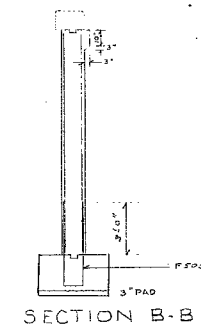
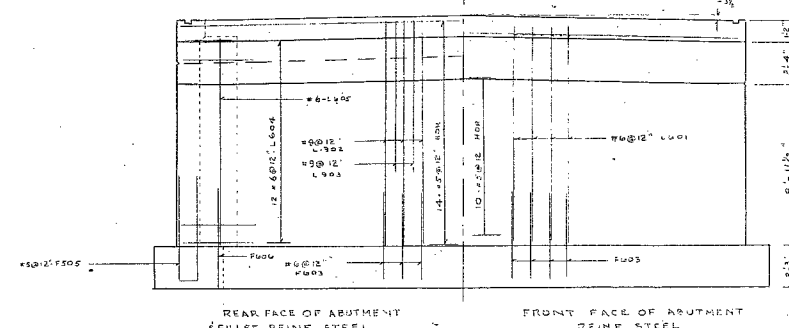
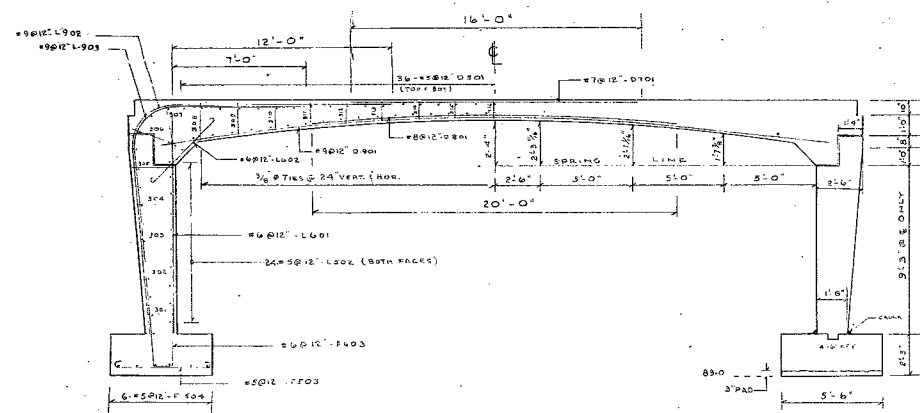
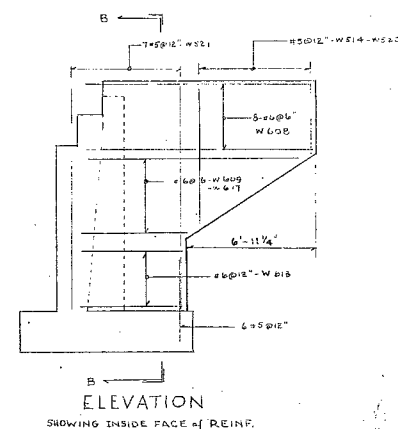
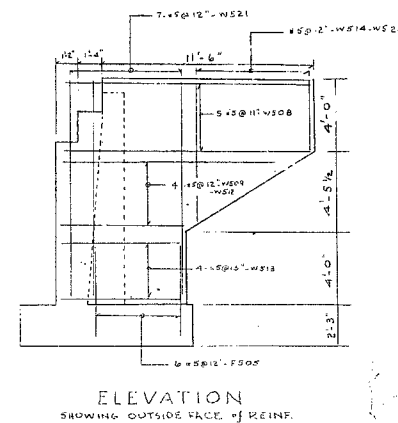
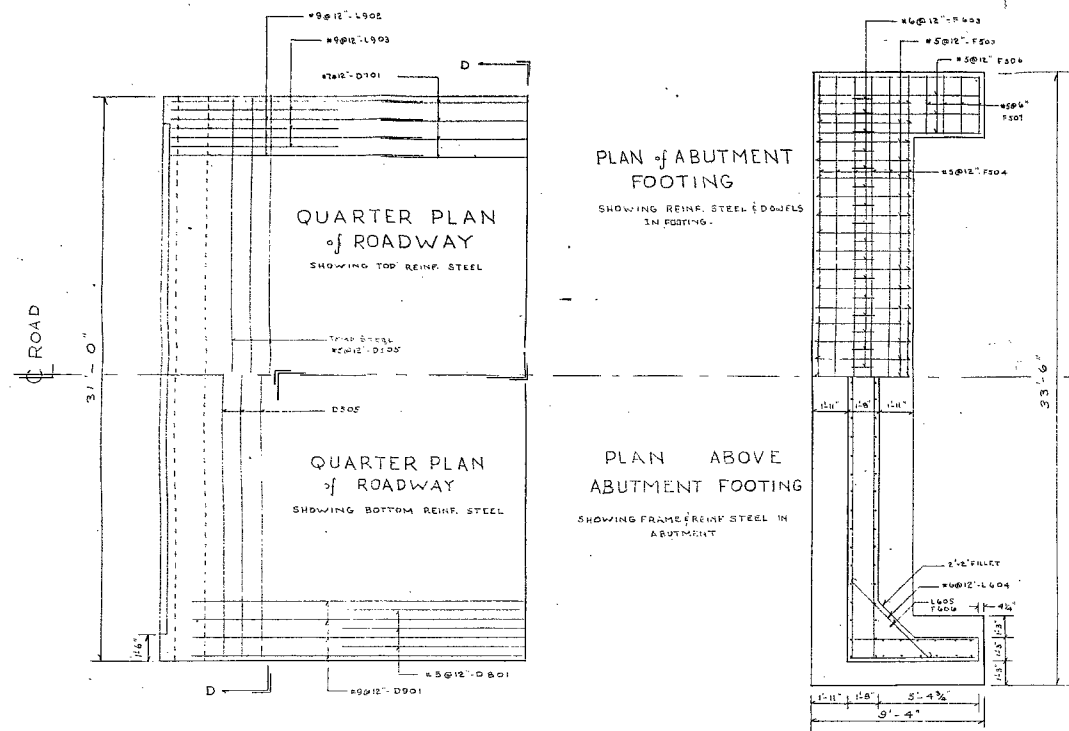


62-F-285M
ROAD BRIDGE
ON
TOWNLINE ROAD
LOBO, E. WILLIAMS
TWPS



- Structure to be built in accordance with D.H.Q. Specs. Form 9 revised March 1957, October 1959 and September 1960 and County of Middlesex supplemental specifications.
- Excavation for footing to be finished by hand to the neat dimensions and the concrete shall be placed on undisturbed material on front, back and bottom faces.
- Excavation for footing shall be made as neat as possible but in any case shall be filled completely with footing concrete.
- Footing depth subject to revision by the Engineer.
- Footings are designed for an allowable soil pressure of 3.3K/sq.ft.
- Reinforced Concrete shall have a minimum compressive strength of 3000 psi in 28 days and maximum slump of 3". County to design a mix on receiving samples of sand and aggregate from the successful bidder.
- Note the added addendum in County specifications regarding the addition of an admixture containing an air entraining agent. For estimating purposes assume that a $\frac{1}{2}$ lb. of Highway Pozzolith shall be added per bag of cement.
- Maximum Size Aggregate
 - 2" in deck slabs, curb and guard rails
 - 1 1/2" in footing
 - 1" elsewhere
- Concrete Cover (main reinforcing)
 - 3" in contact with earth and water
 - 3" in top deck
 - 1 1/2" in bottom of deck
 - 2" elsewhere
- Deck falsework shall not be struck until all backfill has been placed and compacted behind the abutments to the satisfaction of the Engineer.
- All exposed concrete edges to have 1/2" chamfer unless otherwise noted.
- Drain pipes and joint materials shall be supplied by the contractor.
- Construction year to appear on N.E. and S.W. end of guard rail. Templates to be supplied by the County.
- Design Loading H 20 - S 16.
- Deck to have broom finish.
- Estimated Concrete 198. C.Y.
- Estimated Reinforcing Steel 157

COPIES OF ENCLOSED
PROPOSED
BRIDGE
LOBO-EAST WILLIAM T.L.
LOT 16, CON. 311 - LOT 20, C. 11
W. 11/11/11
T.B.C.
V. 11/11/11
FEB 11/11

MESSRS. A.M. SPRIET AND ASSOCIATES
CONSULTING ENGINEERS
300 Queens Avenue
LONDON ONTARIO

62 11 2 24 M

Report on
SOIL INVESTIGATION
for
ROAD BRIDGE
CONCS. III AND IV, N. OF RIVER THAMES
LOT 15, TWP. OF NORTH DORCHESTER
COUNTY OF MIDDLESEX

by
DOMINION SOIL INVESTIGATION LIMITED
363 Queens Avenue
LONDON ONTARIO

Reference No. 2-12-L4
December
1962

Mr. A. M. Teye,
Bridge Engineer.
Materials & Research Division,
(Foundation Section)

March 12, 1962.
REVIEW OF SOILS REPORT BY
DOMINION SOIL INVESTIGATION -
(Ref. BA 1360) and DRAWINGS BY
COUNTY OF MIDDLESEX.

Attention: Mr. K. L. Kleinsteinber,
Municipal Bridge Liaison Engr.

Re: Road Bridge on Townline Road
Between Townships of Lobo and
East Williams, District #2.

We have reviewed the above-mentioned report submitted by the Consultant, Dominion Soil Investigation, Ltd., and also the bridge foundation design as shown on the drawings prepared by the County of Middlesex. Below, we are submitting our comments for your consideration:-

The Consultant has recommended the footings to be placed at or below elevation 92.0. For this elevation, he has quoted the allowable bearing capacities for different footing widths. On the bridge drawings, the bottom of the footings is shown to be at elevation 89.0. Is scour the reason for deepening?

In the report, only little reference is made to the dewatering problem. We are, however, of the opinion that dewatering may cause a lot of trouble if the material is as described in the report (almost cohesionless -- page 2.), and if proper dewatering procedure and methods are not used.

Since grain size distribution curves of the different materials are not available, we would suggest, as probably the most effective method, the driving of interlocking sheet piles around the excavation to a depth below the footing elevation, equal to the height of creek or ground water table above this elevation.

cont'd. /2 ...

Attn: Mr. K. L. Kleinsteinber,
Municipal Bridge Liaison Engr.

March 12, 1962.

Pumping of water from the excavation can then be applied without danger of piping or boiling of the material at the bottom of the excavation. Sheet piling in front and around the sides of the footings could be used for protection of footings against scour while the rest could be pulled out and salvaged. In this manner, a higher footing elevation could be used, even if scour danger exists.

If you feel that some additional information is required, please feel free to call on our Office.

AGS/MdeF

A. G. Stermac
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER

cc: Foundations Office
Gen. Files.

BA 1360

COUNTY OF MIDDLESEX
COUNTY BUILDING
LONDON ONTARIO

Report on
SOIL INVESTIGATION

for

ROAD BRIDGE

67 11-285 M

TOWNLINER ROAD BETWEEN TOWNSHIPS OF
LOBO AND EAST WILLIAMS

by

DOMINION SOIL INVESTIGATION LIMITED
363 QUEENS AVENUE
LONDON ONTARIO

Reference No. 2-2-L1

February, 1962

CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. FIELD WORK	1
III. SUBSURFACE CONDITIONS.	1
IV. BEARING CAPACITY AND SETTLEMENT.	2
V. CONSTRUCTION	3
VI. SUMMARY	3
VII. REFERENCES	3

ENCLOSURES

	<u>No.</u>
LOCATION PLAN, SUBSURFACE PROFILE ETC.	1
ENGINEERING DATA SHEETS.	2 and 3

I. INTRODUCTION

In accordance with verbal authorization from the Middlesex County Engineer's office, a soil investigation has been carried out at a bridge site on the townline road between the Townships of Lobo and East Williams. The existing single-span bridge which carries the road over a small tributary stream of the Aux Sables River is to be replaced by a new single-span structure.

The purpose of this investigation was to reveal the subsurface conditions and to determine the necessary soil properties for the design and construction of foundations.

II. FIELD WORK

Field work was carried out on the 6th and 7th of February, 1962 and consisted of two boreholes at the locations shown on enclosure 1. Dynamic cone penetration tests were made adjacent to each borehole and Standard Penetration tests were made at frequent intervals using a 2" O.D. split spoon. A constant driving energy was employed in the Standard Penetration and dynamic cone tests using a 140 pound hammer dropping 30 inches. The former test provided disturbed samples of the strata and the latter, a continuous record of soil density.

The holes, which were lined with Bx casing, were advanced without the use of wash water, and terminated at depths 21'6". In this way a minimum of disturbance was caused to the soil before sampling.

The results of the field tests are recorded on engineering data sheets comprising enclosures 2 and 3. Elevations have been referred to a benchmark consisting of a nail on a nearby telegraph pole (El. 100 feet), established by the client's surveyor.

III. SUBSURFACE CONDITIONS

A subsurface profile is shown on enclosure 1. Above a depth of 5 to 6 feet, the holes encountered ice, water and an unconsolidated mixture of clay, angular gravel and organics. Below this level (El. 92 feet approximately), the soil is a dense mixture of very fine grey sand and silt. In borehole 1 only, the upper 10 feet of this layer was almost a pure silt and a seam of silty clay was encountered near the top.

IV. BEARING CAPACITY AND SETTLEMENT

The elevation of the bed of the creek at the location of the boreholes is approximately 96.0 feet so it is assumed that footings will be at El. 92.0 or lower. On the basis of the Standard Penetration test results, the angle of internal friction ϕ is approximately 34° and the material is almost cohesionless. Using this value the ultimate bearing capacity (q_u) has been calculated for a range of footing widths. The maximum allowable soil pressure $q_a (=q_u/3)$ is also shown, and an estimate of total settlement corresponding to q_a is given in the following table.

Width of footing (feet)	q_u (p.s.f.)	q_a (p.s.f.)	Estimated Settlement (inches)
4	15600	5200	$1\frac{1}{2}$
6	17750	5900	2
8	20000	6600	$2\frac{1}{2}$
10	22200	7400	3

It may be practicable to use lower pressures than the values for q_a quoted above, and thus to obtain smaller settlements. The following table shows the estimated soil pressures to obtain 1 inch and $1\frac{1}{2}$ inch settlements.

Width of footing (feet)	<u>Soil pressures (p.s.f.) to limit settlement</u>	
	<u>Settlement</u>	
	1"	$1\frac{1}{2}$ "
4	3300	5200
6	2900	4500
8	2600	4200
10	2500	4000

Intermediate values may be obtained by interpolation in either of the above tables.

Throughout this section it has been assumed that within the range of q_a the settlements will be elastic and approximately proportional to the applied load. The basis of the estimates has been the correlation of Terzaghi and Peck between the Standard Penetration tests and the soil pressure which will result in 1 inch of settlement for a certain width of footing.

Settlement will occur immediately upon the application of the load, and since the relative density of the soil on both sides of the bridge is almost the same, no differential deflection will occur between the abutments.

V. CONSTRUCTION

The principal problem associated with construction will be to establish the footings on an undisturbed grade. The silty soil will be sensitive to disturbance either by water or mechanical means and for this reason, special care should be taken during construction if excessive settlements are to be avoided.

Dewatering should be made as effectively as possible by diverting the creek prior to excavation. If the grade is disturbed for any reason, or if local weaknesses are encountered which have not been revealed by this investigation, the soil should be cut out and replaced with lean concrete. Any form of compaction causing vibration of the soil should be avoided.

VI. SUMMARY

1. The soil consists of an unconsolidated mixture of clay and angular gravel forming the bed of the creek and, below El. 92.0 feet, a stratum of very fine grey sand and silt. At borehole 1 the upper 10 feet of this latter layer is chiefly silt.
2. Footings may be located at or below El. 92 feet. Ultimate and recommended maximum soil pressures are quoted for a range of footing widths, and an estimate of the corresponding settlements is given. Soil pressures are also quoted to limit settlement to 1 inch and $1\frac{1}{2}$ inches.
3. Settlement will be immediate upon the application of load.
4. The silty soil is sensitive to disturbance, and special care will be required during construction if excessive settlement is to be avoided.

VII. REFERENCES

1. Procedures for Testing Soils, ASTM, April 1958, pp. 186 to 198. (Unified Soil Classification System - by A.A. Wagner)

2. Proceedings of the 4th International Conference on Soil Mechanics and Foundation Engineering (Research on Determining the Density of Sands by Spoon Penetration Testing by H. J. Gibbs and W. G. Holtz of the United States Bureau of Reclamation)
3. Terzaghi and Peck: Soil Mechanics in Engineering Practice. John Wiley and Sons, New York 1948.



DOMINION SOIL INVESTIGATION LIMITED

A handwritten signature in cursive script, appearing to read "James Park".

James Park, M.Sc., P. Eng.

Dominion Soil Investigation Ltd.

Engineering Data Sheet for Borehole: }

Date: 6/7 FEB 62

Project: ROAD BRIDGE, LOBO

Location: EAST WILLIAMS TOWNSHIP

Hole Location: SEE ENCLOSURE #1

Hole Elevation and Datum:

Field Supervisor: J.P. Prep.: J.T.

Driller: G.G. Checked: J.P.

LEGEND

Shear Strength (C)

Unconfined compression

Vane test and sensitivity (S)

Penetration Resistance (P)

2" Split tube

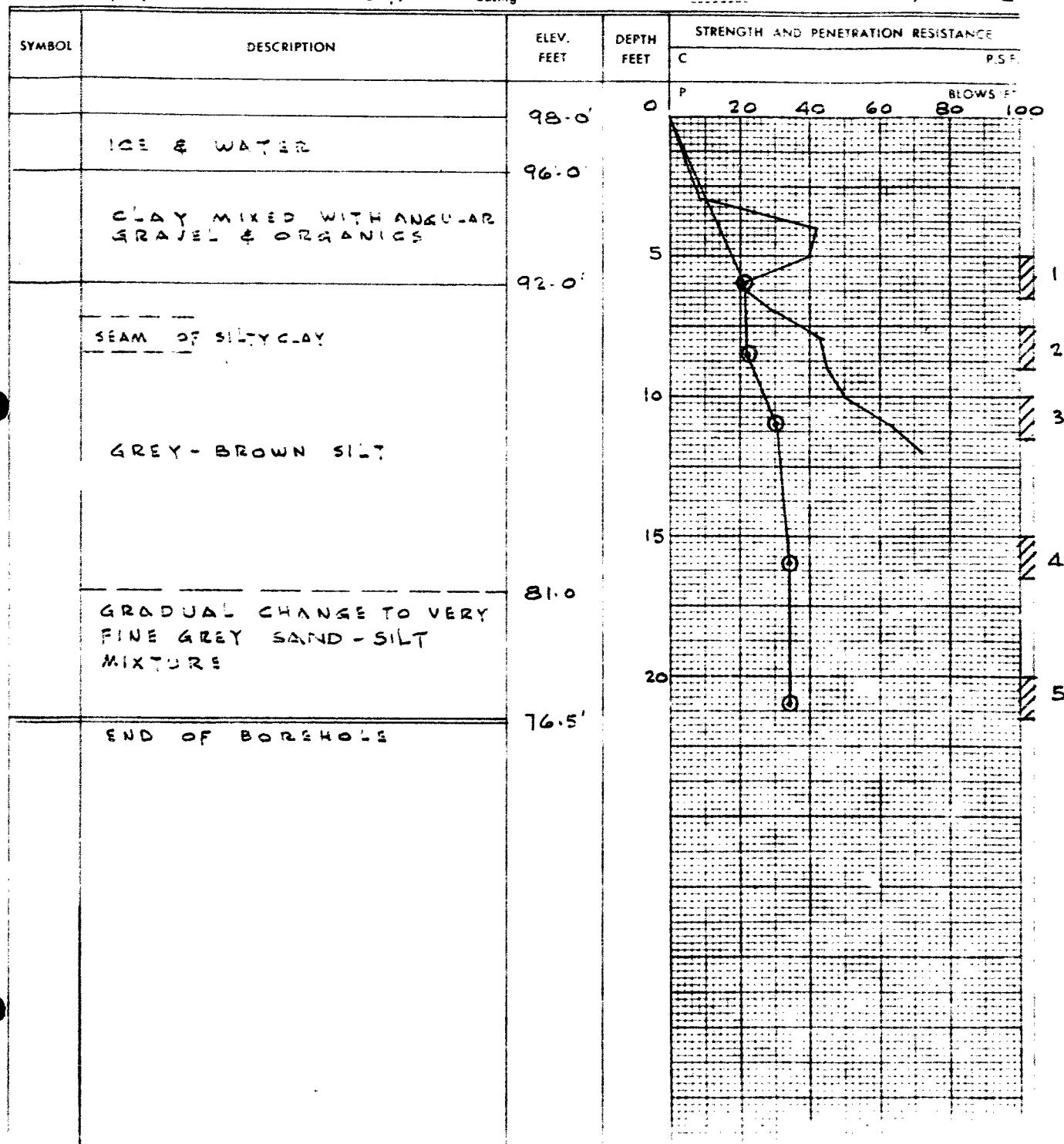
2" Dia. Cone

Casing

Sampling Method

2" Dia. split tube

2" Shelby tube



Dominion Soil Investigation Ltd.

Engineering Data Sheet for Borehole: 2

Date: 7 FEB. 62

Project: ROAD BRIDGE, LOBO +
 Location: EAST WILLIAMS TWP.
 Hole Location: SEE ENCLOSURE #1
 Hole Elevation and Datum:
 Field Supervisor: J.P. Prep.: J.T.
 Driller: G.G. Checked: J.P.

LEGEND

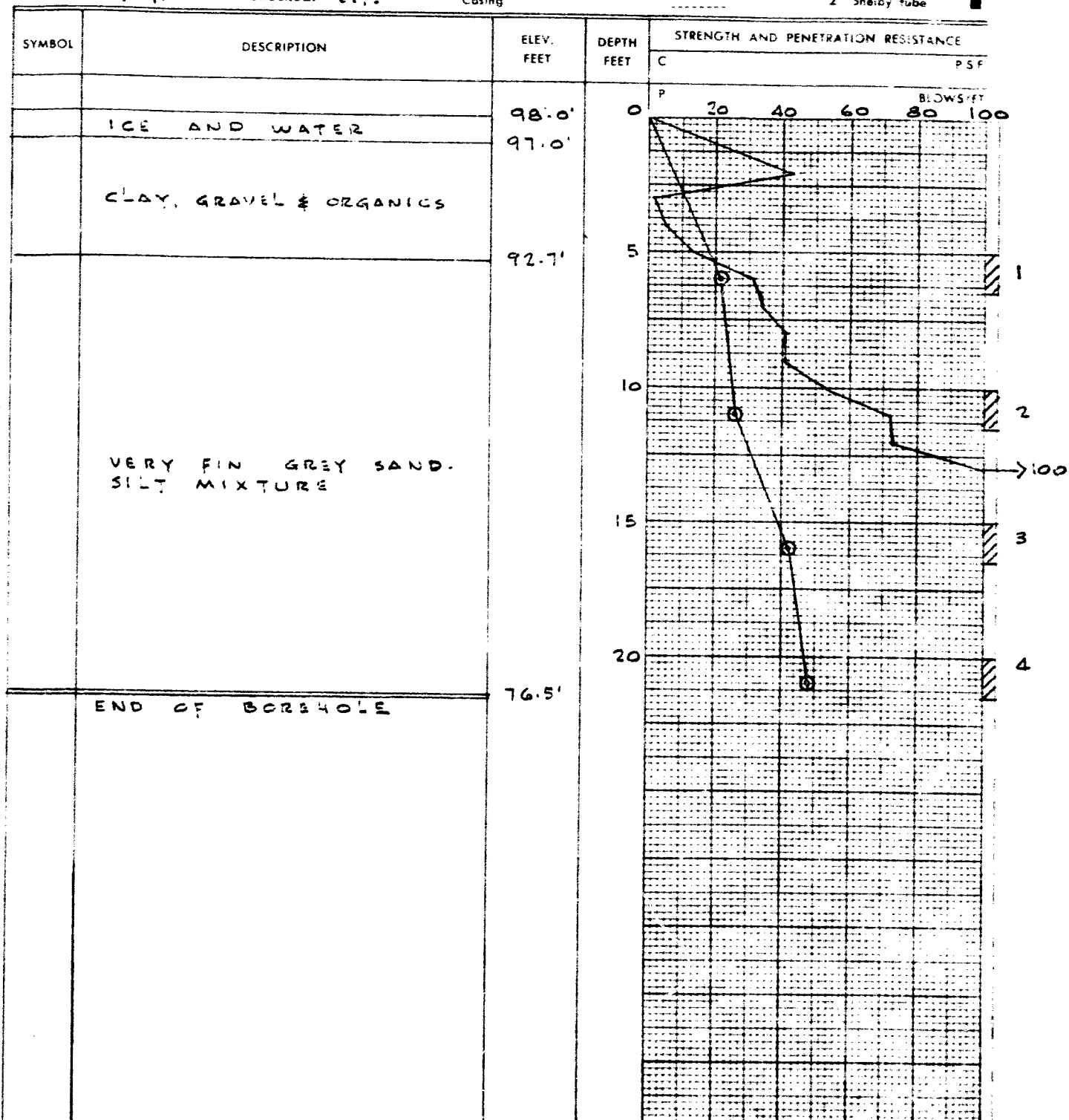
Shear Strength (C)

Unconfined compression \oplus
 Vane test and sensitivity (S) \oplus

Penetration Resistance (P)

2" Split tube \oplus
 2" Dia. Cone \oplus
 Casing \oplus

Sampling Method

2" Dia. split tube \oplus 2" Shelby tube \oplus 

PROPOSED BOWOOD BRIDGE

LOT 6 CON XII : LORD TOWNSHIP

LOT 20 CON I : EAST WILLIAMS TWP

DATE ISSUED

FEB 1/62

APPROVED

JOB NO.

4/62

SHEET NO.

183

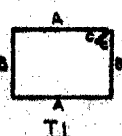
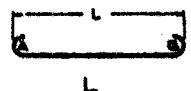
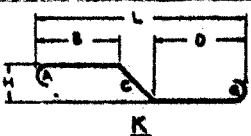
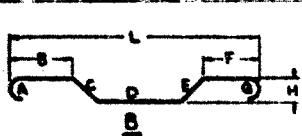
MATERIAL FOR

REFER TO DRAWINGS

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SHIP TO

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FOR FURTHER DETAIL OF TYPES SEE THE STEEL COMPANY OF CANADA, LIMITED - CHART X-117

REINFORCING DETAILS

MARK	NO. BARS	SIZE	LENGTH OF MATERIAL	TYPE	A	B	C	D	E	F	G	H	L	REMARKS
D901	32	9	37'-6"	STR										BOT DECK
D801	32	9	20'-0"	STR										" "
D701	32	7	16'-0"	STR										TOP DECK
D501	72	5	30'-6"	STR										TOP & BOT DECK - WORK
L902	64	9	20'-6"		7'-0"	3'-6"	10'-0"					10"	2'-2 1/2"	OUTSIDE OF LEG
L903	62	9	21'-0"		12'-0"	3'-6"	6'-0"					6"	2'-2 1/2"	" " "
L601	64	6	12'-0"	STR										INSIDE LEG
L602	64	6	7'-0"	1	1'-5"	4'-6"					1'-5"			FILLET UNDER DECK
L502	48	5	30'-6"	STR										LEG (HOR) BOTH SIDES
L604	48	5	8'-0"	1	1'-3"	5'-6"					1'-3"			FILLET
L605	4	5	11'-3"	STR										FILLET (VERT)
F.603	64	6	11'-1"	2	5'-0"	1'-1"					5'-0"	5"		FOOTING DOUBLES
F.503	70	5	7'-0"	1	1'-2"	4'-6"					1'-3"			FOOTING
F.504	12	5	2'-0"	STR										"
F.505	24	5	10'-10"	2	5'-0"	10"					5'-0"			"
F.506	16	5	8'-10"	STR										"
F.507	16	5	3'-3"	STR										"
F.606	4	6	4'-0"	STR										FILLET (VERT)

PROPOSED BOWOOD BRIDGE LOT 16 CON XIII LOBO TOWNSHIP LOT 20 CON I EAST WILLIAMS TWP

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4/62

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REINFORCING DETAILS

MARK	NO. BARS	SIZE	LENGTH OF MATERIAL	TYPE	A	B	C	D	E	F	G	H	L	REMARKS
W508	20	5	13-0	"										OUTSIDE FACE OF WING WALL (HOR)
W509	4	5	11-6	"										"
W510	4	5	10-0	"										"
W511	4	5	8-6	"										"
W512	4	5	7-0	"										"
W513	16	5	6-0	"										"
W514	8	5	3-6	"										BOTH FACES of WING WALL (VERT)
W515	8	5	4-2	"										"
W516	8	5	4-10	"										"
W517	8	5	5-6	"										"
W518	8	5	6-2	"										"
W519	8	5	6-10	"										"
W520	8	5	7-6	"										"
W521	56	5	12-2	"										BOTH FACES of W.W. (VERT)
W608	32	6	13-0	"										INSIDE FACE of W.W. (HOR)
W609	4	6	12-8	"										"
W610	4	6	11-11	"										"
W611	4	6	10-3	"										"
W612	4	6	10-5	"										"
W613	4	6	9-8	"										"
W614	4	6	3-11	"										"
W615	4	6	3-2	"										"

DEFECTS IN NEGATIVE DUE TO
 CONDITION OF ORIGINAL DOCUMENT

PROPOSED BOWOOD BRIDGE
LOT 16 CONJ. LOBO TOWNSHIP
LOT 20 CONJ. EAST WILLIAMS TWP

DATE ISSUED

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JOB NO.

SHEET NO.

4/62

3 of 3

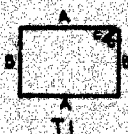
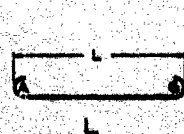
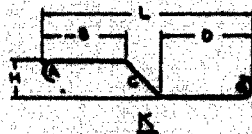
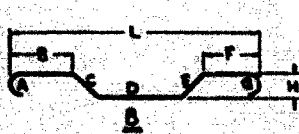
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REINFORCING DETAILS

MARK	NO. BARS	SIZE	LENGTH OF MATERIAL	TYPE	A	B	C	D	E	F	G	H	L	REMARKS
W616	4	6	7'-5"	STR										INSIDE FACE of W.W. (HOR)
W617	4	6	6'-3"											
W618	16	6	6'-0"											
C620	8	6	20'-9"	2"	10"	19'-1"								END of HANDRAIL @ TOP (HOR)
C621	16	6	20'-6"	STR										HAND RAILING (TOP & BOT)
C622	24	6	20'-6"	STR										TOP / BOTTOM of CURB
C623	8	6	10'-6"	STR										END of HANDRAIL (HOR)
C401	130	4	5'-8"	2"	8"	4"	1'-10"	2'-6"	1'-4"					CURB (VERT)
C402	48	4	5'-6"	2"	2'-6"	6"					2'-6"			HANDRAIL (VERT) AT ENDS
C403	20	4	5'-4"	2"	2'-6"	4"					2'-6"			2 / POST. (VERT)
C321	60	3	3'-2"	TI	2"	10 1/2"	5 1/2"	10 1/2"	6 1/2"		2"			HANDRAIL (VERT)
C322	20	3	2'-6"	TI	2"	4 1/2"	3 1/2"	4 1/2"	3 1/2"		2"			POSTS (HOR)
301 311	72	3	2'-8"	1										DECK LEG TIES
302 310	72	3	2'-10"	1										"
303 304 309	108	3	3'-1"	1										"
305 309	72	3	3'-4"	1										"
306 307	72	3	3'-7"	1										"
312	36	3	2'-6"	1										"
313	36	3	2'-4"	1										"
314	36	3	2'-3"	1										"
315 316	72	3	2'-2"	1										"