # 68 → ⊕
B.H. # 69 → ⊗

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
PLASTICITY CHART

Job No. 60 - F - 14

W.P. No.

Location CHODOKE STORM SEWER



NOTES B.H. # 701 → ○
B.H. # 702 → △

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
PLASTICITY CHART

Job No. 60-F-14 W.P. No. _____
Location CHEDOKE STORM SEWER

Contract No.	Sheet No.	Stationing
24-60-00	205	1-4
Design Division	17	
Estimating Group		

GRADING PLAN

C&A
Sta. 417+00 to Sta. 478+00
RAMP 6
Sta. 15+68 to Sta. 45+40
RAMP 7
Sta. 428+20 to Sta. 428+78
CHANNEL
Sta. 31+88 to Sta. 44+60

PLAN LEGEND

Area to be cleared (indicated by cross-hatching)	
Area previously cleared & grubbed	
Wire Fence (to be erected)	
Wire Fence (to be removed)	
Grade Rail	
Single Track Railway	
Double Track Railway	
Earth or Rock Fill	
Earth or Rock Cut	
Concrete Culverts	
Utility Caves (not in this contract)	
Highway Fence (to be erected)	

QUANTITIES LEGEND

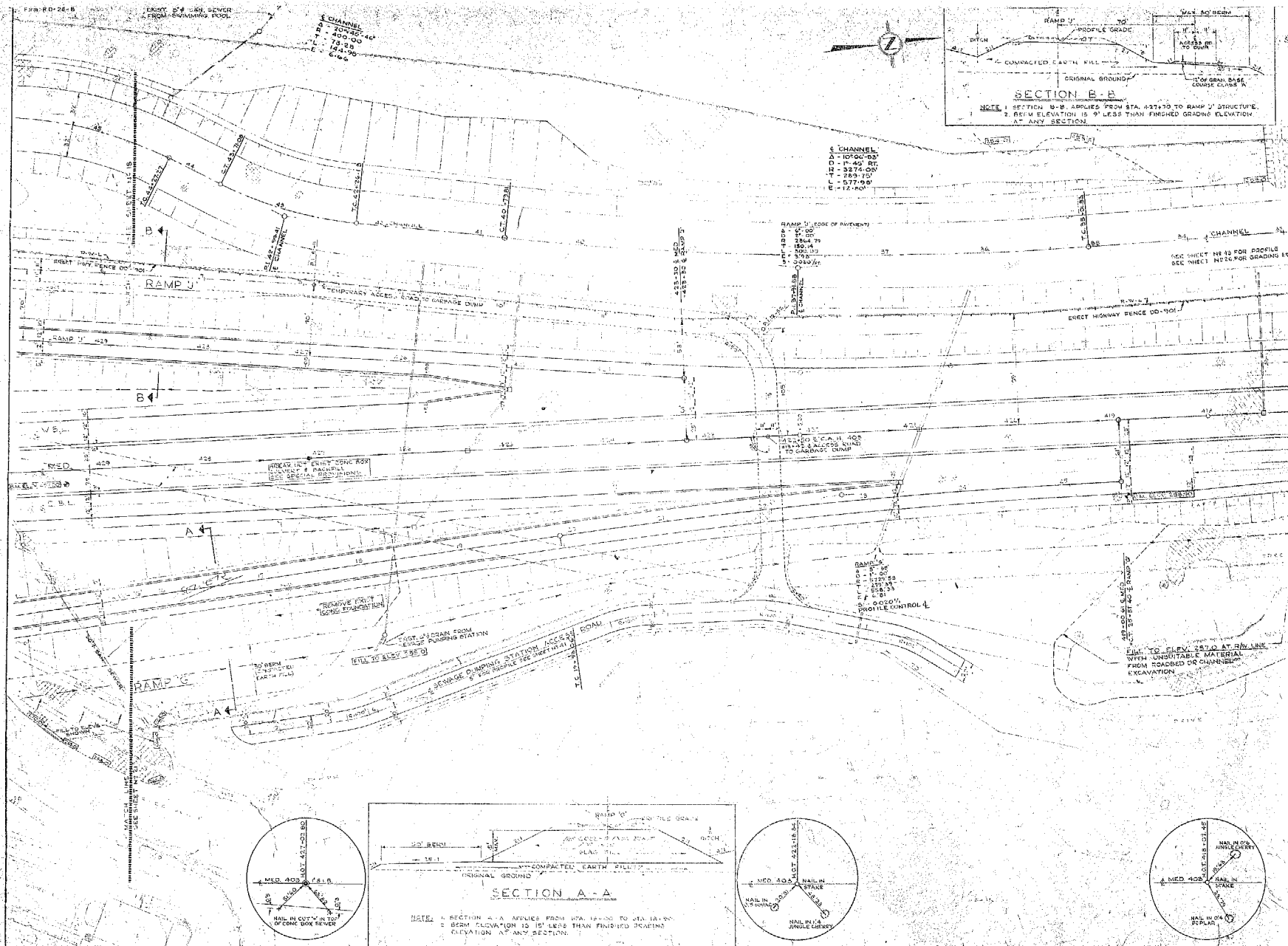
Excavation Cut (net)
RC Rock (including overbreak included)
R- Rock (estimated cut computed using both slopes)
SE- Sub-Excavation
SE- Shattered Rock
ME- Muck Excavation
EF- Earth (including estimated shrinkage)
RE- Rock Fill
SF- Stripping
ED- Earth Excavation for Ditches
RM- Rock Muck Backfill
CMS- Earth Muck Backfill (including estimated shrinkage)

REFERENCE KEY	SHEET NO.
GRADING PLAN	20
DRAINAGE & UTILITIES PLAN	44
PROFILE	45
RIGHTING PLAN	46

SCALES

Horizontal	0 40
Vertical	0 20

Drawn by J. B. D. N. Checked by J. B. D. N.
DATE MARCH 7, 1952 DATE MARCH 7, 1952
DWG. NO.



SOME DEFECTS IN NEGATIVE DUE

TO CONDITION OF ORIGINAL DOCUMENTS.

AS PREPARED BY THE ENGINEER
NO. 1000, 1000, 1000
1000, 1000, 1000

1000, 1000, 1000
1000, 1000, 1000
1000, 1000, 1000

SOILS PROFILE

- YELLOW CLAY SILTS - SILT CLAYS OF LOW PLASTICITY (CL) (CL-ML) (SC)
- BLUE SANDY SILTS, NON-PLASTIC (ML)
- GREEN SILTY SANDS, SANDS (SM) (SP)

B.H. 19 (STA. 19+00 ft.)

DEPTH (ft.)	SOIL TYPE	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	UNSATURATED SWELLING (%)
0.0	CL	25.0	25.0	0.0	0.0
1.0	CL	25.0	25.0	0.0	0.0
2.0	CL	25.0	25.0	0.0	0.0
3.0	CL	25.0	25.0	0.0	0.0
4.0	CL	25.0	25.0	0.0	0.0
5.0	CL	25.0	25.0	0.0	0.0
6.0	CL	25.0	25.0	0.0	0.0
7.0	CL	25.0	25.0	0.0	0.0
8.0	CL	25.0	25.0	0.0	0.0
9.0	CL	25.0	25.0	0.0	0.0
10.0	CL	25.0	25.0	0.0	0.0

B.H. 21 (STA. 21+00 ft.)

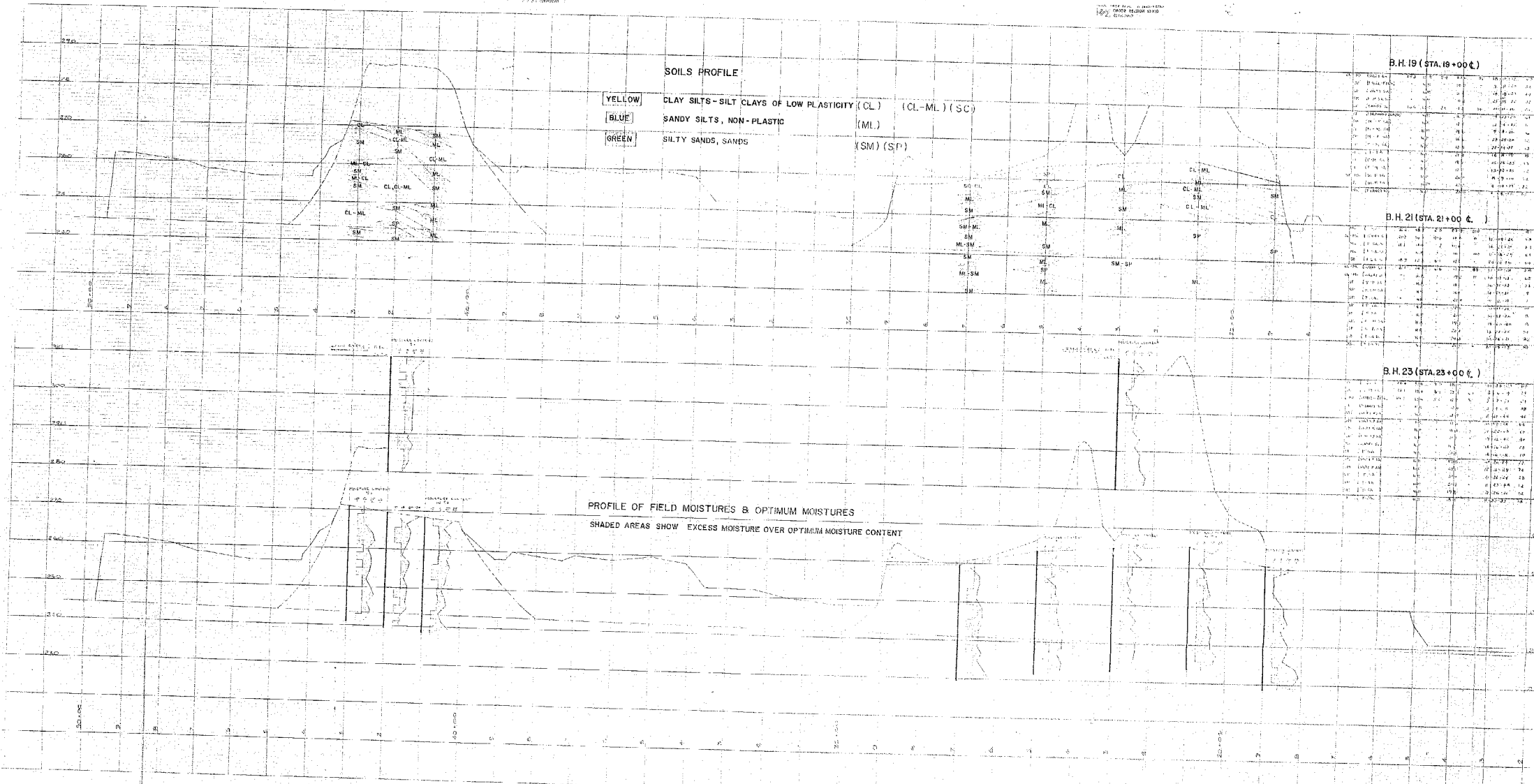
DEPTH (ft.)	SOIL TYPE	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	UNSATURATED SWELLING (%)
0.0	CL	25.0	25.0	0.0	0.0
1.0	CL	25.0	25.0	0.0	0.0
2.0	CL	25.0	25.0	0.0	0.0
3.0	CL	25.0	25.0	0.0	0.0
4.0	CL	25.0	25.0	0.0	0.0
5.0	CL	25.0	25.0	0.0	0.0
6.0	CL	25.0	25.0	0.0	0.0
7.0	CL	25.0	25.0	0.0	0.0
8.0	CL	25.0	25.0	0.0	0.0
9.0	CL	25.0	25.0	0.0	0.0
10.0	CL	25.0	25.0	0.0	0.0

B.H. 23 (STA. 23+00 ft.)

DEPTH (ft.)	SOIL TYPE	WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	UNSATURATED SWELLING (%)
0.0	CL	25.0	25.0	0.0	0.0
1.0	CL	25.0	25.0	0.0	0.0
2.0	CL	25.0	25.0	0.0	0.0
3.0	CL	25.0	25.0	0.0	0.0
4.0	CL	25.0	25.0	0.0	0.0
5.0	CL	25.0	25.0	0.0	0.0
6.0	CL	25.0	25.0	0.0	0.0
7.0	CL	25.0	25.0	0.0	0.0
8.0	CL	25.0	25.0	0.0	0.0
9.0	CL	25.0	25.0	0.0	0.0
10.0	CL	25.0	25.0	0.0	0.0

PROFILE OF FIELD MOISTURES & OPTIMUM MOISTURES

SHADED AREAS SHOW EXCESS MOISTURE OVER OPTIMUM MOISTURE CONTENT

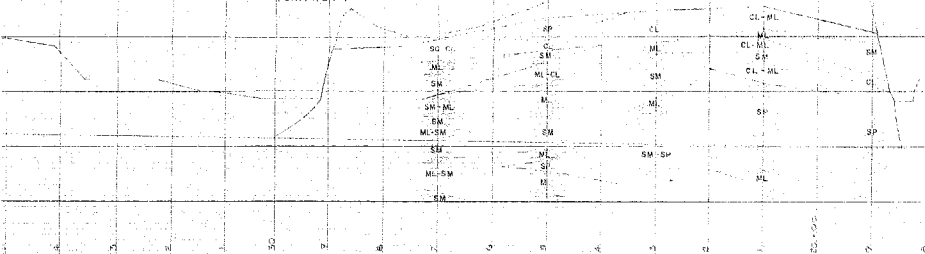


SOILS PROFILE

CLAY SILTS - SILT CLAYS OF LOW PLASTICITY (CL) (CL-ML) (SC)

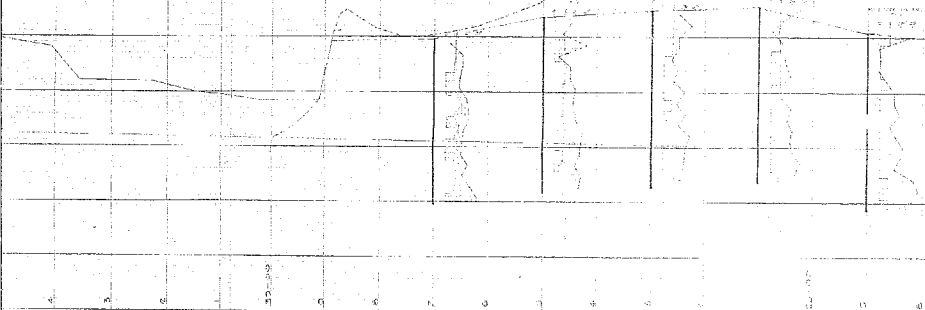
SANDY SILTS, NON-PLASTIC (ML)

SILTY SANDS, SANDS (SM) (SP)



FIELD MOISTURES & OPTIMUM MOISTURES

SHOW EXCESS MOISTURE OVER OPTIMUM MOISTURE CONTENT



B.H. 19 (STA. 19+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 23A (23+00, 100 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 41 (STA. 41+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 21 (STA. 21+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 25 (STA. 25+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 42 (STA. 42+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 23 (STA. 23+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 27 (STA. 27+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 42A (STA. 42+00, 50 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

B.H. 43 (STA. 43+00 ft.)

DEPTH (FEET)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)	WET WEIGHT (%)	DRY WEIGHT (%)
0.0	10.0	10.0	10.0	10.0	10.0	10.0
1.0	10.0	10.0	10.0	10.0	10.0	10.0
2.0	10.0	10.0	10.0	10.0	10.0	10.0
3.0	10.0	10.0	10.0	10.0	10.0	10.0
4.0	10.0	10.0	10.0	10.0	10.0	10.0
5.0	10.0	10.0	10.0	10.0	10.0	10.0
6.0	10.0	10.0	10.0	10.0	10.0	10.0
7.0	10.0	10.0	10.0	10.0	10.0	10.0
8.0	10.0	10.0	10.0	10.0	10.0	10.0
9.0	10.0	10.0	10.0	10.0	10.0	10.0
10.0	10.0	10.0	10.0	10.0	10.0	10.0

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

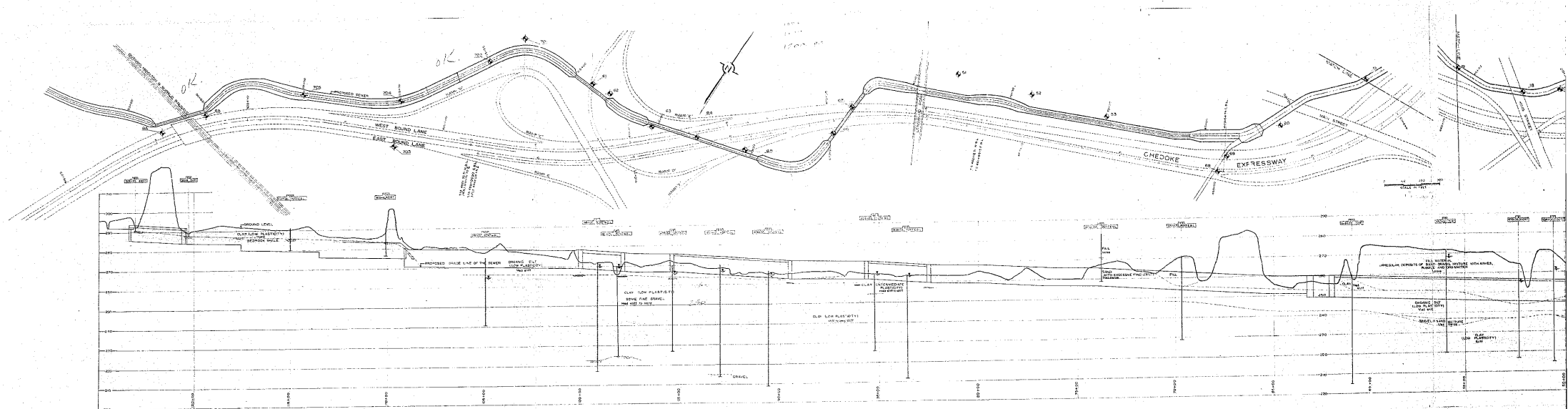
SOILS INVESTIGATION OF
BORROW AREA OF S. W. CHANNEL

STATION 23 A and 42 A

CONTRACT 62-109 KING - MAIN AREA
HIGHWAY NO. 403

SCALE: VERTICAL 1" = 10'
HORIZONTAL 1" = 100'

DATE: FEB 1965



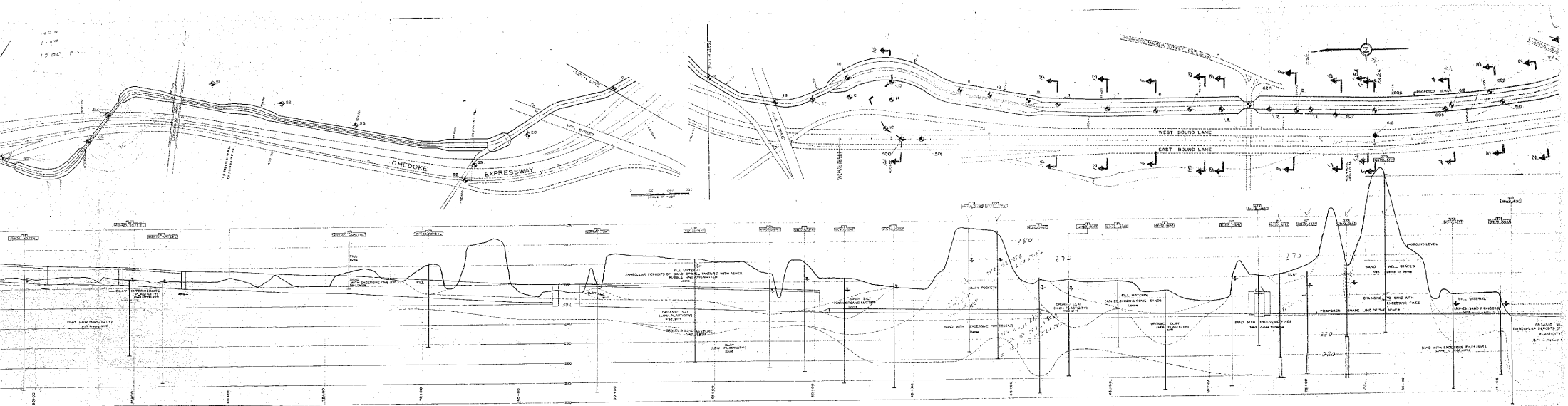
60-F-14

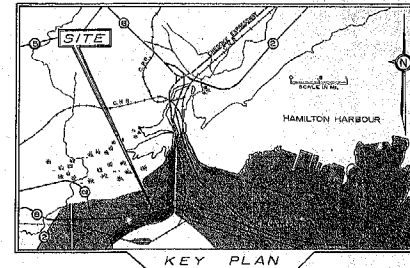
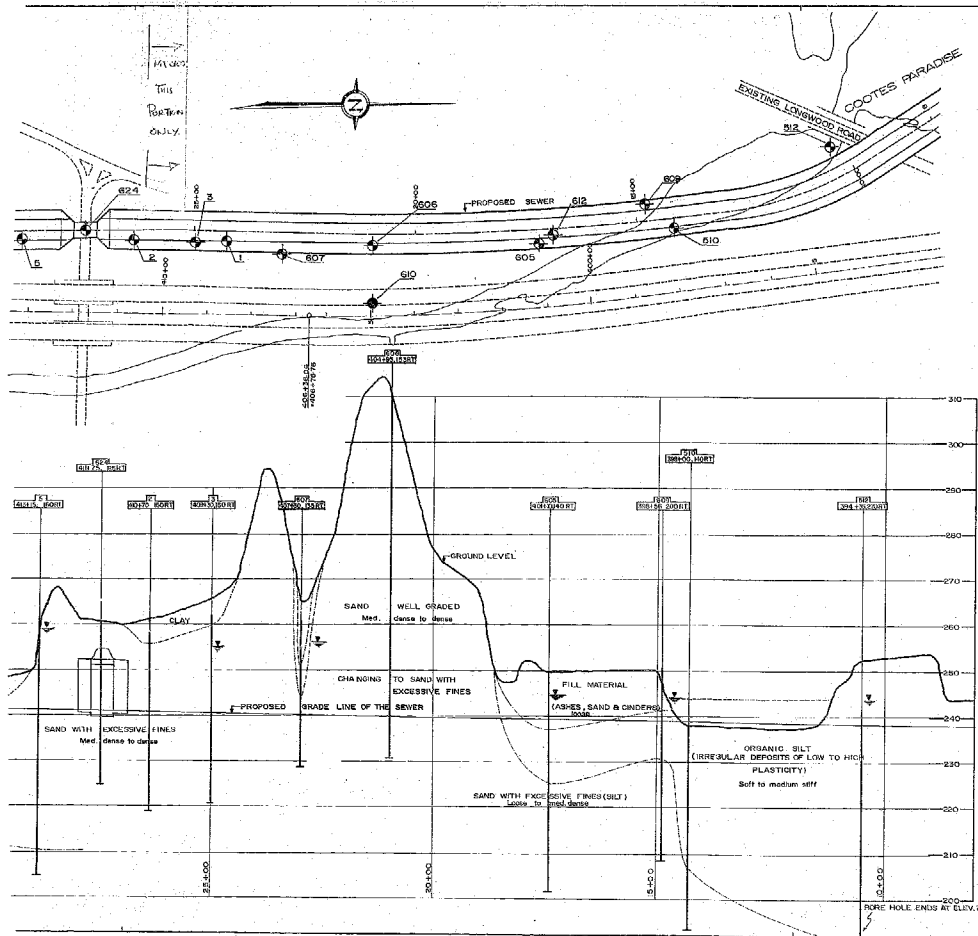
WEST HAMILTON

STORM

SEWER

30MS-31





LEGEND

- BORE HOLE IN PROFILE
- BORE HOLE IN PLAN
- WATER LEVEL

BORE HOLE NO. B10 & B12 DONE BY E.M. PETO & ASSOCIATES
AND THE REST BY DEPARTMENT OF HIGHWAYS

NOTE

THE BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN ESTABLISHED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES THE BOUNDARIES ARE ASSUMED FROM GEOLOGICAL EVIDENCE AND MAY BE SUBJECT TO CONSIDERABLE ERROR.

DEPARTMENT OF HIGHWAYS ONTARIO
MATERIALS & RESEARCH SECTION

PROPOSED CHEDOKE STORM SEWER

ORIGINATED: MURTY DEVATA	DISTRICT NO. 4.	DATE: 15 OCTOBER 1960
DRAWN: <i>[Signature]</i>	SCALE: AS SHOWN	JOB NO. 60-F-14.
CHECKED: <i>[Signature]</i>	W.P. NO. 140-57-1 231-28-2 231-58-3	DRAWING NO. 60-F-14A
APPROVED: <i>[Signature]</i>		