

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 40I13-29

DIST. 1 REGION Southwestern

W.P. No. 42-66-08/09

CONT. No. 76-47

W. O. No. \_\_\_\_\_

STR. SITE No. 14-353

HWY. No. 402

LOCATION Bear CK.

0.4 miles east of Hwy. 7,  
E.B.L. & N.B.L.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. 3

REMARKS: documents to be unfolded  
Before microfilming

FOUNDATION INVESTIGATION REPORT  
For  
Proposed Crossing at Bear Creek  
and C.A.H. 402, Line 'C'  
Twp. of Warwick Co. of Lambton  
District #1 (Chatham)  
W.O. 71-11032 W.P. 42-66-08&09

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1. INTRODUCTION:

A request for a foundation investigation at the crossing of the proposed C.A.H. 402, Line 'C' and Bear Creek, was received from Mr. A. P. Watt, Regional Bridge Planning Engineer, in a memorandum dated April 5, 1971.

A field investigation was subsequently carried out by the Foundation Section to determine the subsoil conditions existing at the site. This report contains the results of this investigation and our recommendations pertaining to the design of the proposed structure foundations and approach embankments.

2. DESCRIPTION OF THE SITE:

The site of the proposed structure is situated about one mile south of Warwick.

The surrounding area is flat with dense brush and trees. At this place the creek meanders, forming an anti-clockwise loop. It is proposed to make a cut-off channel by diverting the creek about 75 ft. east of the present location.

Physiographically, the site is located in the region referred to as the Horseshoe Moraines.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of four sampled boreholes and eight dynamic cone penetration tests were carried out during the course of the field work. Boring was achieved by means of a continuous flight auger machine. During the field work, disturbed samples were obtained by means of a standard split-spoon sampler: the energy used in driving it, conformed to the requirements of the Standard Penetration Test. Undisturbed samples were recovered using 2-inch I.D. Shelby tubes which were pushed into the soil hydraulically, or by hand.

Dynamic cone penetration tests were carried out adjacent to each borehole and also at four other locations. Driving energy used to advance the cone was 350 ft.-lbs. per blow.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the borings are shown on Drawing No. 71-11032A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection, laboratory tests were carried out on selected samples to determine the following physical properties:

Atterberg Limits

Moisture Content

Grain-Size Distribution

Undrained Shear Strength

Bulk Density

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES: (cont'd) ...

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this report.

4. SUBSOIL CONDITIONS:

4.1) General:

Generally, uniform subsoil conditions were found to prevail over the area investigated. The subsoil consists of 1.5 ft. of top-soil, followed by a deposit of clayey silt with traces of sand, followed by a deposit of heterogeneous mixture of sand, gravel and clayey silt, which in turn is underlain by shale bedrock.

The boundaries between various soil types are shown on the Record of Borehole sheets. The estimated stratigraphical profile shown on Drawing No. 71-11032A is based upon this information.

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

4.2) Topsoil:

This material was found in all boreholes from ground level to a depth of 1.5 ft. It consists of clayey silt and sand with organics and roots. The colour of the soil was very dark to black.

4.3) Clayey Silt to Silty Clay:

This stratum was intersected in all boreholes, beginning at 1.5 ft. below the ground level and extending to a depth

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

4.3) Clayey Silt to Silty Clay: (cont'd) ...

of 9.0 ft., i.e. a thickness of 7.5 ft.

The material, in general, consists of clayey silt to silty clay with sand, with sand seams, varying from a fraction of an inch to a few inches in thickness.

It was not possible to carry out field vane tests, because of the presence of sand seams. Unconfined compression tests show that the undrained shear strength of the material varies from 800 to 1800 lbs./sq. ft. indicating a firm to stiff consistency.

Physical properties of the deposit as determined from laboratory tests are as follows, and are plotted on Fig. 1.

		<u>Min.</u>	<u>Max.</u>
Liquid Limit	(%)	24	56
Plastic Limit	(%)	19	38
Natural Moisture Content	(%)	19	29
Bulk Density	p.c.f.	116	121

Grain size analyses carried out on the cohesive portion of the material indicate the following distributions and are plotted on Fig. 2.

		<u>Min.</u>	<u>Max.</u>
Sand	(%)	7	36
Silt	(%)	46	60
Clay	(%)	14	40

4.4) Heterogeneous Mixture of Sand, Gravel and Clayey Silt:

This material was encountered in all boreholes, beginning from a depth of 9.0 ft. and extending down to bedrock at depths varying from 12.5 to 13.0 ft. The

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

4.4) Heterogeneous Mixture of Sand, Gravel and Clayey Silt:

material consists of a heterogeneous mixture of sand, gravel and clayey silt, and in general, is non-cohesive.

The relative density of the material varies from loose to dense (in general, loose to 'compact'), as indicated by 'N' values ranging from 9 to 35 blows per foot.

Grain-size analyses indicate the following distributions, and are plotted on Fig. 3.

		<u>Min.</u>	<u>Max.</u>
Gravel	(%)	6	9
Sand	(%)	23	84
Silt and Clay	(%)	9	70

4.5) Bedrock:

Small amounts of weathered shale were recovered from the last samples obtained in each of the sampled boreholes. No further penetration with the split-spoon was possible, indicating probable sound bedrock below an approximate 1 ft. thick weathered zone. In other boreholes the bedrock surface was assumed to be the level at which refusal to driving the cone was reached. The bedrock surface is relatively level varying from 10.6 ft. to 13.0 ft. below the ground surface. The bedrock was encountered in various boreholes at the following Elevations.

Borehole	1	Elevation	674.7
	2		674.7
	3		674.7
	4		675.8

..... 6.

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

4.5) Bedrock: (cont'd) ...

Borehole	5	Elevation	673.7
	6		676.8
	7		676.8
	8		674.9

5. GROUNDWATER CONDITIONS:

The following water levels were observed during the field work:

Borehole	1	Elevation	683.2
	2		683.3
	3		683.1
	4		683.4

The water levels were stabilized in a very short period, indicating that the overall permeability of the material is high.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to construct a twin, single-span structure at the crossing of new Hwy. 402, Line 'C' and Bear Creek. The span of each bridge will be 94.0 ft. Because of the meandering nature of the creek, it will be permanently diverted, so as to cross the highway some 75 ft. east of the existing location. Thus, a new channel about 6 ft. deep will have to be constructed, in addition to the new bridges. The proposed profile grade will be approximately 20 ft. above the bottom of the creek.

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

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

As described earlier, the subsoil consists of 1.5 ft. of topsoil, followed by 7.5 ft. of clayey silt to silty clay, followed by 3.5 to 4.0 ft. of heterogeneous mixture of sand, gravel and clayey silt, which in turn is underlain by shale bedrock.

6.2) Foundations:

Because an excavation will be necessary for the proposed diversion of the Bear Creek, and because the bedrock occurs at relatively shallow depths, it is recommended that the proposed bridges be supported on spread footings founded on sound bedrock. A safe net pressure of 10.0 tons/sq. ft. may be assumed for design purposes. A dewatering scheme will be necessary to pour concrete in the dry.

As an alternative, the structure may be supported on short end-bearing piles driven to refusal into the bedrock. For design purposes the maximum allowable design load may be used for the particular steel section used.

Pile caps should be protected against frost action by at least 4 ft. of earth cover.

6.3) Approaches and Excavation:

The proposed grade will result in a maximum height of embankment of 20 ft. above the bottom of the creek. The shear strength of the subsoil is such, that it will be able to support the approach embankments constructed with 2:1 forward and side slopes. The fill should consist of well compacted acceptable material. Care should be taken to ensure that no bouldery fill



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

6.3) Approaches and Excavation: (cont'd) ...

is placed within the approaches through which piles have to be driven, and it is recommended that this portion of the fill contain no larger grain sizes than 3 inches.

For the proposed cut-off channel it is recommended that 2:1 side slopes be constructed. The slopes should be protected against scour by means of rip-rap up to H.W.L.

Based on past experience with the structures with somewhat similar subsoil conditions, it is anticipated that maximum settlement of 1-2 inches will occur under the approaches.

The topsoil and any organic material should be removed in accordance with the pertinent D.H.O. Standards within the construction area.

7. MISCELLANEOUS:

The field investigation was carried out during the period June 7-8, 1971, under the supervision of Mr. A. Prakash, Project Foundation Engineer, who also prepared this report.

Equipment was owned and operated by Dominion Soil Investigation Ltd.

This report was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

June, 1971

Dist. 1 Hwy 402

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE


## RECORD OF BOREHOLE No. 1

FOUNDATION SECTION

JOB 71-11032 LOCATION ~~Hwy. 402 Line "C"~~ <sup>231</sup> Sta. ~~131~~ + 85 o/s 98' Rt. <sup>Hwy 402</sup> ORIGINATED BY AR  
 W.P. 42-66-08 & 09 BORING DATE June 8, 1971 COMPILED BY KW  
 DATUM Geodetic BOREHOLE TYPE Bombardier Flight Auger & Cone CHECKED BY SR

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — — w <sub>L</sub> PLASTIC LIMIT — — w <sub>p</sub> WATER CONTENT — — w			BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					w <sub>p</sub> — w — w <sub>L</sub>				
							20	40	60	80	100	WATER CONTENT %				
							SHEAR STRENGTH P.S.F.					20 40 60				
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE										
						<del>1000</del> <del>2000</del>										
687.2	Ground Level															
685.7	Topsoil															
1.5	Clayey silt with sand, occ. sand layers.		1	TW	PM	680										
678.2	Firm to Stiff		2	TW	PM											
9.0	Het. mix. of sand, gravel & clayey silt.		3	SS	23											
674.7	Loose to Compact		4	SS	133											
12.5	Weathered Shale															
13.5	End of Borehole Probable Bedrock					670					100/6"					

## FOUNDATION SECTION

JOB	71-11032	LOCATION	Hwy. 402 Line + C. 122 + 91 o/s 58' Rt. E. Hwy 402	ORIGINATED BY	AP
W.P.	42-66=08 & 09	BORING DATE	June 8, 1971 231	COMPILED BY	KW
DATUM	Geodetic	BOREHOLE TYPE	Dynamic Cone Test	CHECKED BY	

[illegible]

DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 3

FOUNDATION SECTION

JOB 71-11032      LOCATION 231 Hwy. 402, Line 10 Sta. 131 + 91 o/s 60' Lt.      ORIGINATED BY AP

W.P. 42-66-08 & 09      BORING DATE June 8, 1971      COMPILED BY KW

DATUM Geodetic      BOREHOLE TYPE Dynamic Cone Test      CHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT					PLASTIC LIMIT — $w_p$				
							20	40	60	80	100	WATER CONTENT — $w$				
							SHEAR STRENGTH P.S.F.					$w_p$ — $w$ — $w_L$				
						○ UNCONFINED + FIELD VANE					WATER CONTENT %					
						● QUICK TRIAXIAL x LAB. VANE										
687.5	Ground Level															
686.0	Probable Topsoil															
1.5	Probable Clayey silt with sand occ. sand layers.					680										
678.5	Firm to Stiff															
9.0	Probable Het. mix. sa., gra. & clayey silt. Loose to Compact															
674.7																
12.8	End of Cone Test Probable Bedrock					670					100/10'					

## FOUNDATION SECTION

JOB <u>71-11032</u>	LOCATION <u>Sta. <del>132</del> 400 110' Lt. Hwy. 402, Lin. <del>101</del></u>	ORIGINATED BY <u>AP</u>
W.P. <u>42-66-08 &amp; 09</u>	BORING DATE <u>June 8, 1971</u>	COMPILED BY <u>KW</u>
DATUM <u>Geodetic</u>	BOREHOLE TYPE <u>Bombardier Flight Auger &amp; Cone</u>	CHECKED BY <u>[Signature]</u>

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	LIQUID LIMIT ——— W <sub>L</sub> PLASTIC LIMIT ——— W <sub>p</sub> WATER CONTENT —— W	BULK DENSITY $\gamma$	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT.PLOT	NUMBER	T TYPE	BLOWS / FOOT	SHEAR STRENGTH P.S.F.	WATER CONTENT % w <sub>p</sub> w      w <sub>L</sub>	P.C.F.	GR.SA.SI.CL.
688.3	Ground Level					20    40    60    80    100			
686.8	Topsoil					UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE			
1.5	Clayey silt to silty clay with sand; occ. sand layers. Firm to stiff	[Diagonal Hatching]	1	TW	PM	(Handwritten symbols)	(Handwritten graph points at ~20% water content)	118	0 19 50 37
679.3	Het. mix. of sand, gravel & clayey silt.	[Cross-hatching]	2	TW	PM		(Handwritten graph point at ~40% water content)	117	0 8 52 40
9.0	Loose to Compact Weathered Shale	[Stippling]	3	SS	10				7 84 ( 9 )
675.8			4	SS	106				
12.5									
13.5	End of Borehole Probable Bedrock	[Horizontal Lines]				100/9"			

FOUNDATION SECTION

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT ——— W <sub>L</sub>		BULK DENSITY γ	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT		PLASTIC LIMIT ——— W <sub>P</sub>			
							20 40 60 80 100		WATER CONTENT ——— W			
							SHEAR STRENGTH P.S.F.		W <sub>P</sub> ——— W ——— W <sub>L</sub>			
685.9	Ground Level											
684.4	Topsoil											
1.5	Clayey silt to silty clay with sand, occ. sand layers, some org.		1	TW	PM	680					116	0 15 60 25
676.9	Firm to Stiff		2	SS	5							w/c 91%
9.0	Het. mix. of sa. gra. & clayey silt		3	SS	35							9 24 51 16
673.4	Compact to Dense											
12.5	Weathered Shale			SS	140/10"							
13.3	End of Borehole Probable Bedrock					670						

DEPARTMENT OF HIGHWAYS- ONTARIO

MATERIALS &amp; TESTING OFFICE

## RECORD OF BOREHOLE No. 6

FOUNDATION SECTION

JOB 71-11032

LOCATION

 ~~Hwy. 402 Line 10~~ Sta. <sup>232</sup> 132 + 84 o/s 59' Rt. <sup>E Hwy 402</sup>

ORIGINATED BY AP

W.P. 42-66-08 &amp; 09

BORING DATE

June 7, 1971

COMPILED BY KW

DATUM Geodetic

BOREHOLE TYPE

Dynamic Cone Test

CHECKED BY *[Signature]*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — W <sub>L</sub> PLASTIC LIMIT — W <sub>p</sub> WATER CONTENT — W				BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	SHEAR STRENGTH P.S.F.					
												○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE x LAB. VANE	W <sub>p</sub> — W — W <sub>L</sub> WATER CONTENT %			
681.6	Ground Level																
686.1	Probable Topsoil																
1.5	Probable Clayey silt with sand occ. sand layers																
678.6	Firm to Stiff					680											
676.8	Probable silt. Loose to Compact																
10.8	End of Cone Test Probable Bedrock					670				100/10"							

FOUNDATION SECTION

CHECKED BY 

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — $w_L$ PLASTIC LIMIT — $w_p$ WATER CONTENT — $w$			BULK DENSITY $\gamma$ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	SHEAR STRENGTH + P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB. VANE				
687.4	Ground Level															
685.9	Probable Topsoil															
1.5	Probable Clayey silt with sand occ. sand layers															
679.4	Firm to Stiff					680										
8.0	Prob. bet. mix. of sand gravel & clayey silt.															
676.8	Loose to compact															
10.6	End of Cone Test Probable Bedrock					670					100/7"					



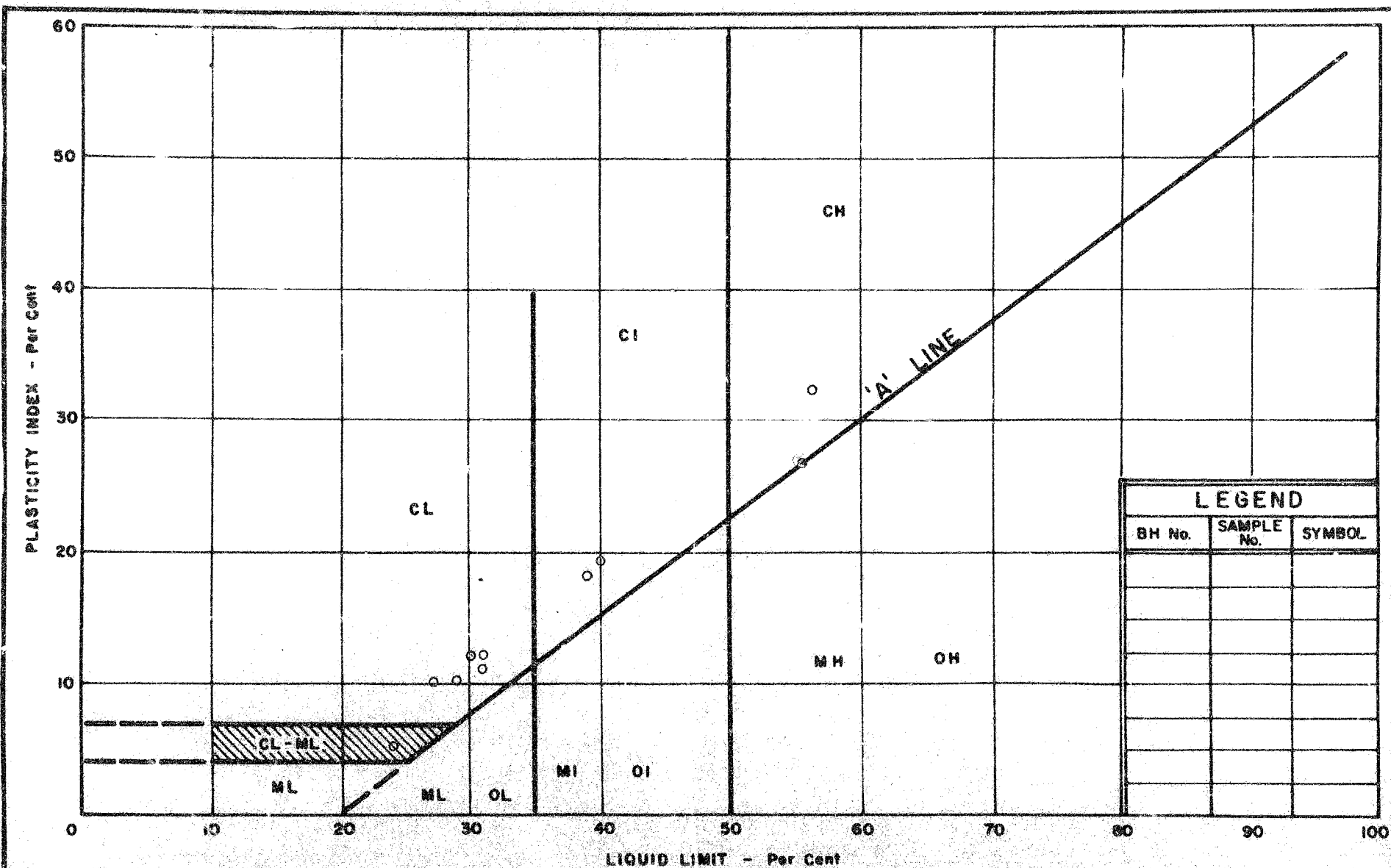
DEPARTMENT OF HIGHWAYS- ONTARIO  
MATERIALS & TESTING OFFICE

## RECORD OF BOREHOLE No. 8

FOUNDATION SECTION

JOB 71-11032 LOCATION Hwy. 402 Line 10 Sta. 232 + 87 o/s 111' Lt. ORIGINATED BY AP  
W.P. 42-66-08 & 09 BORING DATE June 7, 1971 COMPILED BY KW  
DATUM Geodetic BOREHOLE TYPE Bombardier Flight Auger & Cone CHECKED BY [Signature]

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — W <sub>L</sub> PLASTIC LIMIT — W <sub>P</sub> WATER CONTENT — W			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS / FOOT		20	40	60	80	100	W <sub>P</sub>	W	W <sub>L</sub>		
687.9	Ground Level															
686.4	Topsoil															
1.5	Clayey silt with sand occ. sand layers.		1	TW	PM					9					119	0 7 57 36
678.9	Firm to Stiff		2	TW	PM	680									121	0 36 48 16 1 84 (15)
9.0	Het. mix. sand, gravel & clayey silt.		3	SS	9											6 82 (12)
674.9	Loose to compact.		4	SS	107											0 1 52 47
13.0	Weathered Shale															
14.0	End of Borehole Probable Bedrock					670					100/9"					



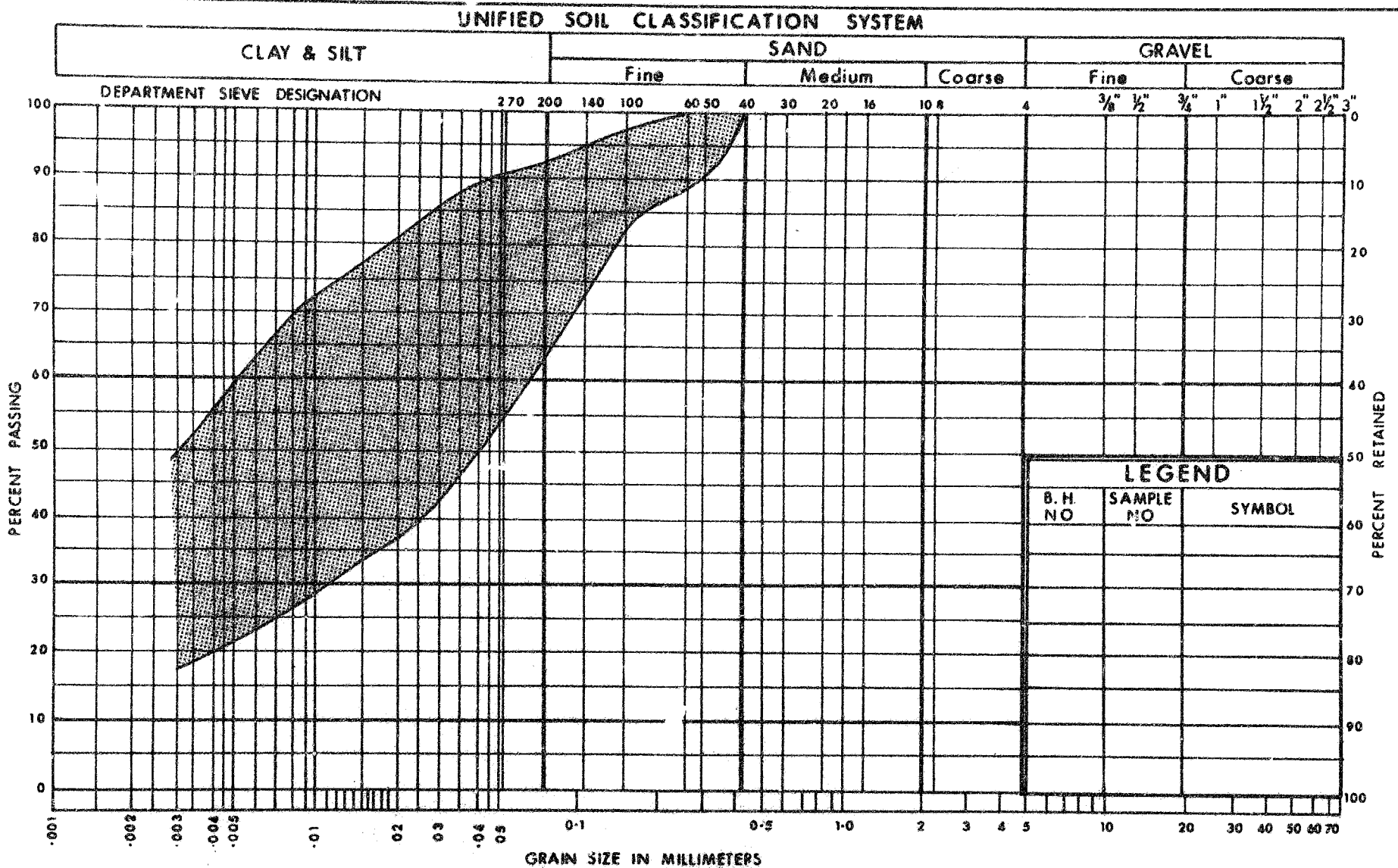
DEPARTMENT OF HIGHWAYS  
 MATERIALS and  
 TESTING  
 DIVISION

# **PLASTICITY CHART** CLAYEY SILT TO SILTY CLAY

WP No. 42-66-08 & 09

JOB No. 71-11032

FIG. 1



DEPARTMENT OF HIGHWAYS  
MATERIALS and  
TESTING  
DIVISION

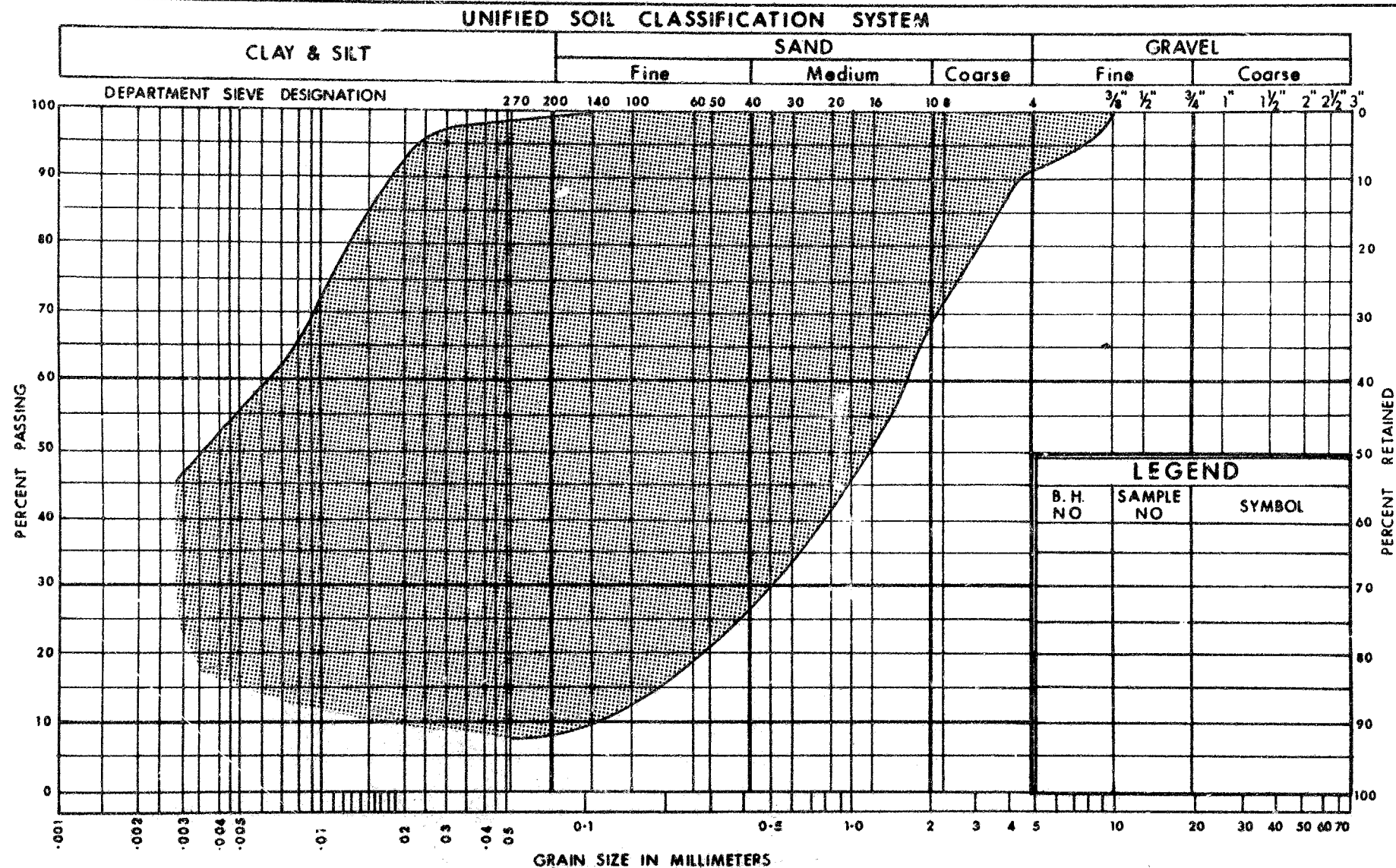
## GRAIN SIZE DISTRIBUTION

CLAYEY SILT TO SILTY CLAY

W.P. No. 42-66-08 & 09

JOB No: 71-11032

FIG. 2



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MATERIALS and  
TESTING  
DIVISION

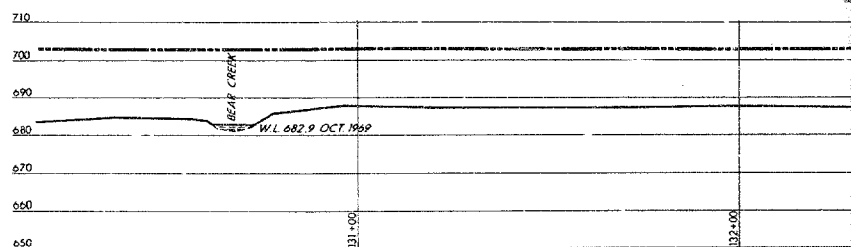
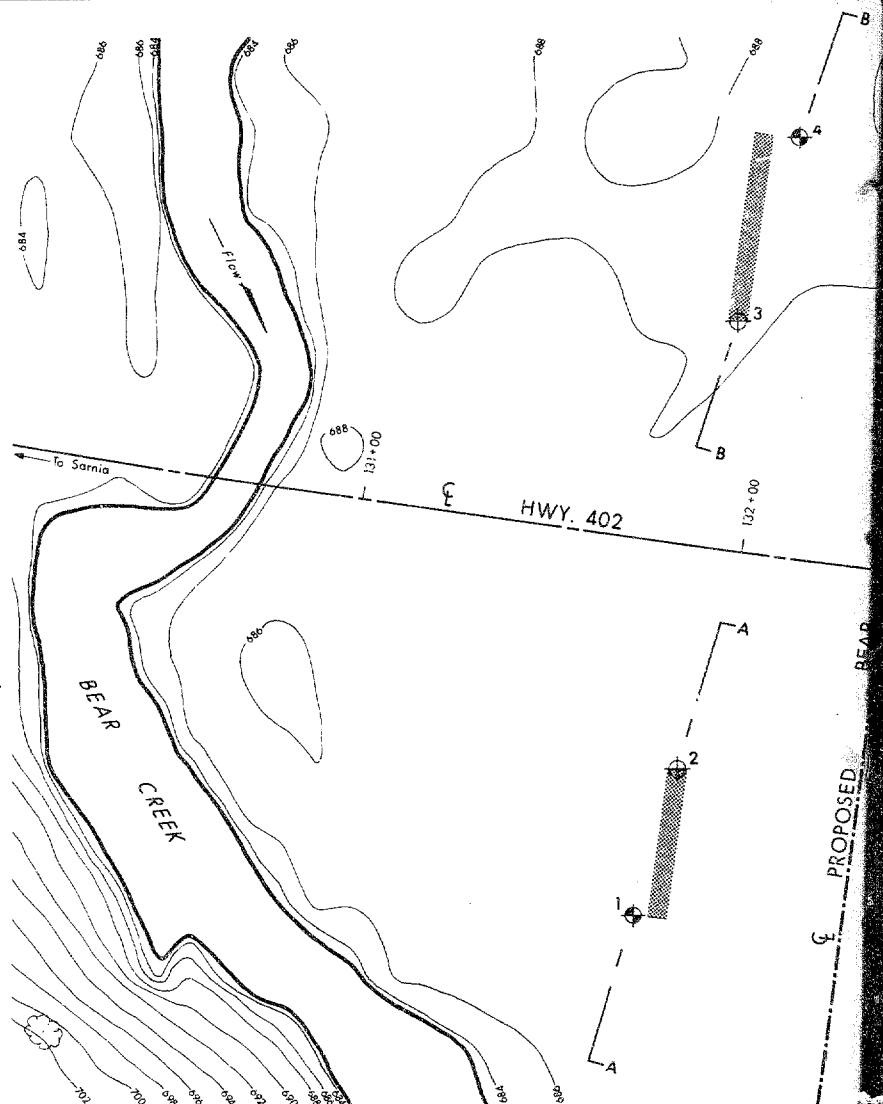
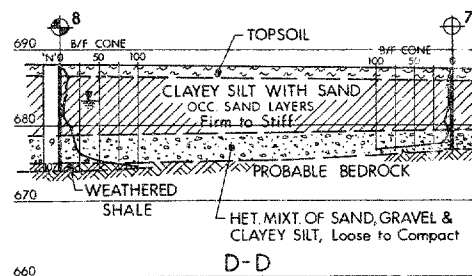
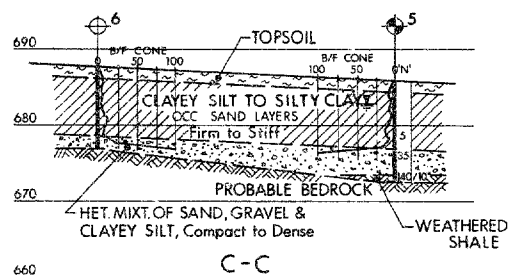
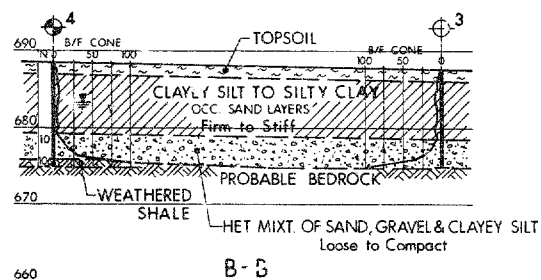
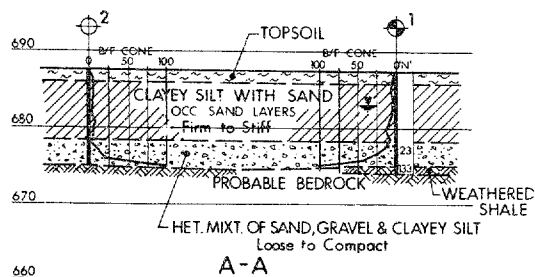
## GRAIN SIZE DISTRIBUTION

HET. MIX. OF SAND, GRAVEL & CLAYEY SILT

W.P. No. 42-66-08 & 09

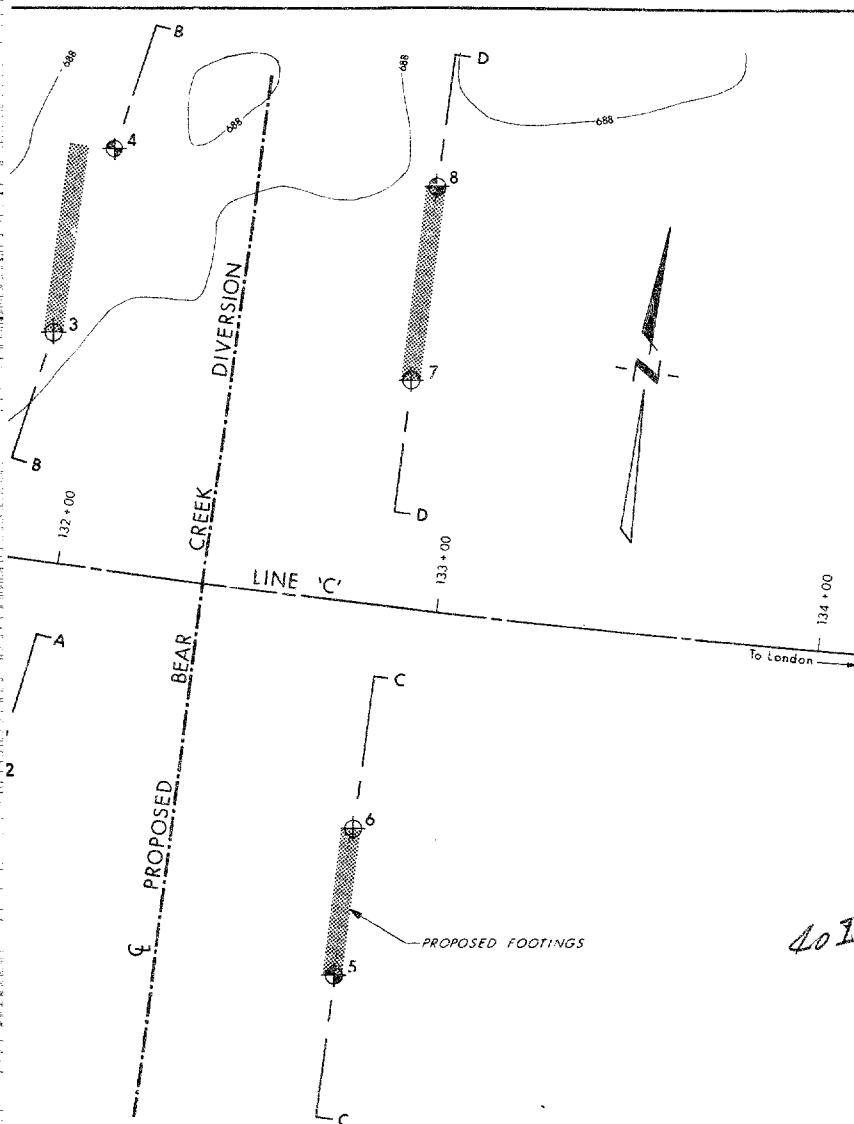
**JOB No:** 71-11032

FIG. 3

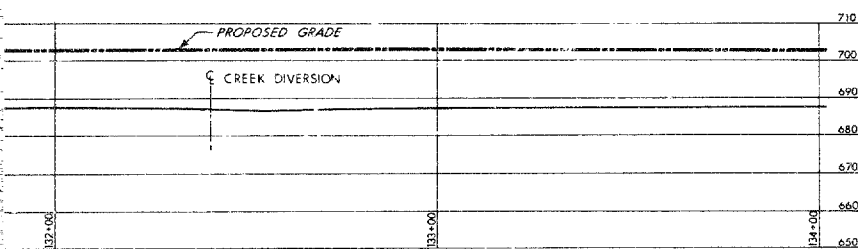


PRINT RECORD		
NO.	FOR	DATE

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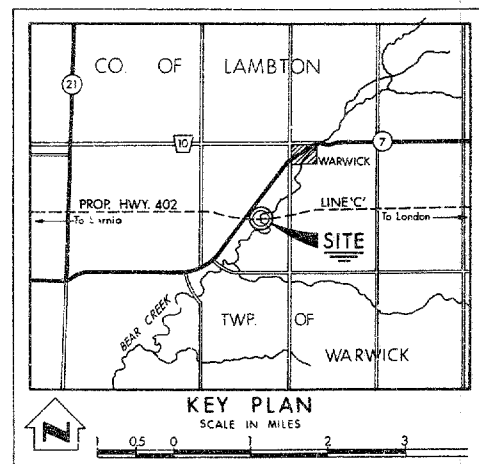


PLAN  
0 SCALE 20 40 FT.



PROFILE - LINE 'C'  
0 SCALE 20 40 FT.

REF. No. E - 4871 - 1



### LEGEND

- Bore Hole
- Cone Penetration Test
- Bore Hole & Cone Test
- Water Levels established at time of field investigation, June 1971.

NO.	ELEVATION	STATION	OFFSET
1	687.2	131+85	98' RT.
2	687.3	131+91	58' RT.
3	687.5	131+91	60' LT.
4	688.3	132+00	110' LT.
5	685.9	132+84	98' RT.
6	687.6	132+84	59' RT.
7	687.4	132+86	59' LT.
8	687.9	132+87	111' LT.

40I13-29

### NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence and may be subject to considerable error.

DATE	BY	DESCRIPTION

DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS  
DESIGN SERVICES BRANCH — FOUNDATION SECTION

### BEAR CREEK

HIGHWAY NO. 402 LINE 'C' DIST. NO. 1  
CO. LAMBTON  
TWP. WARWICK LOT 8 & 9 CON. II

### BORE HOLE LOCATIONS & SOIL STRATA

SURWD. P. P.	CHECKED	W.P. NO. 42-66-08 & 09	DRAWING NO.
DRAWN S. R.	CHECKED	JOB NO. 71-11032	71-11032 A
DATE JUNE 28, 1971	SITE NO.	BRIDGE DRAWING NO.	
APPROVED	CONT. NO.		

DOCUMENT NO. \_\_\_\_\_

GEOCRES No. 401 13-29

DIST. 1 REGION SOUTHWESTERN

W.P. No. 42-66-08/09

CONT. No. 76-47

W. O. No. \_\_\_\_\_

STR. SITE No. 14-353

HWY. No. 402

LOCATION BEAR CK., 0.4 MILES EAST

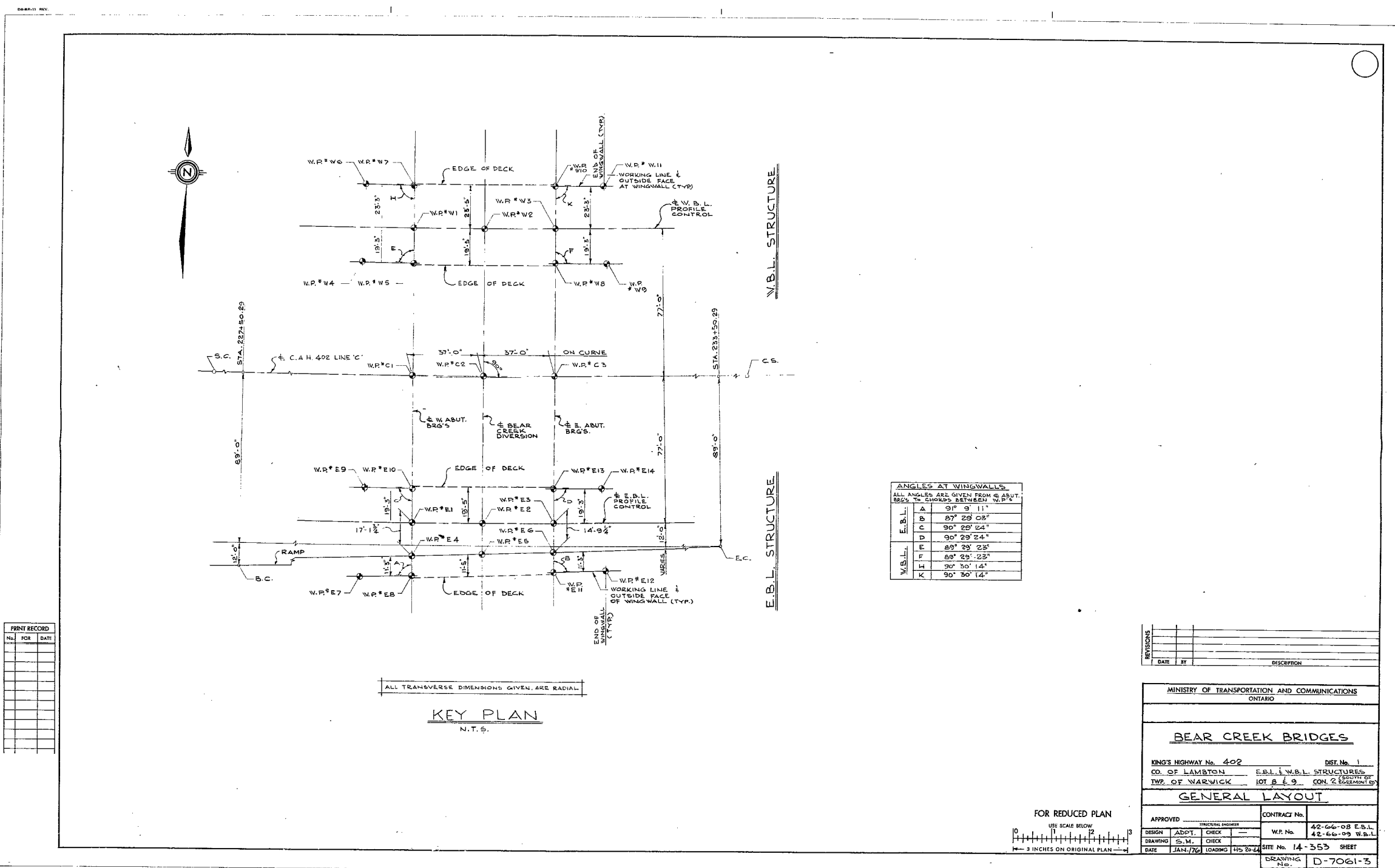
OF HWY. 7, E.B.L. AND H.B.L.

OVERSAMPLING REPORT NO. 3

REMARKS \_\_\_\_\_

\_\_\_\_\_

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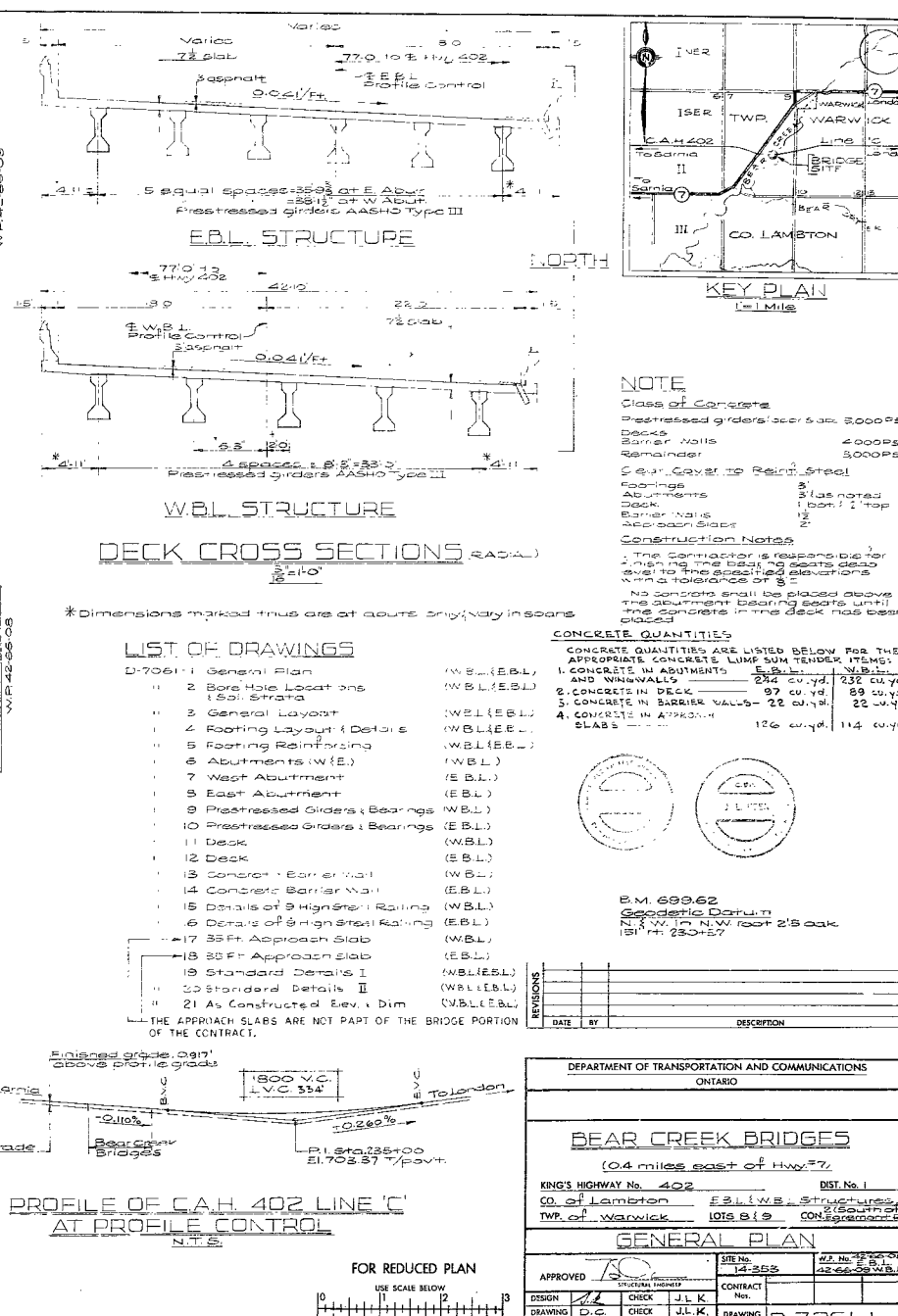
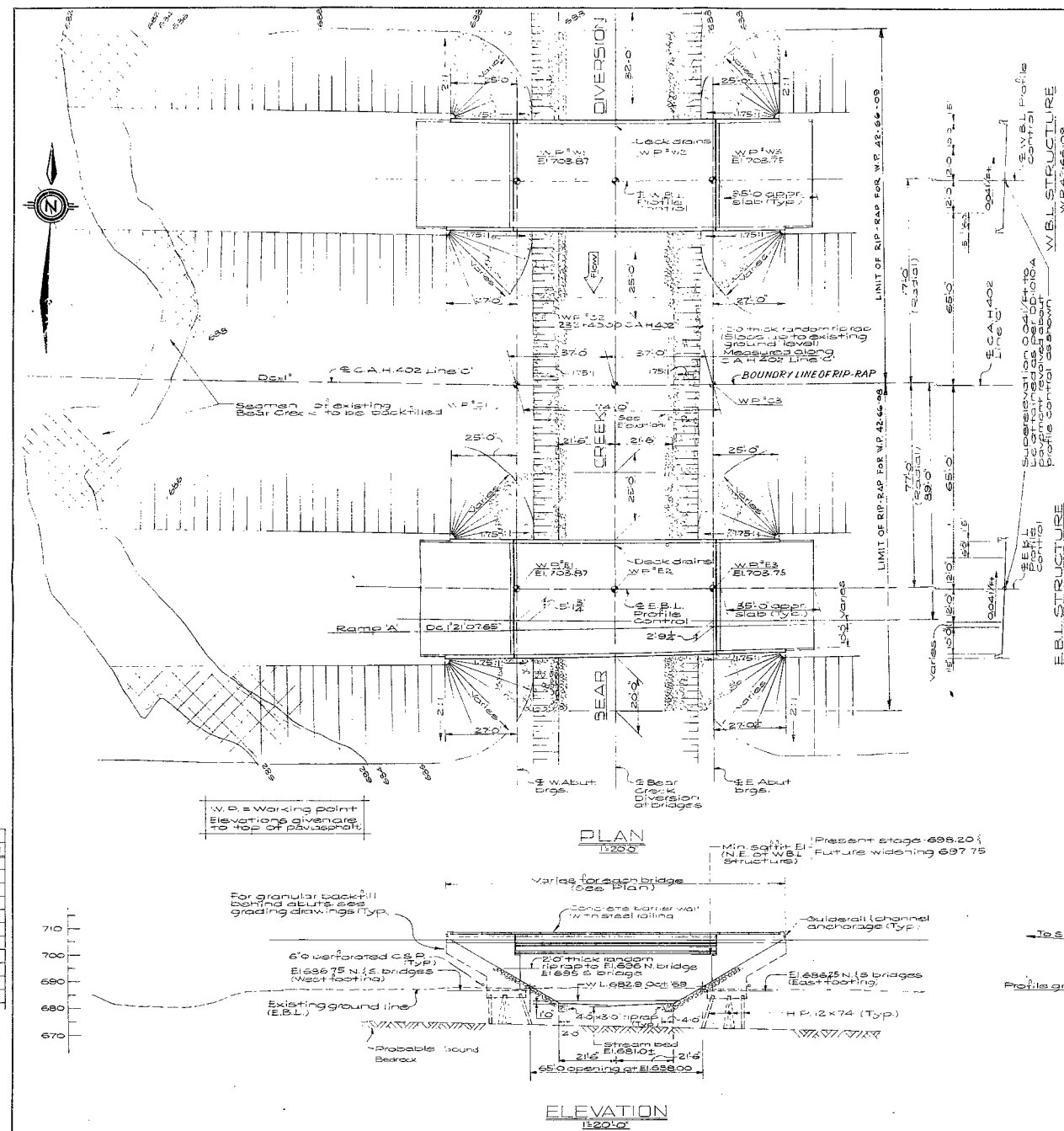
PRINT RECORD		
No.	FOR	DATE

FOR REDUCED PLAN  
USE SCALE BELOW  
1" = 3 INCHES ON ORIGINAL PLAN

REVISIONS	
DATE	DESCRIPTION
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS ONTARIO	
BEAR CREEK BRIDGES	
KING'S HIGHWAY No. 402	DIST. No. 1
CO. OF LAMBTON	E.B.L. & N.B.L. STRUCTURES
TWP. OF WARWICK	LOT 8 & 9 CON. 2 (SOUTH OF BASEMOUNT ST.)
GENERAL LAYOUT	
APPROVED	CONTRACT No.
DESIGN	W.P. No.
ADDT.	42-66-08 E.B.L.
CHECK	42-66-09 N.B.L.
DRAWING	SITE No. 14-353 SHEET
DATE	DRAWING No.
JAN. 76	D-7061-3

40113-29#1B





40I13-29A/B

