

65-F-274M

WADDINGHAM'S BRIDGE

SALMON RIVER

1850 Jane Street  
Weston, Ontario  
241-4644

William A. Trow  
**BA 2023**  
↓  
**Associates Ltd.**

Project: J1816

Soil Mechanics  
Consultants  
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MSc. MEIC. P. Eng.  
K. Peaker  
PhD. MEIC. P. Eng.  
D. H. Shields  
PhD. MEIC. P. Eng.

C. C. Parker & Associates Limited,  
705 Main Street West,  
Hamilton, Ontario.

February 22, 1965.

Attention: Mr. D. C. Cramm, P. Eng.

Re: Waddingham's Bridge, Salmon River,  
Hastings County  
Foundation Investigation

Dear Sirs:

In conformance with your authorization of Jan. 26, 1965, we have made an investigation of subsoil conditions at the above noted river crossing in Tyendinaga Township.

The field work associated with this study consisted of two borings and two adjacent cone tests taken 5 to 10 feet into bedrock for a maximum penetration of 37 feet, or about 25 feet below river bed level. This work was done during the period February 2nd to February 6th. Our preliminary report on this subject was sent by letter dated February 11th.

Our findings and recommendations arising out of this survey briefly are as follows:

1) The site of this proposed bridge replacement lies in a broad limestone plain which has a covering of boulder till drift. Heavy concentrations of drumlin hills lie immediately to the south. Boulders have been reported in adjacent excavations by local residents and, it is understood, that the river bed was recently scraped clear of boulders by dozer equipment.

C. C. PARKER AND ASSOCIATES LIMITED	
REC'D	<i>E. C. Parker</i>
READ BY	
COPY TO	
REP'D BY	
DATE	
ROUTING	



- 2) Silty sand and gravel extending to a depth of about 8 feet or about 3 feet above river bed level comprises the road fill approaches to the bridge. The natural soil below consists of a dense deposit of boulder till, comprising frequent slabs and boulders of limestone and granite in a matrix of sandy silt. This material, in turn, is underlain at relative El 75 feet or about 15 feet below river bed level by sound limestone bedrock.
- 3) It is recommended that the new bridge structure be founded in the boulder till deposit at just sufficient depth for scour protection. A penetration of about 4 feet or about 2 feet below river bed level is considered to be sufficient. A bearing value of 2 tsf is recommended for the design of footings at this depth. This value is probably quite conservative but it allows for the possibility that the boulder till may be slightly less dense than the difficult sampling in this material would indicate.
- 4) Rip rap should be provided in front of the abutments as a protection against possible erosion. There appears to be enough stones and boulders in the vicinity for this purpose.
- 5) Excavation to the footing depth suggested will be about 4 to 5 feet below water level. Since the boulder till matrix is relatively impermeable, it will provide a stable base for excavation. Assuming that the river is kept out by means of a cofferdam, any water present in the excavation can be disposed of by simple pumping from sumps.
- 6) It is understood that the road grade may be raised about 4 feet. Because the soil is dense and essentially granular, no embankment stability problem is expected as a result of this load addition.



7) With granular fill the earth pressure coefficient to use in computing pressures against the abutment walls is estimated to be in the order of  $K_a = 0.25$ . The coefficient of sliding between the base of the abutment and the till is estimated to be equal to or greater than 0.7.

The foregoing comments represent our consideration of the soil mechanics aspects of this construction. The soil types are described in sufficient detail in the borehole logs and therefore no purpose is served by a repetition of this advice. Since the foundation requirements appear to be relatively straightforward, we shall take the liberty to present the foregoing remarks as our report on the project.

If you have any queries regarding conditions at this site, or if you require amplification of any statement, we shall be pleased to discuss them with you.

Yours very truly,

W. A. Trow, P. Eng.

WAT/chm

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


SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION

## LEGEND




DRAWING NO. 2.  
PROJECT NO. J1816.

BOREHOLE NO. 1.  
PROJECT. Proposed Waddingham's Bridge Replacement.  
LOCATION. Salmon River near Lonsdale.  
HOLE LOCATION. N.W. corner of bridge.  
HOLE ELEVATION. 102.2 ft.  
DATUM. Top of west side of south abutment taken = 100.0.

### PENETRATION RESISTANCE

2" O.D. SPLIT TUBE   
2" I.D. SHELBY TUBE   
2" DIA. CONE 

### SHEAR STRENGTH




UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE   
UNCONFINED COMPRESSION   
VANE TEST AND SENSITIVITY (S) 

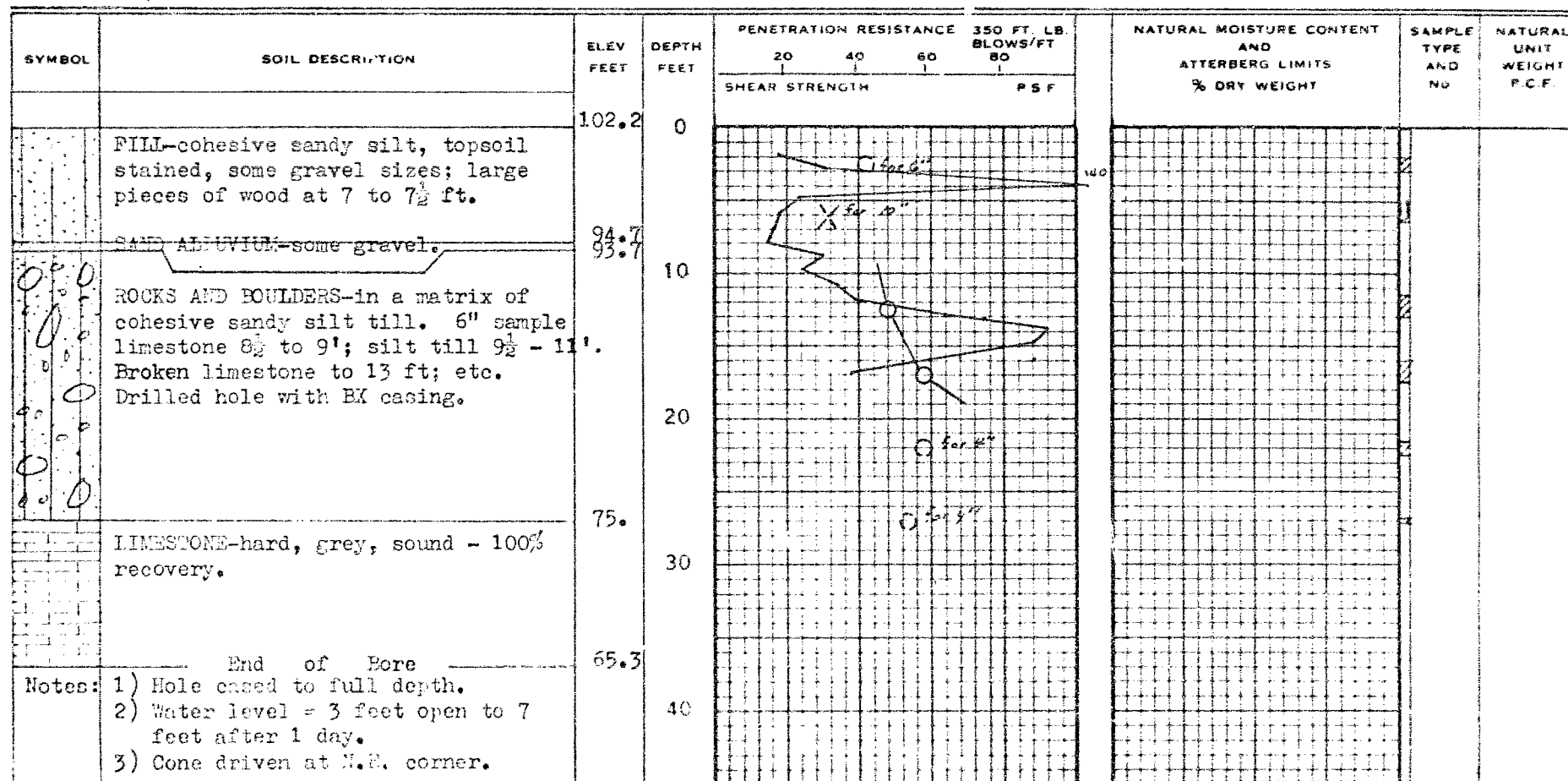
NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

### ATTERBERG LIMITS

LIQUID LIMIT   
PLASTIC LIMIT 

### SAMPLE TYPE

2" O.D. SPLIT TUBE   
2" I.D. SHELBY TUBE   
3" O.D. SHELBY TUBE 



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## LEGEND

DRAWING NO. 3  
PROJECT NO. J1916

BOREHOLE NO. 2  
PROJECT Waddingham's Bridge.  
LOCATION Hastings County.  
HOLE LOCATION S.E. Corner Bridge.  
HOLE ELEVATION 100.9 ft.  
DATUM See Dwg. 1.

### PENETRATION RESISTANCE

2" O.D. SPLIT TUBE —○—○—○—  
2" I.D. SHELBY TUBE —+—+—+—+—  
2" DIA. CONE —————

### SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE ⊕  
UNCONFINED COMPRESSION ⊙  
VANE TEST AND SENSITIVITY (S) ⊕<sup>s</sup>

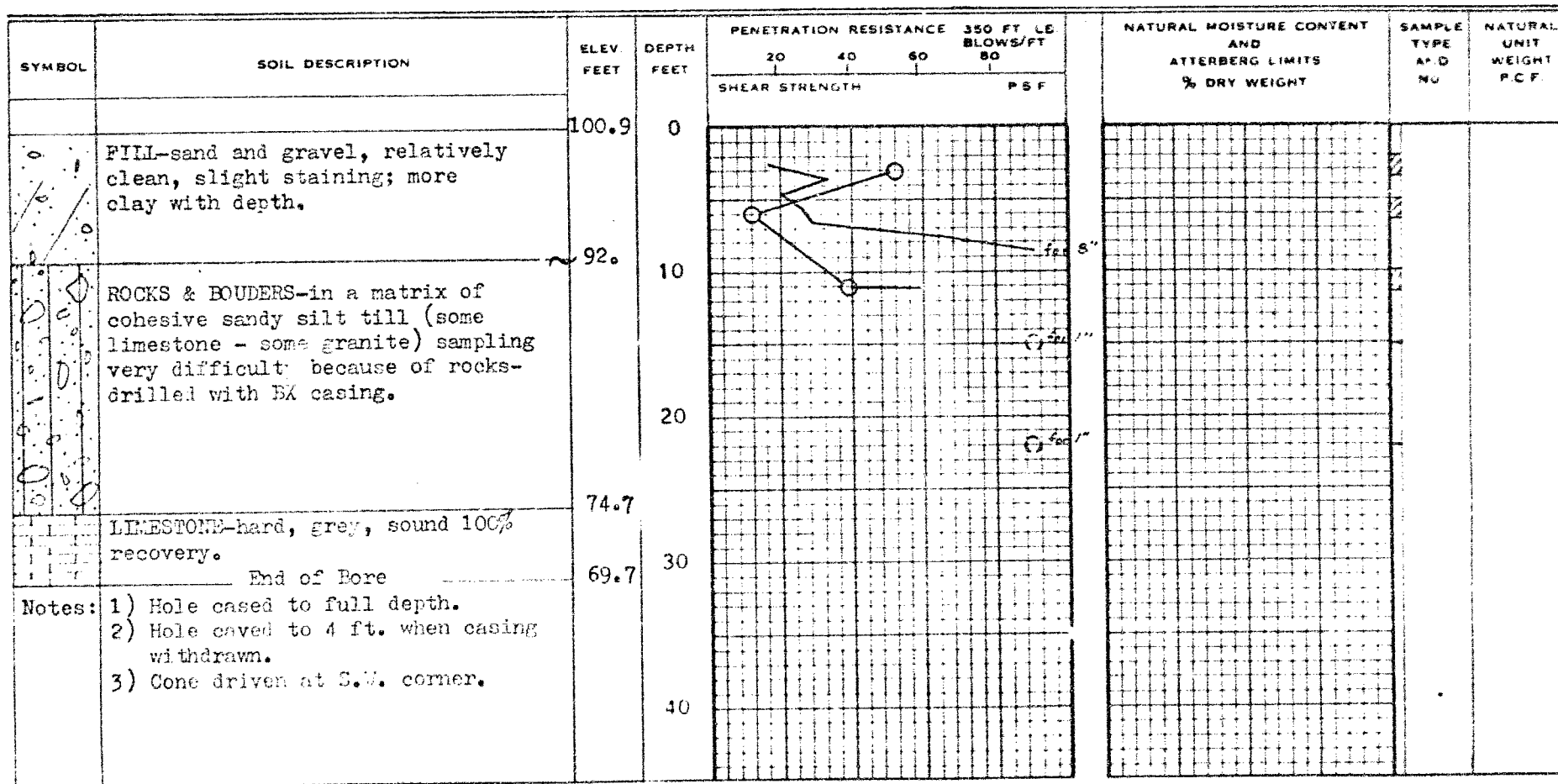
NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX

### ATTERBERG LIMITS

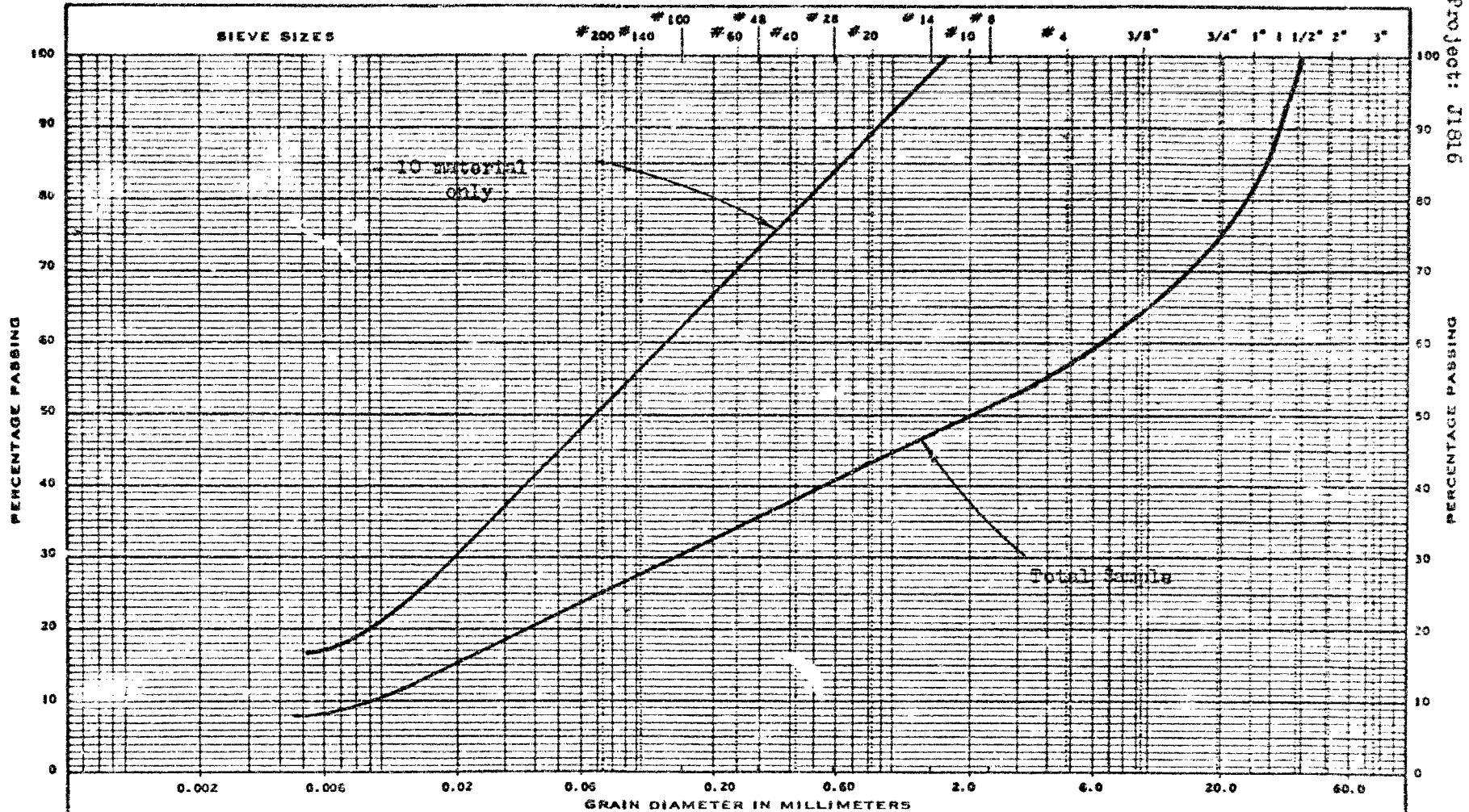
LIQUID LIMIT —○—  
PLASTIC LIMIT —+—

### SAMPLE TYPE

2" O.D. SPLIT TUBE —■—  
2" I.D. SHELBY TUBE —■—  
3" O.D. SHELBY TUBE —■—



# MECHANICAL ANALYSIS

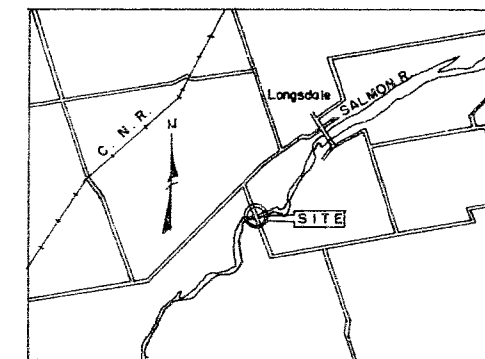
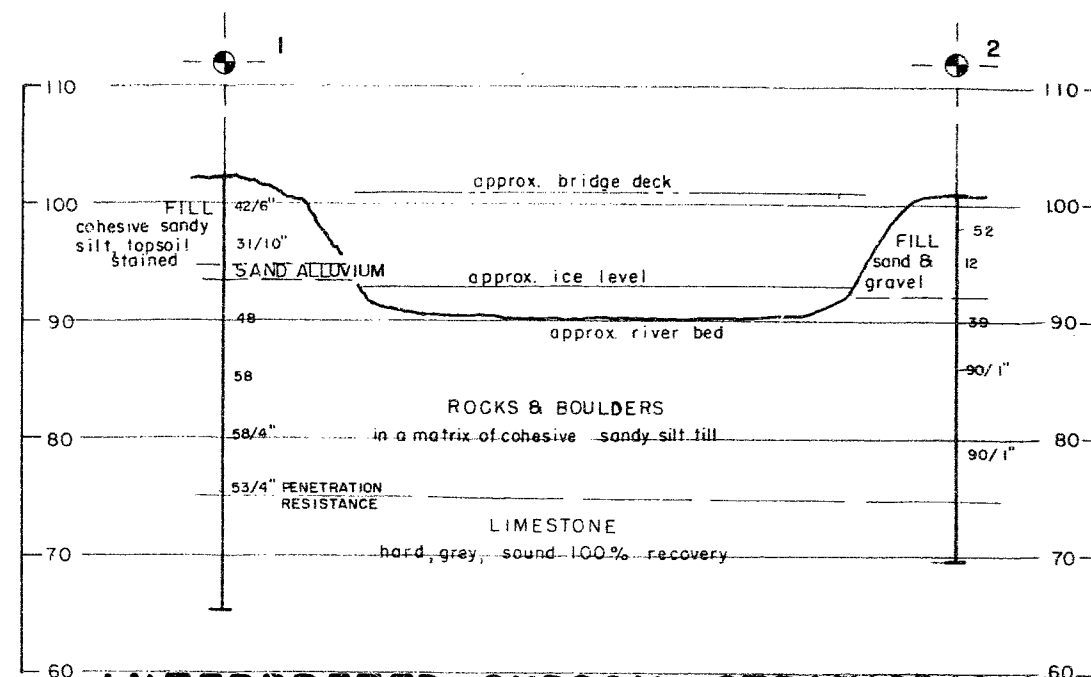
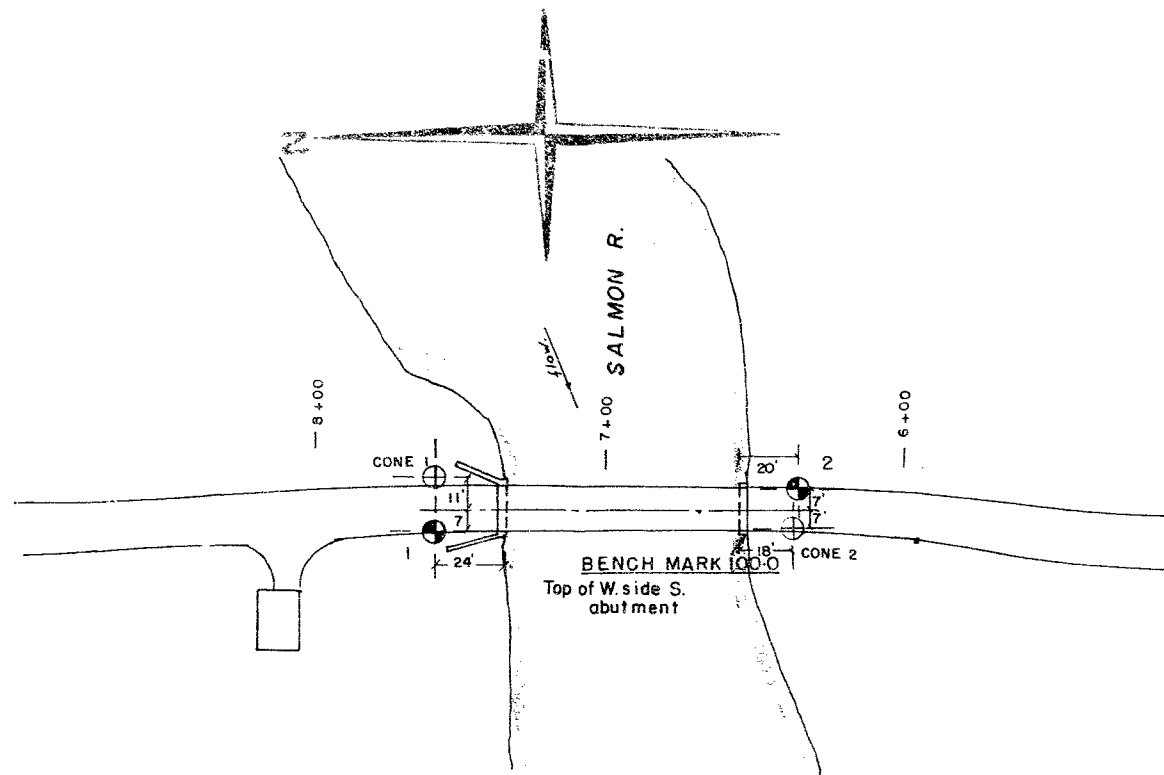


CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION						PROPOSED WADDINGHAM'S BRIDGE WILLIAM A. TROW AND ASSOCIATES LTD.				
GRADING ANALYSIS - SAMPLE OF TILL Hole 1 - 16 - 17½ Ft.										

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PERCENTAGE PASSING

Fig. 4.



- 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.

William A. Trow & Associates Ltd.  
FOUNDATION INVESTIGATION

**PROPOSED WADDINGHAM'S  
BRIDGE REPLACEMENT**

SALMON R. NEAR LONGSDALE  
CO. HASTINGS ONTARIO

PROJ 1816 DATE FEB. 1965 DWG. No. 1