DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40P4-37

DIST. 2 REGION SOUTHWESTERN

W.P. No. 92-72-01

CONT. No. 74-117

W. O. No. 73-11068

STR. SITE No. 19-191

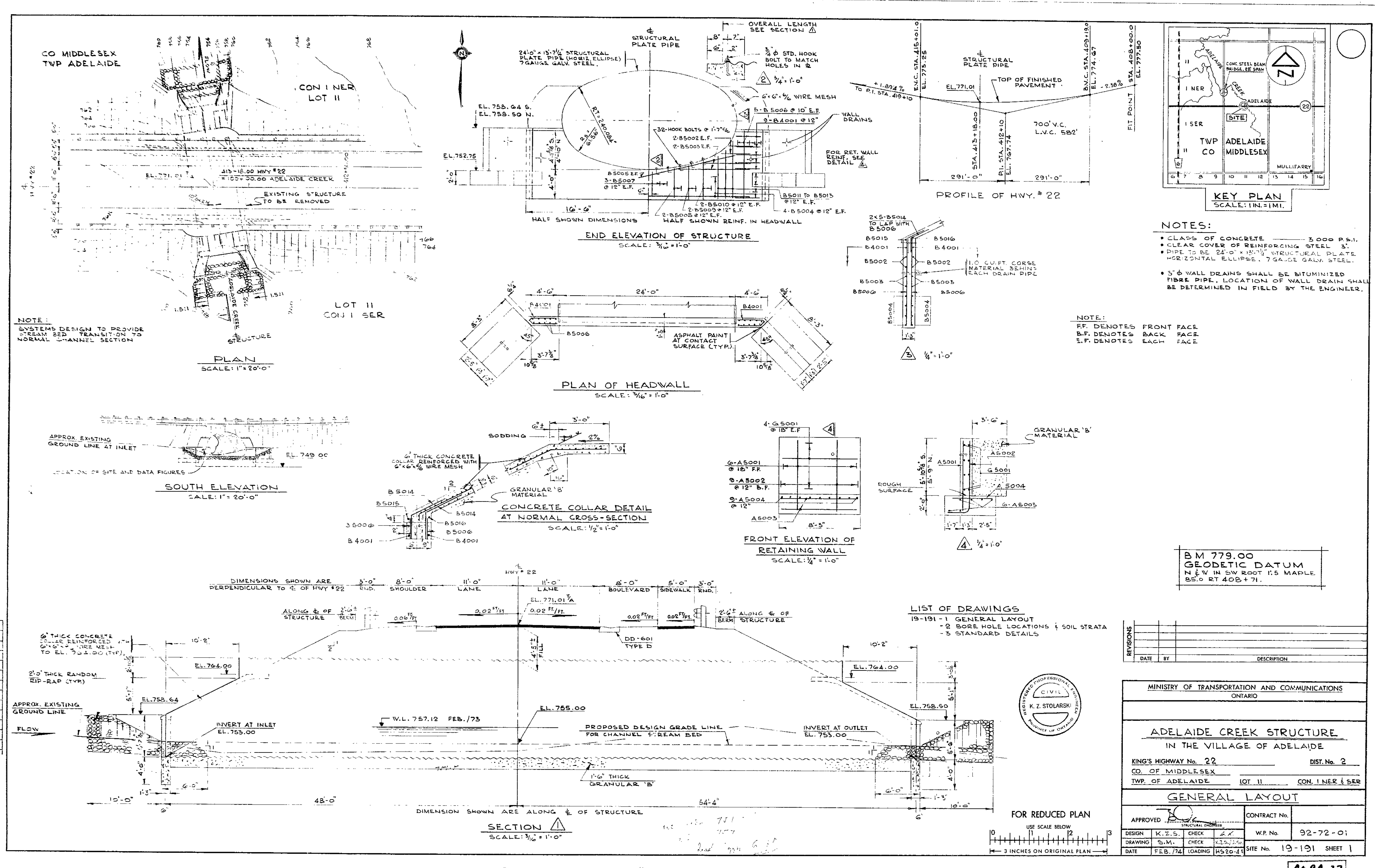
HWY. No. 22

LOCATION NEW CROSSING AT HWY. 22 + Adelaide Creek

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 2

REMARKS: DOCUMENTS TO BE UNFOLDED BEFORE MICROFILMED

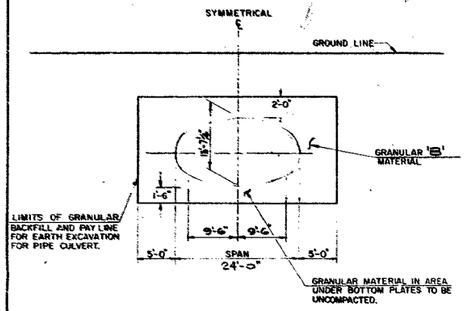
G.I.-30 SEPT. 1976



CO MIDDLESEX
TWP ADELAIDE
CON I NER
LOT II
EXISTING STRUCTURE TO BE REMOVED
LOT II
CON I SER
NOTE:
SYSTEMS DESIGN TO PROVIDE STREAM BED TRANSITION TO NORMAL CHANNEL SECTION
PLAN
SCALE: 1"=20'-0"
END ELEVATION OF STRUCTURE
SCALE: 3/16"=1'-0"
24'-0" x 15'-7½" STRUCTURAL PLATE PIPE (HORIZ. ELLIPSE) 7 GAUGE GALV. STEEL
HALF SHOWN DIMENSIONS
HALF SHOWN REINF. IN HEADWALL
PLAN OF HEADWALL
SCALE: 3/16"=1'-0"
ASPHALT PAINT AT CONTACT SURFACE (TYP.)
PROFILE OF HWY. # 22
TOP OF FINISHED PAVEMENT
700' V.C.
L.V.C. 582'
KEY PLAN
SCALE: 1 IN.=1 MI.
TWP ADELAIDE
CO MIDDLESEX
NOTES:
• CLASS OF CONCRETE — 3 000 P.S.I.
• CLEAR COVER OF REINFORCING STEEL 3".
• PIPE TO BE 24'-0" x 15'-7½" STRUCTURAL PLATE HORIZONTAL ELLIPSE, 7 GA. GALV. STEEL.
• 3"φ WALL DRAINS SHALL BE BITUMINIZED FIBRE PIPE. LOCATION OF WALL DRAIN SHALL BE DETERMINED IN FIELD BY THE ENGINEER.
NOTE:
F.F. DENOTES FRONT FACE
B.F. DENOTES BACK FACE
E.F. DENOTES EACH FACE
SOUTH ELEVATION
SCALE: 1"=20'-0"
APPROX. EXISTING GROUND LINE AT INLET
EL. 749.00
CONCRETE COLLAR DETAIL AT NORMAL CROSS-SECTION
SCALE: 1/2"=1'-0"
FRONT ELEVATION OF RETAINING WALL
SCALE: 1/4"=1'-0"
GRANULAR 'B' MATERIAL
BM 779.00
GEODETIC DATUM
N & W IN SW ROOT 1.5 MAPLE 85.0 RT 408+71.
DIMENSIONS SHOWN ARE PERPENDICULAR TO ℄ OF HWY #22
SHOULDER
LANE
LANE
BOULEVARD
SIDEWALK
LIST OF DRAWINGS
19-191-1 GENERAL LAYOUT
-2 BORE HOLE LOCATIONS & SOIL STRATA
-3 STANDARD DETAILS
APPROX. EXISTING GROUND LINE
FLOW
W.L. 757.12 FEB./73
PROPOSED DESIGN GRADE LINE FOR CHANNEL STREAM BED
INVERT AT INLET EL. 755.00
INVERT AT OUTLET EL. 753.00
1'-6" THICK GRANULAR 'B'
DIMENSION SHOWN ARE ALONG ℄ OF STRUCTURE
SECTION
SCALE: 3/16"=1'-0"
FOR REDUCED PLAN
USE SCALE BELOW
3 INCHES ON ORIGINAL PLAN
PRINT RECORD
No. FOR DATE
REVISIONS
DATE BY DESCRIPTION
K. Z. STOLARSKI
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO
ADELAIDE CREEK STRUCTURE
IN THE VILLAGE OF ADELAIDE
KING'S HIGHWAY No. 22
DIST. No. 2
CO. OF MIDDLESEX
TWP. OF ADELAIDE
LOT 11
CON. 1 NER & SER
GENERAL LAYOUT
APPROVED
CONTRACT No.
DESIGN K.Z.S.
DRAWING S.M.
DATE FEB./74
LOADING HS20-44
W.P. No. 92-72-01
SITE No. 19-191 SHEET 1
40P4-37

MINIMUM GRANULAR BACKFILL REQUIREMENT STRUCTURAL PLATE PIPE (HORIZ. ELLIPSE).

BD 33-2
REV. NOV./1971
(MODIFIED)

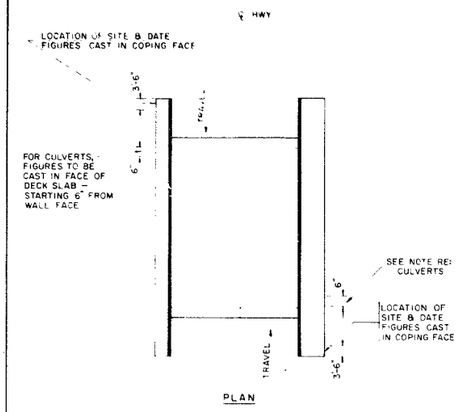


NOTES:

1. SECTION PERPENDICULAR TO ℄ OF SPAN.
2. LATERAL LIMITS – INSIDE FACE TO INSIDE FACE OF CONCRETE CUT-OFF WALLS.
3. FOR BACKFILLING AND COMPACTION REQUIREMENTS, SEE SPECIFICATIONS.
4. PAYLINE FOR EARTH EXCAVATION SHALL EXTEND VERTICALLY TO EXISTING GROUND LINE.
5. FOR PROTECTION AGAINST HEAVY CONSTRUCTION EQUIPMENT SEE DD-815.

LOCATION OF BRIDGE SITE & DATE FIGURES

BD 100-3
APRIL-1970



PLAN

NOTE:

SEE BD 100-2 FOR SIZE & SPACING OF FIGURES

PRINT RECORD

No.	FOR	DATE

FOR REDUCED PLAN

USE SCALE BELOW

0 1 2 3

3 INCHES ON ORIGINAL PLAN

REVISIONS

DATE	BY	DESCRIPTION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ONTARIO

ADELAIDE CREEK STRUCTURE
IN THE VILLAGE OF ADELAIDE

KING'S HIGHWAY No. 22 DIST. No. 2
CO. OF MIDDLESEX
TWP. OF ADELAIDE LOT 11 CON. I NER & SER

STANDARD DETAILS

APPROVED _____ STRUCTURAL ENGINEER

CONTRACT No.

W.P. No. 92-72-01

SITE No. 19-191 SHEET 3

DESIGN	STD.	CHECK	—
DRAWING	S.M.	CHECK	K.Z.S.
DATE	FEB. '74	LOADING	HS20-44

40P4-37

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

MEMORANDUM 73- 11068

TO: Mr. A. G. Stermac
Principal Foundation Engineer
Foundation Office
West Bldg., DOWNSVIEW

FROM: Structural Planning
Southwestern Region

Last week July 4th (4 weeks late)

ATTENTION:

DATE: July 27, 1973

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 92-72-01, Bridge Site 19-191
Adelaide Creek Bridge
At the Village of Adelaide
Hwy 22
District 2, London

Would you kindly arrange to have a foundation investigation conducted at the above site.

Enclosed please find two copies of the bridge site plan E-5344-1 with the probable footing locations marked in red. I have also enclosed a copy of the Field Reconnaissance Report.

Would you kindly comment on the suitability of this site for a single span concrete rigid frame type of structure, a twin cell concrete culvert and a structural plate steel pipe arch.

A. P. Watt
Regional Structural Planning Engineer

APW/pw
Enc.

c.c. A. Crowley
J. Forster
D. King
J. Anderson

MDD

SEP 26/73

$ 1500.00

73-11068

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: F. E. Loscombe,
Reg. Supt. of Eng. Surveys,
Southwestern Region.

FROM: G. Baun,
Field Supervisor.

ATTENTION: P. J. Rule

DATE: Sept. 4, 1973.

OUR FILE REF.

IN REPLY TO

SUBJECT:

RE: W.P. 92-72-01, Hwy. 22, Job #46-73,
Crossing at Adelaide Creek - locate boreholes,
Twp. Adelaide, Co. Middlesex,
District #2, London,
Party Chief - D. Luscombe.

Please be advised that the request received from A. Prakash, Foundation Section, Head Office, dated August 20, 1973, has been completed in the field August 27, 1973 and a copy of the field notes is available for filing in London documents.

Three boreholes were located by plus and offset at the Adelaide Creek site and an elevation obtained at ground level for same at each borehole.

A duplicate set of survey notes were given to the engineer at the site and the originals returned to this office.

Information being submitted is as follows:

1 field book containing borehole location and elevation

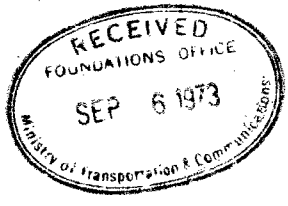
1 portion plan and profile at Adelaide Creek

G. Baun,
Field Supervisor.

GB/lj

c.c. A. Crowley
W.P. File
✓Head Office
Systems Design

Dec 1973


RECEIVED
FOUNDATIONS OFFICE
SEP 6 1973
Ministry of Transportation & Communications

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO
FOUNDATIONS OFFICE

VISUAL CLASSIFICATION SHEET

(1)

PROJECT 23-11068 SITE _____ BOREHOLE No. 1 GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION: LARGEST GRAIN SIZE	GRAIN SIZE DISTRIBUTION: SHAPE	PERCENTAGE: GRAVEL	PERCENTAGE: SAND	PERCENTAGE: SILT & CLAY	DRY STRENGTH	SHINE	DILATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
1A	3.7-4.2	.1"	S.A.	5	30	65	M	D.	S.	M.	O	grey			CLAYEY SILT, with sand, gravel, roots etc. , traces	CL
1B	4.2-4.5	1/2"	S.A.	3	90	7	S	D	Q	S.	E				SAND, fine uniform, trace gravel, trace silt and clay.	SM
2A	6.0-6.8 7.0-7.5	1/4"	S.A.	3	90	7	S	D	Q	S	E				SAND - fine with some coarse sizes. trace gravel, clay + silt.	SP.
2B	6.8-7.0	3/4"	S.A	40	50	10	S	D	Q	S	E				GRAVELLY SAND - trace silt and clay poorly graded fine to coarse	GP.
3	9.0-10.5	-	-	-	98	2	S	D	Q	S	E				SAND - fine uniform, trace silt	SM.
4	W.S.				100										Same as above	SM
5	15.0-16.5	-	-	-	98	2	S	D	Q	S	E				Same as above	SM.
6	20.0-21.5	"	"	-	98	2	S	D	Q	S	E				Same as above.	SM
7	25.0-26.5	-	-	-	98	2	S	D	Q	S	E				Same as above.	SM

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

REMARKS:-

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO
FOUNDATIONS OFFICE

VISUAL CLASSIFICATION SHEET

PROJECT 73-1168 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	3.0 4.5	1"	R.	10	10	75	H	D.	S.	H.	E.	Brown			CLAYEY SILT, some sand & gravel. (FILL)	CL
2	6.0 7.5	-	-	2	15	83	H	D	S	H	E	Brown			CLAYEY SILT. some sand, trace gravel (FILL)	CL
3A	9.0 10.0	1½"	S.A.	20	30	50	M	D	S.	M.	E	Brown			CLAYEY SILT, with sand, some gravel.	CL
3B	10.0 10.5	-	-	1	80	19	S	D	O	S	E	Brown			SAND - some silt.	SM
4	12.0 13.5	—	—	-	30	70	S	D	O	S	E	grey			SANDY SILT - trace to some clay.	SC
5	W.S.														Gravel SAND SILT clay.	
6	18.0 19.5	-	-	-	95	5	S	D	O	S	E				SAND - trace SILT	SM
7	21.0 23.0						ditto								same as above.	SM
8	26.0 27.5						ditto								same as above.	

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

REMARKS:-

9 MIST.

FF 22

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO
FOUNDATIONS OFFICE

VISUAL CLASSIFICATION SHEET

PROJECT _____ SITE _____ BOREHOLE No. _____ 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										
10	45.0 46.5	-	-	-	95	5	L	D	Q	S	E	grey.			SAND - fine uniform, trace silt	SW
11	55.0 56.5						ditto								same as above	SW
12	70.0 71.5						ditto								same as above.	
13	86.0 87.5	-	-	-	5	95	S	D	Q	S	E	grey.			SILT - trace sand & clay.	ML
14	90.0 91.5	-	-	-	5	95	M.	D	Q	S	E	grey.			SILT to CLAYEY SILT (or layers) trace sand grey.	CL-ML
15	100.0 101.0	-	-	-	-	100	H-M	D	N.	M	E	grey.			CLAYEY SILT to SILTY CLAY	CL CI
16	104.0 105.5	-	-	-	-	100	H-M	D	N	H M	E	grey.			SILTY CLAY	CI
17	120.0 121.5	-	-	-	-	100	H	D	N	H-M	E	grey.			CLAYEY SILT to SILTY CLAY	CL CI
18	140.0 141.5	-	-	-	10	90	H	D	N	M.	E	grey.			CLAYEY SILT - traces. Sand.	CL

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

REMARKS:-

19	161.5 162.8	-	B	10	B2	H	D	N	M	E	grey.				clayey silt - trace sand & gravel	CL

FF 22

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO
FOUNDATIONS OFFICE

(2)

VISUAL CLASSIFICATION SHEET

PROJECT 73-11068 SITE _____ BOREHOLE No. _____ GROUND ELEVATION _____

SAMPLE No.	DEPTH	GRAIN SIZE DISTRIBUTION: LARGEST GRAIN SIZE	SHAPE	PERCENTAGE: GRAVEL	SAND	SILT & CLAY	DRY STRENGTH	SHINE	DILATANCY	TOUGHNESS	ODOR	COLOUR	ACID TEST	CONSISTENCY OR UNDRAINED SHEAR STRENGTH	CLASSIFICATION WITH DESCRIPTION	SYMBOL
8	80.0 81.5	-	-	-	60	40	S	D.	Q	S.	E	grey.			SILTY SAND	SF
9	40.0 41.5	-	-	-	60	40	S	D	Q	S	E	grey			SILTY SAND.	SF
10	50.0 51.5	-	-	-	60	40	S	D	Q	S	E	grey			SILTY SAND - traces clay. traces of wood roots	SF
11	60.0 61.5	-	-	-	60 5	40 95	S M	D D	Q N	S H	E E	grey grey			SILTY SAND. - traces clay. CLAYEY SILT - traces sand.	SF CL
12	70.0 71.5	-	-	-	65	35	S	D	Q	S	E	grey			SILTY SAND. - trace clay	SF
13A	80.0 81.0	-	-	-	60	40	S	D	Q	S	E	grey			SILTY SAND - traces clay	SF
13B	81.0 81.5	-	-	-	95	95	S	D	Q	S	E	grey.			SILT - traces sand & clay	ML
14	90.0 91.5	-	-	-	3	97	M	D	S.	M.	E	grey.			CLAYEY SILT - one thin seam of silt or sand partings.	CL
15	100.0 101.5						dith								Same as above.	CL

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

REMARKS:-

16. dith Same as above. CL.

FF 22

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

Telephone: 248-3282.

September 17, 1973.

Canadian Longyear Limited,
35 Brydon Drive,
Rexdale, Ontario.

Dear Sirs:

This letter confirms our request of August 16, 1973, for the supply of a diamond drill together with all necessary equipment, as specified under the terms of our Contract Agreement, at Adelaide, Ontario, on August 23, 1973.

Mobilization will be from London, Ontario.

Our Project Number is W.O. 73-11068.

Yours truly,

A. G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

KGS/ao

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

Foundations Files
Documents

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. P. Watt, (2)
Regional Structural Planning Eng.,
Southwestern Region,
London, Ontario.

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

ATTENTION:

DATE: September 19, 1973.

OUR FILE REF.

IN REPLY TO SEP 26 1973

SUBJECT:

40P4-37
GEOCRES No.

FOUNDATION INVESTIGATION REPORT
For
Proposed New Crossing
At Hwy. 22 and Adelaide Creek
Village of Adelaide, County of Middlesex
District No. 2 (London)
W.O. 73-11068 --- W.P. 92-72-01

CONT 74-117

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.

A. G. Stermac,
PRINCIPAL FOUNDATIONS ENGINEER.

AGS/ao
Attch.
c.c. E. J. Orr
B. R. Davis
A. Rutka
A. Wittenberg
L. E. Walker
B. J. Giroux
J. R. Roy
G. A. Wrong
B. A. Singh

Foundations Files
Documents

TABLE OF CONTENTS

1. INTRODUCTION.

2. DESCRIPTION OF SITE AND GEOLOGY.

3. FIELD AND LABORATORY INVESTIGATIONS.

4. SUBSOIL CONDITIONS.

4.1) General.

4.2) Fill: Silty Clay, Some Sand and Gravel.

4.3) Fine Sand, Traces of Silt and Clay.

4.4) Silty Sand, Traces of Clay.

4.5) Silt, Traces of Sand and Clay,

4.6) Silty Clay, Traces of Sand and Gravel.

5. GROUNDWATER CONDITIONS.

6. DISCUSSION AND RECOMMENDATIONS.

6.1) General.

6.2) Single Span Concrete Rigid Frame Structure.

6.3) Twin Cell Concrete Culvert.

6.4) Structural Plate Steel Pipe Arch.

7. MISCELLANEOUS.

FOUNDATION INVESTIGATION REPORT
For
Proposed New Crossing
at Hwy. 22 and Adelaide Creek
Village of Adelaide, County of Middlesex
District No. 2 (London)
W.O. 73-11068 - W.P. 92-72-01

1. INTRODUCTION:

The Foundations Office received a request to perform a subsoil investigation for a proposed new structure at the crossing of Hwy. 22 at Adelaide Creek in the Village of Adelaide. The request was contained in a memo dated July 27, 1973, from Mr. A.P. Watt, Regional Structural Planning Engineer, Southwestern Region.

Subsequently, a field investigation was carried out by this office to determine the subsoil and groundwater conditions existing at the site of the proposed crossing. Presented in this report are the factual data from the investigation together with our recommendations pertaining to the foundations for the proposed structure.

2. DESCRIPTION OF SITE AND GEOLOGY:

The site of the crossing of Hwy. 22 and Adelaide Creek is in the Village of Adelaide some 23 miles west of London, along Hwy. 22.

Topographically, the land in the area is flat to gently undulating, and is used primarily as pasture land for dairy and beef cattle. At the proposed crossing site, Adelaide Creek is approximately 20 ft. wide and 2 - 5 ft. deep, having little if any noticeable flow. The creek occupies a flat bottomed depression; the result of past erosion, of from 200 - 250 ft. in width and 10 - 20 ft. in depth.

...2

Physiographically, the site is located in the region referred to as the Horseshoe Morraines, consisting of irregular, stony knobs and ridges, and gravel or swamp-floored valleys. The ridges are morraines of brown calcerous silty clay, while it is common to find alluvium of gravel, sand or silt in the valleys.

3. FIELD AND LABORATORY INVESTIGATIONS:

Two sampled boreholes and three dynamic cone penetration tests were carried out during the course of the field work. One borehole and two cone tests were put down at the east footing location while one borehole and an adjacent cone test were put down at the west footing location. The boreholes were advanced by means of washboring using a diamond drill adapted for soil sampling purposes. Disturbed samples were obtained using a 2-inch O.D. split spoon sampler driven according to the specifications for the Standard Penetration Test. Driving energy to advance the cones was 350ft.-lbs. per blow.

Samples were examined visually in the field and again in the laboratory. Tests were performed on selected samples to determine the following physical properties:

(1) Natural Moisture Content
(2) Atterberg Limits
(3) Grain-Size Distribution

The results of the field and laboratory tests are given on the Record of Borehole sheets and Figures 1 to 3, which are contained in the Appendix of this report.

The locations and elevations of the boreholes and cone tests, together with the estimated stratigraphical profile are given on Drawing No. 73-11068A, which is also contained in the Appendix to this report. The borehole locations and elevations were surveyed in the field by personnel from Southwestern Region Engineering Surveys Office, London.

...3

4. SUBSOIL CONDITIONS:

4.1) General:

Generally uniform subsoil conditions were found to prevail over the site area. At the location of Borehole No. 2, a 6 ft. thick deposit of approach fill was encountered. Underlying the fill material at Borehole No. 2 and from the ground level downward at Borehole No. 1, is an 18 to 28 ft. thick deposit of fine uniform sand. Underlying the fine sand layer is an approximately 56 ft. thick deposit of silty sand containing occasional seams of silt and clayey silt. Underlying the silty sand is a 5 to 8 ft. layer of silt which is in turn underlain by a deposit of silty clay with a minimum thickness of 75 ft. Both boreholes were terminated within this latter deposit.

The boundaries between the various soil types and layers are shown on the Record of Borehole Sheets which are contained in the Appendix of this report. The estimated stratigraphical profile shown on Drawing No. 73-11068A is based on this information.

From ground level downward, the various soil strata are described in some detail with regard to soil types and physical properties as follows:

4.2) Fill: Silty Clay, Some Sand and Gravel:

This material was encountered in Borehole No. 2 from the existing approach fill level (elevation 766) to approximately elevation 760. The material in the deposit consists of silty

clay with some sand and gravel. The natural moisture content of the material determined by laboratory tests is 12 - 13 %. The consistency of the deposit may be described as very stiff to hard.

4.3) Fine Sand, Traces of Silt and Clay:

This deposit varies from approximately 16 to 25 ft. in thickness, extending from immediately beneath the fill at Borehole No. 2 and from the ground level at Borehole No. 1, down to approximately elevations 742 and 734 respectively. The material in the deposit consists of fine uniform sand with traces of silt and clay. Occasional thin seams (1/16" - 1/8" thick) of decayed black organic material, chunks of decayed wood and occasional seams (1" - 10" thick) of silt and clayey silt were also discovered within this deposit.

The natural water content of the material in the deposit, determined by laboratory testing, varied between 20% and 27% with an average of 23%.

Standard Penetration Test 'N' values obtained within the stratum ranged from 3 to 31 blows/foot indicating the relative density of the material to be very loose to dense.

Grain size analyses performed on samples of this material indicate the following distributions and are plotted on Figure 1:

		Min.	Max.	Average
Gravel	%	0	0	0
Sand	%	76	98	89
Silt and Clay	%	2	24	11

4.4) Silty Sand, Traces of Clay:

An approximately 56 - 57 ft. thick deposit of this material was encountered in both boreholes and extends from immediately beneath the previously described sand layer down to elevations 678± and 686± in Boreholes No. 1 and 2 respectively.

...5

The material consists of silty sand with small amounts of clay. Occasional seams (1" to 5 ft. thick) of silt and clayey silt were also discovered within the main deposit.

The natural water content of the deposit varies from 19 to 24 % with an average value of 21%.

Standard Penetration Test 'N' values obtained within this stratum ranged between 10 and 127 blows/ft. with an average value for the deposit of 49 blows/ft. Based on these 'N' values, the relative density of the deposit appears to be compact to very dense, however no trend in relative density can be determined.

Grain size analyses performed on samples taken from this stratum give the following distributions and are plotted on Figure 2:

		Min.	Max.	Average
Gravel	%	0	0	0
Sand	%	52	69	58
Silt and Clay	%	31	48	42

4.5) Silt, Traces of Sand and Clay:

A relatively thin layer of this material (6 - 8 ft. thick) was encountered at each boring location beneath the silty sand.

The material in this stratum consists of silt with traces of sand and clay. It has a natural water content of approximately 22%.

The relative density of the layer based on 'N' values of 20 - 37 blows/foot, can be described as dense. A typical grain size envelope is plotted on Figure 2 in the Appendix.

4.6) Silty Clay, Traces of Sand and Gravel:

This material was encountered at elevations 673± and 678± in Boreholes No. 1 and 2 respectively. The material consists of silty clay with traces of sand and gravel and numerous thin

...6

laminations (1/16" - ¼") of silt. Both borings were terminated within this deposit which has a minimum thickness of 75 ft.

Physical properties of the material as determined from laboratory tests are as follows (Figure 3):

			Average
Natural Moisture Content	%	15 - 26	22
Liquid Limit	%	30 - 40	35
Plastic Limit	%	15 - 16	15

Based on obtained 'N' values of 15 to greater than 100 blows/foot, the consistency of the deposit may be described as very stiff to hard, the average undrained shear strength being in excess of 2,000 p.s.f.

5. GROUNDWATER CONDITIONS:

The following groundwater levels were established in the open boreholes at the time of the field investigation:

Borehole No.	Water Level Elevation
1	657.3
2	657.3

The elevation of the surface of the Creek was 657.3. Because of the granular nature of the upper subsoil deposits, the groundwater table will undergo seasonal variations.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to replace the existing single span concrete-steel structure at the crossing of Highway No. 22 and Adelaide Creek in the County of Middlesex. Several alternative proposals are being considered; namely, a 36 ft. span rigid frame concrete structure, a twin cell concrete culvert and a structural plate steel pipe arch. The Crossing is to be skewed at an angle of 10°. In addition, the existing grade (elevation 768) is to be raised some 3.5 ft. to elevation 771.5.

...7

As described in previous subsections, the subsoil prevailing at the site consists of a deposit of fine sand underlain by silty sand which in turn is underlain by a thin layer of silt overlying a deep deposit of silty clay. The groundwater level is 1 to 3 ft. below the general ground level (elevation 757±) in the immediate vicinity of the site and because of the permeable nature of the upper granular soils, will undergo seasonal variations.

This report contains our recommendations pertaining to the foundations for each of the above mentioned structural types.

6.2) Single Span Concrete Rigid Frame Structure:

One proposal under consideration is to replace the existing bridge with a concrete rigid frame type of structure. In view of the subsoil conditions of the site, it is recommended that the structure footings be supported on No. 14 timber piles driven into the compact to very dense silty sand stratum. Pile driving should be controlled in the field according to M.T.C. Standard BD 82-6 or BD 82-7. It is estimated that a design capacity of 20 tons/pile will be achieved if piles are driven to approximate elevation 710. The bases of the pile caps should be at approximately elevation 752 - 53 in order to provide a minimum of 4 ft. of cover for frost protection purposes. Since the bases of the pile caps will be below the groundwater level, and the prevailing fine grained subsoil is highly susceptible to boiling under conditions of unbalanced hydrostatic head, a dewatering scheme will be required in order that the pile caps can be poured in the dry.

If required, data pertaining to scour depth may be obtained from the Hydrology Office, Downsview.

Any settlements associated with this scheme will occur during construction and will be of a minor nature.

...8

6.3) Twin Cell Concrete Culvert:

As an alternative, the existing bridge may be replaced with a twin cell concrete culvert. In this case a Granular 'A' pad of minimum thickness of 18 inches should be provided beneath the culvert. Prior to placing the granular pad, any soft muck in the creek bed should be removed and replaced with a suitable granular material. In order to place the granular bed and culvert in the dry, a dewatering scheme will be required in order to prevent "boiling" and thus loss of foundation support.

6.4) Structural Plate Steel Pipe Arch:

As a further alternative, a flexible type of culvert may be chosen for the crossing. In this case, Granular 'B' material should be used for the bedding and backfill. The granular backfill should extend to a minimum height of 2 ft. above the pipe. A clay seal should be provided at the upstream end of the culvert and a suitable filter blanket (3 ft. thick) placed at the downstream end to prevent piping beneath through the backfill and bedding material.

As with the concrete culvert, a dewatering scheme will be required in order to excavate below the groundwater level and place the bedding in the dry.

7. MISCELLANEOUS:

The field work was carried out during the period from August 23 - 31, 1973, under the supervision of Mr. L.J. Hodge, Project Foundations Engineer, who also prepared this report. The entire project was under the supervision of Mr. K.G. Selby, Supervising Foundations Engineer, who also reviewed this report.

Equipment used was owned and operated by Canadian Longyear Limited, Toronto.

L.J. Hodge.

K.G. Selby, P. Eng.

LJH/zh,
September 19, 1973.

APPENDIX I

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 1

JOB 73-11068 — LOCATION Sta. 413 + 00 - 19' Lt & Hwy. 22 — ORIGINATED BY L.J.H.

W.P. 92-72-01 — BORING DATE Aug 23 - 27, 1973 — COMPILED BY L.J.H.

DATUM Geodetic — BOREHOLE TYPE Casing & Washboring; Cone Test — CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT
759.1	Ground Level				
0.0	Sand, fine, uniform Grey. Occasional seams of silt and clayey silt (1"-10" thick) Traces of organic material, bits of decayed wood. Loose to compact.		1	SS	7
			2	SS	13
			3	SS	2
			4	SS	5
			5	SS	9
			6	SS	14
731.1			7	SS	13
28.0	Silty sand. Traces of clay. Grey. Occasional seams of silt and clayey silt (2"-12" thick) Compact to very dense.		8	SS	18
			9	SS	13
			10	SS	127
			11	SS	27
			12	SS	95
678.1			13	SS	37
81.0	Silt, traces of sand and clay. Grey. Dense.				
673.1					
86.0	Silty clay. Grey. Stiff to hard. Occasional seams (1/16"-6") of light grey silt. Traces of gravel.		14	SS	15
			15	SS	103/6"

ELEV. SCALE: 750, 740, 730, 720, 710, 700, 690, 680, 670, 660

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100

SHEAR STRENGTH P.S.F. — ○ UNCONFINED — ● QUICK TRIAXIAL — + FIELD VANE — × LAB VANE

LIQUID LIMIT W_L — PLASTIC LIMIT W_P — WATER CONTENT W — W_P — W — W_L

WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS — GR. SA. SI. CL.

El. 757.3

37 39 25 5

0 95 (5)

0 98 (2)

0 95 (5)

0 82 (18)

0 59 (41)

0 52 (48)

0 52 (48)

0 1 88 11

0 1 51 48

15 20 10 5 % STRAIN AT FAILURE

Continued

OFFICE REPORT OF SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE Nº 1 Continued

JOB 73-11068 — LOCATION Sta. 413+00 - 19' Lt & Hwy. 22 — ORIGINATED BY L.J.H.

W.P. 92-72-01 — BORING DATE Aug 23 - 27, 1973 — COMPILED BY L.J.H.

DATUM Geodetic — BOREHOLE TYPE Casing & Washboring; Cone Test — CHECKED BY

SOIL PROFILE ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT; SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	LIQUID LIMIT W_L PLASTIC LIMIT W_P WATER CONTENT W — WATER CONTENT % 10 20 30	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
655.1										
104.0										
						650				
647.6			16	SS	18					0 0 57 43
111.5	End of Borehole.									
						640				

OFFICE REPORT OF SOIL EXPLORATION

20
15 ◇ 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE Nº 2

JOB 73-11068 — LOCATION Sta. 413 + 39 - 25.5' Rt. & Hwy. 22 — ORIGINATED BY L.J.H.

W.P. 92-72-01 — BORING DATE August 28 - 30, 1973 — COMPILED BY L.J.H.

DATUM Geodetic — BOREHOLE TYPE Casing & Washboring; Cone Test — CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	TYPE	BLOWS/FOOT
765.9	Ground Level				
0.0	Fill Brown clayey silt, with sand. Very stiff to hard.		1	SS	15
759.9			2	SS	3
6.0	Fine sand. Traces of silt & clay. Thin seams of black organic material. Occasional seams of silt and clayey silt (1"-10" thick). Loose to compact.		3	SS	15
			4	SS	10
			5	SS	6
			6	SS	31
741.9			7	SS	10
24.0	Silty sand. Traces of clay. Occasional seams of silt and clayey silt (1"-5" thick) Grey. Compact to very dense.		8	SS	10
			9	SS	71
			10	SS	46
			11	SS	89
			12	SS	36
685.9					
80.0	Silt, traces of clay and sand. Grey. Compact.		13	SS	20
677.9					
88.0	Silty clay. Traces of sand and gravel. Frequent thin seams (1/8"-½") silt. Grey. Hard.		14	SS	49
			15	SS	103/4"

ELEV. SCALE: 760, 750, 740, 730, 720, 710, 700, 690, 680, 670

DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100

SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE

LIQUID LIMIT w_L — PLASTIC LIMIT w_P — WATER CONTENT w — w_P w w_L

WATER CONTENT % 10 20 30

BULK DENSITY γ P.C.F.

REMARKS	GR. SA. SI. CL.
	0 29 45 26
▼El. 757.3	
	0 76 (24)
	0 19 (81)
	0 91 (9)
	0 69 (31)
	0 1 97 2

20 15 ◇ 5 10 % STRAIN AT FAILURE

Continued

OFFICE REPORT OF SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS – ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE Nº 2 Continued

JOB 73-11068 — LOCATION Sta. 413 + 39 - 25.5' Rt. & Hwy. 22 — ORIGINATED BY L.J.H.

W.P. 92-72-01 — BORING DATE August 28 - 30, 1973 — COMPILED BY L.J.H.

DATUM Geodetic — BOREHOLE TYPE Casing & Washboring; Cone Test — CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT; SHEAR STRENGTH P.S.F. (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	LIQUID LIMIT w_L, PLASTIC LIMIT w_P, WATER CONTENT w; WATER CONTENT % (10 20 30)	BULK DENSITY γ P.C.F.	REMARKS GR. SA. SI. CL.
661.9	Silt		16	SS	22	660				0 1 90 9
104.0	Silty clay. Traces of sand and gravel. Frequent thin seams of silt. Grey. Very stiff to hard.		17	SS	25	650				0 0 49 51
						640				
			18	SS	45	630				
						620				
						610				
603.1			19	SS	121/9"					12 43 25
162.8	End of Borehole.					600				

15 20 5 % STRAIN AT FAILURE

OFFICE REPORT SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS–ONTARIO

DESIGN SERVICES BRANCH — FOUNDATIONS OFFICE

RECORD OF BOREHOLE Nº 3

JOB 73-11068 — LOCATION Sta. 412 + 98 - 31' Rt. & Hwy. 22 — ORIGINATED BY L.J.H.

W.P. 92-72-01 — BORING DATE August 28, 1973 — COMPILED BY L.J.H.

DATUM Geodetic — BOREHOLE TYPE Cone Test — CHECKED BY

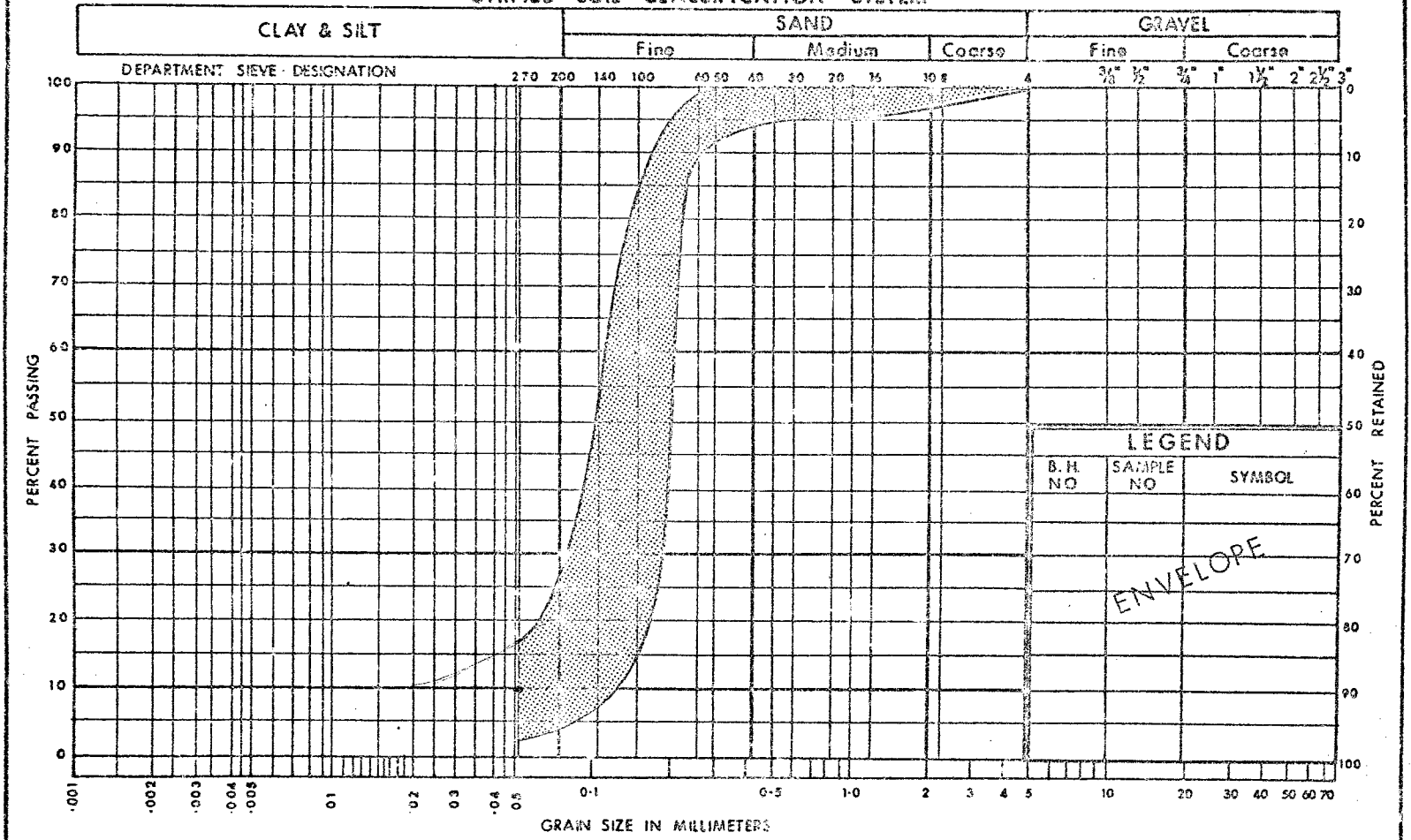
SOIL PROFILE ELEV. / DEPTH	DESCRIPTION	STRAT. PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/FOOT	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 — SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE	LIQUID LIMIT W_L — PLASTIC LIMIT W_P — WATER CONTENT W — W_P W W_L — WATER CONTENT %	BULK DENSITY γ P.C.F.	REMARKS GR.SA.SI.CL.
763.6	Ground Level									
0.0						760				
						750				
						740				
725.6						730				
38.0	End of Cone Test					720				

20
15 ◇ 5 % STRAIN AT FAILURE
10

OFFICE REPORT OF SOIL EXPLORATION

FORM CD - AT - 17
REV. AUG. 1971

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION

FINE · SAND

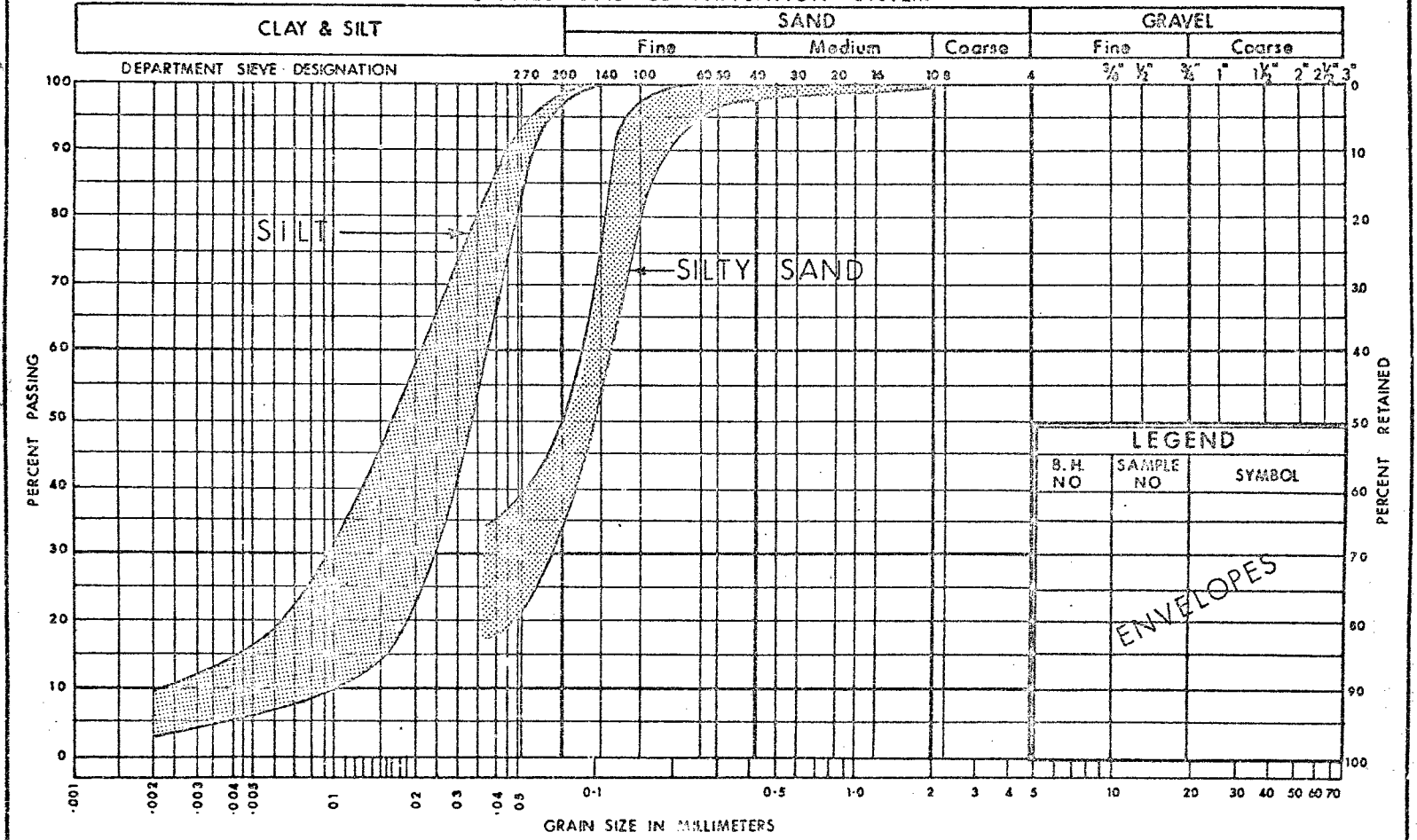
W.P. No. 92 - 72 - 01

JOB No. 73 - 11068

FIG. NO. 1

FORM OD-MT-17
REV. AUG. 1971

UNIFIED SOIL CLASSIFICATION SYSTEM



DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

DESIGN SERVICES BRANCH

GRAIN SIZE DISTRIBUTION

SILT

SILTY SAND

W.P. No. 92-72-01

JOB No. 73-11068

FIG. NO. 2

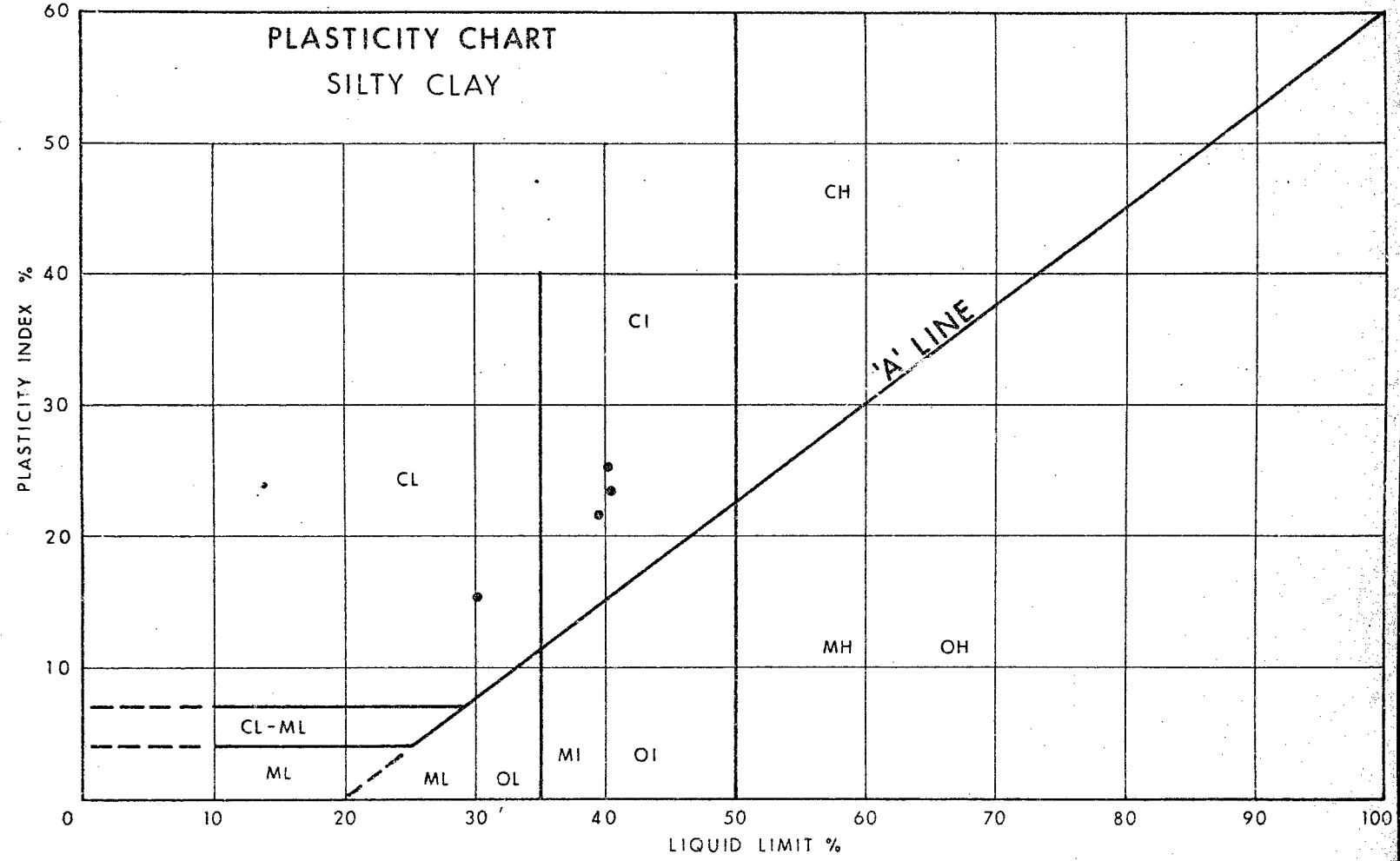


FIG. 3

W.O. 73-11068

FD-9a (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 : -

CONSISTENCY	c LB./SQ.FT.	DENSENESS	'N' BLOWS / FT.
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
CIU	CONSOLIDATED ISOTROPIC UNDRAINED TRIAXIAL	C	CONSOLIDATION
CID	" " DRAINED "	S	SENSITIVITY
CAU	" ANISOTROPIC UNDRAINED "		
CAD	" " DRAINED "		

FD-4-9b (Rev. Jan. 73)

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
	IN TERMS OF EFFECTIVE STRESS $\tau_f = c' + \sigma' \tan \phi'$
c_u	APPARENT COHESION
ϕ_u	APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION
	IN TERMS OF TOTAL STRESS $\tau_f = c_u + \sigma \tan \phi$
μ	COEFFICIENT OF FRICTION
S_t	SENSITIVITY

GENERAL

π	= 3·1416
e	BASE OF NATURAL LOGARITHMS 2·7183
$\log_e \sigma$ OR $\ln \sigma$	NATURAL LOGARITHM OF σ
$\log_{10} \sigma$ OR $\log \sigma$	LOGARITHM OF σ 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 (YOUNGS MODULUS)
G	MODULUS OF SHEAR DEFORMATION
K	MODULUS OF COMPRESSIBILITY
η	COEFFICIENT OF VISCOSITY

EARTH PRESSURE

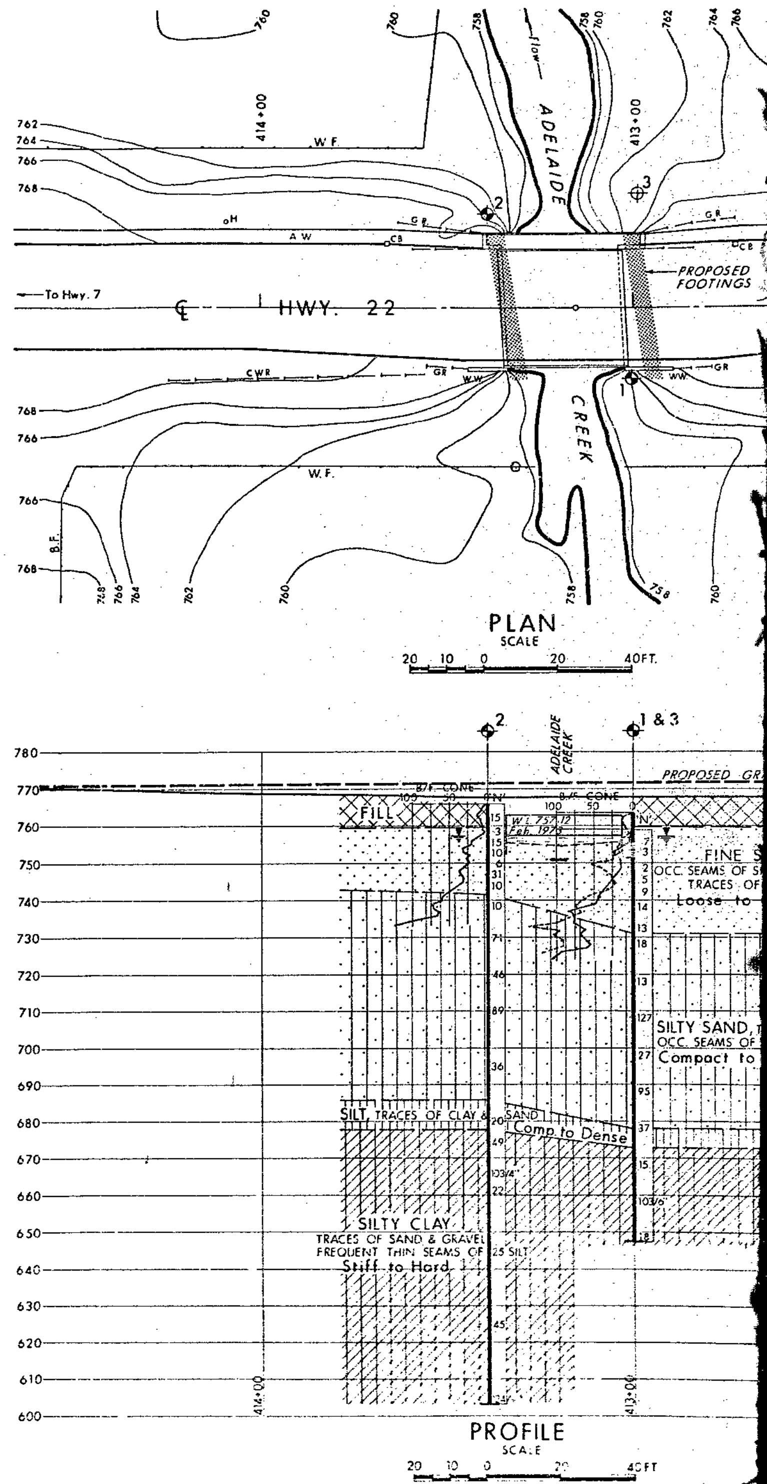
d	DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE
δ	ANGLE OF WALL FRICTION
K	DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS
K_o	COEFFICIENT OF EARTH PRESSURE AT REST

FOUNDATIONS

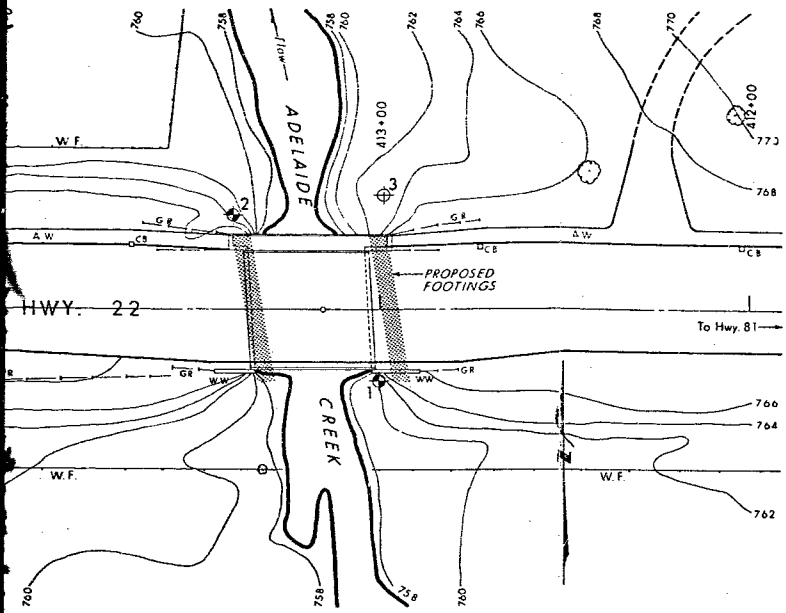
B	BREADTH OF FOUNDATION
L	LENGTH OF FOUNDATION
D	DEPTH OF FOUNDATION BENEATH GROUND
N	DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY
k_s	MODULUS OF SUBGRADE REACTION

SLOPES

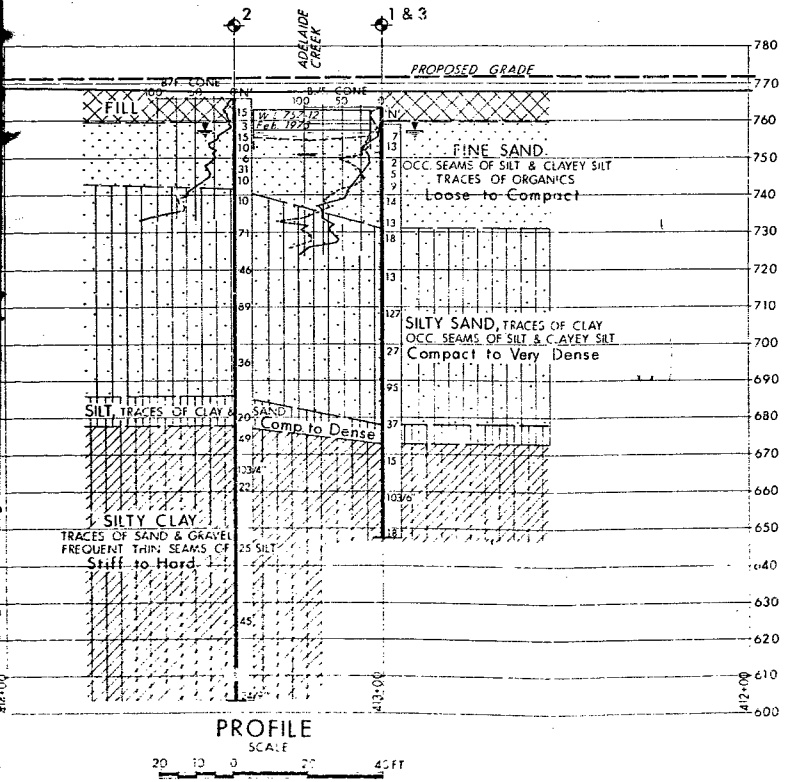
H	VERTICAL HEIGHT OF SLOPE
D	DEPTH BELOW TOE OF SLOPE TO HARD STRATUM
β	ANGLE OF SLOPE TO HORIZONTAL



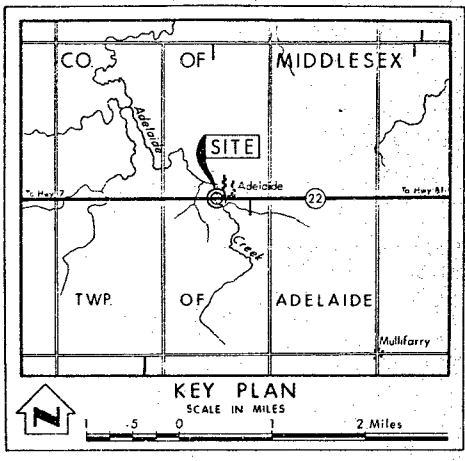
ADELAIDE CREEK
flow
414+00
413+00
W.F.
A W
G R
CB
CWR
WW
B.F.
To Hwy. 7
℄ HWY. 22
PROPOSED FOOTINGS
762
764
766
768
760
758
PLAN
SCALE
20 10 0 20 40FT.
2
1 & 3
PROPOSED GR
B/F CONE
FILL
W.L. 757.12 Feb. 1979
FINE S
OCC. SEAMS OF S
TRACES OF
Loose to
SILTY SAND,
OCC. SEAMS OF
Compact to
SILT, TRACES OF CLAY & SAND
Comp. to Dense
SILTY CLAY
TRACES OF SAND & GRAVEL
FREQUENT THIN SEAMS OF SILT
Stiff to Hard
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
620
610
600
PROFILE
SCALE
20 10 0 20 40FT



PLAN
SCALE
20 10 0 20 40FT.



PROFILE
SCALE
20 10 0 20 40FT



LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation. Aug. 1973

NO.	ELEVATION	STATION	OFFSET
1	759.1	413+00	19' LT.
2	765.9	413+39	25.5' RT.
3	763.6	412+98	31' RT.

CONTRACT DOCUMENT NOTE
The complete soil investigation report for this structure may be examined at the Structural and Foundations Office, Downsview, and at the London District Office.

— 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

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

ADELAIDE CREEK

HIGHWAY NO 22 DIST. NO. 2
CO. MIDDLESEX
TWP. ADELAIDE LOT 11 CON I NER & SER

BORE HOLE LOCATIONS & SOIL STRATA

SUBMD J H	CHECKED	WP NO 92-72-01	DRAWING NO 73-11068A
DRAWN	CHECKED	WO NO 73-11068	
DATE Sept 19 1973		SITE NO	BRIDGE DRAWING NO
APPROVED PRINCIPAL FOUNDATION ENGINEER		CONT NO	

REF NO E-5344-1

BAD-TRACC 300-6-72

Ken Marty 2/02

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A.P. Watt
Regional Str. Plan. Engineer
Southwestern Region

FROM: Structural Office
West Bldg.
Downsview

ATTENTION:

DATE: January 31, 1974

OUR FILE REF.

IN REPLY TO

SUBJECT: Adelaide Creek Structure
in the Village of Adelaide
W.P. 92-72-01, Site 19-191
Hwy. #22, District 2

73-11-068

Attached herewith are prints of the Preliminary Bridge Plan Drawing D-19-191-P1 for the above-mentioned structure.

The estimated cost of the proposed structure is $58,000.00 which includes tender, materials, engineering, and sundry construction.

Any comments or revisions you may have should be submitted within four weeks.

We may change the shape and guage of this pipe; however, this will not effect the general scheme as shown on the plan.

C.S. Grebski
Structural Design Engineer

CSG:AMF

Attached.

c.c. B. Davis
W. Birch
A. McKim
W. Stoyanoff
W. McFarlane
A. Rutka
J. Anderson
A. Crowley
J. Harris

[redacted] [redacted] 10 Folders.

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

To: Mr. A.P. Watt
Reg. Structural Planning Eng.
Southwestern Region
London

From: Structural Office
West Bldg.
Downsview

Attention:

Date: February 12th, 1974

Our File Ref.

In reply to

Subject: Adelaide Creek Structure
in the village of Adelaide
W.P. 92-72-01, Site 19-191
Hwy. Hwy. #22, District 2

Attached herewith are prints of the revised Preliminary Bridge Plan Drawing D-19-191-Ps for the above-mentioned structure.

The estimated revised cost of the proposed structure is $60,000.00 which includes tender, materials, engineering, and sundry construction.

We have sent a copy of the Preliminary Plan to the Hydrology Office for their comments.

C S. Crebski
Structural Design Engineer

CSG:AMF

Attached

c.c. B. Davis
W. Birch
A. McKim
W. McFarlane
M. Stoyanoff
A. Rutka
J. Anderson
A. Crowley
J. Harris

FOUNDATIONS OFFICE

REVIEW OF DESIGN DRAWINGS: W.P. 92-72-01
W.O. 73-11068

Foundation Report By: L.J. Hodges
Review of Design Drawings By: P Horgmagi
Design Drawing No.'s: 17-101 Sh. P1

1. Does footing design comply with our report or subsequent memos? No

2. If answer to 1. is No, is present design acceptable?

3. Has sufficient field work been done? Yes

4. Are estimated pile lengths shown on Drawings correct? If not, make a new list. N/A.

5. If excavation of unsuitable soil is recommended, is this shown on Drawings?

6. Are approaches designed in accordance with our report? Check slopes and berm lengths. N/A.

7. Do you ~~anticipate~~ any construction problems? i.e., dewatering, stability of temporary slopes or ~~excavations~~.

8. Summarize your comments; on separate sheet if necessary.

Wing walls & head walls may settle excessively due to very loose nature of soil at founding elev.

Drawings Rece'v Feb. 11 19 74
Reviewed Feb 13 19 74

Signed P Horgmagi

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. A. Rutka
Mgr.
Geotechnical Office
West Bldg.

FROM: Structural Office
West Bldg.

ATTENTION:

DATE: March 4/74

OUR FILE REF.

IN REPLY TO

SUBJECT: Adelaide Creek Structure
In The Village of Adelaide
W.P. 92-72-01, Site 19-191
Hwy. #22, District #2

73-11-068

Attached herewith we are submitting the final bridge drawings which show the foundation design for this structure.

Kindly give us your comments at your earliest convenience.

C.S. Grebski
Structural Design Engineer

CSG:AMF

Attached

c.c. Foundation Office

No comments

APr
April 8/74

Finalized
Approved
[illegible] 9/74

FF-78
FF-A-5

FOUNDATIONS OFFICE

REVIEW OF DESIGN DRAWINGS: W.P. 92-72-01
W.O. 73-11068

Foundation Report By: L. J. HODGE
Review of Design Drawings By: A. PRAKASH
Design Drawing No.'s: 19-191 SHEETS 1 & 3

1. Does footing design comply with our report or subsequent memos? yes
2. If answer to 1. is No, is present design acceptable?
3. Has sufficient field work been done? Yes
4. Are estimated pile lengths shown on Drawings correct? If not, make a new list. N/A
5. If excavation of unsuitable soil is recommended, is this shown on Drawings? N/A
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. No.
8. Summarize your comments; on separate sheet if necessary.

The final proposal consists of 24'-0" x 13'-7¼" S.P.P. (Horizontal Ellipse).

Drawings Received March 15 19 74
Reviewed April 8 19 74

Signed A Prakash

Date May 15, 1974

APPROVED SCHEDULE FOR 1974 – 75

PROGRAM OF CONSTRUCTION

DISTRICT No. 2, LONDON

W.P. No.	HWY. No.	Type of work	LOCATION	Date of Advert.	Date of Award.	Tend. open.	CONT. No.
92-72-02 92-72-01	22	G. D. GB. Pav. & Str.	0.2 Mi. West of Village of Adelaide E'ly 0.5 Mi. Incl. Adelaide Creek Bridge.	~~Aug. 21/74~~ Feb 19/75	~~Sept. 25/74~~ March 6/75	~~26~~ 5 2	74-117
				amended	~~March~~ April 3/75		

Mr. L. E. Walker,
District Engineer,
London.

Materials and Testing Office,
London.

Mr. W. Sawyer.

July 9, 1974.

W.P. 92-72-01, Highway #22,
Adelaide Creek Structure, Adelaide.

The structure drawings presented at the review meeting June 27, 1974 for the above project indicated that a concrete collar is to be constructed around the pipe at both ends.

This collar precludes the use of the clay seal at the upstream end of the pipe and the filter blanket at the downstream end as recommended in the Foundation Report.

However, the excavation and granular backfill limits for the pipe may be beyond the limits of the collar (also high water level may be above collar). If this is the case, during construction it may become necessary to construct the clay seal and filter blanket beyond the limits of the concrete collar and to above the anticipated high water level ensuring that this treatment is applied to the exposed backfill are at the pipe ends.

The above treatment is not shown on the drawings and therefore your field staff should be made aware of this possible treatment.

We would be prepared to assist you at the time of construction to determine the extent of treatment if any.

J. G. FORSTER,
SENIOR SOILS ENGINEER.

JGF:hp
c.c.- A. Wittenberg,
G. A. Wrong,
K. Selby,
A. Watt,
G. A. Sutherland,
J. McKeown,
File.

HEAD OFFICE REVIEW REPORT

BOARDROOMS: E-1 and E-2,
DOWNSVIEW, ONTARIO.

DATE: July 19, 1974

W.P.: 92-72-02 CONTRACT: 74-117 HIGHWAY: 22

TYPE OF WORK: Grading, Drainage, Granular Base, Hot Mix Paving, Structure

LOCATION: Adelaide Creek Bridge & approaches from 0.2 mile west of Village of Adelaide Easterly 0.5 mile

DISTRICT: 2

ADVERTISING DATE: February 19, 1975

ATTENDANCE:

J. R. Wear	R. Northwood	D. Hopper
J. B. Wilkes	G. McClelland	S. Edwards
E. J. Willis	H. Chyc	H. Becker
A. G. Kelly	J. Keen	A. Prakash

POINTS OF DISCUSSION:

(1) Advertising to be deferred until spring of '75 (later stated to be Feb. 19, 1975).

(2) Ministry is to supply metal pipe.

(3) Detour presently designed to be paved with 2" HL 5 - Why? R. Northwood will check with Regional M & T to ascertain if depth can be reduced to 1½". Post Review, Mr. Northwood advised this office that Regional M & T have no objections to proposed reduction - Regional Systems Design to comment please - drawings and quantity to be revised.

(4) Check if detour pipes are capable of accommodating spring runoff and further with Estimating Office what qualifications are required in contract to avoid placing pipes and detour in advance or end of spring runoff.

..... /2

W.P. 92-72-02
Contract 74-117 continued...

(5) Delete operational constraint special provision.

EJW/jc

E. J. Willis
Project Review Supervisor

for:

J. R. Wear
Project Review Engineer

c.c. J. H. Blevins
A. Wittenberg
J. G. Forester
L. E. Walker
G. R. Sutherland
W. Melinyshyn
G. Wrong
R. A. Verscheure
B. Giroux
J. Crannie
E. J. Willis
M. Stoyanoff
C. Grebski
W. R. Bennett
C. Mirza