

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 31C-123

DIST. B REGION Eastern

W.P. No. 229-65 (1 of 2)

CONT. No. 74-118

W. O. No. 73-F-655

STR. SITE No. 17-124

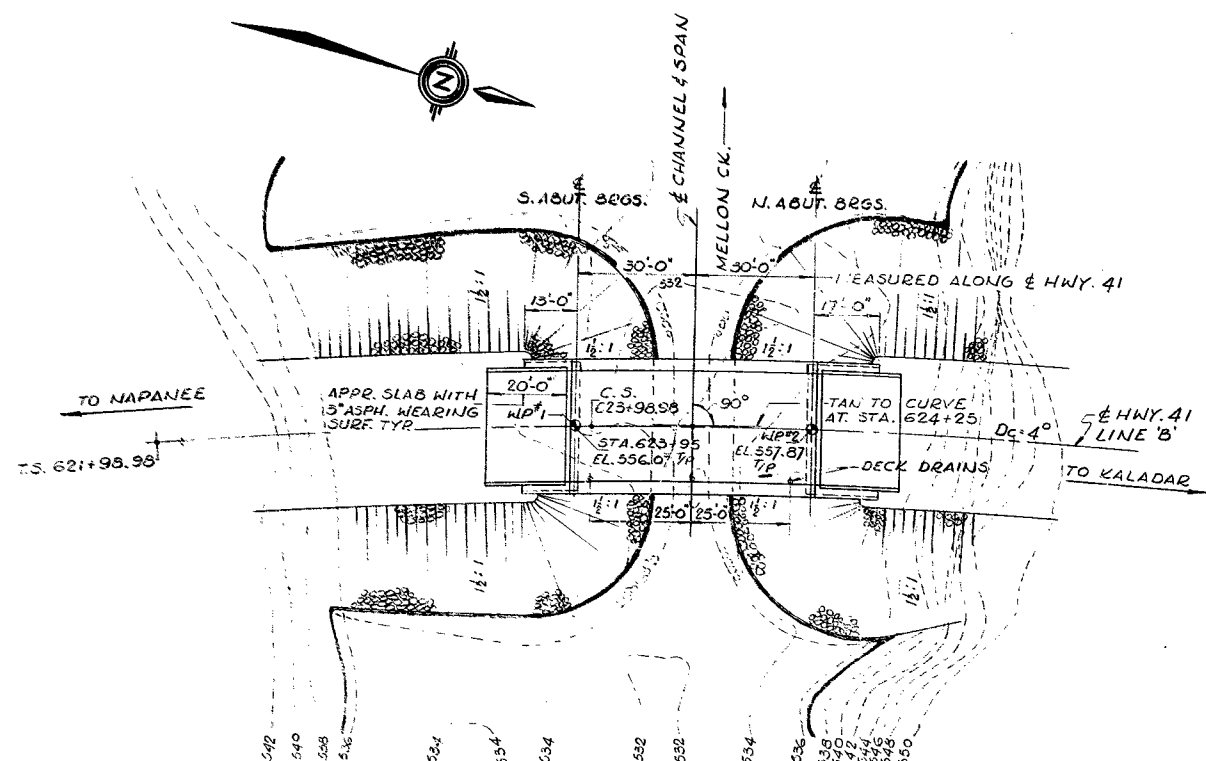
HWY. No. 41

LOCATION X-ing of Mellon Creek
Relocated Hwy. 41 (Line B)

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

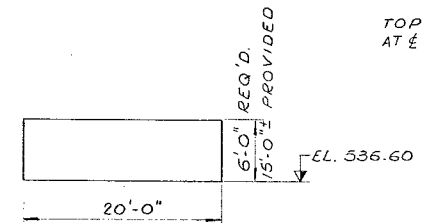
REMARKS: DOCUMENTS TO BE UNFOLDED BEFORE
MICROFILMED

01.30 SEP. 1976

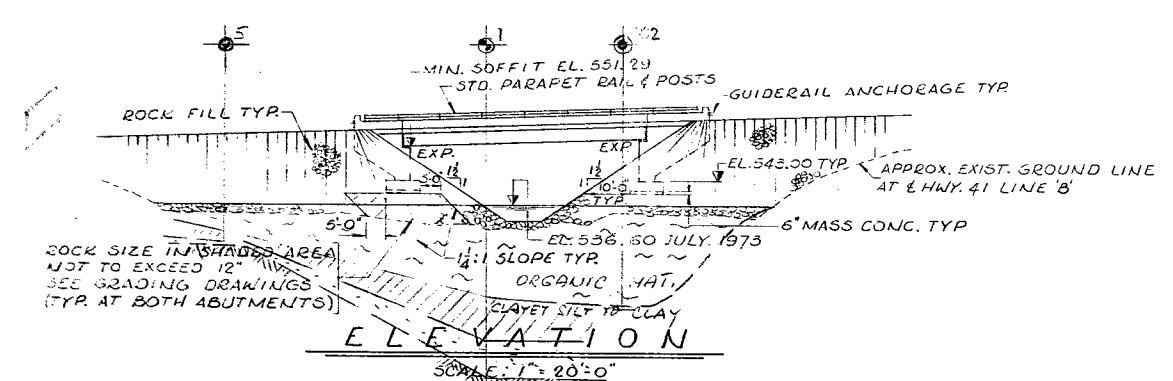


NOTES:
 -W.P. DENOTES WORKING POINT
 -T.P. DENOTES TOP OF FINISHED PAVT.

PLAN
 SCALE: 1" = 20'-0"

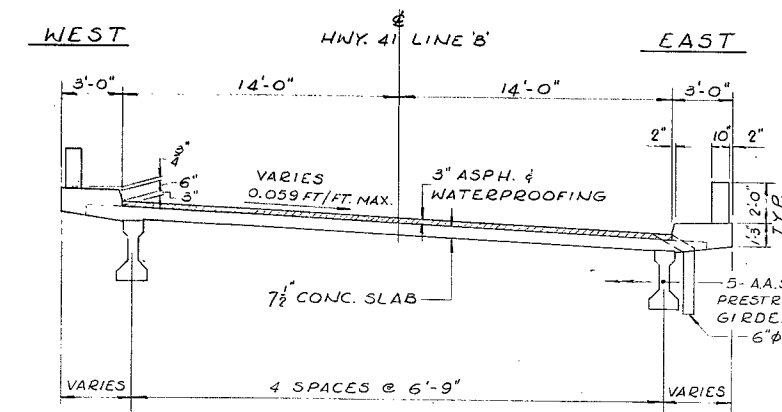


NAVIGATION CLEARANCE DIAGRAM
 N.T.S.

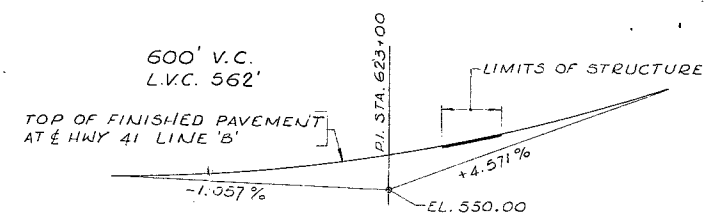


NOTES:
 - ALL SOFT ORGANIC MATERIAL WITHIN THE PLAN LIMITS OF THE EMBANKMENTS TO BE REMOVED TO ITS FULL DEPTH AND REPLACED WITH ROCK FILL.
 - ROCK FILL AT THE ABUTMENTS TO BE PLACED TO THE BOTTOM OF FOOTING ELEVATION THREE MONTHS PRIOR TO CONSTRUCTION OF ABUTMENTS.

ELEVATION
 SCALE: 1" = 20'-0"



TYP. DECK SECT.
 SCALE: 1/2" = 1'-0"



PROFILE OF HWY. 41 LINE 'B'
 N.T.S.

LIST OF DRAWINGS

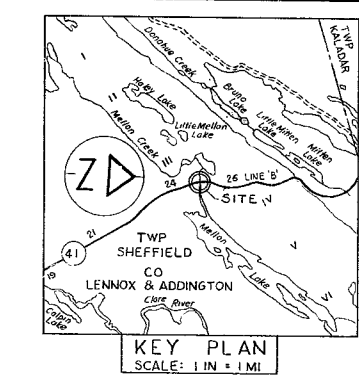
- SHEET 1 GENERAL PLAN
- 2 BORE HOLE LOCATIONS & SOIL STRATA
- 3 FOUNDATION LAYOUT & REINF.
- 4 SOUTH ABUTMENT
- 5 NORTH ABUTMENT
- 6 PRESTRESSED GIRDERS & BEARINGS
- 7 DECK
- 8 PARAPET WALL DETAILS
- 9 STEEL PARAPET RAILING (DOUBLE TUBE)
- 10 20 FOOT APPROACH SLAB
- 11 STANDARD DETAILS I
- SHEET 12 STANDARD DETAILS II

NOTES

CLASS OF CONCRETE
 PRESTRESSED GIRDERS — 5000 P.S.I.
 DECK, CURBS & PARAPET WALLS — 4000 P.S.I.
 REMAINDER — 5000 P.S.I.
CLEAR COVER ON REINF. STEEL
 FOOTINGS AND ABUTMENTS — 3"
 CURBS AND APPROACH SLABS — 2"
 DECK, TOP & BOT. — 1 1/2"
 AND/OR AS NOTED

CONSTRUCTION NOTES

THE CONTRACTOR IS RESPONSIBLE FOR FINISHING THE BEARING SEATS DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITH A TOLERANCE $\pm 1/8$ "
 NO CONCRETE SHALL BE PLACED ABOVE THE ABUTMENT BEARING SEATS UNTIL THE CONCRETE IN THE DECK HAS BEEN PLACED

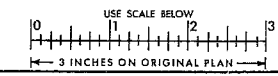


G.B.M. NO 169-G EL. 650.402
 C.P. BY DOUBLE STONE AND CONC. BOX CULVERT,
 22 MILES SOUTHWEST OF STATION AND AT
 MILEAGE 48.6 FROM GLEN TAY, BOLT IN
 SOUTHWEST END OF SOUTHEAST FACE,
 1.2 FEET BELOW TOP. QUAD 44077 LINE 48 PAGE 18

REVISIONS	DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO	
73-11-055	
MELLON CREEK BRIDGE	
APPROX. 7.9 MILES SOUTH OF HIGHWAY 7.	
KING'S HIGHWAY No. 41	DIST. No. 8
CO. LENNOX & ADDINGTON	
TWP. SHEFFIELD	LOT 25 CON. III & IV
GENERAL PLAN	
APPROVED	CONTRACT No.
DESIGN E.K. CHECK R.C. DATE APR/74	W.P. No. 229-65-01
LOADING 1/220-24	SITE No. 17-124 SHEET 1

FOR REDUCED PLAN



DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 13-11055 SITE _____ BOREHOLE No. 2 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION					DRY STRENGTH	SHINE	DIALATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
		LARGEST GRAIN SIZE	SHAPE	PERCENTAGE												
				GRAVEL	SAND	SILT & CLAY										
1	8.0-9.5														wood chips - red organic material	●
2	13.0-14.5															
3	18.0-19.5															
4	23.0-24.5															
5	28.0-29.5															
6	33.0-34.5															
7	38.0-39.5															
8	43.0-44.5															
9	48.0-49.5															
10	53.0-54.5															
11	58.0-59.5															
12	63.0-64.5															
13	68.0-69.5															
14	73.0-74.5															
15	78.0-79.5															
16	83.0-84.5															
17	88.0-89.5															
18	93.0-94.5															
19	98.0-99.5															
20	103.0-104.5															
21	108.0-109.5															
22	113.0-114.5															
23	118.0-119.5															
24	123.0-124.5															
25	128.0-129.5															
26	133.0-134.5															
27	138.0-139.5															
28	143.0-144.5															
29	148.0-149.5															
30	153.0-154.5															
31	158.0-159.5															
32	163.0-164.5															
33	168.0-169.5															
34	173.0-174.5															
35	178.0-179.5															
36	183.0-184.5															
37	188.0-189.5															
38	193.0-194.5															
39	198.0-199.5															
40	203.0-204.5															
41	208.0-209.5															
42	213.0-214.5															
43	218.0-219.5															
44	223.0-224.5															
45	228.0-229.5															
46	233.0-234.5															
47	238.0-239.5															
48	243.0-244.5															
49	248.0-249.5															
50	253.0-254.5															
51	258.0-259.5															
52	263.0-264.5															
53	268.0-269.5															
54	273.0-274.5															
55	278.0-279.5															
56	283.0-284.5															
57	288.0-289.5															
58	293.0-294.5															
59	298.0-299.5															
60	303.0-304.5															
61	308.0-309.5															
62	313.0-314.5															
63	318.0-319.5															
64	323.0-324.5															
65	328.0-329.5															
66	333.0-334.5															
67	338.0-339.5															
68	343.0-344.5															
69	348.0-349.5															
70	353.0-354.5															
71	358.0-359.5															
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73	368.0-369.5															
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80	403.0-404.5															
81	408.0-409.5															
82	413.0-414.5															
83	418.0-419.5															
84	423.0-424.5															
85	428.0-429.5															
86	433.0-434.5															
87	438.0-439.5															
88	443.0-444.5															
89	448.0-449.5															
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91	458.0-459.5															
92	463.0-464.5															
93	468.0-469.5															
94	473.0-474.5															
95	478.0-479.5															
96	483.0-484.5															
97	488.0-489.5															
98	493.0-494.5															
99	498.0-499.5															
100	503.0-504.5															

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

73-11055
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundations Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: 11 July 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 229-65, Mellon Creek Structure,
Highway 41, District 8 - Kingston

The above project is on the 1975-76 program and is for the re-construction of Highway 41. As indicated on the attached sketches, Highway 41 is to be relocated in the vicinity of Mellon Creek, about 10 miles north of Erinsville. Relocation became necessary because of the existence of a rare cactus ("Opuntia Fragilis") and other rare forms of plant and animal life in an area just northwest of the present Mellon Creek crossing.

The Ministry of the Environment will establish a park for the preservation of the cactus in the area indicated on the enclosed plan and also intends to construct a boat launching ramp at the creek to provide access to Mellon Lake, west of Highway 41. This would possibly call for this crossing to be navigable under the provisions of the Navigable Waters Protection Act.

The proposed relocation crosses the creek about 230 feet ^{east} ~~west~~ of the present location, crossing a 150 ft. wide marshy area.

We have been requested by Regional Systems Design to prepare comparative cost estimates between a culvert of sufficient size to handle the expected flow, and a bridge. As can be seen from the profile, the culvert will be under some 18 feet of fill.

We would be pleased if you would conduct a preliminary foundation investigation at this site. It is understood from Regional Systems Design that rock fill will be available on this project and it is imperative in our cost estimating to determine what slopes can be tolerated at this crossing.

In addition to a plan and profile, we also include sketches of alternative proposals for a culvert or bridge based on $1\frac{1}{2}$:1 slopes and 2:1 slopes.

ESTIMATED COST: \$ 2500.0

.....2

NDD

W.P. 229-65 SEP. 15/73

A raft will be required to conduct your investigation due to the depth of water and muck. Between the proposed crossing and the existing culvert some 15 feet of water was sounded. At the site of the crossing there is some 5 - 6 ft. of water over a soft bed.



T. C. Kingsland
Regional Structural Planning Engineer

TCK/hl
encls.

c. c. B. R. Davis
A. J. Percy - Att. G. McMillan
R. Forrest
C. S. Grebski - Att. K. Bassi



MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundations Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: 13 July 1973.

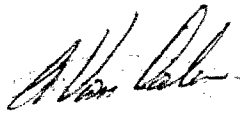
OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 229-65, Mellon Creek Structure,
Highway 41, District 8 - Kingston

Further to Mr. Kingsland's memo dated July 11, 1973, we now enclose a photograph of the proposed crossing taken from existing Highway 41, looking east.

Also please note that the proposed relocation is 230 ft. east of the present location and not 'west' as indicated in the third paragraph of the above-mentioned memo.


A. Van Dalen
For: T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl
encl.

c.c. A. J. Percy
R. Forrest
C. S. Grebski - Att. K. Bassi

44-111, 2, 3

RECEIVED TO 11, 1, 1

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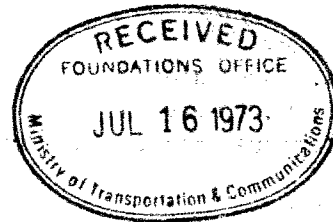
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MEMORANDUM

TO: THE SECRETARY OF THE MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
FROM: THE SECRETARY OF THE MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
SUBJECT: [Illegible]

[Illegible text follows]



MILLON C.R. HWY. 41 N.P. 229-65



SITE OF PROPOSED CROSSING

July /73

K

MX DOWN JULY 24/73 11:05A VR

KINR 1 - REG MAIL'S ENGR

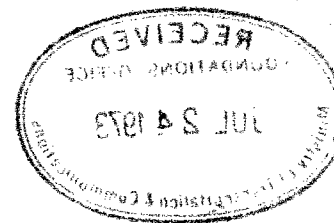
KIND 2 - CC : R J SIM - DIST MICE ENGR

WE WILL COMMENCE FOUNDATION INVESTIGATION WORK FOR MELLON CREEK

STRUCTURE WP229-65, W073-11055 - HIGHWAY NO.41 ON JULY 30, 1973.

P PAYER - SRN FOUNDATIONS ENGR, FOUNDATIONS OFFC.

HCA



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W. BAKER - BBS FOUNDATIONS ENGR. FOUNDATIONS OFFIC.

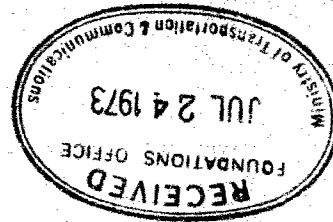
TELEPHONE 25252-22, 2525-11022 - HIGHWAY 20.41 ON JUNE 20, 1973.

WE WILL COMMENCE FOUNDATION INVESTIGATION WORK FOR BETTER CEMENT

KIND 3 - CO : B 7.1W - DISTANCE ENGR

KIND 1 - 120 HAIR, 2 ENGR

XX 2000 2000 2000 11:00V AM



HCV

5. BAYER - SWA FOUNDATIONS ENG' FOUNDATIONS GLEC.

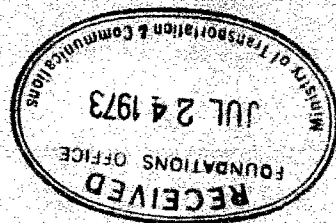
2100100E 06552-02, 0012-11022, - HIGHWAY NO. 41 ON JULY 20, 1973.

WE WILL COMMENCE FOUNDATION INVESTIGATION WORK FOR WETLOW CREEK

ROAD 2 - CO : B. T. BOW - DIST. WICE ENG'.

MEAN I - LEO HAVIL. D. ENG'.

XX DEAN JULY 20, 1973 11:02A AM



Design Services Branch,
1201 Wilson Avenue,
Downsview, Ontario.
M3M 1J8

Telephone: 248-1282.

August 3, 1973.

F. E. Johnston Drilling Co. Ltd.,
P.O. Box 4134,
Postal Station 'E',
Ottawa, Ontario.
K1S 5B2

Dear Sirs:

This letter confirms our request of July 24, 1973,
for the supply of a diamond drill together with all necessary
equipment, as specified under the terms of our Contract
Agreement, at Malabar on July 30, 1973.

Mobilization will be from your yard in Ottawa.

Our Project Number is W.O. 73-11055. ✓

Yours truly,

MD/ao

c.c. W. W. Fry
(Attn: Mrs. M. Porter)

Foundations Files
Documents

For. M. Devata,
Supervising Foundations Engineer,
A. G. Sternac,
Principal Foundations Engineer.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. T. C. Kingsland,
Regional Structural Planning Eng.,
Eastern Region,
Kingston, Ontario.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: August 20, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT: *Preliminary Foundation Recommendations for
the Proposed New Structure at the Crossing
of Mellon Creek and Relocated Hwy. #41
W.O. 73-11055 -- W.P. 229-65*

1. Introduction:

A request to carry out a foundation investigation at the crossing of realigned Hwy. #41 and Mellon Creek approximately 8 miles south of Kaladar (Jct. of Hwy. #7 & Hwy. #41) was contained in a memorandum from Mr. T. C. Kingsland, Regional Structural Planning Engineer (Eastern Region) dated July 11, 1973.

The surrounding terrain is rolling and bush covered. The valley of Mellon Creek is about 150 ft. wide and in most part marshy area. The banks of the creek consist of rock outcrops being almost vertical at the north side.

The water in Mellon Creek was found to be stagnant at the time of field investigation.

Due to the urgency of the project for cost estimating purposes, we have been requested to submit our written recommendations as soon as possible. This report, therefore, provides preliminary information on the subsoil conditions, as well as recommendations pertaining to foundation design and stability of the approach fills.

2. Subsoil Conditions:

Three boreholes were put down at the proposed crossing to obtain information on the parent subsoil conditions. Due to the inaccessibility of some portion of the marshy area, at the time of the field investigation, additional borings, if necessary, will be carried out during the winter period.

The subsoil at the site was found to consist immediately below the creek bed a deposit of very soft organic material (muck) containing sand, some 4 to 20 ft. in thickness, followed by 2 to 10 ft. of firm to stiff silty clay, trace of sand, followed by

a loose to compact layer of sand, gravel and boulders at least 2 ft. thick overlying bedrock. The bedrock surface encountered at the boring locations was found to range from elevation 495 to elevation 529. Bedrock outcrops are visible at both sides of the creek. The water level in the creek was at elevation 536.8 at the time of the field work (August 1973) and the average depth of water at the proposed structure site was about 4 ft.

3. Recommendations:

It is proposed to realign Hwy. #41, some 230 ft. east of the present location at the crossing of Mellon Creek. A single-span, some 115 ft. long, structure is proposed at this location.

The subsoil consists of organic material, silty clay, granular type material (sand, gravel, occasional boulders) and bedrock in that order.

The proposed profile grade is about 25 ft. above the creek water level.

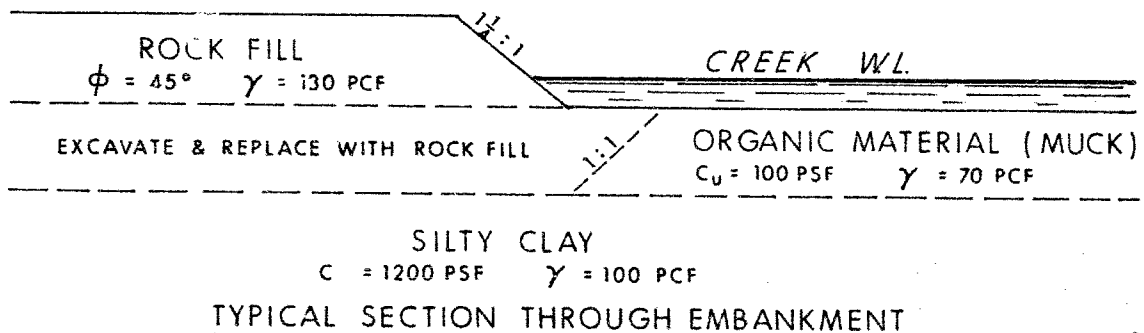
Due to the presence of organic material immediately below the creek bottom, certain measures will be required for the construction of the approaches and the suggested method of treatment is as follows:

Excavation of the Organic Material (Muck):

In order to ensure the stability of the approach embankments, all soft, organic material (muck) should be removed to its full depth and replaced with rockfill or other suitable material. The width of the excavation should be as shown on sketch below.

As mentioned elsewhere the subsoil underneath the approaches embankment locations consists of silty clay having a minimum thickness of 10 ft. Due to the loading of the embankment, settlements are likely to take place over a long-term period. The rate and the magnitude of the predicted settlement will be submitted in a memo by this Office after the completion of the laboratory tests.

This method may prove to be costly, but from a performance point of view, it should be a satisfactory one.



Foundations:

The subsoil conditions are not favourable for a spread footing type foundation. It is recommended, therefore, that the structure abutments be supported on end-bearing steel 'H' piles driven to the bedrock. The allowable capacity of the pile will be dependent on the pile section chosen.

A granular core should be placed within the rockfill to enable the piles to be driven through. The core should be slightly larger than the net area of the footing.

Frost protection should be provided for the pile caps.

No dewatering problems are anticipated for the construction of the pile caps, perched within the approaches.

The foregoing should be sufficient for your design purposes. If further information is required, please contact this Office. Our complete report will be submitted in the near future.

P. Payer

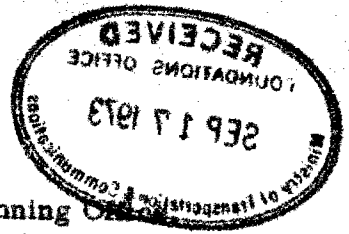
P. Payer,
Senior Foundations Engineer,
M. Devata,
Supervising Foundations Engineer.

PP/ao

For:

c.c. B. R. Davis
A. J. Percy (Attn: G. McMillan)
R. Forrest
C. S. Grebski (Attn: K. Bassi)

Foundations Files ✓
Documents



Mr. A. J. Percy,
Regional Manager, Systems Design,
Kingston, Ontario.

Structural Planning
Kingston, Ontario.

Mr. H. Eimers

15 September 1973.

W.P. 229-65 - Mellon Creek Crossing,
Highway 41, District 8 - Kingston

We have been informed by the Federal Ministry of Transport that the above crossing is considered to be navigable within the meaning of the Navigable Waters Protection Act. A copy of their letter was handed to you previously.

You will note that the M.O.T. recommend a minimum horizontal clearance of 20 ft. and a minimum vertical clearance of 6 ft. above the normal summer water level.

Depending upon completion of the final foundation investigation, we consider that the use of a 20 ft. circular structural plate pipe culvert could be a practical alternative to a bridge. A pipe of this size would be more than sufficient for hydrology reasons and hopefully would comply with the requirements of the Navigable Waters Protection Act.

Not including the cost of excavating the organic material in the streambed, we estimate the cost of purchase and assembly of a 20 ft. structural plate pipe to be approximately \$32,000. In comparing the cost of this culvert with the cost of a beam type structure, it should be kept in mind that approximately 5000 cu. yds. more fill will be required for the pipe culvert.

Regardless of the type of structure that is decided upon, we will have to apply for approval under the Navigable Waters Protection Act and this will affect schedule dates.

A. Van Dalen
For: T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl

c.c. ✓ A. G. Stermac - Att. M. Devata
C. S. Grebski - Att. K. Bassi
R. Forrest



Structural Planning
Kingston, Ontario

Mr. A. J. Percy,
Regional Manager, Systems Design,
Kingston, Ontario.

12 September 1973.

Mr. H. Bimars

W.P. 320-85 - Mellon Creek Crossing,
Highway 41, District 8 - Kingston

been informed by the Federal Ministry of Transport
that the crossing is considered to be navigable within the
Navigable Waters Protection Act. A copy of their
letter is being forwarded to you previously.

note that the M.C.T. recommends a minimum
clearance of 20 ft. and a minimum vertical clearance
of normal summer water level.

upon completion of the final foundation level -
the use of a 30 ft. circular structural pipe
proposed alternative to a bridge. A pipe of this
type is sufficient for hydrology reasons and possibly
the requirements of the Navigable Waters Protection

ing the cost of excavating and installing the
timber the cost of purchase and assembly is \$15,000.
to be approximately \$15,000. In comparison, the
cost of this alternative with the cost of a beam type structure, it would
be kept in mind that approximately 3000 cu. yds. more fill will be
required for the pipe culvert.

in regards of the type of structure that is decided upon, we will
have to apply for approval under the Navigable Waters Protection Act
and this will affect schedule dates.

Mr. van Galen
T. C. Kingland
Regional Structural Planning Engineer

cc: A. G. Hennes - Attn. Mr. Devere
C. J. Grebeki - Attn. Mr. Bassi
H. Forrest

73-11055

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. G. Stermac,
Principal Foundations Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION: Mr. M. Devata

DATE: 25 September 1973.

OUR FILE REF.

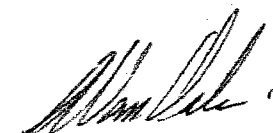
IN REPLY TO

SUBJECT: W.P. 229-65, Mellon Creek Structure
Relocated Highway 41, District 8-Kingston

Enclosed herewith are two prints of the preliminary

Site Plan E-5256-1 for the above structure.

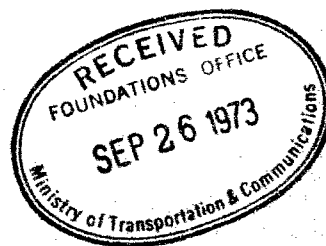
The final grade is presently under review and we will
send you two further prints of this plan showing the
grade as soon as available.



For: A. Van Dalen
T. C. Kingsland
Regional Structural Planning Engineer

AV/TCK/hl
encls.

c.c. A. J. Percy - Att. H. Eimers
C. S. Grebski - Att. K. Bassi



MEMORANDUM

TO: Mr. T.C. Kingsland, (2)
Regional Structural Planning Eng.,
Eastern Region,
Kingston, Ontario.

FROM: Foundations Office,
Design Services Branch,
West Bldg., Downsview.

ATTENTION:

DATE: October 16, 1973.

OUR FILE REF.

IN REPLY TO

OCT 22 1973

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For
The Proposed New Structure
at the Crossing of Mellon Creek
and Relocated Hwy. 41 (Line 'B')
Township of Sheffield
County of Lennox & Addington
District No. 8 (Kingston)
W.O. 73-11055 - W.P. 229-65

CON 74-118

Attached we are forwarding to you our detailed foundation investigation report on the subsoil conditions existing at the above-mentioned site.

We believe that the factual data and recommendations contained therein will prove adequate for your design requirements. Should additional information be required, please do not hesitate to contact our Office.

M. Devata

M. Devata,

SUPERVISING FOUNDATIONS ENGINEER,
for

A.G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

MD/AGS/zh

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Foundations Files
Documents

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W.O. 73-11055 - W.P. 229-65

1. INTRODUCTION:

The Foundations Office was requested to carry out a subsurface investigation at the site of the proposed realignment of Hwy. 41 and Mellon Creek in the Township of Sheffield, County of Lennox and Addington. The request was contained in a memo from Mr. T.C. Kingsland, Regional Structural Planning Engineer, Eastern Region, dated July 11, 1973. Subsequently a field investigation was carried out by this office to determine the subsoil and groundwater conditions in this area.

In order to facilitate the feasibility studies without any further delay, a detailed memo containing all these recommendations was submitted on August 20, 1973.

This report presents the factual information obtained from this investigation together with recommendations pertaining to the foundation design of the proposed structure and stability and settlement considerations associated with the approach embankments.

2. DESCRIPTION OF SITE AND GEOLOGY:

The site is located approximately 8.0 miles south of Kaladar (Jct. Hwy. 7 and Hwy. 41) on Hwy. 41 at the crossing of Mellon Creek, in the Township of Sheffield, County of Lennox and Addington. The surrounding terrain is rolling and bush covered. The valley of Mellon Creek is about 150 ft. wide and in most parts marshy area. The banks of the creek consist of rock outcrops being almost vertical at the north side.

Geologically, the area is in the Precambrian Shield, which consists of crystalline rocks. The area has been deeply buried within the earth's crust and the rocks have been highly metamorphosized or changed by intense heat and pressure. The characteristic bedrock type encountered is a gneiss belonging to the Hastings-Highland gneiss complex. Also found in the area are remnants and patches of volcanic and sedimentary.

3. FIELD AND LABORATORY WORK:

Three sampled boreholes, each accompanied with a dynamic cone penetration test plus two additional dynamic cone penetration tests, were carried out during the course of the field investigation. The borings were advanced by means of a conventional diamond drilling equipment adapted for soil sampling purposes. At certain locations, where borings have to be carried out on water, a raft was used to mount the diamond drilling equipment. Samples of the

non-cohesive stratum were obtained in a 2" O.D. split-spoon sampler, which was hammered into the soil in accordance with the specifications for the Standard Penetration Test. The dynamic cone penetration tests were advanced using the same method. Samples of the cohesive stratum were obtained in 2" I.D. Shelby Tubes which were manually pushed into the soil. Field vane tests were also carried out within this zone to determine the in-situ undrained shear strength and the sensitivity of the clay. Bedrock was proven at two boring locations by obtaining BXL rock core samples.

All boreholes were located within the creek boundaries. The water level in the creek was at elevation 536.8 at the time of the field work (August, 1973).

The locations and elevations of all boreholes are shown on Drawings No. W.O. 73-11055A. An estimated stratigraphical section is presented on the same drawing. The surveying was carried out by personnel from the Kingston Region, Engineering Surveys Office. All elevations are referenced to Geodetic datum.

All samples were subjected to careful visual examination both in the field and in the laboratory. Laboratory tests were performed on selected samples to determine the engineering properties of the various soil types; namely:

Bulk Densities

Natural Moisture Contents

Grain-Size Distributions

Atterberg Limits

Undrained Shear Strengths

Consolidation Characteristics

The results of the laboratory testing are plotted on the "Record of Borehole" sheets and summarized on Figure Nos. 1 to 5, all of which are contained in the Appendix of this report.

4. SUBSOIL AND BEDROCK CONDITIONS:

4.1) General:

The subsoil at the site was found to consist immediately below the creek bed of a deposit of very soft organic material (muck), some 4 to 19 feet in thickness, followed by a stratum of 2 to 10 feet of firm to stiff clayey silt, to clay with some sand, trace of gravel, which in turn is followed by a loose to compact deposit of silty sand to sandy silt, some gravel at least 8 feet thick overlying bedrock. Bedrock outcrops are visible at both sides of the creek banks.

The boundaries of the various deposits, as determined in the boreholes, are shown on the individual Record of Borehole sheets. The stratigraphical section presented on Drawing No. 73-11055A has been inferred from this data. From ground surface downward, the various soil types and bedrock encountered are described in the subsections to follow:

4.2) Organic Material (Muck):

Immediately below the creek bed, is a deposit of very soft organic material (muck) containing decayed and undecayed organic substances. The thickness of this organic deposit varies from 4 feet (Borehole No. 5) to 19 feet (Borehole No. 1).

The engineering properties of the deposit as determined by laboratory testing, are presented below:

	<u>Range</u>	<u>Average</u>
Natural Moisture Content (W) (%)	80 - 1250	709
Organic Content (%)	58.8-79.8	68
Standard Penetration 'N' Values	1 blow/18"	1 blow/18"

4.2a) Clayey Silt to Clay, Some Sand, Trace of Gravel:

Directly beneath the organic material (muck) is a cohesive deposit consisting of clayey silt to clay, some sand, trace of gravel. Occasional layers of fine sand up to 2 inches thick, were encountered randomly throughout this deposit. Grain-size distribution testing was carried out on several samples of the stratum and the results are shown on the Record of Borehole sheets and are plotted on Figure No. 2 in an envelope form.

The engineering properties of the deposit, as determined by field and laboratory testing, are presented in the following table:

<u>Identity Tests</u>		<u>Range</u>	<u>Average</u>
Liquid Limit (W_L)	%	59-81	71
Plastic Limit (W_p)	%	26-30	27
Natural Moisture Content (W)	%	55-67	59

Compressibility Characteristics

Initial Void Ratio (e_o)	1.565) 1 test
Compression Index (C_c)	1.29	
Degree of Preconsolidation ($P_c - P'_o$)	p.s.f. 4220	

Undrained Shear Strength (C_u) p.s.f.

In Situ Field Vane Tests	1200-1800
Sensitivity (S_t)	3.0 - 5.0

The Atterberg Limit tests results, given in the table, are also summarized on the Plasticity Chart, Figure No. 1. The testing indicates that the cohesive soil is inorganic with the plasticity in the low to high range. The natural moisture content is generally below the liquid limit.

The consolidation characteristics of the stratum was determined by carrying out one laboratory test: the results are shown on Figure No. 5 as Void Ratio vs. Log of Pressure Plots. The testing indicates that the cohesive stratum is preconsolidated by 4220 p.s.f. in excess of the existing overburden pressure.

The consistency of the overall deposit is estimated to be firm to stiff.

4.3) Silty Sand to Sandy Silt, Some Gravel:

This granular deposit was found underlying the cohesive stratum. It consists of sand, some gravel, trace of silt.* Standard Penetration testing was carried out within this granular deposit. The results gave 'N' values ranging from 5 blows/ft. to 28 blows/ft. The relative density of this deposit ranges from loose to compact.

Grain-size distribution curves, for samples of this deposit, are shown on Figure No. 3 of the Appendix.

4.4) Gneiss Bedrock:

The granular deposit is directly underlain by gneiss bedrock, which was proven at two boring locations (Borehole Nos. 1 and 2) by obtaining 3 to 5 feet of BXL size core samples. The surface of the bedrock was found to be between elevation 494.6 and 495.2 at Borehole Nos. 1 and 2 respectively. However at Borehole No. 5 location, it was inferred that the bedrock was found to be at elevation 527, where the casing met refusal. As mentioned elsewhere, bedrock outcrops are visible on both banks of the Mellon Creek.

The bedrock is composed of sound massive bedded gneiss with granite inclusions.

* In the lower portion of the deposit, immediately above the bedrock, the gravel content increased considerably.

5. CREEK WATER CONDITIONS:

All boreholes were located within the boundaries of Mellon Creek water course. The creek was found to be stagnant and the water level in the creek was at elevation 536.8 at the time of the field work (August, 1973). The average depth of water at the proposed crossing was approximately 4.0 feet.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to realign Hwy. 41, some 230 feet east of the present location at the crossing of Mellon Creek. At present, two alternative schemes are considered for the Mellon Creek crossing, namely i) 115' single span structure; ii) structural plate pipe arch culvert.

The proposed profile grade in the vicinity of the crossing will be at approximately elevation 561 with creek bed at elevation 532. The associated approach fills will, therefore, have a maximum height of 29 feet over the creek bed level.

The subsoil within the confines of Mellon Creek consists of a deposit of soft organic material followed by firm to stiff clayey silt to clay, underlain by loose to compact sandy silt to silty sand.

Underlying the overburden is sound gneiss bedrock. On the creek banks, the bedrock is generally exposed.

The presence of a soft organic material immediately below the creek water level requires that steps must be taken to ensure overall stability of the approach embankments. As the stability and settlement of the approach fills are the major problems at this site, they will be discussed first.

6.2) Approach Embankments:

As mentioned elsewhere in this report, the maximum height of the approaches will be in the order of 29 feet above the river bed.

In order to ensure the stability of the approach embankments, all soft, organic material (muck) should be removed to its full depth within the plan limits of the proposed approach fills and replaced with rock fill or other acceptable granular material. If a single span structure scheme is selected, the sub-excavation of the organic material should extend a further distance of 10 feet from the proposed toe of the future embankments in the longitudinal direction. The recommended geometry of the sub-excavation is shown on Figure No. 4 in the Appendix.

If the afore-mentioned construction is followed, no deep-seated rotational type of failure is anticipated for the

embankments constructed with rock fill using $1\frac{1}{4}$:1 slopes. However, if the embankment is constructed with earth material, the slopes should be 2:1.

The cohesive stratum will undergo settlements due to consolidation, over a period of time, under the weight of the approach embankments. Settlement computations were, therefore, carried out.

It is estimated that the settlement of the approach fills could be of the order of 6 to 8 inches. The total amount of the predicted settlement should take place within a period of 1 to 2 years. About 50% should, however, occur within a period of 6 months.

Since predicted settlements will occur relatively quickly, it would be advantageous to place the fills prior to construction of the structure, in order to minimize post-constructive maintenance. If scheduling permits, a period of at least six months should be provided for this purpose.

6.3) Foundations:

6.3.1) Scheme I: 115' Single Structure:

The subsoil conditions are not favourable for a spread footing type foundation. It is recommended, therefore, that the structure abutments be supported on end-bearing piles

driven to bedrock surface. The allowable capacity of the pile will be dependent on the pile section chosen. If rock fill is used for embankment construction, a granular core should be placed in the area where piles have to be driven through the fill. An earth cover of at least 4 feet should be provided to the underside of the pile caps for frost protection purposes.

Since the pile caps are perched within the approaches, no dewatering problems are anticipated.

6.3.2) Scheme II: Structural Plate Pipe
Arch Culvert:

If this scheme is chosen, it may be necessary to construct the structural plate pipe arch culvert within the rock fill embankment. The bedding and backfilling for the culvert should be carried out in accordance with current M.T.C. practices. The pertinent standard is No. DD-808-C.

The culvert should be provided with a 3 inch camber in order to allow for the anticipated differential settlement.

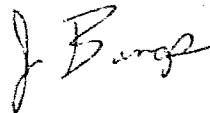
Since the culvert will be placed below the Mellon Creek water elevation, a dewatering scheme may be necessary for placing bedding in relatively dry condition.

7. MISCELLANEOUS:

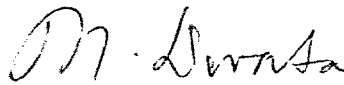
The field work was carried out between July 31 and August 9, 1973, under the supervision of Mr. J.T. Bangs, Project Foundations Engineer.

The drilling equipment used was owned and operated by F.E. Johnston Drilling Limited, Toronto.

This report was prepared by Mr. J.T. Bangs, and reviewed by Mr. M. Devata, Supervising Foundations Engineer.



J. Bangs, P. Eng.



M. Devata, P. Eng.

JB/zh
October 16, 1973.

APPENDIX I

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 1

JOB 73-11055

LOCATION Sta. 624 + 15 o/s 11' (Rt) Hwy. 41 (Line 'B')

W.P. 229-65

BORING DATE July 31, 1973

ORIGINATED BY J.D.

COMPILED BY J.H.

DATUM Geodetic

BOREHOLE TYPE Washboring - NX Casing

CHECKED BY J.H.

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT				LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT		20	40	60	80	100	w_p	w	w_L	
536.8	Water Level														
0.0	Water														
533.4	Ground Level														
3.4	Organic material (muck)		1	SS	*										
	Very soft		2	SS	17/18"	530									(800)
	Brown		3	SS	17/18"										(844)
			4	SS	*	520									(1025)
514.6	Clayey silt to clay. Some sand. Trace of gravel. Firm to stiff. Grey		5	SS	5	510									
22.2			6	SS	3										
503.8			7	SS	PM										
33.0	Sandy silt to silty sand. Some gravel. Trace of clay. Loose to compact. Grey		8	SS	28	500									
			9	SS	23										
494.6			10	SS	5										
42.2	Bedrock. Gneiss (sound)														
489.5															
47.3	End of Borehole.		11	RC	92	490									

* Sampler penetrated into the soil by the 20
15 \diamond 5 % STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 2

JOB 73-11055

LOCATION Sta. 624 + 37 - 32' (Lt) Hwy. 41 (Line 'B')

ORIGINATED BY J.B.

W.P. 229-65

BORING DATE August 2, 1973

COMPILED BY J.B.

DATUM Geodetic

BOREHOLE TYPE Washboring - NX Casing

 CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ P.C.F.	REMARKS			
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT			SHEAR STRENGTH P.S.F.					WATER CONTENT %		
							20	40	60	80	100	P.S.F.					
												+ FIELD VANE x LAB VANE					
536.8	Water Level																
0.0	Water																
532.6	Ground Level																
4.0	Organic material																
	Brown		1	SS	17/18	530											
	Very soft		2	SS	17/18												
			3	SS	*	520											
			4	SS	*												
513.0			5	TW	PM	510											
23.7	Clayey silt to clay. Trace of sand. Firm to stiff. Grey		6	TW	PM												
			7	SS	8												
			8	SS	4												
503.1			9	TW	PM												
33.5	Silty sand with gravel. Compact. Grey		10	SS	19	500											
495.2			11	SS	26												
41.4	Bedrock		12	EC	100												
403.2	Gneiss		13	EC	0												
43.4	End of Borehole.																

* Camper penetrated into the soil by the weight of Hammer (140 lbs.)

 20
15 \diamond 5 % STRAIN AT FAILURE
10

FOUNDATIONS OFFICE

JOB 73-11055

LOCATION Sta. 624 + 00; 44' Rt. Hwy. 41 (Line 'B')

ORIGINATED BY I.B.

W.P. 229-65

BORING DATE August 3, 1973

COMPILED BY D. D.

DATUM Geodetic

BOREHOLE TYPE Cone Test only

CHECKED BY C/L

20
15 ϕ 5 % STRAIN AT FAILURE
10

FOUNDATIONS OFFICE

JOB 73-11055

LOCATION Sta. 624 + 10 - o/o 76' (Lt) Hwy. 41 (Line 'B') OR

ORIGINATED BY J.B.

W.P. 229-65

BORING DATE August 7, 1973

COMPILED BY J.B.

DATUM: Geodetic

BOREHOLE TYPE Cone Test only

CHECKED BY QK

15 $\frac{20}{\phi}$ 5 % STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 5

FOUNDATIONS OFFICE

JOB 73-11055

LOCATION Sta. 623 + 49 - C Hwy. 41 (Line 'B')

ORIGINATED BY J.B.

W.P. 229-65

BORING DATE August 8 & 9, 1973

COMPILED BY J.B.

DATUM Geodetic

BOREHOLE TYPE Washbore - NX Casing

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT ——— w_L			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT			PLASTIC LIMIT ——— w_p				
							SHEAR STRENGTH P.S.F.			WATER CONTENT ——— w				
							<input type="checkbox"/> UNCONFINED + FIELD VANE			w_p ——— w ——— w_L				
							<input checked="" type="checkbox"/> QUICK TRIAXIAL x LAB. VANE			WATER CONTENT %				
										25 50 75				
36.8	Water Level													
0.0	Ground Level													
2.4	Organic material		1	SS	1/18"									
	Very soft. Brown		2	SS	1/17"	530						(55%)		
30.4	Clayey sl. some		3	SS	4									
28.7	sa. Soft. Gray.		4	SS	25							o(518)		
27.1	Silty sa. with gr.													
9.7	Probable bedrock													5 42 (13)
	End of Borehole.													
						520								

OFFICE REPORT SOIL EXPLORATION

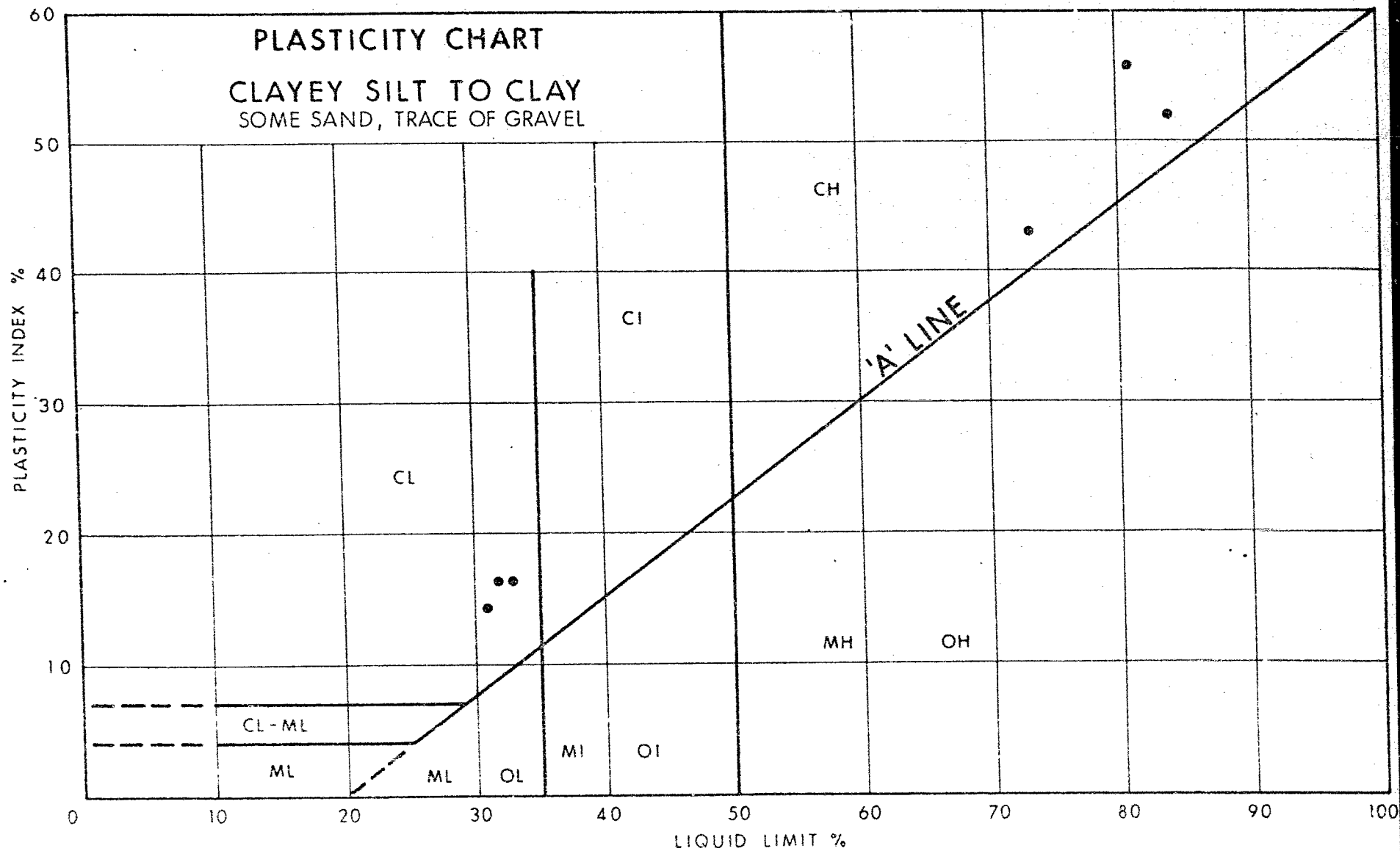
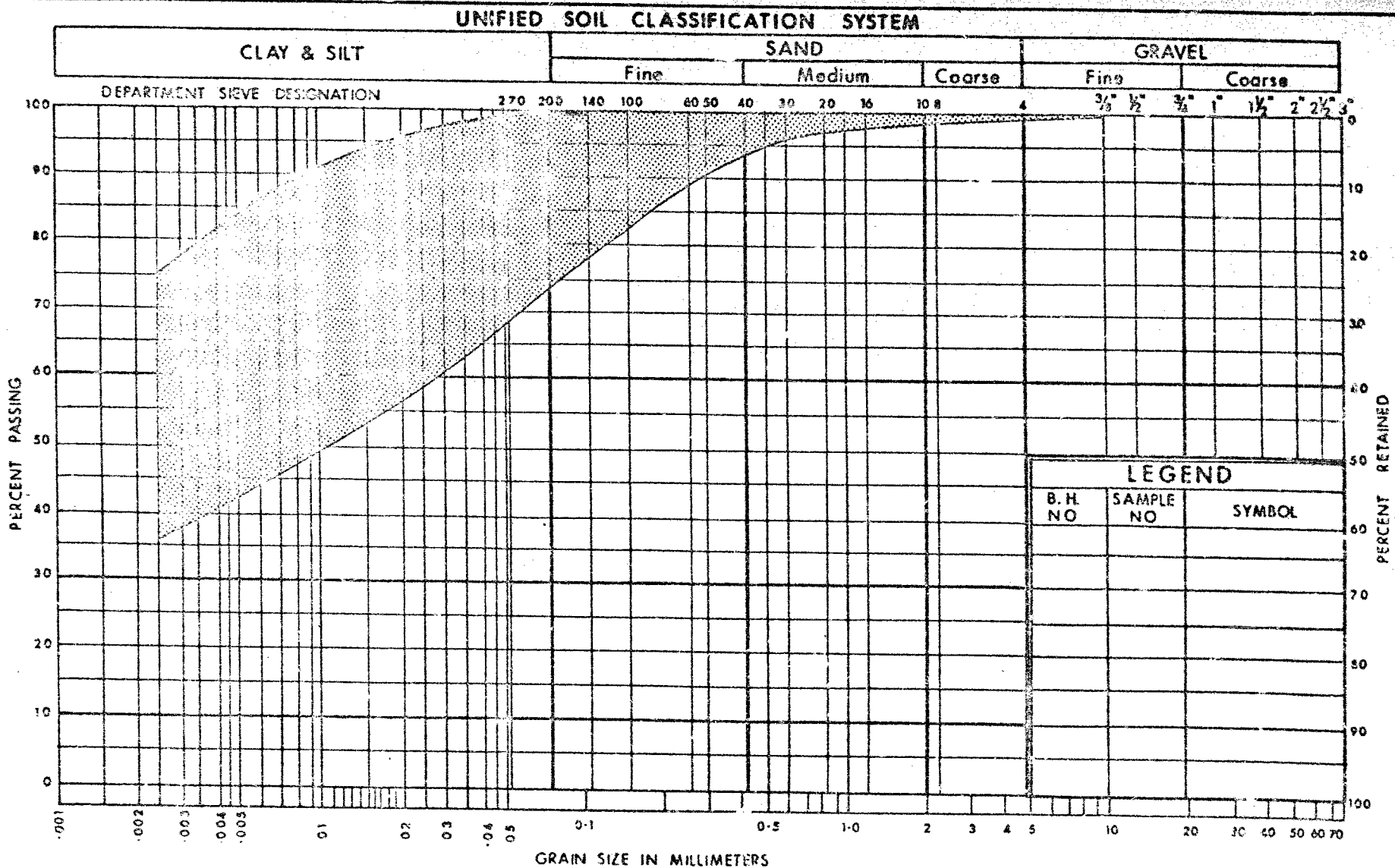


FIG. 1



DEPARTMENT
C
TRANSPORTATION AND COMMUNICATIONS

[illegible]

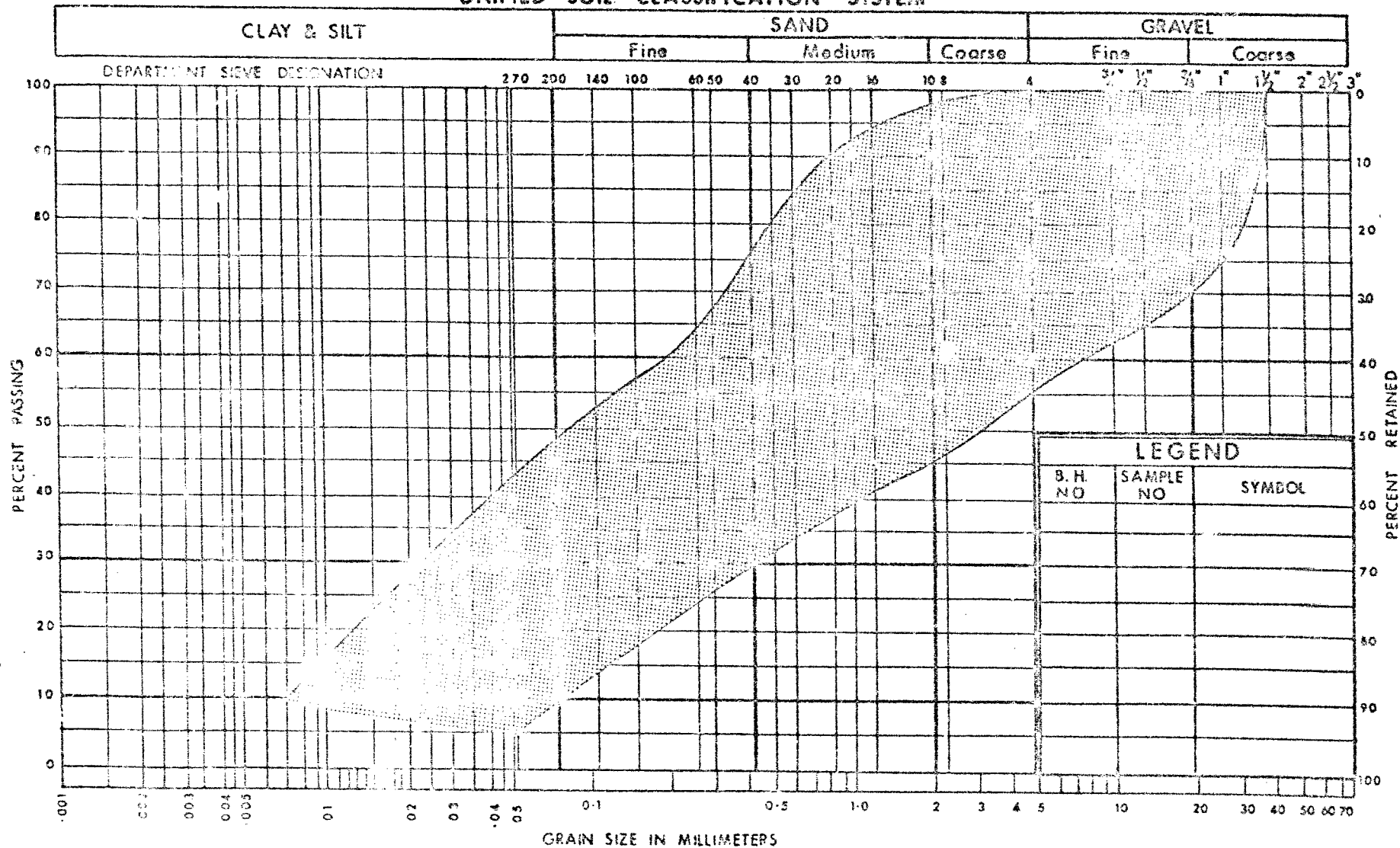
GRAIN SIZE DISTRIBUTION
CLAYEY SILT TO CLAY
SOME SAND, TRACE OF GRAVEL

W.P. No. 229 - 65

JCS No. 73-11055

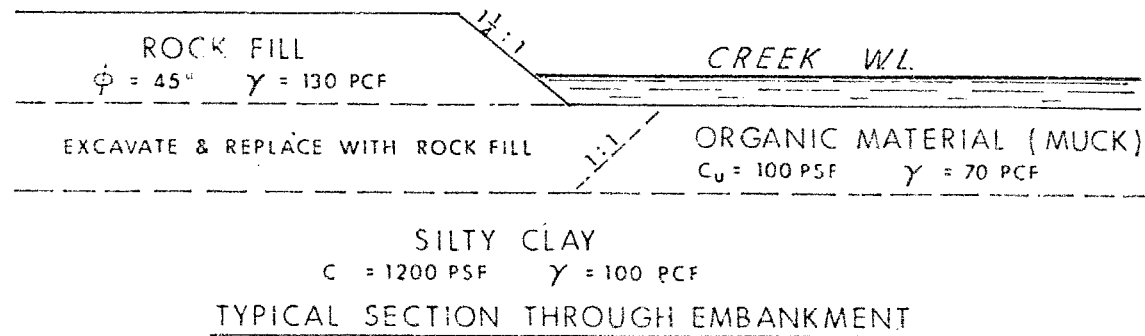
FIG. 2

UNIFIED SOIL CLASSIFICATION SYSTEM



GRAIN SIZE DISTRIBUTION
SANDY SILT TO SILTY SAND
WITH GRAVEL

W.P. No. 229 - 65
JSD No. 73-11055
FIG. 3



W.P. 229-65

FIG. 4

W.O. 73-11055

VOID RATIO - PRESSURE CURVES

JOB NO. 73-11055

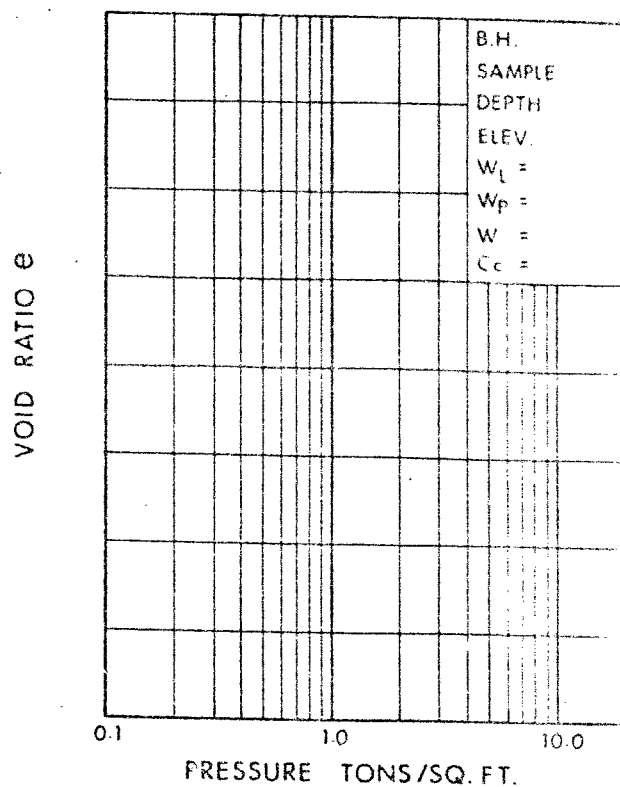
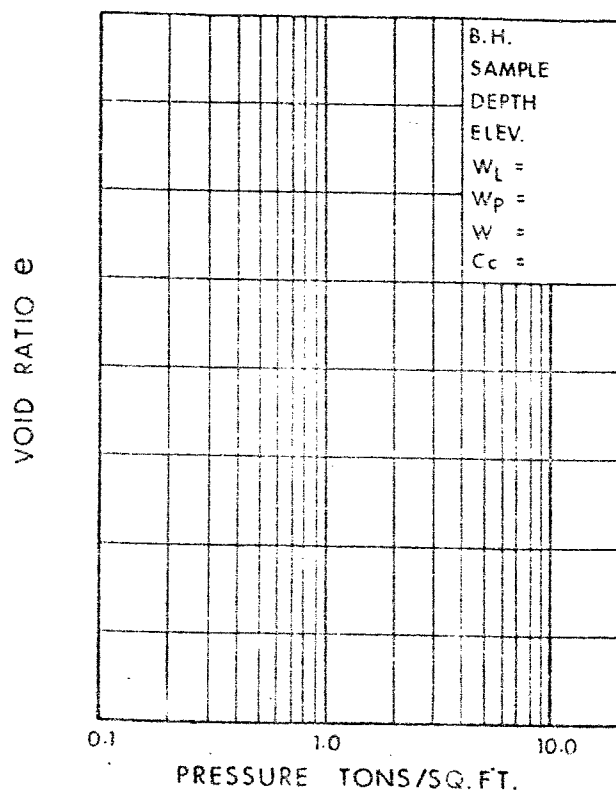
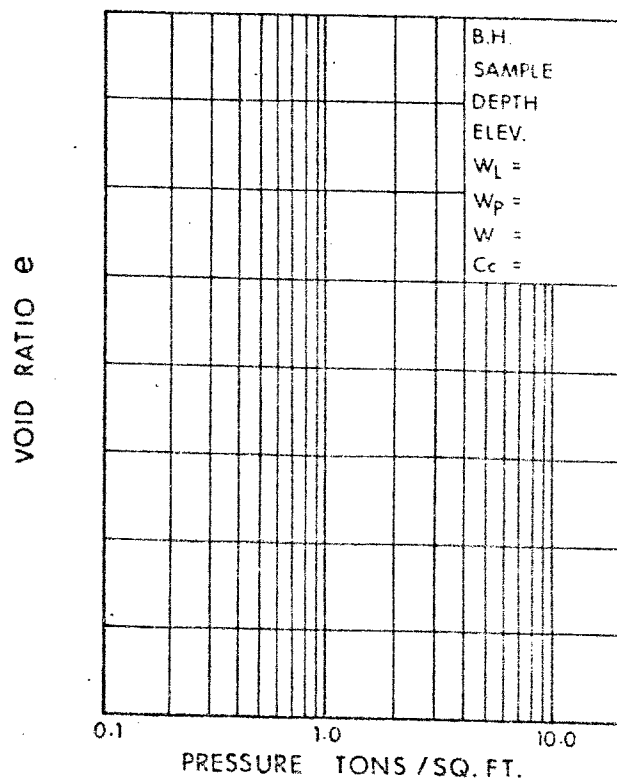
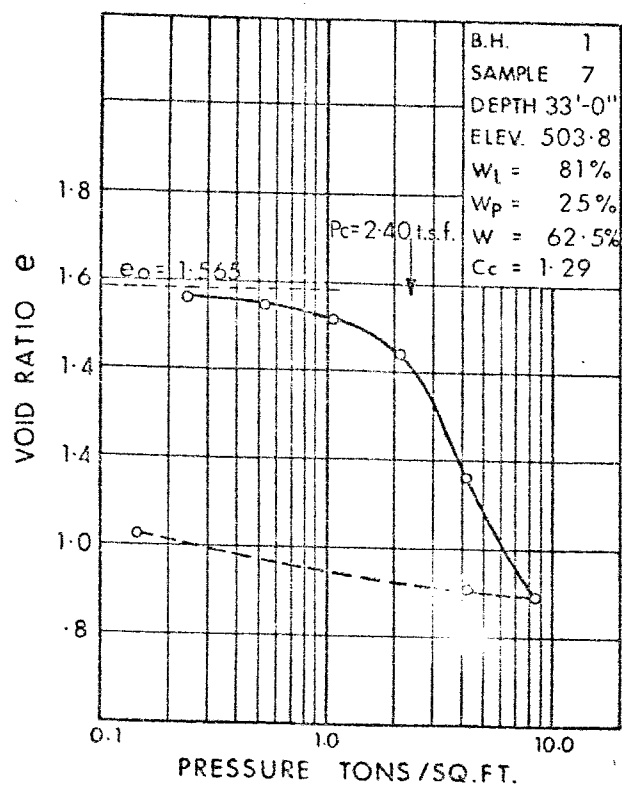


FIG. 5

FD-9 (Rev. Jan. 73)

ABBREVIATIONS & SYMBOLS USED IN THIS REPORT

PENETRATION RESISTANCE

'N'-STANDARD PENETRATION RESISTANCE : - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE :- THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL. THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS :-

<u>CONSISTENCY</u>	<u>c LB./SQ. FT.</u>	<u>DENSENESS</u>	<u>'N' BLOWS / FT.</u>
VERY SOFT	0 - 250	VERY LOOSE	0 - 4
SOFT	250 - 500	LOOSE	4 - 10
FIRM	500 - 1000	COMPACT	10 - 30
STIFF	1000 - 2000	DENSE	30 - 50
VERY STIFF	2000 - 4000	VERY DENSE	> 50
HARD	> 4000		

TERMS TO BE USED IN DESCRIBING SOILS:-

TRACE < 10% , SOME 10-25% , WITH 25-40% , > 40% SILTY, SANDY, GRAVELLY, CLAYEY ETC.

TYPE OF SAMPLE

S.S.	SPLIT SPOON	T.W.	THINWALL OPEN
W.S.	WASHED SAMPLE	T.P.	THINWALL PISTON
S.T.	SLOTTED TUBE SAMPLE	O.S.	OESTERBERG SAMPLE
A.S.	AUGER SAMPLE	F.S.	FOIL SAMPLE
C.S.	CHUNK SAMPLE	R.C.	ROCK CORE

P.H. SAMPLE ADVANCED HYDRAULICALLY

P.M. SAMPLE ADVANCED MANUALLY

SOIL TESTS

U	UNCONFINED COMPRESSION	L.V.	LABORATORY VANE
UU	UNCONSOLIDATED UNDRAINED TRIAXIAL	F.V.	FIELD VANE
CU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

ABBREVIATIONS & SYMBOLS USED IN THIS REPORT

SOIL PROPERTIES

γ	UNIT WEIGHT OF SOIL (BULK DENSITY)
γ_s	UNIT WEIGHT OF SOLID PARTICLES
γ_w	UNIT WEIGHT OF WATER
γ_d	UNIT DRY WEIGHT OF SOIL (DRY DENSITY)
γ'	UNIT WEIGHT OF SUBMERGED SOIL
G	SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$
e	VOID RATIO
n	POROSITY
w	WATER CONTENT
S_r	DEGREE OF SATURATION
w_L	LIQUID LIMIT
w_p	PLASTIC LIMIT
I_p	PLASTICITY INDEX
w_s	SHRINKAGE LIMIT
I_L	LIQUIDITY INDEX $= \frac{w - w_p}{I_p}$
I_C	CONSISTENCY INDEX $= \frac{w_L - w}{I_p}$
e_{max}	VOID RATIO IN LOOSEST STATE
e_{min}	VOID RATIO IN DENSEST STATE
I_D	DENSITY INDEX $= \frac{e_{max} - e}{e_{max} - e_{min}}$
	RELATIVE DENSITY D_r IS ALSO USED
h	HYDRAULIC HEAD OR POTENTIAL
q	RATE OF DISCHARGE
v	VELOCITY OF FLOW
i	HYDRAULIC GRADIENT
k	COEFFICIENT OF PERMEABILITY
j	SEEPAGE FORCE PER UNIT VOLUME
m_v	COEFFICIENT OF VOLUME CHANGE $= \frac{-\Delta e}{(1+e)\Delta \sigma'}$
c_v	COEFFICIENT OF CONSOLIDATION
C_c	COMPRESSION INDEX $= \frac{\Delta e}{\Delta \log_{10} \sigma}$
T_v	TIME FACTOR $= \frac{C_v t}{d^2}$ (d, DRAINAGE PATH)
U	DEGREE OF CONSOLIDATION
τ_f	SHEAR STRENGTH
c'	EFFECTIVE COHESION INTERCEPT
ϕ'	EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
μ	COEFFICIENT OF FRICTION
S_i	SENSITIVITY

GENERAL

π	$= 3.1416$
e	BASE OF NATURAL LOGARITHMS 2.7183
$\log_e a$ OR $\ln a$	NATURAL LOGARITHM OF a
$\log_{10} a$ OR $\log a$	LOGARITHM OF a TO BASE 10
t	TIME
g	ACCELERATION DUE TO GRAVITY
V	VOLUME
W	WEIGHT
M	MOMENT
F	FACTOR OF SAFETY

STRESS AND STRAIN

u	PORE PRESSURE
σ	NORMAL STRESS
σ'	NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED)
τ	SHEAR STRESS
ϵ	LINEAR STRAIN
γ	SHEAR STRAIN
ν	POISSON'S RATIO (μ IS ALSO USED)
E	MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_0	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL

Mr. A. J. Percy,
Regional Manager, Systems Design,
Kingston, Ontario.

Structural Planning Office,
Kingston, Ontario.

Mr. G. McMillan

17 October 1973.

W.P. 229-65 - Mellon Creek Structure
Relocated Highway 41, District 8-Kingston

As discussed this morning we enclose herewith two copies of a sketch showing the proposed 20 ft. diameter structural steel pipe.

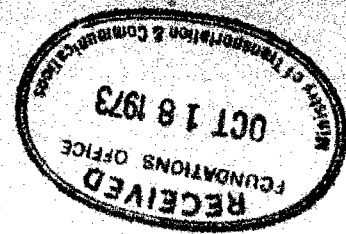
We understand that the report on the foundation investigation at this site will be forthcoming shortly and that the recommendations therein will cover the beam type structure and the 20 ft. circular pipe.

A. Van Dalen
For: T. C. Kingsland
Regional Structural Planning Engineer

AV/TCH/hl
encls.

c.c. ✓ Mr. A. G. Stermac - Att. Mr. M. Devata (+encl.)
Mr. C. S. Grebski - Att. Mr. K. Bassi (+encl.)





MR. C. P. CLERKE - VII. MR. K. BERRY (+ENC.)
C. C. MR. V. C. BELLING - VII. MR. W. DEANIS (+ENC.)

ENCLOS.

VA/LSK/MI

Regional Structural Planning Engineer
ECL: J. C. WINGARD
A. VAN DER

Enc.

Enclosure will cover the design of the structural and the 30 ft. diameter
at this site will be forthcoming shortly and that the recommendations
are understanding that the report on the foundation investigation

Enc.

of a sketch showing the proposed 30 ft. diameter structural steel
as discussed this morning. The enclosure contains two copies

Enclosure attached at: District 8-Kingston
M. P. 338-88 - Nelson Creek Structural

MR. C. P. CLERKE

13 October 1973

Kingston, Ontario
Regional Manager, Atlantic Region
MR. W. J. LETCH

Kingston, Ontario
Structural Planning Office

22011-87

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. M. Devata,
Supervising Foundations Engineer,
Downsview, Ontario.

FROM: Structural Planning Office,
Kingston, Ontario.

ATTENTION:

DATE: 11 January 1974.

OUR FILE REF.

IN REPLY TO

SUBJECT: W. P. 229-65, Site 17-224,
Mellon Creek Culvert,
Relocated Hwy. 41, District 8-Kingston

Further to our telephone discussion concerning the foundation investigation for the above-mentioned culvert, we shall be glad if you will extend the investigation covered by your Report W.O. 73-11055 in order to determine the limits of the organic material to be removed from the creek bed. It has been decided to use a 20 ft. diameter CSP at this site and we shall be glad of any further recommendations you may have relating to the use of this type of culvert at this site.

It will be remembered that the north side of the creek was not covered by the previous investigation owing to the difficulty of access at that time. It should now be possible to mount a drilling rig on the ice, and we will be in touch with you again with information on ice conditions at the site.



T. C. Kingsland
Regional Structural Planning Engineer

TCK/hl

c.c. E. R. Saint
A. J. Percy - Att. L. O. Dawley
V. Snell
R. Forrest
C. S. Grebski - Att. K. Bassi

Mark:
Paul Would you
take necessary action
And also file this in people project
FEB 26 4 17 PM '74
OH.D
27th Feb/74

DOWN KINR 5 FEB 26/74 3:50

M. DEVATA, SOILS MECHANICS OFFICE, ENGINEERING SERVICES BRANCH
COPY TO KINR: T C KINGSLAND

RE: W.P. 229-65 HWY NO 41- MELLON CREEK

FOLLOWING HAND AUGER SOUNDINGS WERE PLACED ON
FEB. 21, 1974 TO SUPPLEMENT FOUNDATION BORINGS:

STATION 623 PLUS 30- START ORGANIC DEPOSIT AT CENTRE LINE

STATION -623 PLUS 50- 50' LT- CENTRELINE BH.# 100

0-12"- WATER

12"-8'- BLK AMPHOROUS GRAN. ORGANIC (FIBROUS)

8'- 9' GRY CLAYEY SILT TO CLAY (FIRM)

STATION 623 PLUS 50- 50' RT BH.# 101

0-12"- WATER

12" -10' BLK AMORPH. GRAN ORGANIC (FIBROUS)

10'- 13'- GR. CLAYEY SILT -(SI) CL (SOFT)

13' - N.F.P. POSSIBLE BEDROCK

STATION 624 PLUS 50- (CENTRELINE) BH.# 102

0- 14"- WATER

14" - 25' BLK AMORPHOUS GRAN ORGANIC (FIBROUS)

25'- 26- GR CLAYEY SILT-SI CL (FIRM)

26- PLUS N.F.P. POSSIBLE BEDROCK

STATION 624 PLUS 50- 50' RT BH.# 103

0- 18"- WATER

18" -22' BLK AMOR. GRAN ORGANIC (FIBROUS)

22'- 24' CR CLAYEY SILT -SI CL (FIRM)

24' PLUS N.F.P. BEDROCK

STATION 624 PLUS 80 END DEPOSIT AT CENTRE LINE.

THESE SOUNDINGS WERE MADE WORKING ON DIFFICULT SURFACE

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CONDITIONS. SAMPLE RECOVERY WAS MINIMIZED; HOWEVER
EFFORTS WERE MADE TO ESTABLISH THE EXTENT OF THE DEPOSIT.

A M BATTEN

M AND T

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MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. T.C. Kingsland, FROM: Soil Mechanics Section,
Reg. Structural Planning Engineer, Geotechnical Office,
Eastern Region, Kingston. West Building, Downsview.

ATTENTION: DATE: March 21st, 1974.

OUR FILE REF. IN REPLY TO MAR 29 1974

SUBJECT: re: Supplementary Subsoil Information,
Mellon Creek Structure, Highway #41,
W.O. 73-11055 W.P. 229-65.

The Soil Mechanics Section requested the Regional Materials Office to investigate the extent and depth of the organic deposits in the immediate vicinity of the structure approaches.

We have now received this additional information. The subsoil at the site was found to consist immediately below the creek bed of a deposit of very soft organic material (muck) containing sand, some 4 to 25 ft. in thickness, followed by a silty clay stratum.

A review of the encountered subsoil conditions indicates that the recommendations pertaining to the proposed structure foundations and the stability of the approach embankments are still applicable.

Please attach the Supplementary Record of Borehole Sheets (numbered 100 to 103) and replace original Foundation Report Drawing 73-11055 A with the revised Drawing.

If further information is required, please contact this Office.

P. Payer

P. Payer
Senior Engineer

For: M. Devata
Supervising Engineer

PP/mj

c.c. E.J. Orr,
B.R. Davis, G.A. Wrong,
A.J. Percy, B.A. Singh,
J.M. Childs, M.M. Dillon (Ottawa),
B.J. Giroux, Files, ✓
E.R. Saint, Documents.

Attach*

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 100

FOUNDATIONS OFFICE

JOB 73-11055

LOCATION Sta: 623 + 50; 50' LT

W.P. 229-65

BORING DATE February 21, 1974

ORIGINATED BY MB

DATUM Geodetic

BOREHOLE TYPE Hand Auger Hole

COMPILED BY HS

CHECKED BY SE

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT				BULK DENSITY	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT				PLASTIC LIMIT					
537.0	Water (Ice) Level						SHEAR STRENGTH P.S.F.				WATER CONTENT %					
0.0	Ground Level						O UNCONFINED + FIELD VANE				Wp — W — Wl					
1.0	Organic						● QUICK TRIAXIAL x LAB VANE				WATER CONTENT %					
529.0	Material					530								Y P.C.F. GR.SA.SI.CL		
528.0	Clayey Silt															
9.0	End of Borehole															
						520										

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE No 101

FOUNDATIONS OFFICE

JOB 73-11055

LOCATION Sta: 623 + 50; 50' RT

ORIGINATED BY MB

W.P. 229-65




BORING DATE February 11, 1974

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Hand Auger Hole

CHECKED BY SP

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT _____w _L				BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT				PLASTIC LIMIT _____w _p					
537.0	Water (Ice) Level						SHEAR STRENGTH P.S.F.				WATER CONTENT _____w					
0.0	Ground Level						O UNCONFINED + FIELD VANE				w _p — w — w _L					
	Organic						● QUICK TRIAXIAL x LAB VANE				WATER CONTENT %					
527.0	Material					530										
10.0																
524.0	Clayey Silt															
13.0	(Refusal)															
	End of Borehole					520										

OFFICE REPORT ON OIL EXPLORATION

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE NO 102

JOB 73-11055

LOCATION Sta: 624 + 50; 6

ORIGINATED BY MB

W.P. 229-65

BORING DATE February 21, 1974

COMPILED BY PP

DATUM Geodetic

BOREHOLE TYPE Hand Auger Hole

CHECKED BY SP

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT w_L				BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT				PLASTIC LIMIT w_p					
537.0	Water (Ice) Level															
0.0	Ground Level															
1.2	Organic Material					530										
						520										
512.0																
511.0	Clayey Silt															
26.0	(Refusal) End of Borehole					510										

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE N^o 103

FOUNDATIONS OFFICE

JOB 73-11055

LOCATION Sta: 624 + 50; 50' RT

W.P. 229-65

BORING DATE February 21, 1974

ORIGINATED BY MB

DATUM Geodetic

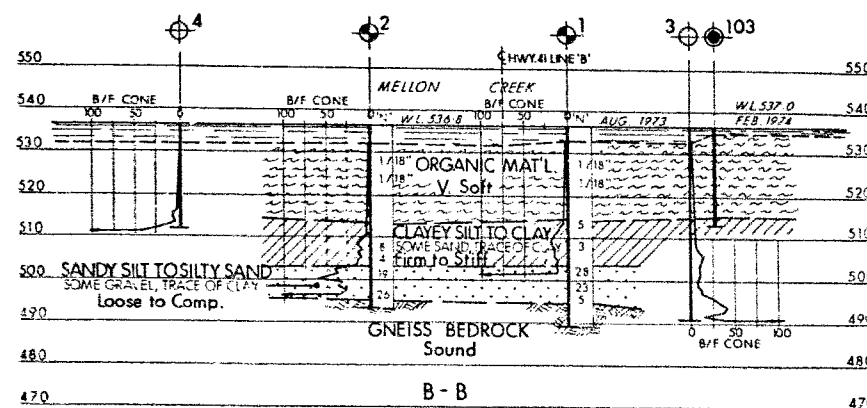
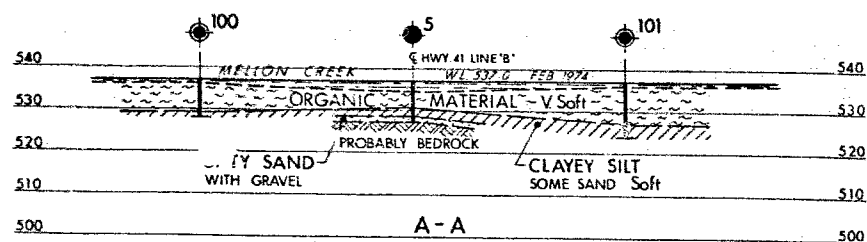
BOREHOLE TYPE Hand Auger Hole

COMPILED BY PP

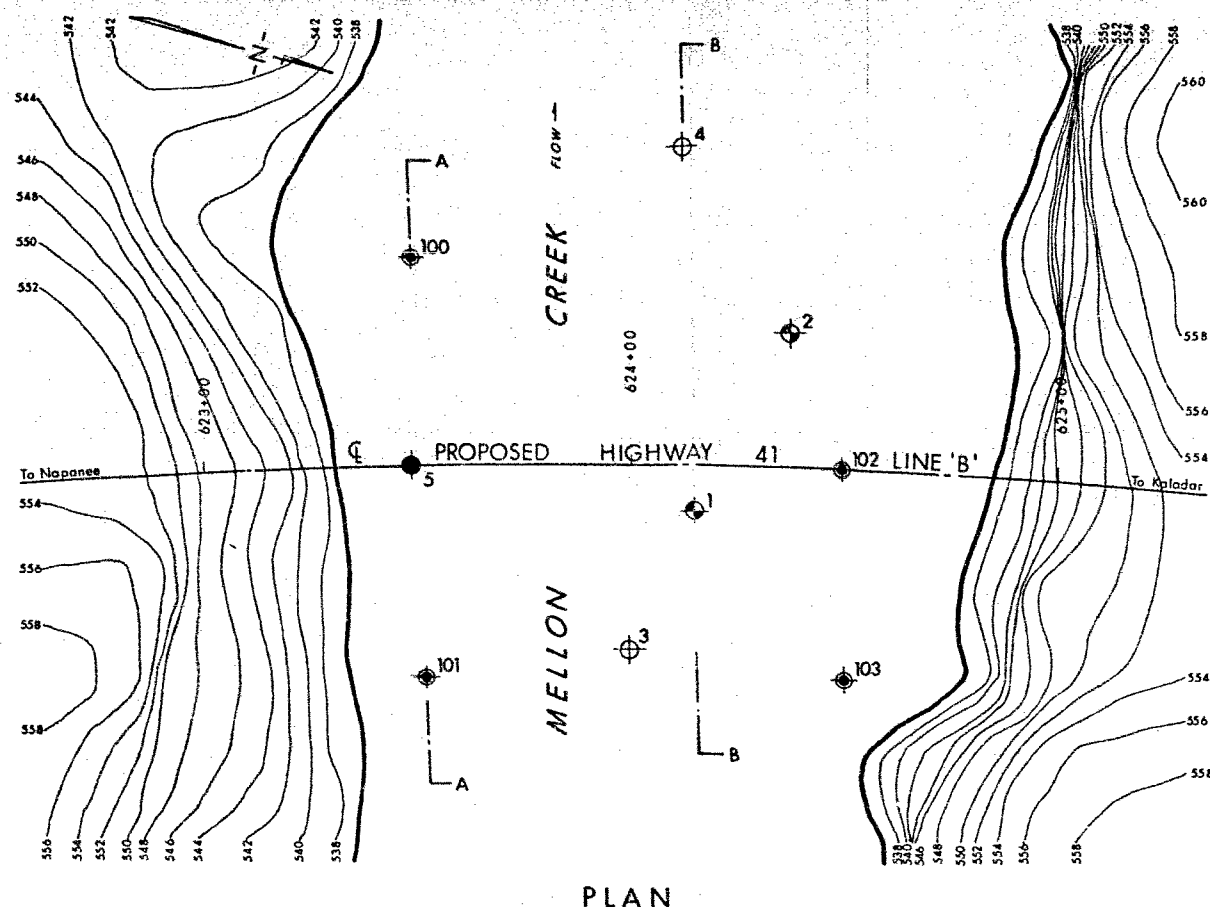
CHECKED BY SR

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT				BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT				W _L	W _P			
537.0	Water (Ice) Level						SHEAR STRENGTH P.S.F.				WATER CONTENT %				
0.0	Ground Level						O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE				W _P — W — W _L				
1.5	Organic Material					530									
						520									
515.0															
22.0	Clayey Silt														
513.0	(Refusal)														
24.0	End of Borehole					510									

OFFICE REPORT SOIL EXPLORATION

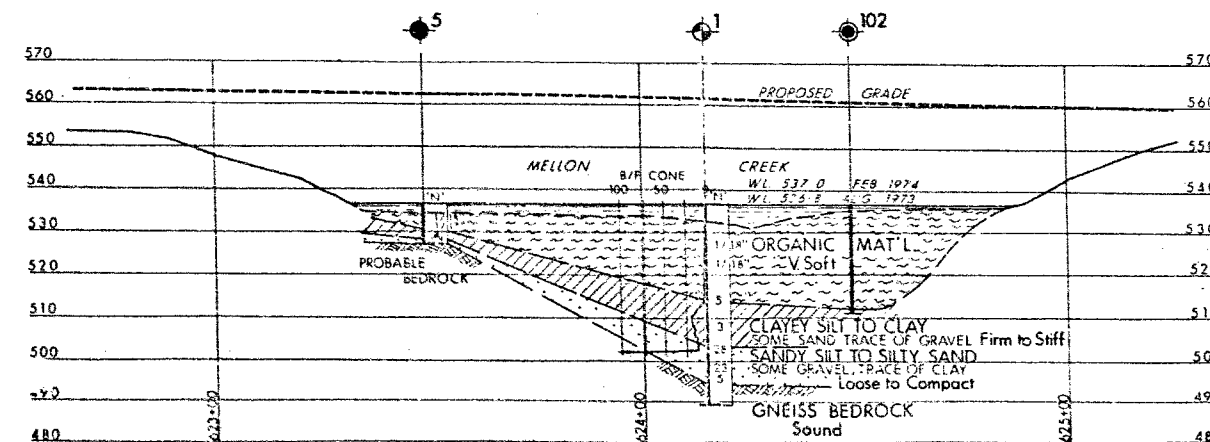


SECTIONS
20 10 0 SCALE 20 40 FT.



PLAN

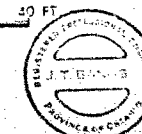
20 10 0 SCALE 20 40 FT.



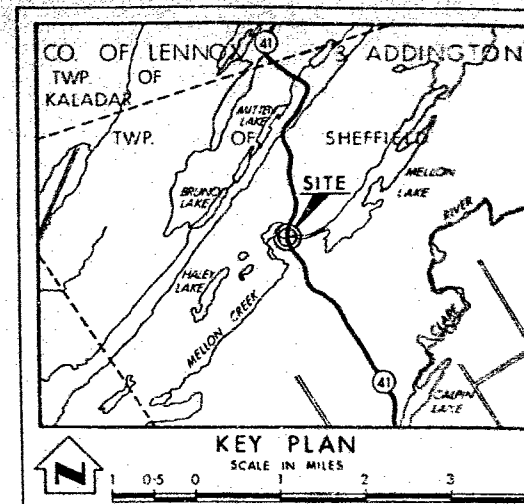
PROFILE

20 10 0 SCALE 20 40 FT.

NOTE FOR CONTRACT DOCUMENT:
The complete foundation investigation report for this structure may be examined at the Structural Office and Foundations Office, Downsview, and at the Kingston District Office.



REF NO E-5250-1



LEGEND

- Bore Hole
- ⊕ Cone Penetration Test
- ⊕ Bore Hole & Cone Test
- ⊕ Water Levels established at time of field investigation Aug. 73 & Feb. 74
- ⊕ Hand Auger Hole

NO.	ELEVATION	STATION	OFFSET
1	536.8	624+15	11' RT.
2	536.8	624+37	32' LT.
3	536.8	624+00	44' RT.
4	536.8	624+10	76' LT.
5	526.8	623+49	⊕
100	537.0	623+50	50' LT.
101	537.0	623+50	50' RT.
102	537.0	624+50	⊕
103	537.0	624+50	50' RT.

NOTE

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

REVISIONS	DATE	BY	DESCRIPTION
1	MARCH 74	S.R.	BORE HOLES 100, 101, 102, 103 & SECTION B-B ADDED

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS—ONTARIO
DESIGN SERVICES BRANCH—FOUNDATIONS OFFICE

MELLON CREEK

HIGHWAY NO. 41 LINE 'B' DIST NO. 8
CO. LENNOX & ADDINGTON
TWP. SHEFFIELD LOT 25 CON. 3 & 4

BORE HOLE LOCATIONS & SOIL STRATA

SUBMITTAL NO.	CHECKED BY	W.P. NO.	229-65	DRAWING NO.
DRAWN BY	CHECKED BY	W.P. NO.	73-11055	73-11055A
DATE	2 OCT 1973	SITE NO.		BRIDGE DRAWING NO.
APPROVED		DESIGNER'S SIGNATURE		

Mr. C.S. Grebski,
Structural Design Engineer,
Structural Office,
West Building, Downsview.
Mr. K. Bassi.

Soil Mechanics Section,
Geotechnical Office,
West Building, Downsview.

April 2nd, 1974.

RE: Mellon Creek Structure, Hwy. #41,
W.O. 73-11055 W.P. 229-65.

We have reviewed the Preliminary Bridge Drawing 17-224-P1 for the abovementioned structure and submit the following comments.

1. It was recommended in our Foundation Report that the footings be supported on end-bearing piles driven to bedrock. According to the preliminary Structural Drawing, spread footing type foundations are proposed, for the simply supported structure. The footings will be placed within the approach embankments consisting of rock fill at EL. 540, with a design load of 2.0 t.s.f. From the stability point of view, no major problems are anticipated.
2. All soft organic material within the plan limits of the embankments to be removed to its full depth and replaced with rock fill.
3. The underlying clayey silt subsoil will undergo settlements due to the weight of the superimposed embankment. It's estimated that the settlement which is recompressed in nature, will be in the order of 2.0 to 3.0 inches. To minimize the effect of the settlement on the structure it is recommended that the rock fill at the abutment locations be placed three months prior to the construction of abutments.
4. The granular backfill to the abutments should be in accordance with standard M.T.C. practices.

If you have any further queries, please contact our Office.

P. Payer,
Senior Engineer,
For: M. Devata,
Supervising Engineer.

PP/mj
c.c. T.C. Kingsland,
J.W. Reid,
E.R. Saint

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

FROM: Mr. [Name] 4/11/74
[Name]

DATE: April 30, 1974

IN REPLY TO

73-11-055

Kindly give me your comments on your latest comments.

[Handwritten signature]

[Handwritten text]

no comments -
M. Arvanta
April 16/74

FOUNDATIONS OFFICE

REVIEW OF DESIGN DRAWINGS:

W.P. ...229-65-01...
W.O. 73-11055.....

Foundations Report by:

J. Bangs... P. Payer...

Review of Design Drawings by:

V. Korb...

Design Drawing No.'s:

17-124-1
17-124-3

1. Does footing design comply with our report or subsequent memos? — *NO*
2. If answer to 1. is 'No', is present design acceptable? *Yes*
3. Has sufficient field work been done? — *yes*
4. Are estimated pile lengths shown on Drawings correct? If not, make a new list. —
5. If excavation of unstuitable soil is recommended, is this shown on drawings? — *yes*
6. Are approaches designed in accordance with our report? Check slopes and berm lengths. — *yes*
7. Do you anticipate any construction problems? i.e. dewatering, stability of temporary slopes or excavations. —
8. Summarize your comments; on separate sheet is necessary.

The submitted plan shows spread footing support. While our recommendations in the report or subsequent memo has been pile support.

O.K. SEE MEMO, DATED APRIL 2/74

Drawings Received *April 5... 1974*
Reviewed *April 16... 1974*

Signed *[Signature]*

7/12/74
APR 12/74
S.B.

Date May 15, 1974

APPROVED SCHEDULE FOR 1974 - 75

Page 5 of 9

PROGRAM OF CONSTRUCTION

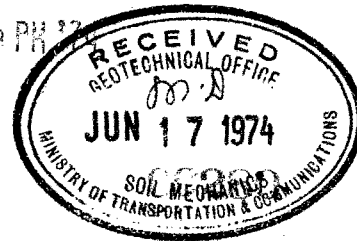
DISTRICT No. 8, KINGSTON

W.P. No.	HWY. No.	Type of work	LOCATION	Date of		Tend. open.	CONT. No.
				Advert.	Award.		
229-65 229-65-01	41	G. D. GB. & S. D. Culvt.	4.6 Mi. South of Hwy. 7 Kaladar S'ly 3.6 Mi. Incl. Mellon Creek Culvert.	Aug. 21/74	Sept. 25/74	26	

*Discussed with
Tom King and
and agreed that no need to be
present at this meeting.
June 25/74*

WP 229-65-01

JUN 14 4 12 PM '74



DOWN KINR 10 JUNE 14/74 4:07

K. G. BASSI, REG. STRUCTURAL DESIGN ENGINEER

CC :- M. STOYANOFF, STRUCTURAL CONTRACT ENGINEER

M.S. DEVATA, SUPVR. FOUNDATIONS ENGINEER

KINR CC :- T C KINGSLAND, STRUCTURAL PLANNING

RE: W.P. 229-65-00 & 01, HWY 41 FROM 4.6M. SOUTH OF KALADAR

S 'LY FOR 3.6M DISTRICT NO 8, KINGSTON

THE REGIONAL REVIEW MEETING FOR THE ABOVE NOTED PROJECT IS

PRESENTLY SCHEDULED FOR JUNE 27, 1974. AT 10:30 A M IN

REGIONAL BD.RM. NO 3. THIS PROJECT INCLUDES MELLOW CREEK BRIDGE,

SITE 17-124, AND A GABION COVER WALL, SITE 17R.

KEN SHEPHERD, SYSTEMS DESIGN

Mr. V.A. Snell,
District Engineer,
Kingston.

Construction Office,
Third Floor, Central Bldg.

Mr. J. Reid,
District Construction Engr.

June 18, 1975.

Contract 74-118, Mellon Creek Bridge,
Site 17-124, W.P. 229-65-01, Hwy. 41,
District 8.

This will confirm the conversation I had with L. Wannamaker,
Project Supervisor regarding the construction of footings and
abutments for the above structure.

It is desirable that the Contractor begin construction on the
south abutment first and complete it to the elevation of the
bearing seats. This would allow two to three weeks for
further settlement to take place in the north abutment fill
before removing the excess fill that was placed.

The fill excavated from the footing locations should be placed
on the west side of the approach fills in order to increase
the width of the approach fill.

All of the elevations shown on the contract drawings for the
south abutment should be raised 2" and the north abutment 3"
to allow for some further settlement to take place. At the
time of placing the deck it will probably be necessary to
adjust the screed elevations shown on the contract drawings.
It may also be necessary to adjust the grades on the structure
approaches when the structure is completed.

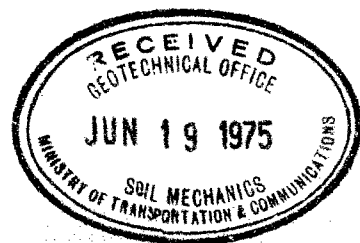
Would you please have your field staff monitor the elevations
of the footings when they are completed and also the distance
between them.

K. C. Carter

K.C. Carter,
Structural Inspection Engineer.

KCC/JC

c.c. B. Davis
M. Devata -
G. Martens





totten sims hubicki associates limited

G.L. TOTTEN B.Sc., P. Eng.
R.E. SIMS B.A.Sc., P. Eng.
J.M. HUBICKI B.A.Sc., P. Eng.
R.L. WINDOVER M.Sc., P. Eng.
P.C. EBERLEE B.A.Sc., P. Eng.

1500 HOPKINS STREET, L1N 2C3
WHITBY, ONTARIO, (416) 668-9363

MINUTES OF MEETING

RE: W.P. 229-65-00, 01, Highway 41 from 4.6
Miles South of Highway 7, Southerly 3.59
Miles

July 5th, 1974

A Regional Review Meeting was held at the Kingston Region Offices of the Ministry of Transportation and Communications on Thursday, June 27th at 10:30 a.m. for the purpose of reviewing the above project.

Present were:

Mr. T. Irving	Systems Design Office
Mr. K. Shepherd	Systems Design Office
Mr. J. Reid	Construction Engineer
Mr. J. Burleigh	Construction Supervisor
Mr. M. Owens	Structural Design Office
Mr. T. Kingsland	Structural Design Office
Mr. R. Kan	Structural Design Office
Mr. V. Snell	District Engineer
Mr. H. McKay	Engineering Audit Office
Mr. S. Chen	Materials and Testing Office
Mr. F. Belfry	Totten Sims Hubicki Associates Limited

Mr. Irving opened the meeting by outlining the project which provides for reconstruction of Highway 41 from 4.6 Miles south of Highway 7, southerly for 3.59 Miles to the north limit of W.P. 609-71-01. Included in the project is a 60 foot single span structure located at Mellon Creek and a gabion wall located 200 feet south of the Highway 41 and Highway 7 intersection.

A. Gabion Cover Wall

The Construction Office recommended that the earth and rock excavation required for the construction of the gabion wall be included in the Item, 'Gabion Cover Wall' and that the granular backfill to the wall be a separate item. The Consultant will revise the drawing and the specifications to include provision for 4 inches of topsoil and sod behind the wall.



B. Mellon Creek Structure

- 1. Mr. Kingsland recommended that the Contract have a fall award to facilitate prior placing of the bridge approach fills and that the final streambed elevation of 532.0± should be indicated on the plans.
- 2. Mr. Reid and Mr. Burleigh noted that muskeg removal at the structure should be a separate Item, "Rental of Swamp Excavation Equipment". Any payment for trucking of excess muskeg from the site will be paid on a force account basis. The Consultant will include the necessary provisions in the Contract.
- 3. The Consultant will show a typical section indicating the limits of muskeg excavation at the structure site.
- U.T.C. Staff
4. Mr. Irving noted that the Marine Construction Guidelines issued by the Ministry of the Environment will not be included in the specifications for this Contract.
5. Mr. Burleigh recommended that Construction Note No. 2 on Sheet No. 1 of the structure drawings be deleted. The Structural Office will review this recommendation.
6. The 6 inch diameter perforated C.S.P. will not be required at the structure. The Structural Office will modify the applicable standards.
7. Mr. Shepherd will review the need for a special provision for the time limit on transporting concrete.

C. Removal and Grading Plans

1. Mr. McKay requested that the project's location description read as follows; from 4.6 Miles south of Highway 7, southerly for 3.59 Miles.
2. Mr. Belfry noted that the boulder strewn areas, as indicated on the plans, are to be removed under the grubbing Item.
3. Mr. Shepherd indicated that the new fence at the O'Neil property, Station 560+00 to Station 580+00, is to be erected 60 feet offset from centreline. Any Ministry owned land beyond the 60 foot fence line shall be reverted back to the adjacent owner.
4. Mr. Burleigh stated that areas to receive frost treatment are to be indicated on the plans.
5. Mr. Chen requested that the excavation of the existing road from Station 563+00 to Station 564+00 be deleted from the drawings.
6. The Consultant will revise the transition point treatment at Station 599+00 and Station 604+50 to provide for four feet of rock fill across the full section.

C. Removal and Grading Plans (Cont'd)

- Mr. McKay pointed out an error Station 613+50, original ground profile.*
7. ~~Mr. McKay will check for accuracy the original ground profile at Station 613+50.~~ *Mr. McKay indicated that this project was scheduled for an original x-section check.*
 8. The Consultant will investigate relocating culvert numbers 17, 43, 53 and 57 to the edge of the muskeg deposit at each culvert site.
 9. Mr. Shepherd noted that the existing culvert at Mellon Creek will remain at the request of the Ministry of the Environment.
 10. The Consultant will delete the centreline alignment designation of the existing road in the vicinity of Mellon Creek.
 11. The Consultant will provide for excavation to bedrock in the vicinity of Station 633+50 to Station 634+00.
 12. The Consultant will check the depth of the right ditch from Station 679+00 to Station 682+00.
 13. Mr. Shepherd indicated that maintenance of the existing road, Station 726+00 to Station 730+00 right, will be the responsibility of the adjacent land owner.
 14. Mr. Burleigh requested that pavement widening be applied where the degree of curvature is 4 degrees or larger.
 15. The Consultant will indicate on the plans the areas where standard SD-4-71 (swamp treatment for culverts) applies.
 16. Mr. Chen will supply the Systems Design Office with information regarding the Soils Report recommendations and rock location at Station 715+50 to Station 719+50 and Station 734+50 to Station 735+50.
 17. Mr. Belfry noted that the low point of the ditch right of Station 728+50 will be drained by seepage through the rock fill.
 18. The Consultant will indicate the rock line on the sideroad and entrance profiles.
 19. At the request of Mr. Chen, the Consultant will review the areas where standard DD-414 (Benching of Earth Slopes) is to be applied.
 20. The Consultant will widen the rock cut near the Mellon Creek structure in order to provide the additional 12,000 cubic yards of rockfill required to balance the quantities. A typical section on the plans will be drawn to outline the area of the proposed widening.

D. Breakdown Sheets

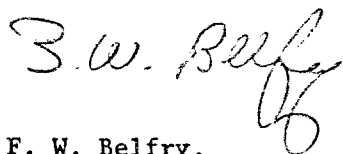
1. The Consultant will make the necessary changes to the breakdown sheets resulting from the above revisions.

E. Documents

1. Items #16, 30" C.S.P. culverts (Plain Galvanized) and Item #17, 30" C.S.P. culverts (Asphalt Coated and Asbestos Protected), will be combined into one item. Similarly Item Nos. 18 and 19 will be combined into one item.
2. Mr. Burleigh recommended that any topsoil required will be imported and that the earth stripping is not an acceptable fill material.
3. Mr. Irving noted that grouted rip-rap placed on ditch grades greater than 10 percent was acceptable.
4. Mr. Chen requested that the Consultant review the granular backfill to culvert quantity and indicate any granular backfill required for frost treatment on the "New Construction" profile.
5. The Consultant will revise the Proposed Special Provision for the Item "Remove Frame Shed and Fill Well".

The Meeting adjourned at 4:30 p.m.

Yours very truly,



F. W. Belfry,

FWB/an



Memorandum

To: Mr. V.A. Snell
District Engineer
Kingston

From: Soil Mechanics Section
Geotechnical Office
West Building, Downsview

Attention: Mr. J. Reid
District Construction Engineer

Date: July 11, 1975

Our File Ref.

In Reply to

Subject:

MELLON CREEK BRIDGE
Hwy. 41, Dist. #8 (Kingston)
Site 17-124, W.P. 229-65-01, Cont. 74-118

The above mentioned project is under construction and the rock fill approach embankments have been completed to the profile grade. At this site initially, a 4 ft. surcharge was recommended at the approaches in the area of the abutment foundations. In addition the fills including the surcharge were recommended to be left in place for as long a period as possible (up to 2 months) prior to the construction of the structure footings. The purpose of this was to minimize past construction settlements for the foundations of the proposed 60 ft. simply supported structure founded on rock fill embankments. The surcharge was not constructed and consequently the District is now concerned about the commencement of the construction of the abutment footings. The Soil Mechanics Section has recently been requested by District personnel and also by Mr. A.E. Mckim to review the site conditions and make necessary recommendations pertaining to the commencement of structure footing construction. In response to this, a site visit was made by the writer on June 17th, 1975. This memo summarizes the observations made at the site and subsequent meeting held at the Head Office including the various recommendations provided to Mr. L. Wannamaker, Project Supervisor with regard to footing construction.

The construction of the approach embankments consisting of rock fill material was completed to the profile grade around April 10th, 1975. The fills were constructed temporarily for an additional horizontal distance of 10 ft. in the longitudinal direction as shown on the enclosed drawing. It was ascertained at the site that all soft organic material was excavated to its full depth within the plan limits of the proposed embankments and replaced with rock fill material prior to the construction of the approaches as recommended in our Foundation Report W.O. 73-11055. A total of 14 settlement plates (7 plates at the north approach and 7 plates at the south approach) were installed when the fills were completed to the profile grade. Settlement observations were carried out by the District personnel every two weeks interval since April 10th, 1975. The maximum settlement observed is of the order of 0.4 ft. at the north approach and about 0.25 ft. at the south approach. It is further observed that the settlement appeared to be more severe at the south side of both the approaches.

A meeting was held on June 18th, 1975 at the Structural Office to discuss the foundation requirements for the project under construction. The meeting was attended by:

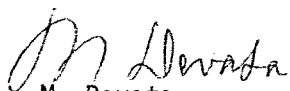
Messrs. C.S. Grebski
K.G. Bassi
A. K. Mckim
K.C. Carter
M. Devata

The Soil Mechanics Section presented all the data obtained at the site and also settlement observation shown on the enclosed drawing. From the Soil Mechanics point of view it would be desirable to construct the south abutment footing without any further delay since the settlements appeared to be less severe at this location. The south abutment construction should be completed to the bearing seats and by this sequence of construction an additional two to three weeks of time can be gained for the commencement of the north abutment footing construction. It is believed by that time some additional settlements can take place and consequently no excessive differential settlements are anticipated between the two abutment footings of the simply supported structure. The Construction Office indicated that this sequence of construction would be quite satisfactory and the contractor would not have any objections to proceed in this manner. The Structural Design Section was of the opinion that the grade be raised in order to accommodate any future settlements. At this meeting it was agreed that Mr. K.C. Carter will inform the District without any further delay outlining the following recommendations:

- 1) Sequence of construction of the south abutment footing and the north abutment footing should be carried out in a manner to attain at least 2 to 3 weeks extra time before the commencement of the north abutment footing.
- 2) The rock fill material excavated from the footing locations should be placed on the west side of the approaches in order to provide an additional berm at the waters edge.
- 3) All the elevations shown on the contract drawings for the south abutment should be raised 2 inches and the north abutment 3 inches to allow for future settlements to take place.
- 4) Settlement readings should be carried out periodically by District personnel and submitted to the Soil Mechanics Section.
- 5) Soil Mechanics Section should be contacted by the Project Supervisor prior to the commencement of the north abutment footing.

We have now received additional settlement data and the updated information will be submitted by this section after the completion of the structure and approaches at this site. It is believed that this data may be of some value to assess construction of future foundation projects of a similar nature.

c.c. A.E. Mckim
C.S. Grebski
K.G. Bassi
K.C. Carter
Files
Record Services


M. Devata
Supervising Engineer

MEMORANDUM FOR:

Mr. J. B. Wilkes,
Executive Director,
Design Division,
East Building,
1201 Wilson Avenue,
Downsview, Ontario.
M3M 1J8

Systems Design Branch,
East Building,
1201 Wilson Avenue,
Downsview, Ontario.
M3M 1J8

July 15, 1974.

Re: Meeting on Contract Documents Review
Boardrooms E-1 and E-2.

The following contract documents and drawings will be available for review on Friday,
July 19, 1974 at 9:00 a.m.:

No.	W.P.	Cont.	Hwy.	Dist.	Location	Type	Adv. Date
1.	128-71-01 (Gr.No.) 128-71-02		2	4	Inters. Improvement at Hwy. 52 & Trinity Rd. 0.5 mi. & at Lynden Rd. (Sunny Ridge Rd.) 3.0 mi. West of Hwy. 52, 0.1 mi.	G-D- GB & HMPav	Aug. 7/74
2*	229-65-00 (Gr.No.) 229-65-01		41	8	From 4.6 mi. South of Hwy. 7 S'ly for 3.64 mi.	G-D- GB & Str.	Aug. 21/74
3.	92-72-02 (Gr. No.) -01		22	2	Adelaide Creek Bridge & Approaches from 0.2 mi. West of Village of Adelaide E'ly 0.5 mi.	G-D- GB- HM & Str.	Aug. 21/74

M.D.

EJO/ACK/dp

* FILMS WILL BE SHOWN

A. G. Kelly, Manager,
Special Designs & Analysis Office.

Systems Design

A. G. Kelly
J. R. Wear
D. W. Fry
G. K. Hunter
V. A. McCullough
A. Kip
R. S. Pillar
A. Wittenberg
J. Percy
E. J. Willis (6)

Design Services

W. Melinyshyn
S. Cobden
M. Stoyanoff
C. Grebski
G. A. Wrong
D. Gunter
W. McFarlane
T. Stolarski
K. Mirza
M. Devata
K. Selby

Operations

L. R. Eadie
J. E. Callaghan
D. M. Hopper
R. Verscheure
A. Rutka
W. R. Bennett
Z. Katona

Others

A. Lennox
J. M. Crannic
A. E. Argue
J. MacDougall
B. J. Giroux
J. Parkinson

CONSULTANTS: Giffels & Assoc. Ltd. (at 9:00 a.m. for No. 1)
Totten, Sims, Hubicki (at 9:15 for No. 2)



Mr. V. Snell,
District Engineer,
Kingston, Ontario.

Structural Planning Office,
Kingston, Ontario.

Mr. J. Reid

8 January 1975.

W.P. 229-65-01, Site 17-124
Highway 41, District 8-Kingston

This is to confirm my telephone conversation today with Mr. J. A. Burleigh concerning the possibility of placing a surcharge at the approaches to the above-noted structure.

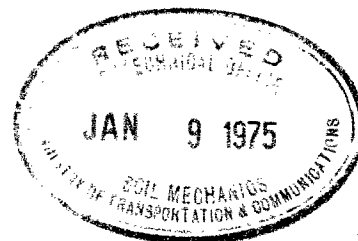
Mr. M. Devata informed me by telephone today that a surcharge of $3\frac{1}{2}' - 4'$ would be acceptable on the approach fills. A period of 3-6 months would take care of most of the predicted settlement as compared with 1-2 years under the normal height of approach fill as mentioned in the Foundation Report. If the surcharge period has to be reduced to 2 months before construction of the abutment foundations, the maximum height of 4 ft. should be used.

A surcharge height of more than 4 ft. is not acceptable because of possible instability problems due to the relatively weak nature of the underlying clay subsoil. As mentioned to Mr. Burleigh, the surcharge behind the abutments should be left in place as long as possible in order to achieve maximum settlement by the time the bridge deck is placed. If necessary, for access or other reasons, the surcharge height could be tapered from a maximum of 4 ft. at, say, 50 ft. behind the abutments, to 0 at the ends of the approaches.

T. C. Kingsland
Regional Structural Planning Engineer

TCK/hl

c.c. P. D. Billings
B. R. Davis
/M. Devata
C. S. Grebski - Att. K. Bossi



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T C KINGSLAND REG STRUC PLANNING ENGR

RE WP-229-65-01 WO-73-11055 MELON CREEK STRUCTURE DIST. 8.

THIS IS TO CONFIRM OUR DISCUSSION THAT A 4' FOOT SURCHARGE
WILL NOT CREATE STABILITY PROBLEMS AT THIS LOCATION.

P PAYER SR ENGR SOILS MECHANICS WEST BLDG

ROB

#

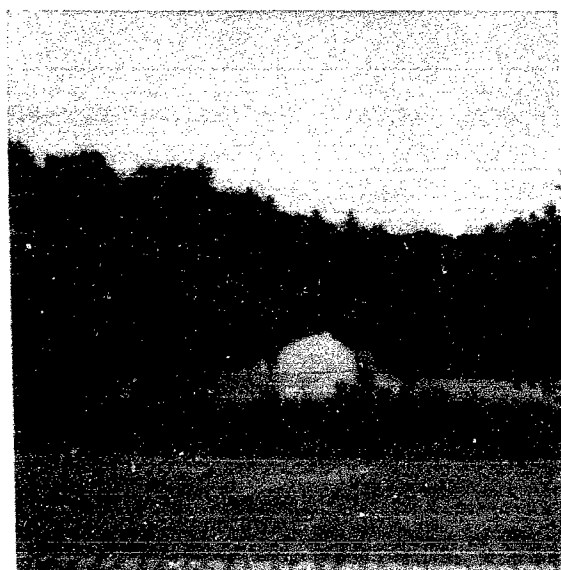
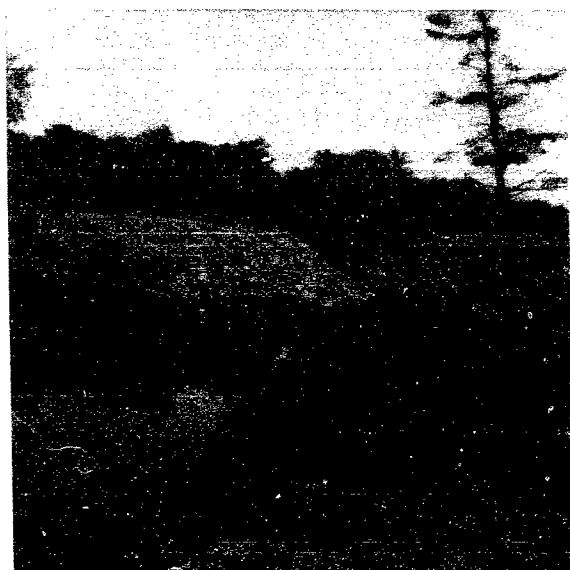
ACC TCI 380 01091058 ENR 384



June 17/75
m/d



Look 74. 116
Looking East - 500 ft. out - end of

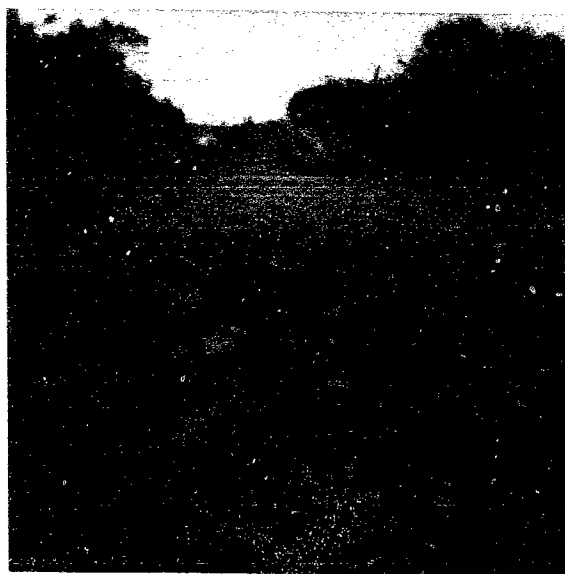


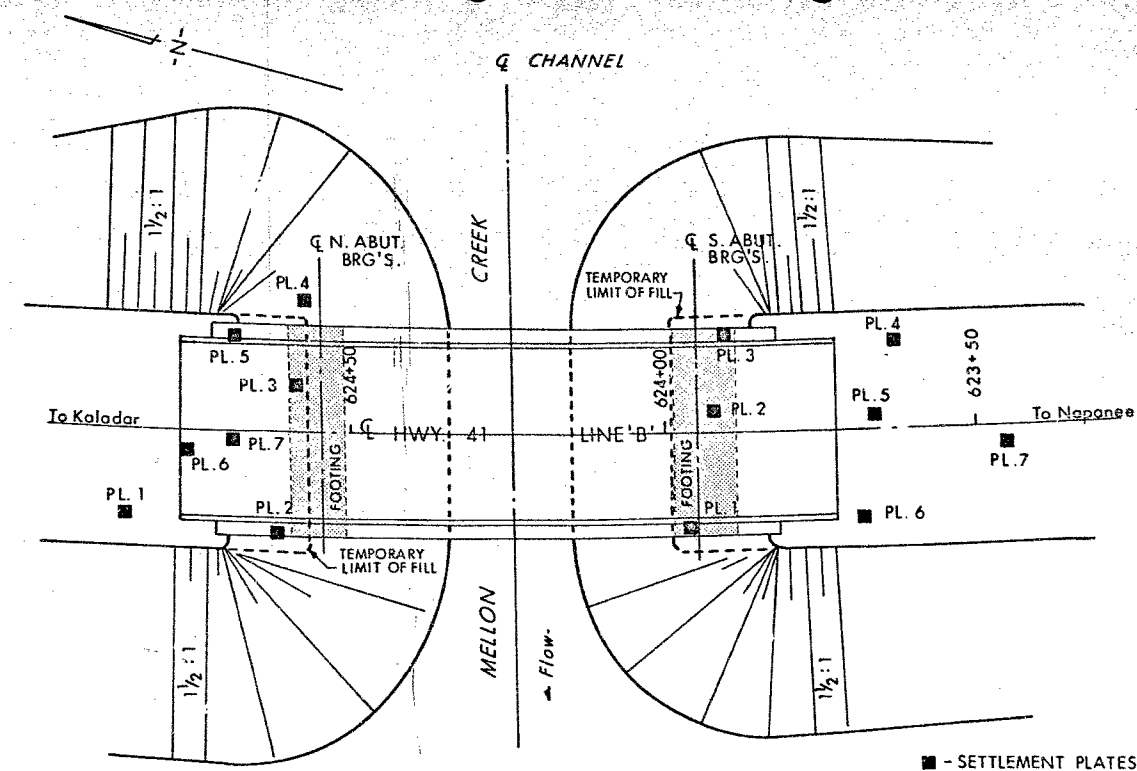
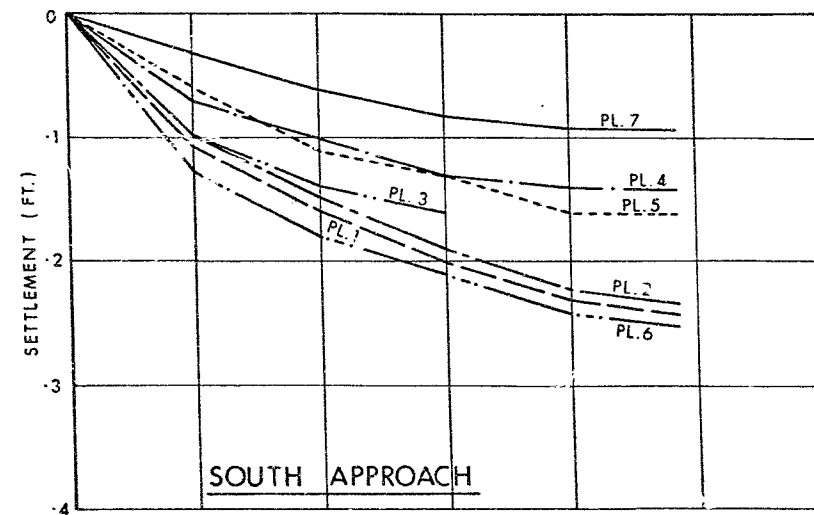
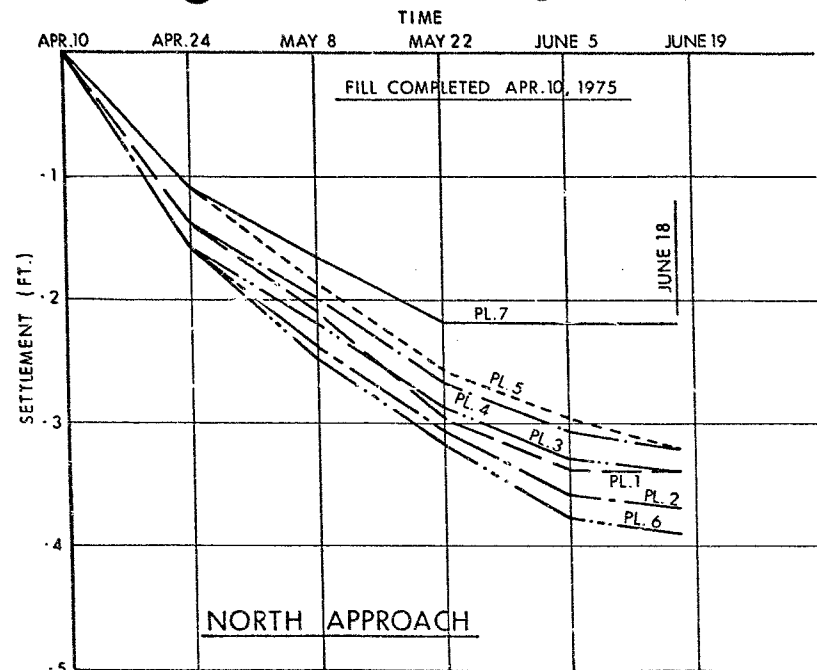
Look East - 500 ft. out - end of

June 17/78
m 3



June 17/78
m 3





SETTLEMENT PLATES - LOCATION PLAN
SCALE 1"=20'

NORTH APPROACH		
PLATE NO.	STATION	OFFSET
1	624+56	14' LT.
2	624+62	17' LT.
3	624+58	7' RT.
4	624+57	21' RT.
5	624+68	15' RT.
6	624+76	4' LT.
7	624+69	2' LT.

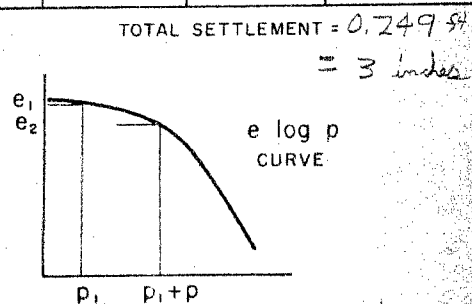
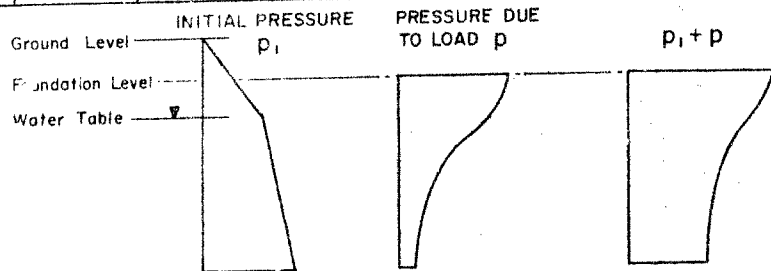
SOUTH APPROACH		
PLATE NO.	STATION	OFFSET
1	623+94	16' LT.
2	623+92	3' RT.
3	623+90	16' RT.
4	623+63	14' RT.
5	623+66	2' RT.
6	623+68	14' LT.
7	623+45	3' LT.

MELLON CREEK & HWY. 41

DATE	APPROVED	CHECKED	ORIGINATED	LAYER	DEPTH TO CENTRE OF LAYER Z	THICKNESS OF LAYER δh	INITIAL PRESSURE p_i	PRESSURE DUE TO LOAD p	TOTAL PRESSURE $\Delta p: p_i + p$	$e \log p$ CURVE	VOID RATIO AT p_i e_i	VOID RATIO AT $p_i + p$ e_z	$e_i - e_z$	$\frac{e_i - e_z}{1 + e_i}$	SETTLEMENT $\delta s = \frac{e_i - e_z}{1 + e_i} \delta h$
				1	1.5	3'	72 (0.25)	1764 (0.88)	0.92		1.562	1.522	0.040	0.016	10.48
				2	4.5	3'	216 (0.108)	1684 (0.34)	0.76		1.560	1.519	0.041	0.016	10.48
				3	7.5	3'	360 (0.180)	1612 (0.31)	0.99		1.558	1.515	0.043	0.017	10.51
				4	10.5	3'	505 (0.25)	1560 (0.73)	1.03		1.556	1.514	0.042	0.0165	10.51
				5	13.5	3'	650 (0.33)	1512 (0.75)	1.09		1.535	1.512	0.043	0.0171	10.51

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION
SETTLEMENT ANALYSIS
BY VOID RATIO METHOD

LOCATION
W. F. NO.
JOB NO.
SHEET NO.



VOID RATIO - PRESSURE CURVES

JOB NO. 73-11055

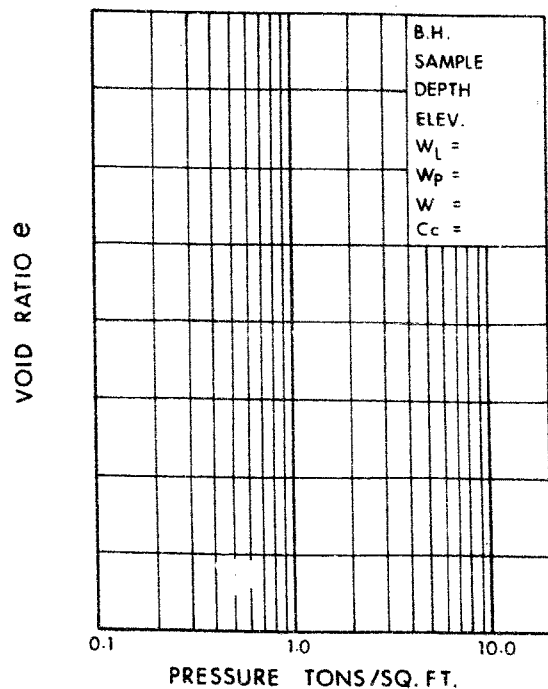
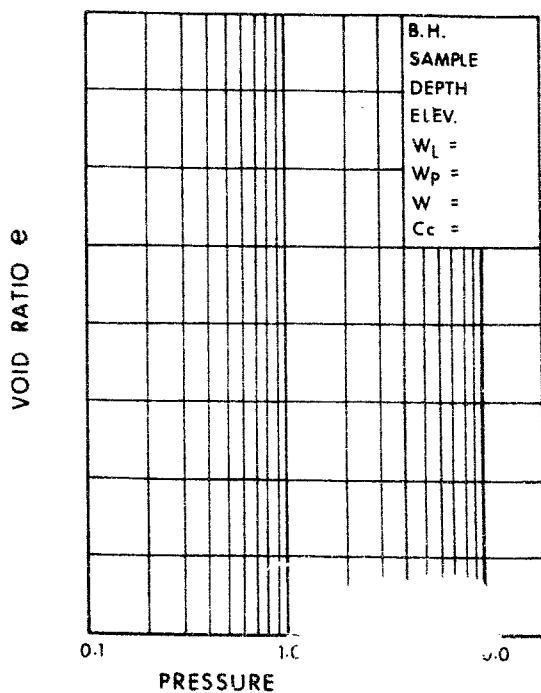
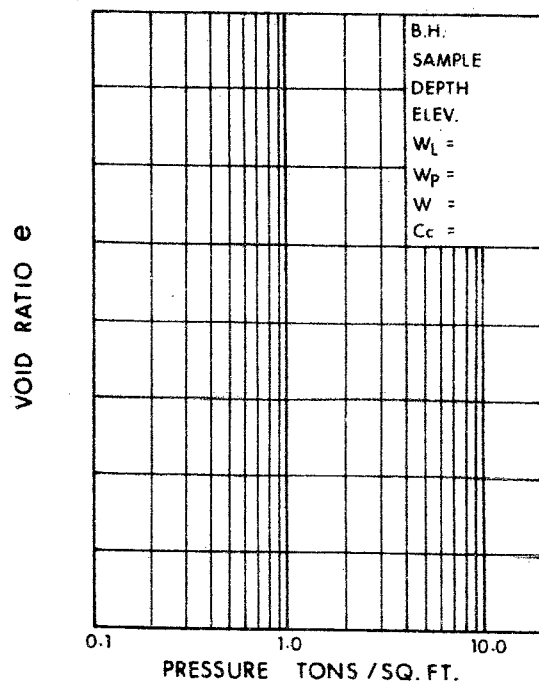
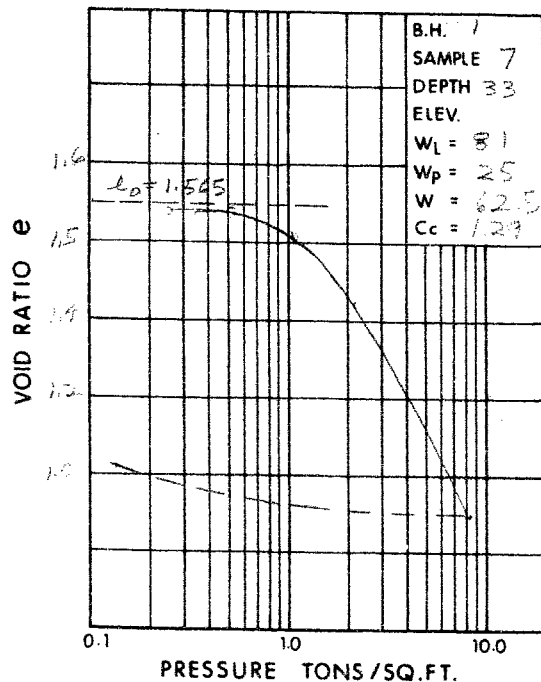


FIG. 5

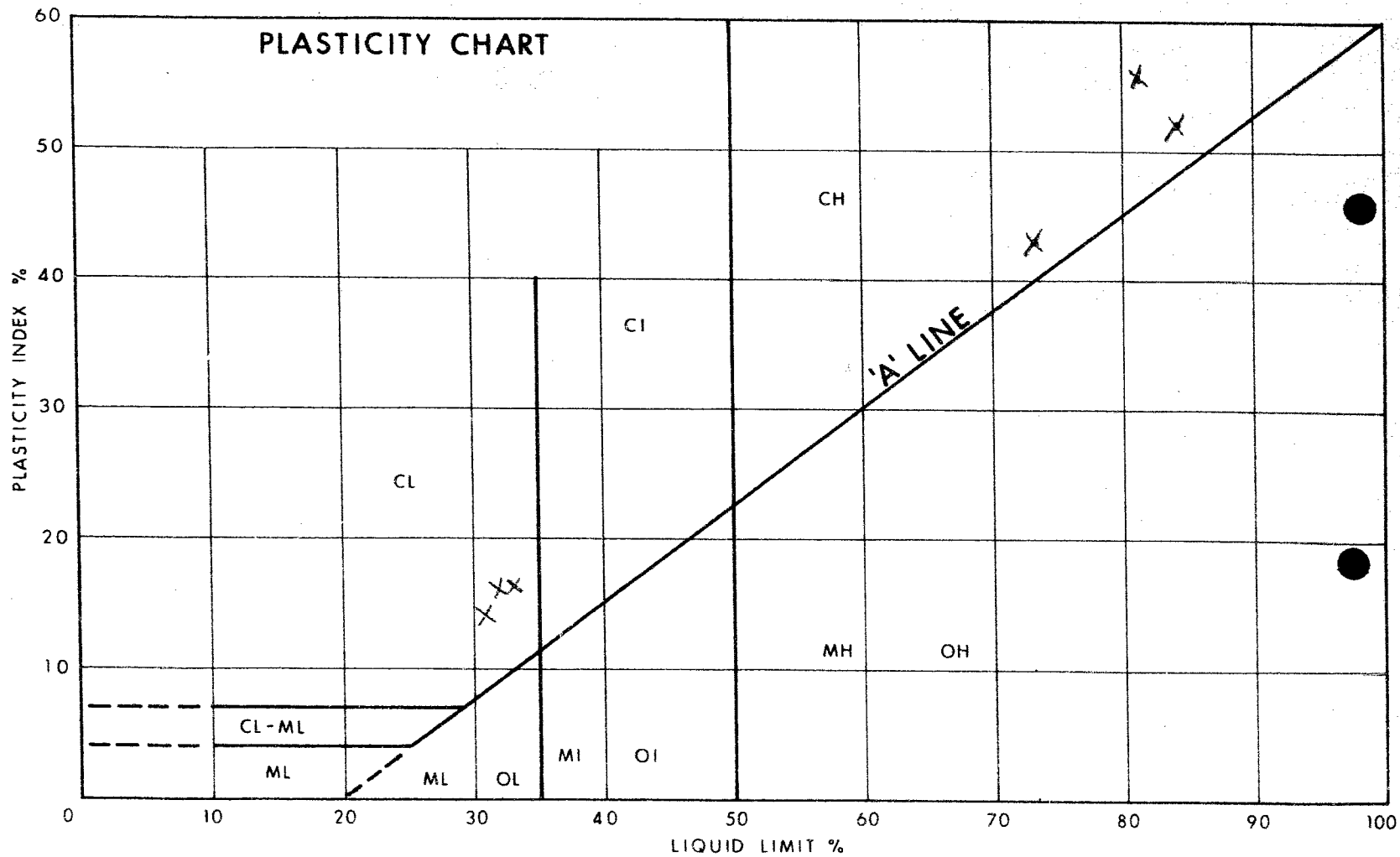


FIG. 1

W.O. 73-11055