



ONTARIO  
DEPARTMENT OF HIGHWAYS

**Memo to** Mr. A. M. Toye, **Date** August 12, 1960.  
Bridge Engineer. **Subject** FOUNDATION INVESTIGATION REPORT  
**From** Materials & Research Section. **by:** Geocon, Limited.

Attention: Mr. S. McCombie.

**Re:** -- Desjardins Canal Bridge --  
Hwy. 403 (Chedoke Expressway)  
W.P. 193-60-1 -- District No.4.

This memo accompanies a detailed soils report for the above structure, recently submitted by Geocon, Limited. Four copies of this report have been forwarded directly to C.C. Parker, Parsons & Brinckerhoff, Ltd., in Hamilton.

The Foundation Section has reviewed the data and recommendations contained in this report, and submit the following comments:-

1. In view of the variation in relative density of the upper deposits of silt and sand encountered in the borings at this site, it is our recommendation that footings be supported on large displacement friction piles. Either timber, Class 'A' piles, or steel tube piles can be used. The allowable capacities and lengths are given in Geocon's report.
2. If the required set is not obtained with the pile lengths specified in the Consultant's report, provision should be made to carry out static load tests to confirm the design loads being used.

cont'd. /2 ...

Recommendations: (cont'd.) ...

3. The condition of the footings for the existing structure is such that remedial slope protection will have to be carried out. An inspection of the condition of the existing footings was recently carried out by this Section, and at the North abutment, it was observed that the inside of the footing is exposed due to inadequate drainage provision, which has resulted in scouring.

If you have any queries with regard to the contents of the attached report, or our foregoing comments, please do not hesitate to contact the Foundation Section.

LGS/MdeF  
Attach.

*M. de Josselin (actg.)*  
for L. G. Soderman,  
PRINCIPAL FOUNDATIONS ENGINEER

cc: Messrs. A. M. Toye (2)  
H. A. Tregaskes  
D. G. Ramsay  
I. Campbell  
R. E. Richardson  
A. Watt  
T. J. Kovich  
C. C. Parker & Assoc. (4)  
Foundations Office  
Gen. Files.

# GEOCON LTD

## HEAD OFFICE

130 VALLÉE ST., MONTREAL 18, QUEBEC  
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## DISTRICT OFFICES

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VANCOUVER 5, B.C.  
TEL. MU. 1-8926

Rexdale, Ontario,  
August 8th, 1960.

60-F-293C

Department of Highways, Ontario,  
Downsview, Ontario.

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

Re: Soil Conditions and Foundations,  
Proposed Desjardins Canal Bridge,  
Hamilton, Ontario.

Dear Sirs:

This letter accompanies our detailed report concerning the soil conditions encountered at the site of the proposed Desjardins Canal Bridge and our discussion of possible foundation types.

The site is covered by very loose to dense silt and sand. The relative density of the deposits markedly increases with depth. The sand and silt strata is underlain by stiff silty clay.

It is recommended that the structure be founded on a friction piled foundation as discussed in the report. The driving energy and set requirements for two significant types of pile are further discussed.

We believe that this report gives all the information required for safe and economical foundation design of the proposed structure. If we can be of further service, we would be pleased if you would call us.

Yours very truly,

GEOCON LTD

*M. A. J. Matich per J. L. S.*

M. A. J. Matich, P. Eng.,  
Chief Engineer.

MAJM/dw  
S7067

S7067  
REPORT  
TO  
DEPARTMENT OF HIGHWAYS, ONTARIO  
ON  
SOIL CONDITIONS AND FOUNDATIONS  
PROPOSED DESJARDINS CANAL BRIDGE  
HAMILTON ONTARIO

Distribution:

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

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## INTRODUCTION

Geocon Ltd has been retained by the Department of Highways, Ontario by letter dated March 30th, 1960 to carry out a foundation investigation at the site of a proposed bridge which is to carry the westbound lane of the Chedoke Expressway over the Desjardins Canal in Hamilton, Ontario.

The main object of the investigation was to determine the soil conditions at the site as they affect the foundation design of the proposed bridge.

Drawing S7067-1 at the rear of this report shows the location of the boreholes, together with sections of the inferred soil stratigraphy. Detailed logs of the boreholes are contained in Appendix I and figures relating to laboratory testing are given in Appendix II.

## SITE AND GEOLOGY

The site is located just west of and adjacent to the existing bridge which carries Longwood Road over the Desjardins Canal which connects Hamilton Harbour and Cootes Paradise in Hamilton, Ontario.

The site forms part of the Lake Iroquois offshore deposits consisting mainly of fine-grained sands, becoming silty with depth and resting on early Lake Iroquois clays. The deposits are generally stratified.

## SUMMARIZED SOIL CONDITIONS

The subsoil at the site generally consists of very loose to compact fine to medium uniformly graded sand, becoming dense to very dense with depth. Beneath the canal bottom and extending into the banks at either side of the canal is a layer of very loose to loose organic sandy silt about 2 to 10 feet in thickness. The fine to

medium sand stratum contains thin layers or lenses of silt and clay and at depth grades to compact to very dense sandy silt which in turn grades to very stiff silty clay interbedded with silty and sandy layers.

### DISCUSSION

The existing bridge carrying Longwood Road over the Desjardins Canal is a three-span reinforced concrete structure. From available structural information, it is known that the abutments are founded on stepped spread footings in the sand stratum. The east and west ends of the north abutment are founded at elevations 260 and 254 respectively. The corresponding elevations at the south abutment are 257 and 252 respectively. The pier footings are also founded in the sand stratum at about elevation 230.

It is understood that the proposed bridge carrying the westbound lane of the Chedoke Expressway will be located adjacent to and west of the existing bridge which is to carry the eastbound lane of the proposed Chedoke Expressway. It is further understood that the proposed bridge will be a multi-span simply supported steel structure. The maximum pier and abutment structural loadings will be of the order of 1000 and 700 kips respectively. It is understood that piled foundations are proposed in the present design.

The main foundation strata at the site are the fine to medium sand and the sandy silt strata. It is considered that either spread footing or piled foundations could be used for the proposed structure. Details concerning both types of foundation are discussed below.

Spread Footing Foundations

The depth of foundation will depend upon the topography at the site and the variation of relative density with depth in the sand stratum. Borehole 1 was put down at the location of the proposed south abutment, borehole 4 was put down at the location of the proposed north abutment. Boreholes 2 and 6 and boreholes 3 and 7 were put down at the location of the proposed south and north piers respectively. Boreholes 1 and 8 were put down about midway between the proposed south pier and abutment and about midway between the proposed north pier and abutment respectively.

The results of boreholes 1, 2, 3 and 4 indicate the presence of a stratum of very loose and compressible organic sandy silt, generally above elevation 226. Below this elevation, the relative density of the sand and silt deposits increases rapidly with depth being generally dense to very dense below elevation 220.

Boreholes 5 to 8 inclusive, along the east side of the proposed pier and abutment locations did not encounter the organic silt stratum. The standard and dynamic penetration tests generally indicated rapid increase in relative density with depth, the deposits being generally dense to very dense below elevation 235.

In order to take advantage of the lateral variation in relative density of the sand and silt deposits, it is considered that the west side of the piers and abutment foundations could be founded at or below elevation 220 and the east side of the foundations be founded at or below elevation 235. At these elevations an allowable bearing pressure of 3 tons per square foot may be used for design. In view of the variation in relative density discussed above, it is probable that individual spread footings would be used



Spread Footing Foundations (continued)

at each side of the proposed piers and abutments. Allowing for a maximum pier loading of the order of 1200 to 1500 kips, individual footing sizes would be approximately 15 feet square. Total settlement of footings of this size under the allowable bearing pressure should not exceed one inch, which is within tolerable limits for a simply supported structure.

Examination of the existing adjacent structure, which is founded on spread footings, shows evidence of some scour below the footings. The construction of the proposed structure will tend to intensify scour in Desjardins Canal. Consequently, provision should be made to protect footings for both the existing and proposed structure against scour. Furthermore, the adoption of spread footing foundations for the proposed structure will necessitate excavation below the water level to the proposed foundation grades. It will therefore be necessary to sheet all excavations during construction. In order to prevent boiling at the base of the excavation, the depth of penetration of the sheeting below foundation grade should be approximately equal to the depth of excavation below maximum water level. Because of scour requirements it is suggested that depth of penetration be specified to provide a permanent protection.

In view of the requirements discussed above, and particularly the fact that scour protection should be provided, a piled foundation was examined.

Piled Foundation

Computations of pile capacity for two typical pile types, a 10 inch x 42 lbs. steel H. pile and a 12 inch cylindrical pipe pile were carried out. The computations were based on the average standard penetration resistance, or "N" values, obtained with depth. The com-

Piled Foundation (continued)

puted pile capacities for various pile lengths are summarized on Figures 1 and 2 of Appendix III.

It may be seen that the computed ultimate capacity for 12 inch diameter circular pipe piles of 50 feet penetration is about 90 tons. This gives good agreement with the results of 8 pile load tests previously carried out in this general area on red pine timber piles of 8 inch tip diameter, varying in embedded length from 20 to 40 feet. In these tests a penetration of 40 feet provided an ultimate capacity of about 75 tons.

It is therefore recommended that the proposed bridge be founded on 8 inch tip diameter class 'A' timber piles approximately 35 to 40 feet in length, the length being also controlled to provide scour protection. Provided that a hammer energy within the range of 10,000 to 15,000 foot pounds per blow is used and the piles are driven to a set of 10 to 5 blows respectively for the last inch, it is considered that an allowable pile load of 25 tons may be used in design. This figure may possibly be increased to 35 tons should control pile load tests be carried out during construction at each pier and abutment location. Piles driven at the abutment locations and therefore subject to water level variation should be pressure creosoted to prevent deterioration with time. Alternatively, the complete structure may be founded on 12 inch diameter pipe piles driven closed end. The length, driving energy and set requirements for pipe piles should correspond with the higher values quoted for the timber piles above, the required set being at least 10 blows for the last inch. In this case an allowable pile load of 40 tons may be used in design for the pipe piles.

Piled Foundation (continued)

The anticipated settlements for piled foundations, as above, should be small and well within tolerable limits for the structure proposed.

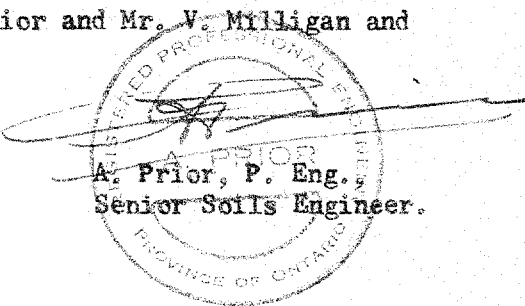
CONCLUSIONS AND RECOMMENDATIONS

1. The subsoil at the site generally consists of very loose to dense silt and sand strata. The relative density of the deposits markedly increases with depth. The sand and silt strata is underlain by stiff silty clay.
2. The water level measured in all the boreholes at the time of the investigation was at elevation 246.5 which corresponds with canal water level during the same period.
3. The proposed structure could be founded on spread footing foundations at the grades specified in the report. However in view of probable scour requirements, it is recommended that piled foundations be adopted, either 8 inch tip diameter timber piles being used under an allowable load of 25 tons per pile or 12 inch diameter pipe piles under an allowable load of 40 tons per pile.
4. The driving energy and set requirements for the pile types given above are discussed in the report.

PERSONNEL

The field work was carried out under the supervision of Mr. R. Sullivan. The report was written by Mr. A. Prior and Mr. V. Milligan and reviewed by Mr. M.A.J. Matich.

AP/dw  
S7067

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

## APPENDIX I

Procedure

Soil Conditions

Water Conditions

Office Reports on Soil Exploration

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## PROCEDURE

The field work was commenced on April 6th, 1960 and completed on May 9th, 1960. Ten boreholes accompanied by dynamic penetration tests were put down using a standard machine drillrig. Six of these boreholes were carried out over water from a raft supplied by the Department of Highways.

The locations of the boreholes together with sections of the inferred soil stratigraphy are shown on Drawing S706/-1 located in the pocket at the rear of the report. A detailed log for each boring is given on the Office Reports on Soil Exploration in this Appendix.

The results of laboratory testing on samples obtained are given on the Office Reports and on the Figures of Appendix II. The soil samples remaining after testing will be stored until January 1st, 1961, at which time you will be notified regarding this disposal.

Figures showing the results of pile capacity computations are given in Appendix III.

Elevations referred to in this report are Geodetic and were obtained from a bench mark consisting of a cross chiseled in the railing curb over the west side of the south abutment of the existing bridge. This bench mark was supplied by C. C. Parker & Parsons, Brinckerhoff Ltd. The Geodetic elevation of this bench mark was given as 279.78.

## SOIL CONDITIONS

The main soil strata encountered by the borings are as follows:

Topsoil

The banks of the canal are generally covered by about 1 foot of sandy topsoil.

Fill

In borehole 5 at the surface and in boreholes 9 and 10 at the canal bottom, a layer of brown sand and gravel fill was encountered varying in thickness from about 4 feet in boreholes 9 and 10 to about 9 feet in borehole 5. The fill is probably part of the backfill for the piers and abutments of the existing bridge.

Based on the results of the dynamic penetration tests and one standard penetration value of 10 blows per foot obtained within the fill stratum in borehole 5, the fill is considered to be generally of very loose to loose relative density.

Very Loose to Very Dense Grey-Brown Silty Fine to Medium Sand

Beneath the topsoil in boreholes 1, 4 and 8 and beneath the fill in borehole 5 is a stratum of sand. This stratum was also encountered beneath the canal bottom. The thickness of the stratum ranges from 13 feet in borehole 7 to at least 76 feet in borehole 4, which did not penetrate the stratum completely. The colour of the sand is generally brown to grey-brown except in borehole 4 where it grades to grey with depth.

The structure of the stratum is non-homogeneous. Generally stratified and occasionally cross bedded in the sand sizes themselves, thin seams or lenses of sandy silt, clayey silt and silty clay were frequently encountered at random within the sand stratum.

Very Loose to Very Dense Grey-Brown Silty Fine  
to Medium Sand (continued)

The sand sizes are generally uniformly graded in the fine to medium range and the individual sizes are mainly subangular to subrounded in shape. Typical grainsize distribution curves for the sand are shown on Figures 1, 2 and 3 of Appendix II.

Standard penetration or "N" values obtained on samples of the stratum ranged from 1 blow per foot to well over 100 blows per foot with a median value of about 40 blows per foot. In boreholes 1, 2, 4 and 8, the upper portion of the stratum is very loose to loose in relative density to a maximum depth of about 30 feet, after which it rapidly increases in density with depth. In the remainder of the boreholes, the sand is generally compact in the upper range and increasing in relative density with depth.

The average wet unit weight obtained on samples of the sand from borehole 4, was 130 pounds per cubic foot at an average natural moisture content of 16 percent.

Due to the stratified structure of the stratum and the presence of fine-grained seams of unknown continuity, it is impractical to determine the composite coefficient of permeability for the stratum. However, because of the possibility of excavations in this stratum below the water table, the coefficient of permeability of the fine to medium sand was estimated from the grainsize distribution curves, using Hazen's formula. The results are shown in Figure 7 of Appendix II. It can be seen that the average range of the coefficient of permeability for the sand is between  $10^{-2}$  and  $10^{-3}$  centimeters per second. The low coefficients on the figure were obtained on fine-grained layers within the sand stratum.

Very Loose to Very Dense Grey-Brown Silty Fine to Medium Sand (continued)

For design purposes the angle of shearing resistance  $\phi$  may be taken as 35 degrees, and the angle of wall friction as 24 degrees. The wet unit weight is estimated to be 130 pounds per cubic foot and the submerged unit weight 70 pounds per cubic foot.

Very Loose to Loose Dark Grey Organic Sandy Silt

Within the fine to medium sand stratum in boreholes 1, 2 and 4 and at the canal bottom at borehole 3 is a layer of dark grey silt. This material was not encountered by the other boreholes and it is considered that at these locations the material has been dredged at one time and replaced, or that boreholes 1, 2, 3 and 4 are on the edge of a stratum extending into Cootes Paradise.

The stratum is organic and contains some sandy pockets and layers. Thin coarse sand layers were encountered in the stratum at borehole 4. The thickness of the stratum ranges from 2 feet in borehole 4 to 10 feet in boreholes 2 and 3.

Standard penetration tests gave "N" values ranging from 1 blow per foot to 28 blows per foot indicating that the relative density of the stratum ranges from very loose to compact. Generally, the density is minimum beneath the canal, and maximum where the stratum extends into the canal banks.

Compact to Very Dense Grey-Brown and Grey Sandy Silt

Beneath the stratum of fine to medium sand is a stratum of sandy silt. The stratum was not encountered in borehole 4, which was stopped in the sand stratum. The thickness of the stratum ranges from 20 feet in borehole 10 to over 35 feet in borehole 7,



Compact to Very Dense Grey-Brown and Grey Sandy Silt (continued)

which did not penetrate the stratum completely. The upper part of the stratum is generally grey-brown in colour, to a depth varying between 7 and 25 feet. The remainder of the stratum varying in thickness between 10 and 24 feet is generally grey in colour. The grey-brown coloured part of the stratum was not encountered in boreholes 3, 9, and 10. Thin seams or lenses of silty sand, clayey silt and silty clay were encountered at random within the silt stratum. Typical grainsize distribution curves for the sandy silt stratum are given on Figures 4, 5 and 6 of Appendix II.

Standard penetration tests gave "N" values ranging from 14 to well over 100 blows per foot with a median value of about 46 blows per foot. This indicates that the silt is compact to very dense and generally of dense relative density.

The average wet unit weight obtained was about 127 pounds per cubic foot at an average moisture content of about 20 per cent.

The coefficient of permeability as estimated from the grain-size distribution curves is shown as a function of elevation on Figure 7 of Appendix II. As discussed previously, the coefficients of permeability obtained do not represent the true permeability of the composite stratum, due to the presence of seams or lenses of both coarser and finer grained material.

Compact to Very Dense Grey Sandy Silt with Clayey Silt and Clay Layers

Beneath the sandy silt stratum is a stratum which is very similar except that it contains frequent clayey silt and silty

Compact to Very Dense Grey Sandy Silt with Clayey Silt and Clay Layers (continued)

clay seams or lenses. The thickness of this stratum ranges from 6 feet to at least 19 feet.

"N" values obtained on samples from the stratum ranged from 18 to 61 blows per foot, with a median value of about 40 blows per foot. These indicate that the stratum is compact to very dense and generally of dense relative density.

The average wet unit weight obtained was about 131 pounds per cubic foot at an average moisture content of 18 percent.

Very Stiff Grey Silty Clay with Sandy Silt and Clayey Silt Layers

The sandy silt with clayey silt and clay layers grades into a silty clay with sandy silt and clayey silt seams or lenses. The stratum was encountered in boreholes 2, 3 and 5 and penetrated for a maximum distance of 18 feet in borehole 3.

An unconsolidated undrained triaxial test gave a shear strength of about 1000 pounds per square foot. The wet unit weight obtained was 117 pounds per cubic foot and the average moisture content was 28 percent. Atterberg limit determinations gave liquid limits varying between 36 and 51 and plasticity indices varying between 18 and 28, at corresponding natural moisture contents varying between 22 and 35 percent.

Based on the results of the standard penetration test which gave "N" values ranging from 18 to 39 blows per foot with a median value of 23 blows per foot, the consistency of the stratum is estimated to be generally very stiff.

## WATER CONDITIONS

VII.

Water level observation pipes were installed in boreholes 1, 4, 5 and 8 on May 9th, 1960. Water levels measured at these locations were found to be equal and stationary at elevation 246.5. This elevation corresponds with that of the water level in the canal at the time of the investigation.

GEOCON

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

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

### ELEVATION AND DEPTH

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

### WATER CONDITIONS

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

### DESCRIPTION

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

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

### STRATIGRAPHIC PLOT

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

### ELEVATION SCALE

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

### GRAPHS

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

### OTHER TESTS

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

### SAMPLES

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

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

**GEOCON**

## GEOCON

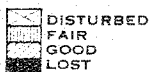
## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7067 BORING # 1 DATUM GEODETIC CASING 2x  
 BORING DATE MAY 5, 1960 REPORT DATE MAY 14, 1960 COMPILED BY M.W. CHECKED BY K.  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

## SAMPLE CONDITION

## SAMPLE TYPES

## ABBREVIATIONS



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

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

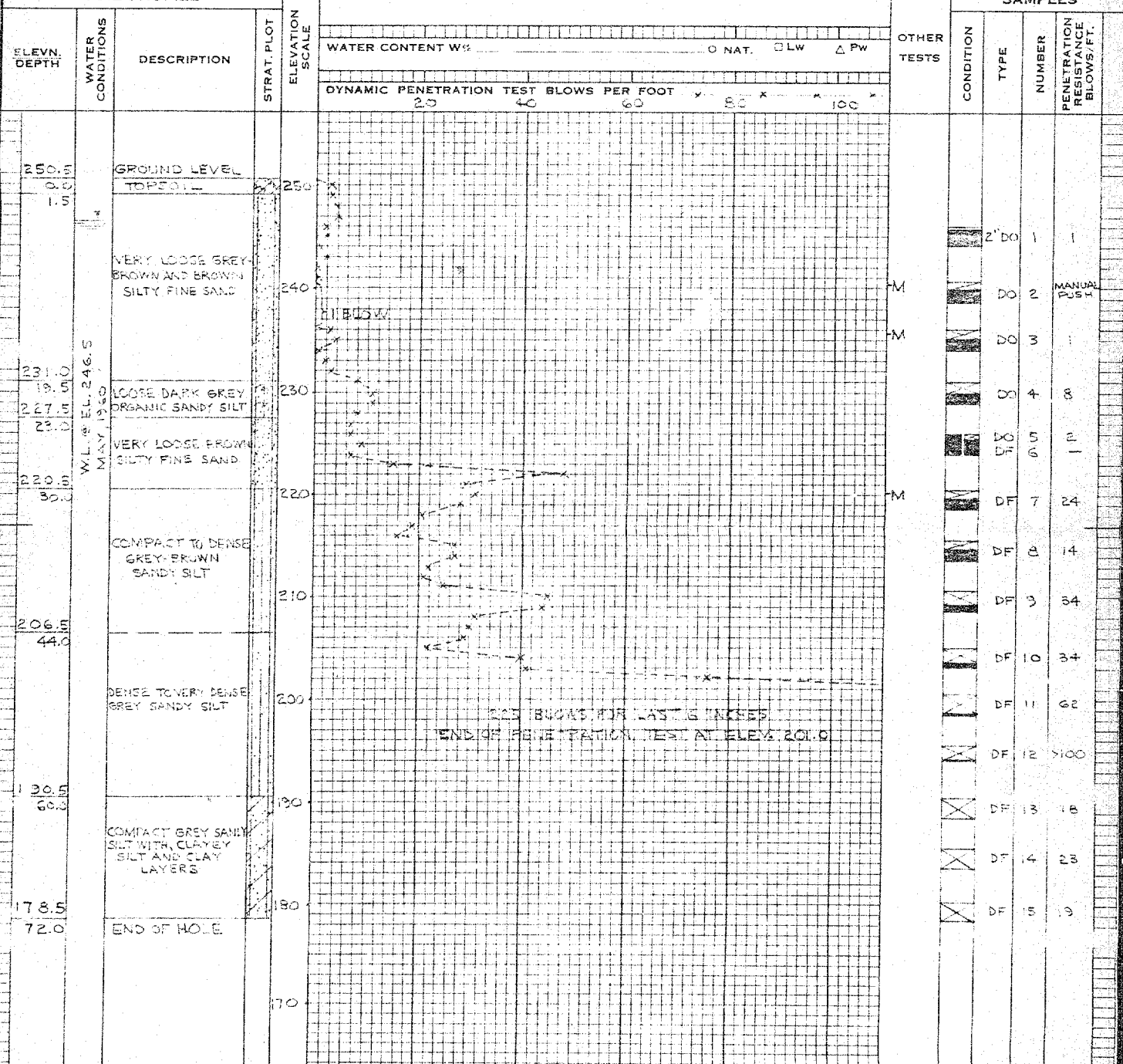
V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 Qc - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW

γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION

WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

## SOIL PROFILE

## SAMPLES



# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT 57007 BORING # 2 DATUM GEODETIC CASING BX  
 BORING DATE APRIL 21 1960 REPORT DATE MAY 13, 1960 COMPILED BY M.W. CHECKED BY h  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

### SAMPLE CONDITION



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

### SAMPLE TYPES

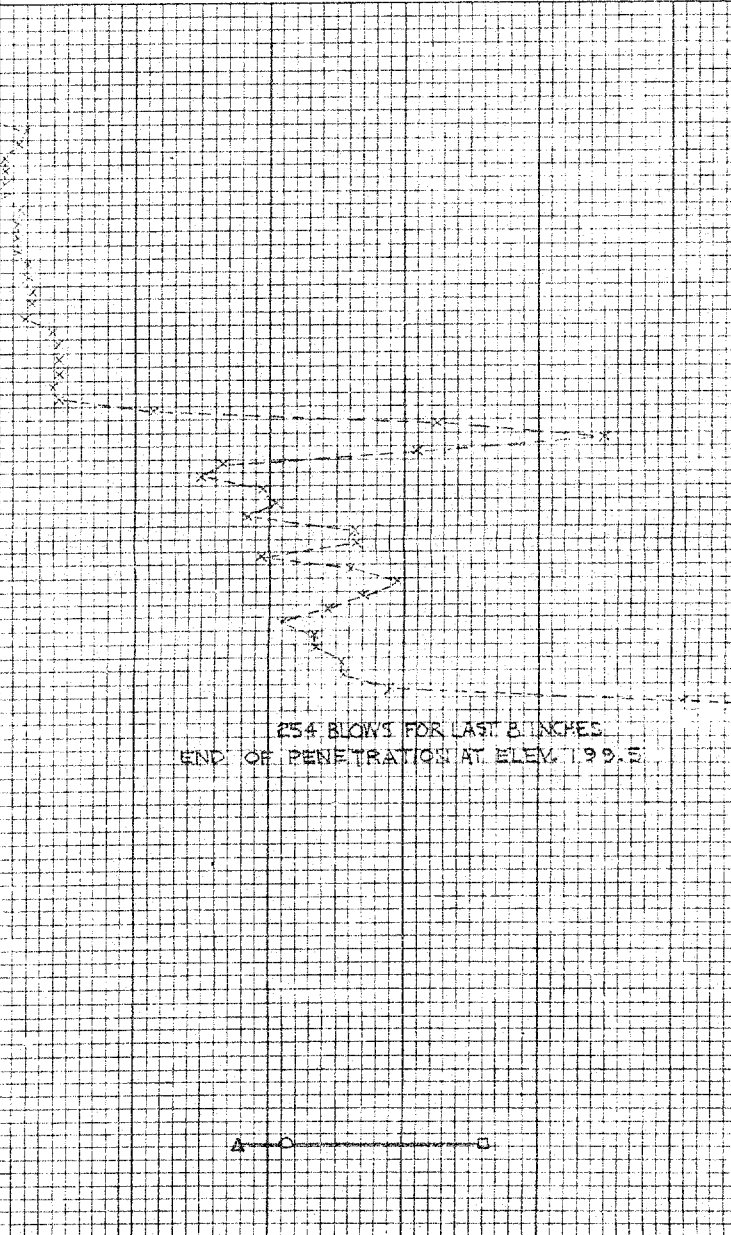
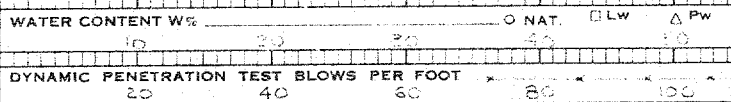
F.S. - FOIL SAMPLE  
 S.O. - SLEEVE-OPEN  
 S.F. - SLEEVE-FOOT VALVE  
 T.O. - THIN WALLED OPEN  
 R.C. - ROCK CORE

### ABBREVIATIONS

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

### SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
246.5		CANAL LEVEL		250
244.2		CANAL BOTTOM		240
238.2		VERY LOOSE GREY-BROWN SILTY FINE SAND		230
228.2		VERY LOOSE DARK GREY ORGANIC SANDY SILT		220
220.2		LOOSE TO COMPACT GREY-BROWN FINE SAND		210
200.2		COMPACT GREY-BROWN SANDY SILT		200
189.2		VERY DENSE GREY SANDY SILT		190
173.2		COMPACT TO DENSE GREY SANDY SILT WITH CLAYEY SILT AND CLAY LAYERS		180
161.7		VERY STIFF GREY SILTY CLAY WITH SANDY SILT AND CLAYEY SILT LAYERS		170
		END OF HOLE		160



### OTHER TESTS

### SAMPLES

CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
DF	1	1	
DF	2	1	
DF	3	4	
DF	4	29	
DF	5	27	
DF	6	28	
DF	7	24	
DF	8	29	
DF	9	46	
DF	10	82	
SO	11	44	
SO	12	34	
SO	13	44	
SO	14	47	
SO	15	26	
SO	16	39	

# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7067 BORING # 3 DATUM GEODETIC CASING 2x  
 BORING DATE APRIL 27 & 29, 1960 REPORT DATE MAY 4, 1960 COMPILED BY M.W. CHECKED BY J.  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

### SAMPLE CONDITION



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

### SAMPLE TYPES

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

### ABBREVIATIONS

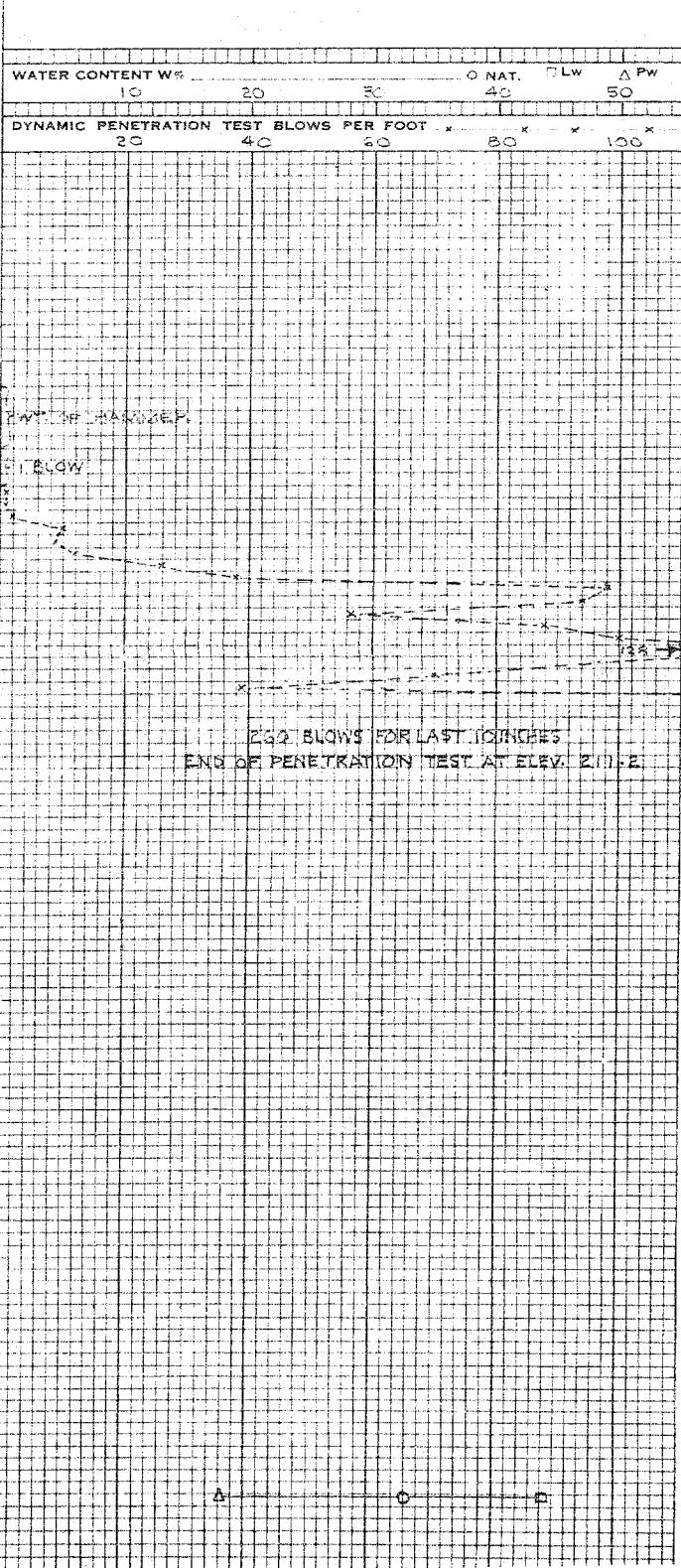
V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW

γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION

WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

### SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLLOT	ELEVATION SCALE
246.5 9.5		CANAL LEVEL		250
237.0 9.5		CANAL BOTTOM		240
226.5 20.0		VERY LOOSE DARK GRAY ORGANIC SANDY SILT		230
193.0 53.5		DENSE GREY-BROWN SILTY FINE TO MEDIUM SAND		210
169.0 77.5		DENSE GREY SANDY SILT		180
163.0 83.5		DENSE GREY SANDY SILT WITH CLAYEY SILT AND CLAY LAYERS		170
145.0 101.5		VERY STIFF GREY SILTY CLAY WITH SANDY SILT AND CLAYEY SILT LAYERS		150
		END OF HOLE		



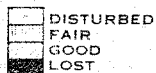
OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
	WS	1		
	DO	2	13	
	DO	3	54	
	DO	4	42	
	DO	5	>100	
	DO	6	42	
	DO	7	>100	
	DO	8	36	
	DO	9	36	
	DO	10	36	
	DO	11	34	
	DO	12	1	
	DF	13	31	
	SO	14	34	
	SO	15	34	
	DF	16	1	
	SO	17	31	
	SO	18	25	
	SO	19	18	
	SO	20	20	

## GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7067 BORING # 4 DATUM GEODETIC CASING Bx  
 BORING DATE APRIL 13, 1960 REPORT DATE MAY 13, 1960 COMPILED BY MNV CHECKED BY Att  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

## SAMPLE CONDITION



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

## SAMPLE TYPES

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

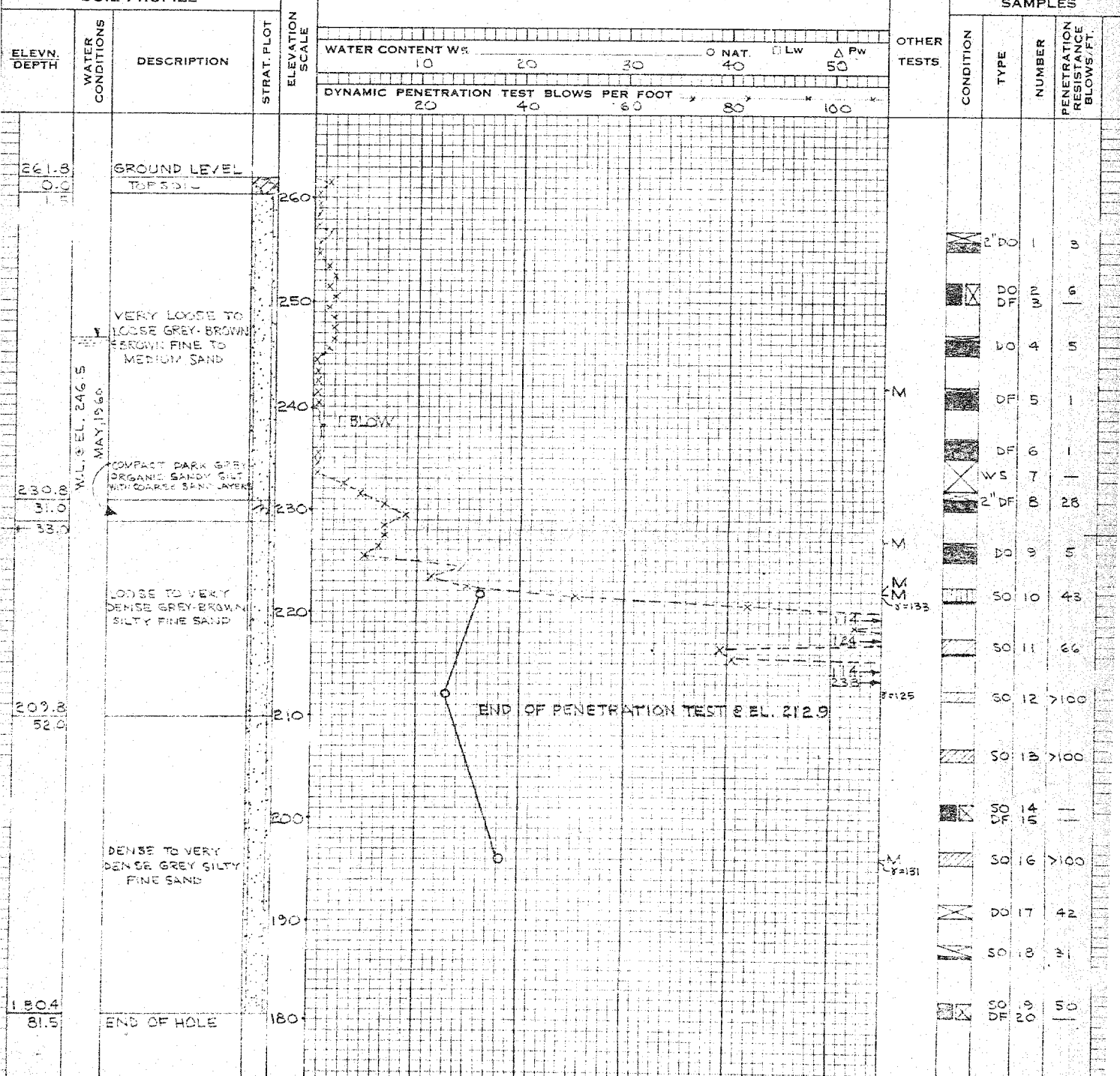
## ABBREVIATIONS

V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW

γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION

WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

## SOIL PROFILE







# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7027 BORING # 6 DATUM GEODETIC CASING BX  
 BORING DATE APRIL 23 & 25, 1960 REPORT DATE MAY 13, 1960 COMPILED BY M.W. CHECKED BY A.  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

### SAMPLE CONDITION



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

### SAMPLE TYPES

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

### ABBREVIATIONS

V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 GC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW  
 γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION

WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

### SOIL PROFILE

ELEV. DEPTH  
 WATER CONDITIONS  
 DESCRIPTION  
 STRAT. PLOT  
 ELEVATION SCALE

250  
246.5  
0.0  
243.5  
2.7

CANAL LEVEL  
 CANAL BOTTOM

VERY DENSE GREY-BROWN AND BROWN SILTY FINE TO MEDIUM SAND

DENSE GREY-BROWN SANDY SILT

VERY DENSE GREY SANDY SILT

END OF HOLE

210.8  
55.7

203.8  
42.7

191.8  
54.7

WATER CONTENT W% O NAT. □ LW ▲ PW

DYNAMIC PENETRATION TEST BLOWS PER FOOT  
 20 40 60 80 100

OTHER TESTS

### SAMPLES

CONDITION  
 TYPE  
 NUMBER  
 PENETRATION RESISTANCE BLOWS/FT.

2 DF	1	69
DO	2	77
DO	3	51
DO	4	57
DO	5	51
DO	6	62
DO	7	29
DO	8	46
DO	9	54
DO	10	73

246 BLOWS FOR LAST 102 INCHES  
 END OF PENETRATION TEST AT ELEV. 221.9

# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT 57067 BORING # 7 DATUM GEODETIC CASING 2x  
 BORING DATE APRIL 26, 1968 REPORT DATE MAY 13, 1968 COMPILED BY M.M.C. CHECKED BY X  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

### SAMPLE CONDITION



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

### SAMPLE TYPES

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

### ABBREVIATIONS

V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW

γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION

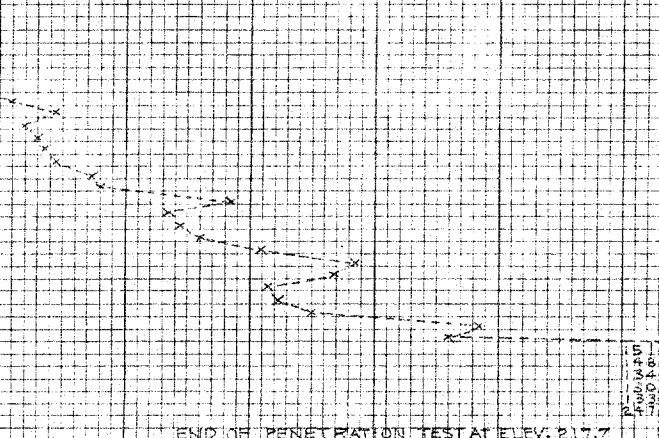
WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

### SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
246.5 30.0		CANAL LEVEL		250
243.7 32.2		CANAL BOTTOM		240
230.7 45.2		COMPACT GREY-BROWN FINE TO MEDIUM SAND		230
205.7 60.2		DENSE TO VERY DENSE GREY-BROWN SANDY SILT		220
191.7 74.2		DENSE GREY SANDY SILT		210
		END OF HOLE		200
				190

WATER CONTENT W% \_\_\_\_\_ O NAT. □ LW ▲ PW

DYNAMIC PENETRATION TEST BLOWS PER FOOT x 20 40 60 80 100



### OTHER TESTS

### SAMPLES

CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
M	DO	1	20
M	DO	2	27
M	DO	3	47
M	DO	4	>100
M	DO	5	78
	DO	6	81
	DO	7	>100
	DO	8	43
	DO	9	55
	DO	10	20

# GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT 57067 BORING # 8 DATUM GEODETIC CASING BX  
 BORING DATE APRIL 19, 1960 REPORT DATE MAY 13, 1960 COMPILED BY M.W. CHECKED BY 7  
 SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

### SAMPLE CONDITION



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

### SAMPLE TYPES

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

### ABBREVIATIONS

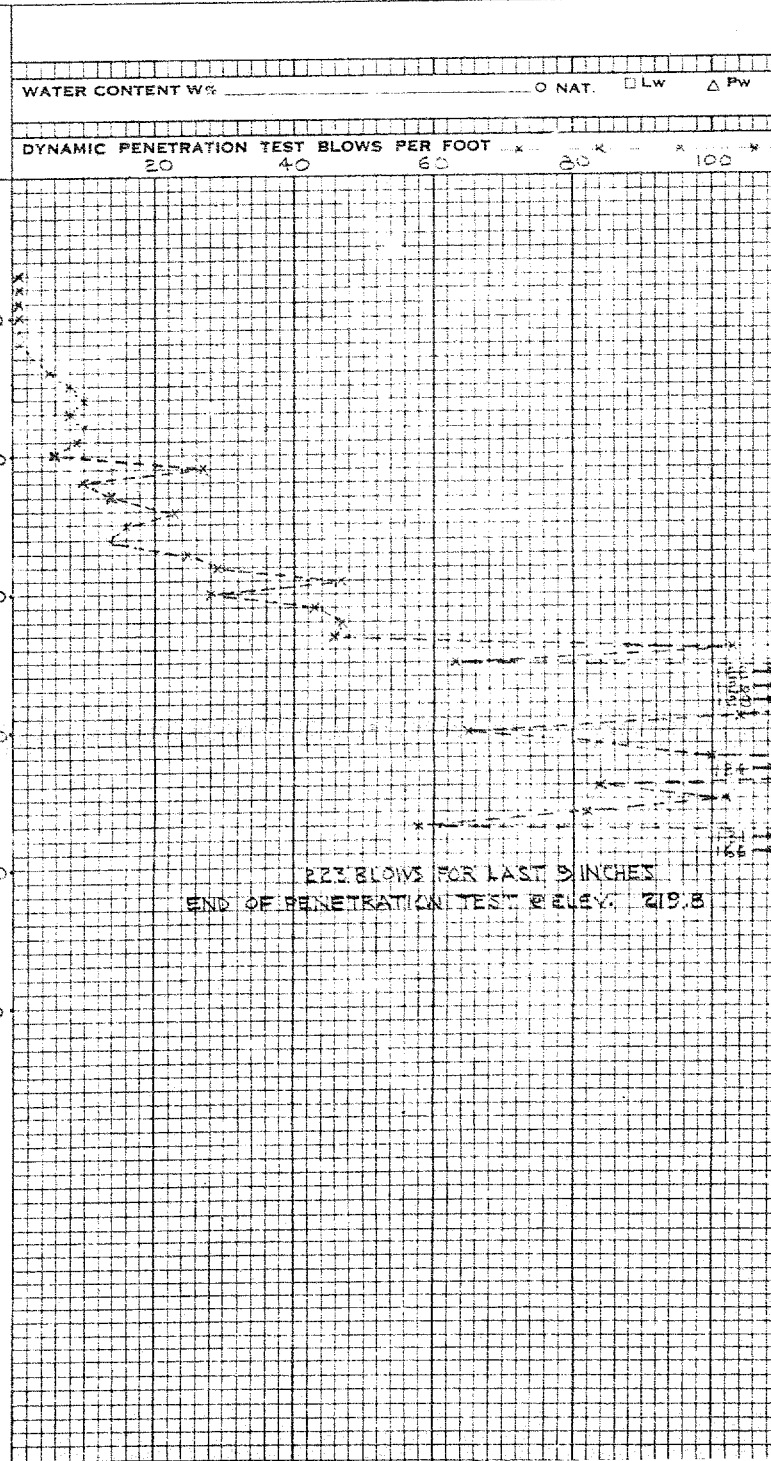
V - IN-SITU VANE TEST  
 M - MECHANICAL ANALYSIS  
 U - UNCONFINED COMPRESSION  
 QC - TRIAXIAL CONSOLIDATED QUICK  
 Q - TRIAXIAL QUICK  
 S - TRIAXIAL SLOW

γ - WET UNIT WEIGHT  
 K - PERMEABILITY  
 C - CONSOLIDATION

WL - WATER LEVEL IN CASING  
 WT - WATER TABLE IN SOIL

### SOIL PROFILE

ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE
263.8 260 250		GROUND LEVEL		260
	W.L. @ EL. 246.5 MAY, 1960	LOOSE TO VERY DENSE GREY-BROWN AND BROWN SILTY FINE SAND		250
222.8 210		DENSE TO VERY DENSE GREY-BROWN SANDY SILT		240
215.8 212.6 210		VERY DENSE GREY SANDY SILT		230
		END OF HOLE		220



OTHER TESTS				SAMPLES			
CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
	DO	1	4		DO	2	14
	DO	3	11		DO	4	26
	DO	5	42		DO	6	60
	DO	7	68		DO	8	45
	DO	9	>100		DO	11	70
	DO	12	—		DO	12	—

## GEOCON

## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7067 BORING # 9 DATUM GEODETIC CASING BX  
 BORING DATE MAY 3, 1960 REPORT DATE MAY 14, 1960 COMPILED BY M.W. CHECKED BY [Signature]  
 SAMPLER HAMMER WT. 14.0 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN - LBS. ENERGY)

## SAMPLE CONDITION



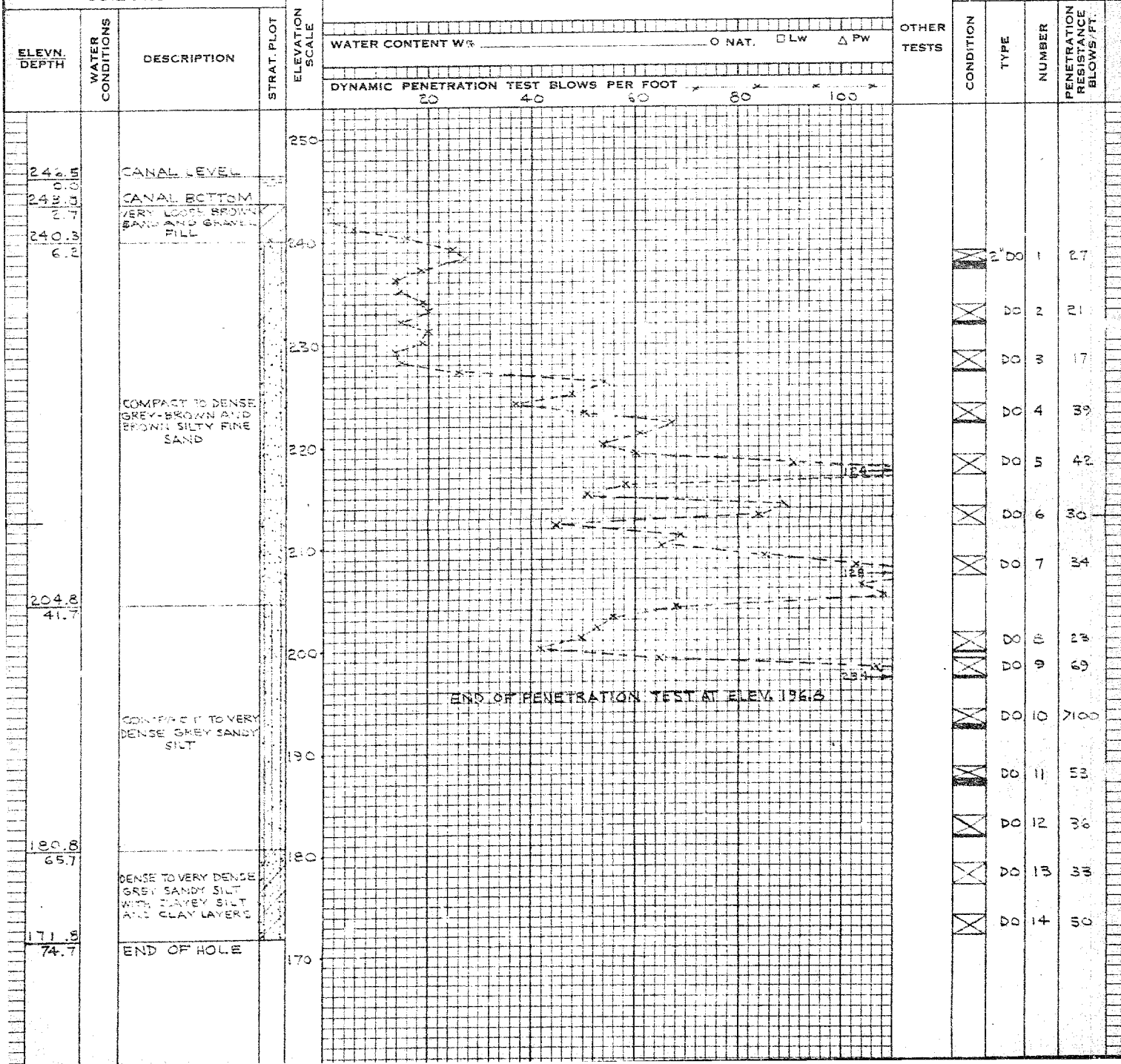
## SAMPLE TYPES

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

## ABBREVIATIONS

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

## SOIL PROFILE



## OFFICE REPORT ON SOIL EXPLORATION

CONTRACT S7067 BORING # 10 DATUM GEODETIC CASING EX  
BORING DATE \_\_\_\_\_ REPORT DATE MAY 14, 1960 COMPILED BY MMV CHECKED BY JA  
SAMPLER HAMMER WT. 140 LBS. DROP 30 INCHES (PENETRATION RESISTANCES CONVERTED TO BLOWS OF 4200 IN. LBS. ENERGY)

### SAMPLE CONDITION



DISTURBED  
FAIR  
GOOD  
LOST

## SAMPLE TYPES

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

## ABBREVIATIONS

V - IN-SITU VANE TEST  
M - MECHANICAL ANALYSIS  
U - UNCONFINED COMPRESSION  
QC - TRIAXIAL CONSOLIDATED QUICK  
Q - TRIAXIAL QUICK  
S - TRIAXIAL SLOW

γ - WET UNIT WEIGHT  
K - PERMEABILITY  
C - CONSOLIDATION

WL - WATER LEVEL IN CASING  
WT - WATER TABLE IN SOIL

### SOIL PROFILE

SOIL PROFILE				SAMPLES						
ELEV. DEPTH	WATER CONDITIONS	DESCRIPTION	STRAT. PLOT	ELEVATION SCALE	WATER CONTENT W <sub>3</sub>	OTHER TESTS	CONDITION	TYPE	NUMBER	PENETRATION RESISTANCE BLOWS/FT.
				DYNAMIC PENETRATION TEST BLOWS PER FOOT						
				20 40 60 80 100						
246.5 0.5		CANAL LEVEL		250						
243.5 3.0		CANAL BOTTOM								
239.5 7.0		VERY LOOSE TO LOOSE BROWN SAND AND GRAVEL FILL		240						
		COMPACT TO VERY DENSE GREY-BROWN AND BROWN SILTY FINE SAND		230						
				220						
				210						
				200						
195.5 51.0				190						
		DENSE TO VERY DENSE GREY SANDY SILT		180						
				170						
173.5 71.0				160						
		DENSE TO VERY DENSE GREY SANDY SILT WITH CLAYEY SILT AND CLAY LAYERS		150						
162.0 84.5		END OF HOLE		140						

## APPENDIX II

Figures - Laboratory Testing



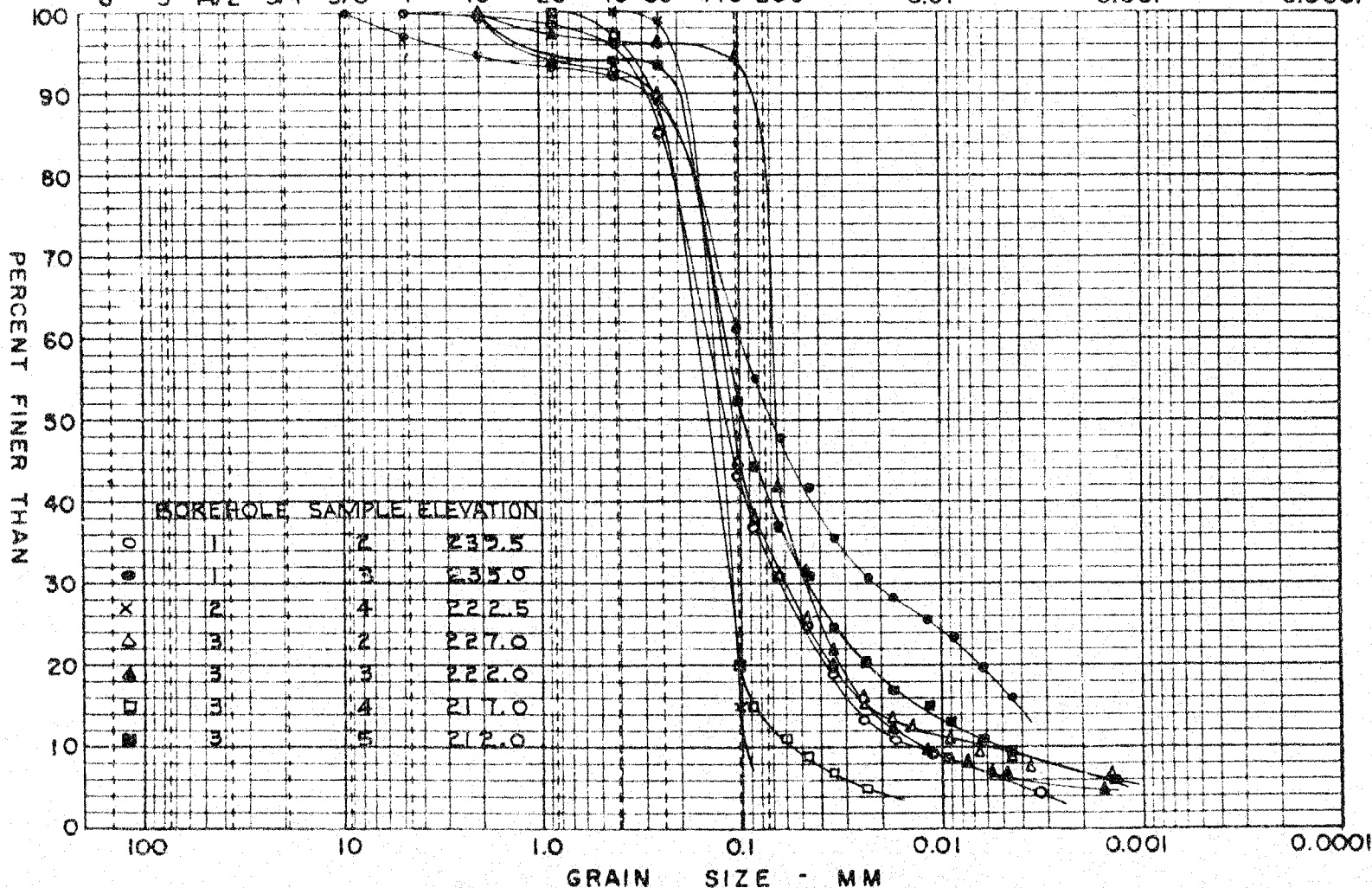
# GRAIN SIZE DISTRIBUTION

APPENDIX II  
FIGURE 1  
PROJECT S7067

COBBLE — SIZE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE —

SIZE OF OPENING - INS.    U.S.S. SIEVE SIZE - MESHES/IN.    EQUIVALENT GRAIN DIAMETER - MM

6"   3"   1 1/2"   3/4"   3/8"   4   10   20   40   60   140   200   0.01   0.001   0.0001



M.I.T. GRAIN SIZE SCALE

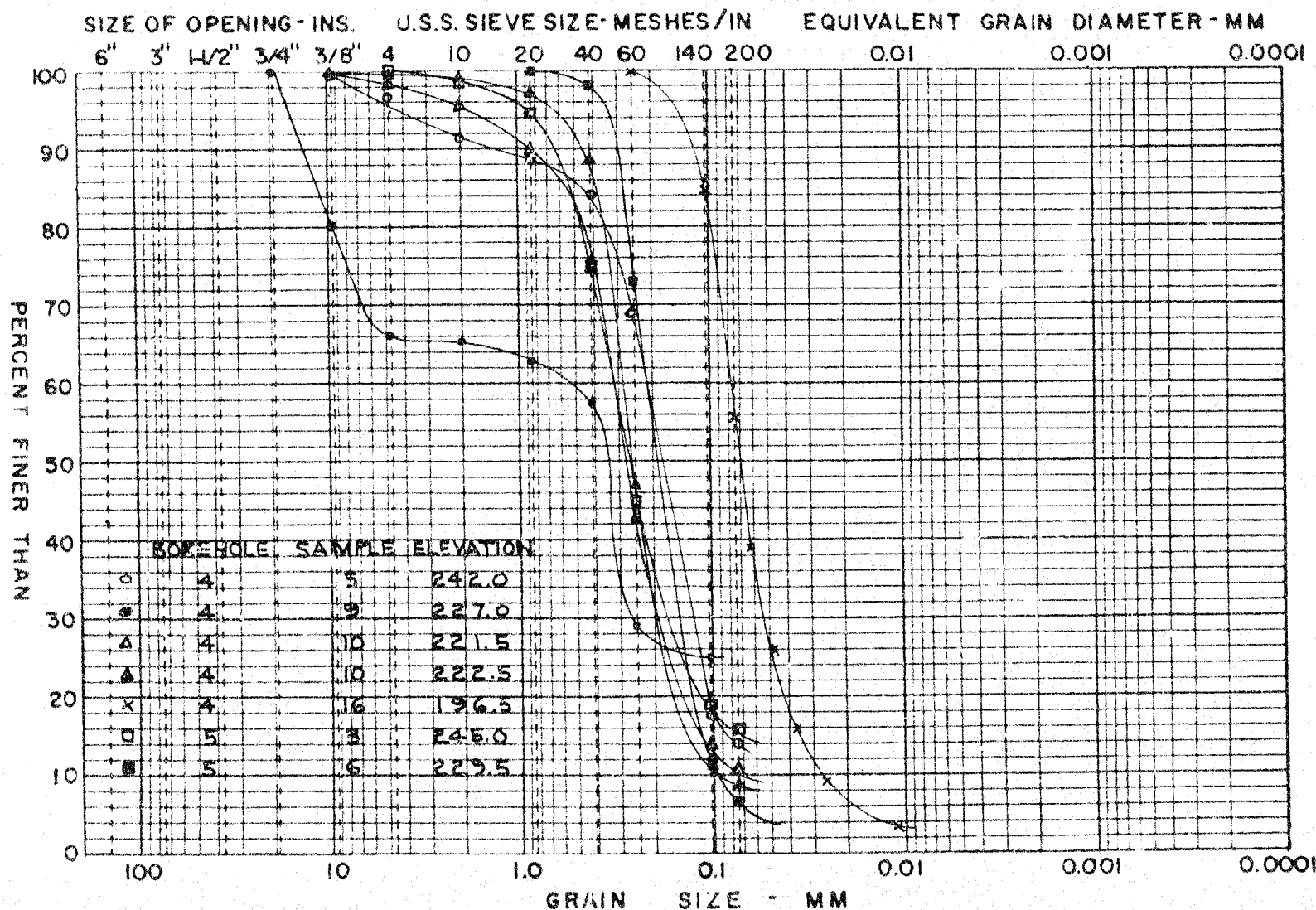
GEOCON



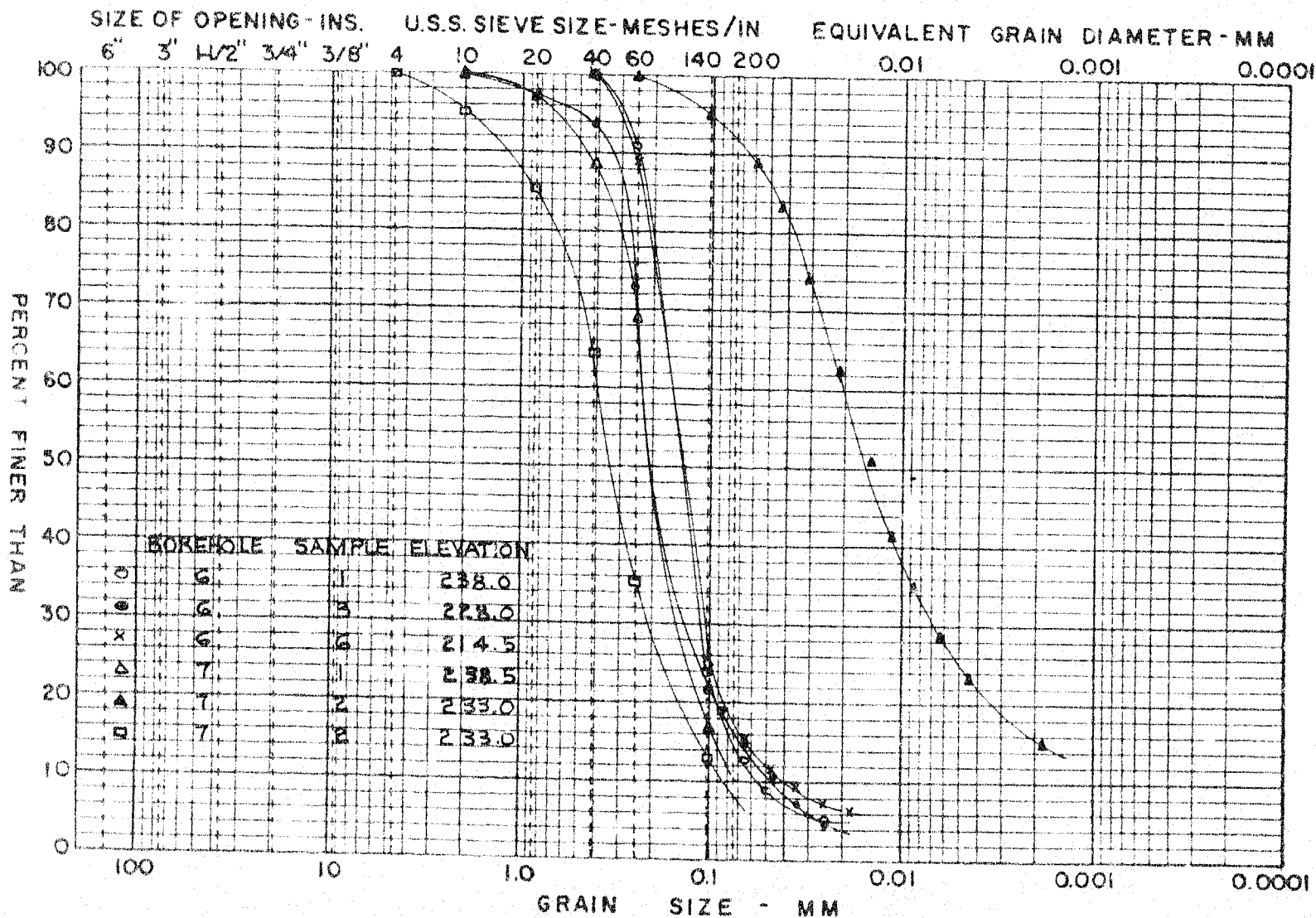
# GRAIN SIZE DISTRIBUTION

APPENDIX II  
FIGURE 2  
PROJECT S7067

COBBLE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
← SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE →



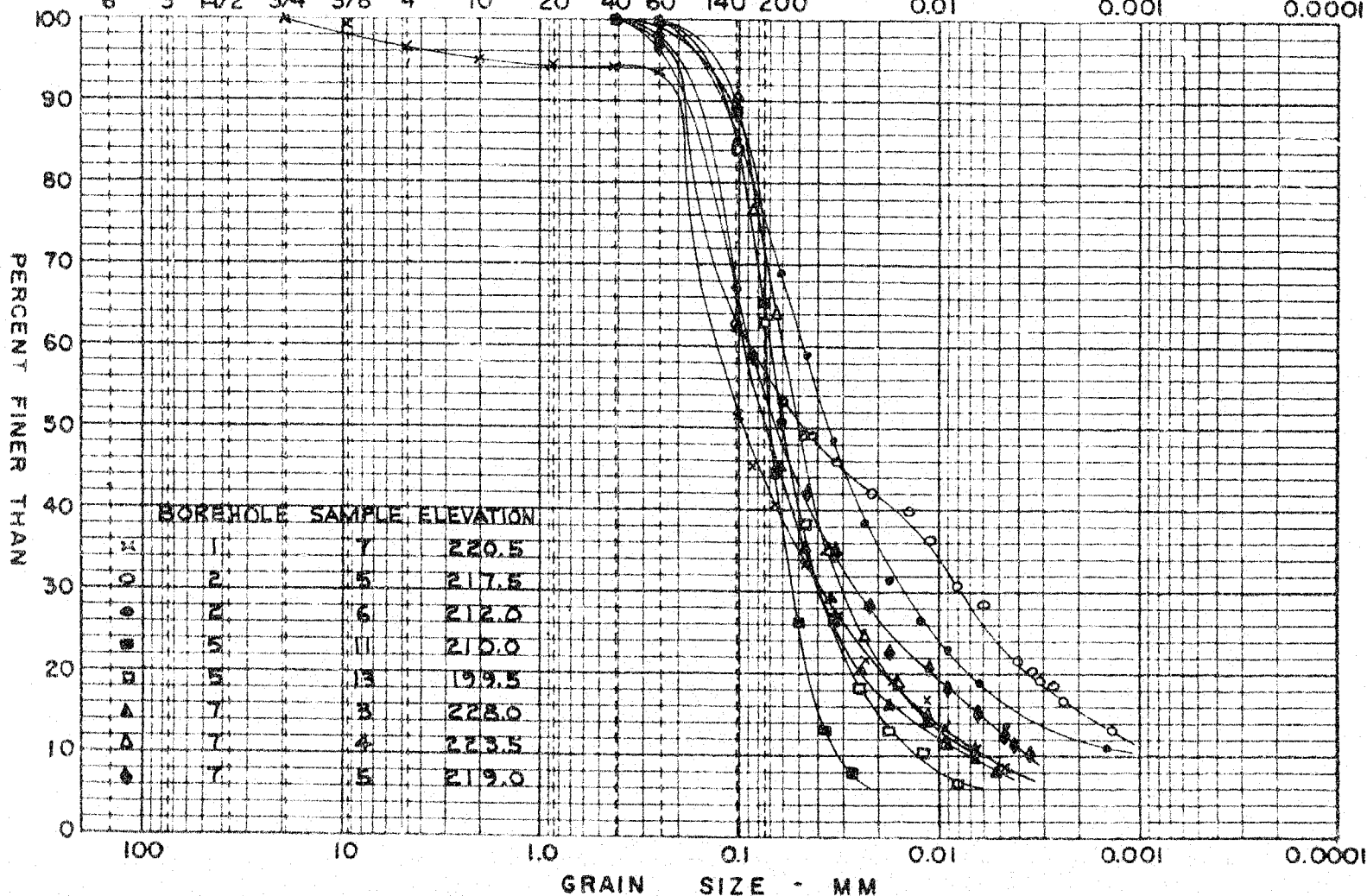
COBBLE ← SIZE	GRAVEL SIZE			SAND SIZE			FINE GRAINED		→ CLAY SIZE
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE	



COBBLE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
← SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE →

SIZE OF OPENING - INS.    U.S.S. SIEVE SIZE - MESHES/IN    EQUIVALENT GRAIN DIAMETER - MM

6"   3"   1 1/2"   3/4"   3/8"   4   10   20   40   60   140   200   0.01   0.001   0.0001



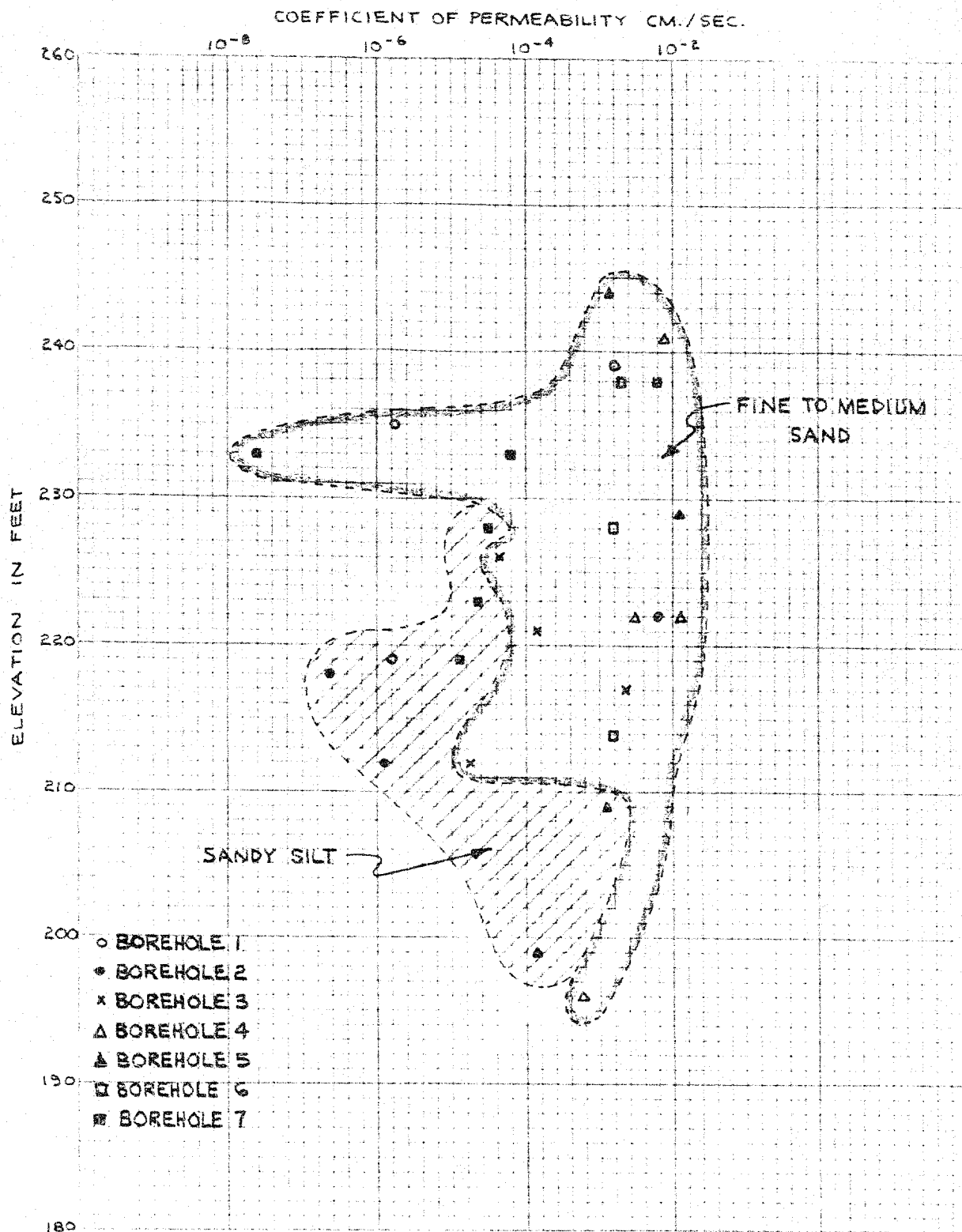
# COEFFICIENT OF PERMEABILITY

(ESTIMATED FROM GRAIN SIZE DISTRIBUTION CURVES)

APPENDIX II

FIGURE 5

PROJECT S7067



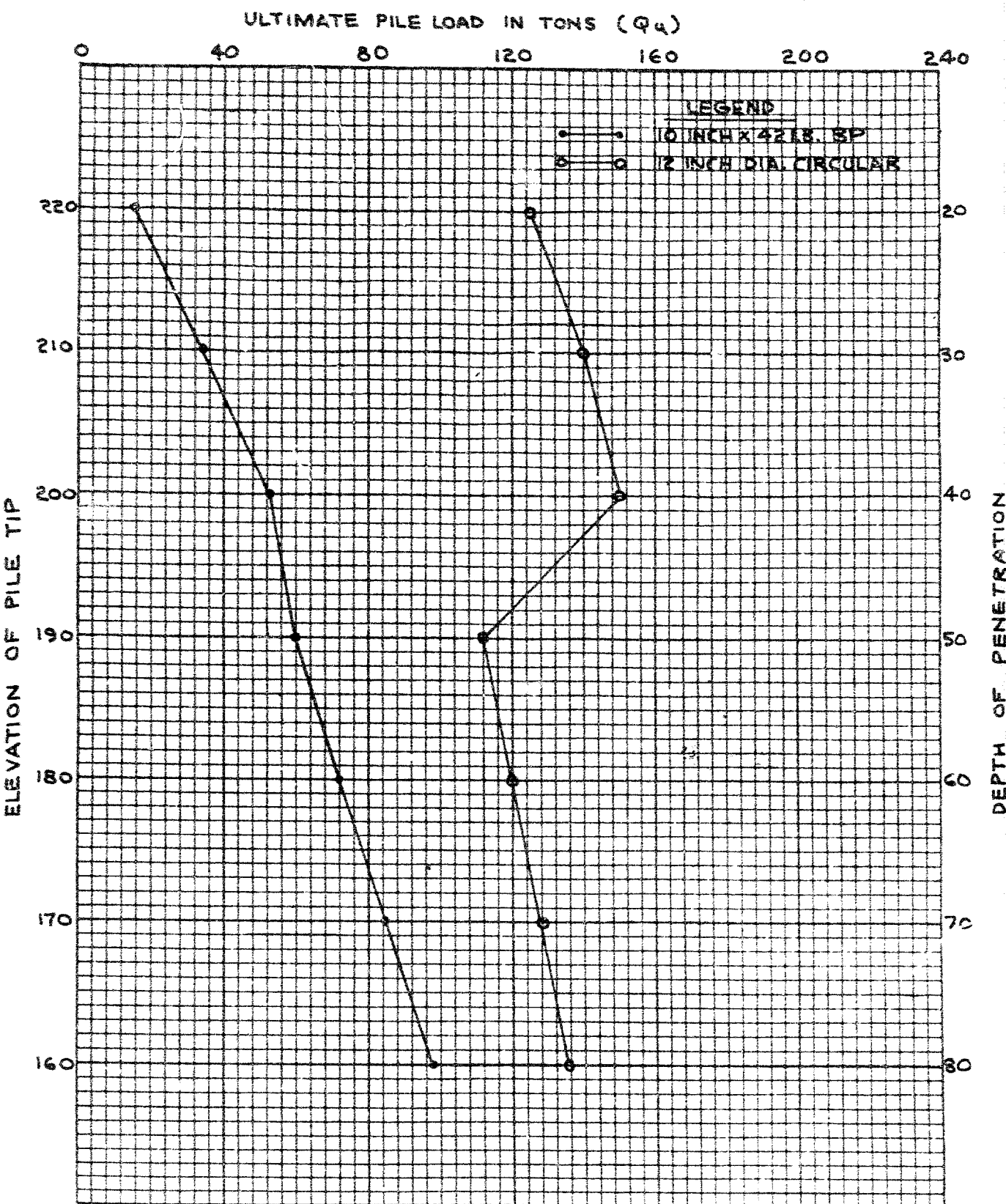
### APPENDIX III

Figures - Bearing Capacities of Piles

**GEOCON**

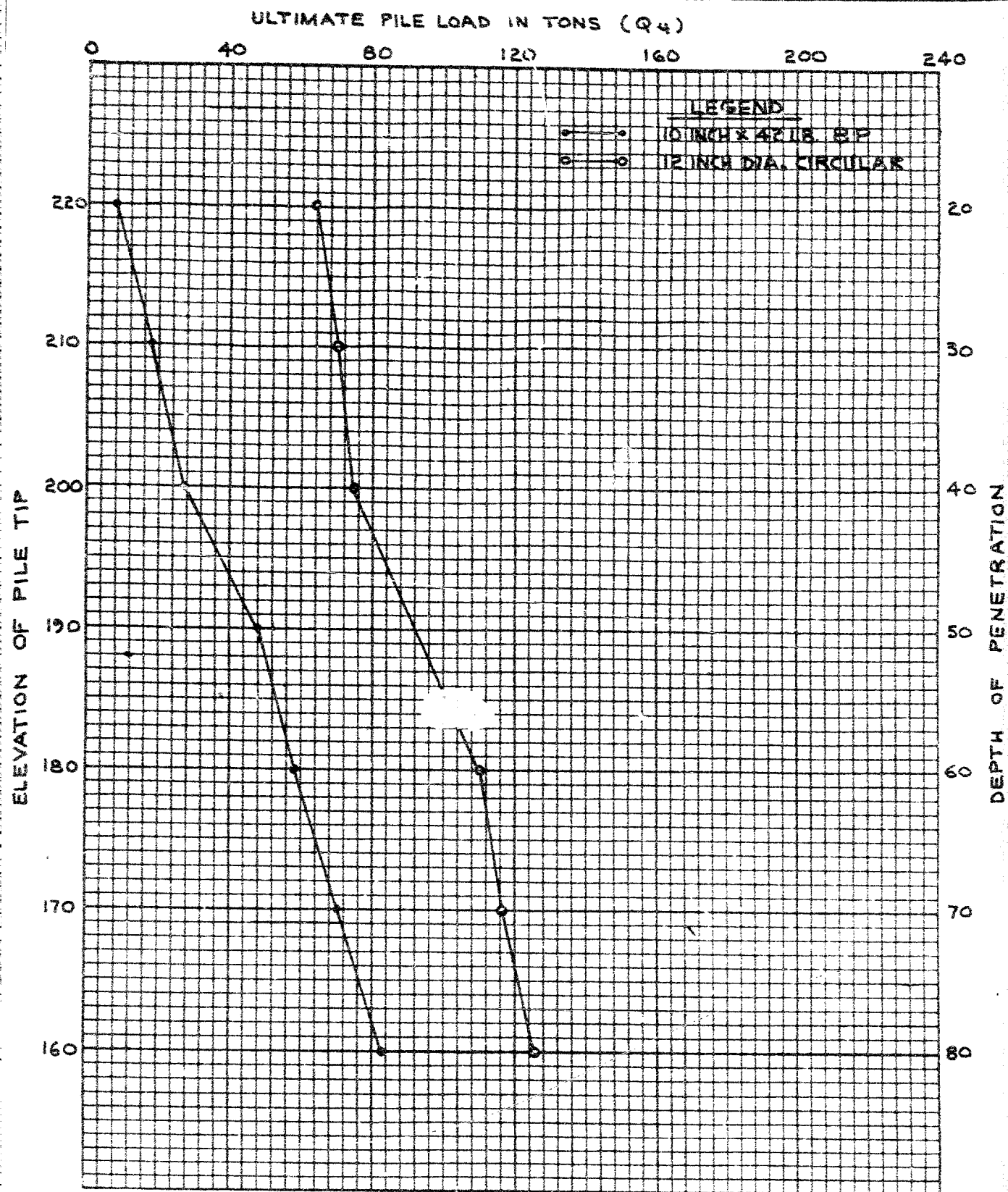
COMPUTED ULTIMATE PILE CAPACITIES  
VS ELEVATION  
NORTH PIER

APPENDIX III  
FIGURE I  
PROJECT S7067

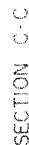


COMPUTED ULTIMATE PILE CAPACITIES  
VS ELEVATION  
SOUTH PIER

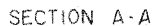
APPENDIX III  
FIGURE 2  
PROJECT S7067










23-61-174.2



LEGEND

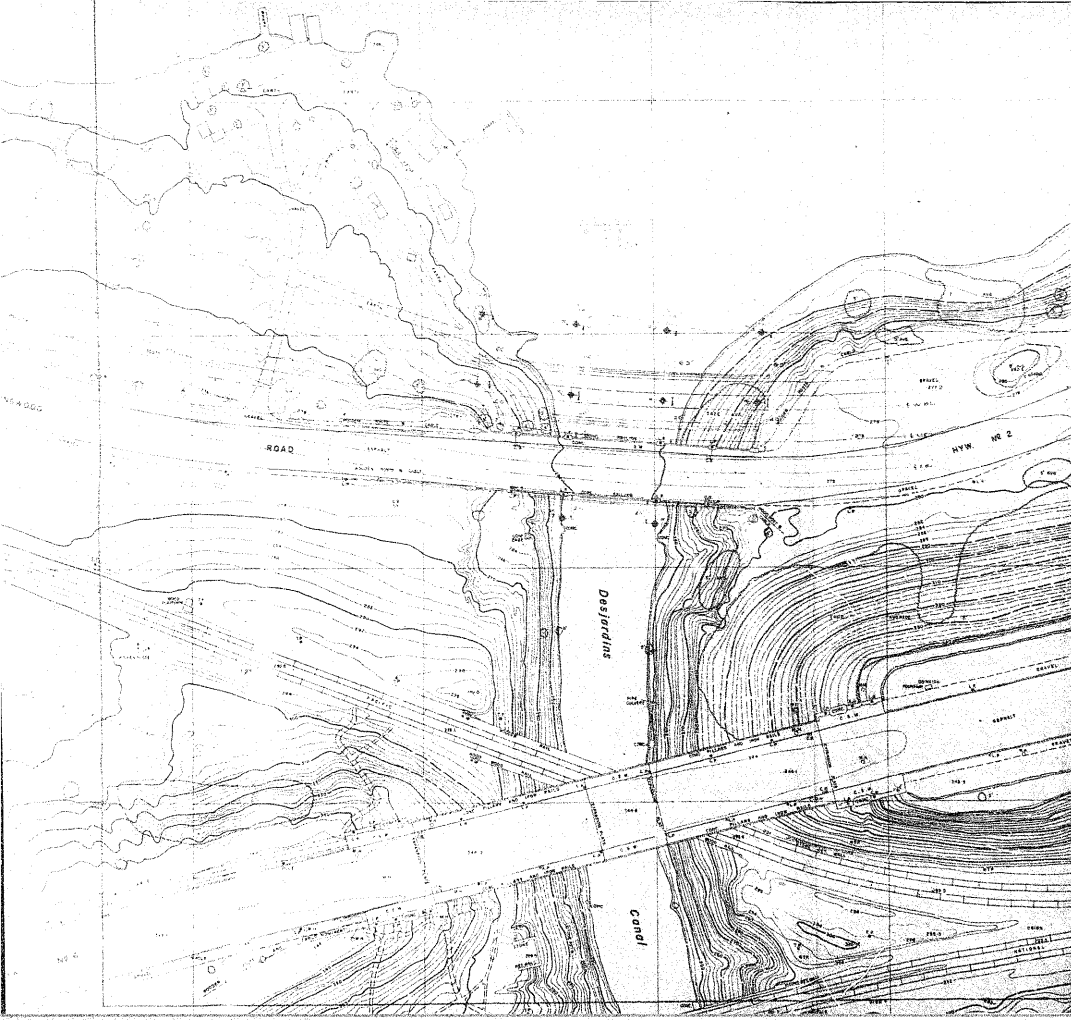
- 
 BOREHOLE WITH PENETRATION TEST IN PLAN
- 
 BOREHOLE WITH PENETRATION TEST IN ELEVATION
- 
 WATER LEVEL IN BOREHOLE

## STRATIGRAPHY

- [illegible]

GENERAL INFO			REFERENCE		REFERENCE		DEPARTMENT OF HIGHWAYS, ONTARIO		GEOCON LTD	
NO.	DATE	DESCRIPTION	DRAWING NO.	DESCRIPTION	DWG NO.	DESCRIPTION	TORONTO	ONTARIO	DATE	BY
			SH - B A	SEE PARTNER'S DRAWING FOR LITH. DRAWING OF WEST BRIDGING LAYOUT FOR BRIDGES AT ISLANDS CANAL - DATED APRIL 2, 1960.					DATE: JUL 8, 1962	BY: J. G. T. - 1
							<b>PROPOSED BRIDGE</b> CHEDONE EXPRESSWAY - WEST BOUND LANE - DESJARDINS CANAL <b>BORING PLAN AND SOIL STRATIGRAPHY</b>		DATE: JUL 8, 1962 BY: J. G. T. - 1	





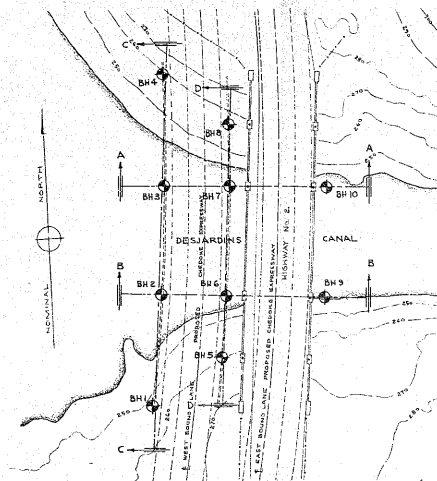
MADE IN CANADA  
CHEROKEE EXPRESSWAY  
BRIDGES AT DESJARDINS CANAL  
EAST AND WEST SOUND LANKS  
TEST BORING HOLE LOCATIONS  
C.C. PARKER & PARTNERS BRINCKERHOFF LTD.  
HAMILTON CONSULTING ENGINEERS ONTARIO DRNG 84-54  
MAY 21 1960

#60-F-293-C

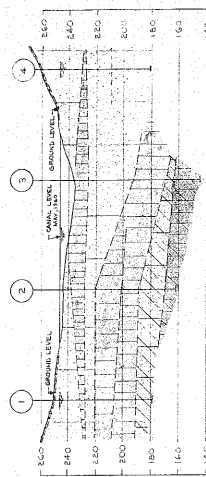
W.P. #193-60-1

HWY. #403

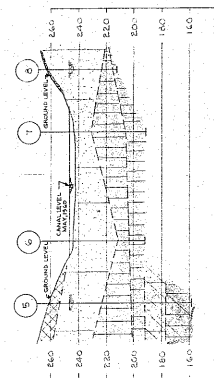
CANAL BRIDGE,  
LONGWOOD RD.



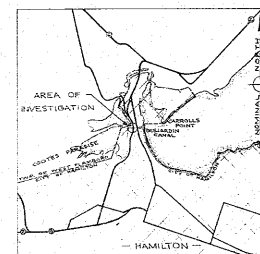
PLAN



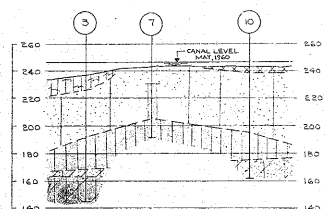
SECTION C-C



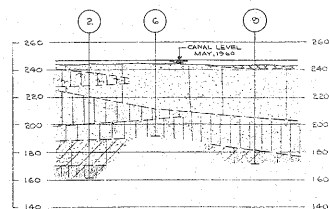
SECTION D-D



KEY PLAN  
SCALE 1"=0.5 MILE



SECTION A-A



SECTION B-B

#### LEGEND

- ⊕ BOREHOLE WITH PENETRATION TEST IN PLAN
- BOREHOLE WITH PENETRATION TEST IN ELEVATION
- WATER LEVEL IN BOREHOLES - MAY, 1960

#### STRATIGRAPHY

- TOP SOIL
- VERY LOOSE TO LOOSE SAND AND GRAVEL FILL
- VERY LOOSE TO VERY DENSE GRAY-BROWN SILTY FINE TO MEDIUM SAND
- VERY LOOSE TO LOOSE DARK GRAY ORGANIC SANDY SILT
- GRAY-BROWN CLAY COMPACT TO VERY DENSE SANDY SILT
- COMPACT TO VERY DENSE GRAY SANDY SILT WITH CLAYEY SILT AND CLAY LAYERS
- VERY STIFF GRAY SILTY CLAY WITH SAND, SILT AND CLAYEY SILT LAYERS

GENERAL NOTE: DATA OBTAINED IN THE BORING TESTS WERE USED TO DETERMINE THE STRATIGRAPHY. THE DATA WERE USED TO DETERMINE THE STRATIGRAPHY. THE DATA WERE USED TO DETERMINE THE STRATIGRAPHY.

REVISIONS			REFERENCE			REFERENCE		
NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
10			10			10		

DEPARTMENT OF HIGHWAYS, ONTARIO  
TORONTO  
PROPOSED BRIDGE  
CHEDOK EXPRESSWAY - WEST BOUND LANE - DESJARDINS CANAL  
BORING PLAN AND SOIL STRATIGRAPHY

GEOCON LTD  
DATE: JUNE 8, 1960 SCALE: 1"=40'-0"  
M.W. 36% 1/4 No. 1007-1