

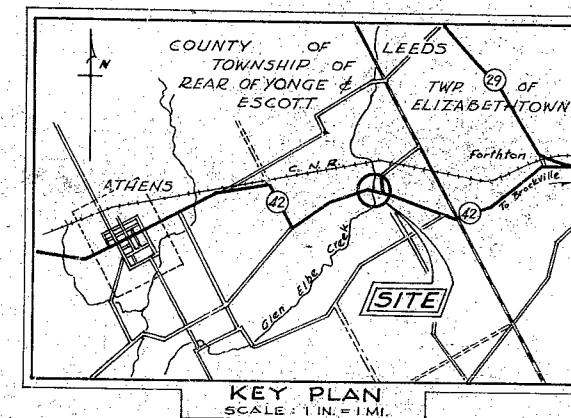
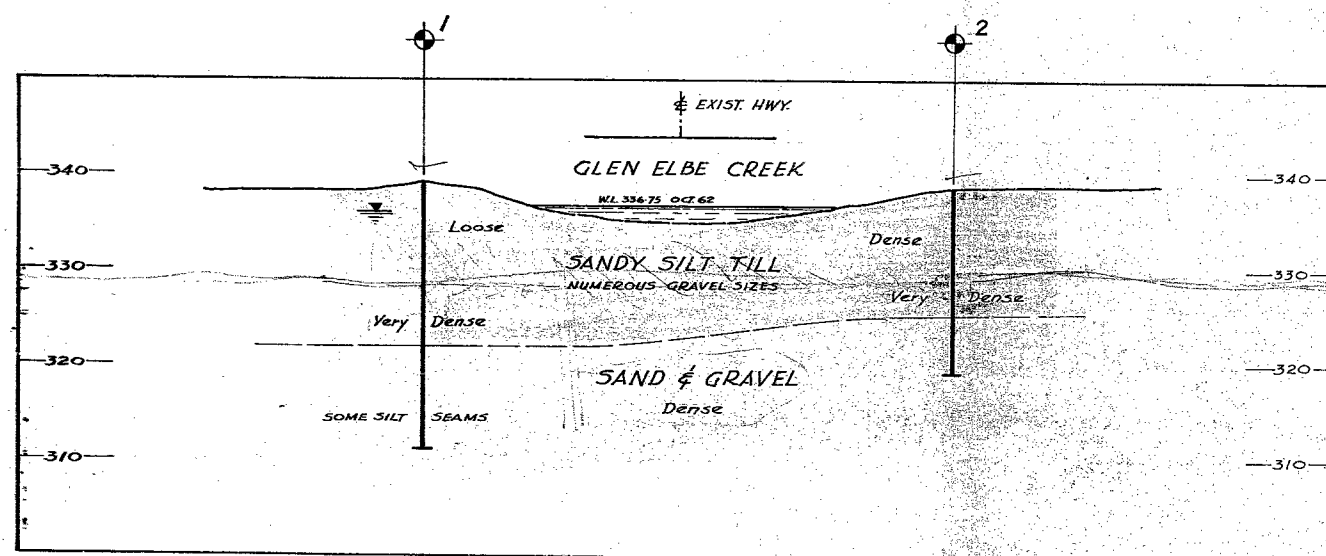
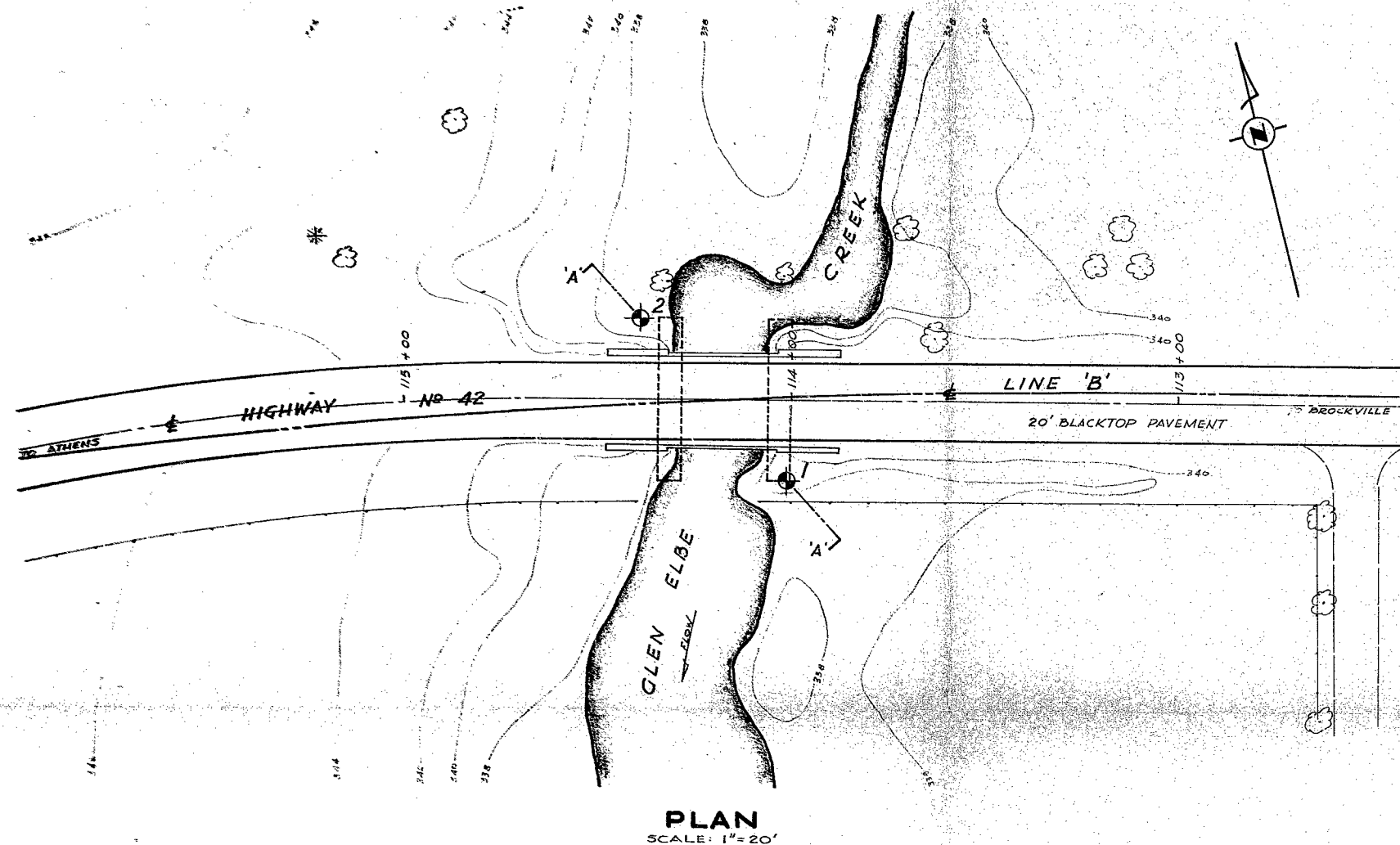
63-F-212-C


W.P. # 99-61

HWY. # 42 &

GLEN ELBE

CREEK X-ING



LEGEND			
 BOREHOLE			
NO	ELEVATION	STATION	OFFSET
1	339.1	114+01	21' LT.
2	338.5	114+39.5	21' RT.

WILLIAM A. TROW & ASSOCIATES LTD.
FOUNDATION INVESTIGATION
PROPOSED BRIDGE REPLACEMENT
**GLEN ELBE CREEK &
KINGS HIGHWAY NO 42**
ATHENS-ONTARIO
PROJECT NO J 1013 W.P. NO 99-61 DATE DEC. 62 DWG. 1

Mr. A. M. Toye,
Bridge Engineer,
Bridge Division.

Attention: Mr. S. McCombie.

Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials and Research Division.

January 25, 1963

FOUNDATION INVESTIGATION REPORT BY -
Wm. A. Trow and Associates, Limited,
Proposed Crossing Glen Elbe Creek,
Hwy. #42 near Athens, Ontario.
W.P. 99-61 -- Dist. #8.

Attached, we are forwarding to you the above-mentioned report submitted by the Consultant, W. A. Trow & Associates, Ltd. of Toronto.

We have reviewed the report and find the factual data well presented, and we also agree with the foundation recommendations. Concerning dewatering, however, we would like to emphasize that the proposed procedure is just one way of dewatering, i.e., one alternative. The final choice should be left to the Contractor. We should, on our part, just draw the Contractor's attention to the fact that boiling conditions could develop due to the unbalanced head of water if normal sump pumping from the foundation excavation is carried out and that, therefore, an appropriate dewatering procedure should be applied.

Concerning the dewatering procedure recommended by the Consultant in his report, we would like to point out that it is uncertain whether pumping from a trench in the middle of the creek and having the bottom at elev. 329.0 would sufficiently decrease the uplift pressures at the footing locations having elev. 330.0, to prevent boiling.

AGS/MdeF
Attach.

cc: Messrs. A. M. Toye (2)
H. A. Tregaskes
H. D. McMillan
J. Ford
E. A. Cash
J. E. Gruspier
T. J. Kovich
J. Roy
E. R. Saint
F. Norman
A. Watt
Foundations Office
Gen. Files.

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

WILLIAM A. TROW AND ASSOCIATES LTD.

SITE INVESTIGATIONS
LABORATORY TESTING
SOIL MECHANICS CONSULTATION

BA 1576

W. A. TROW. M.A.Sc., M.E.I.C., P.ENG.

1850 JANE ST.,
WESTON, ONT.
CH. 1-4644

Project: J1013

January 21, 1963

Mr. A. Rutka, P.Eng.,
Materials & Research Engineer,
Materials & Research Section,
Department of Highways of Ontario,
Parliament Buildings,
Toronto, Ontario

Attention: Mr. A.G. Stermac

Re: Foundation Conditions - Proposed Bridge Replacement
Over Glen Elbe Creek - Hwy. 42 East of Athens

Dear Sirs:

This letter constitutes our report on the foundation conditions existing under this bridge site. Since dense, competent sandy silt till materials underlie this crossing at relatively shallow depth and, consequently, since no serious foundation problem exists, we take the liberty to be brief in our submission to you.

Our observations and conclusions arising out of this survey are outlined briefly in the sections that follow.

SITE

The Glen Elbe Creek flows in a general north - south direction in a low valley which passes through gently rolling countryside. At this location, it is about 3 miles east of Athens, Ontario. The creek banks adjacent to the highway crossing are low, and there is no visual evidence of scouring. The creek banks and bed are strewn with gravel and larger stones.

The normal flood level of the creek is approximate El 340 feet, although this level depends on the amount of ice jammed in the channel. During one period of flooding, the school yard, to the northeast of the bridge, was covered with water. A well in this school yard, at Sta 113+00 90 feet right, is 17½ feet deep and the water in it is at El 341.9 feet.

Bedrock is reported at 5 feet in a well by a farm house at Sta 117+40.

SUBSOIL

Two borings were made at diagonally opposite corners of this site at the locations shown on Dwg. 1. The subsoil, described in the logs for these holes, consists of sandy silt till which becomes very dense below El 330 feet and ranges from loose to dense above this level. The silt content decreases below El 322 feet approximately. The holes were terminated at a maximum depth of 28 feet.

Typical gradings of the soil at and just below foundation level are indicated in Dwgs. 4 and 5.

FOUNDATIONS

The proposed bridge replacement for this location will be a simple span structure having a length of approximately 28 feet. Support of this bridge on simple footings bearing at El 330 feet, or about 6 feet below the creek bed and $7\frac{1}{2}$ feet below the river surface, is recommended. The soil above this depth in the hole 1 location, is too loose for satisfactory support, although an upper bearing limit at El 332 feet could be considered with reduced bearing value.

On the basis of penetration resistance measurements, the safe net bearing value to apply at El 330 feet is 8 tsf, and this reduces to 4000 psf at El 332 feet. These pressures make allowance for submergence. The settlement associated with these loadings should be well within tolerable limits.

The only difficulty associated with this recommendation is that excavations for the footings will range from 5 to 7 feet below the river surface. However, since there is no space restrictions in this area, it will be possible to make a wider, more freely-draining excavation, provided that measures are taken to control uplift pressures.

The soil becomes more granular below these recommended levels, and therefore it is conceivable that uplift of the footing base will occur if the water pressure in this lower material is not controlled. To obtain this control in an economic manner and to maintain the present competent state of the soil at El 330 feet, the following excavation procedure should be followed.

The creek should be diverted well to the east of the present location and the water should be drained out of the present channel in the bridge area. When this is done, machine auger holes about 5 inches in diameter should be drilled to 20 feet along the creek bed, midway between the proposed footings and for the full width of the bridge. A hole spacing of 10 feet is suggested. These holes should be backfilled immediately with concrete sand and then pea gravel. They will act as wicks to permit the permeable soil below El 325 feet to drain. A back-hoe trench should be dug along the line of these holes to El 329 feet.

One foot of well-graded pit run gravel should be placed over the bottom of the trench and pumping from it should then proceed.

After the water level has been depressed, the excavation work for the footings can proceed. When the bearing level has been reached, a skim coat of weak concrete should be poured over it to provide a dry base for footing construction. Under no circumstance should pumping operations in the sump be terminated until the concrete of the footings has hardened.

After the footings are poured and abutments installed, the sump must be backfilled with sand and gravel with the top 2 feet consisting of coarser stone sizes. Similar material should be placed as backfill in the excavations around the sides of the footings adjacent to the stream channel. This is necessary, in order to prevent scouring of the river bed.

The raising of the road level with approximately 5 feet of fill should, in no way, affect the stability of the bridge or produce any settlement of consequence.

If you have any queries concerning the information and comments submitted in this brief report, we shall be pleased to discuss them with you.

Yours very truly,



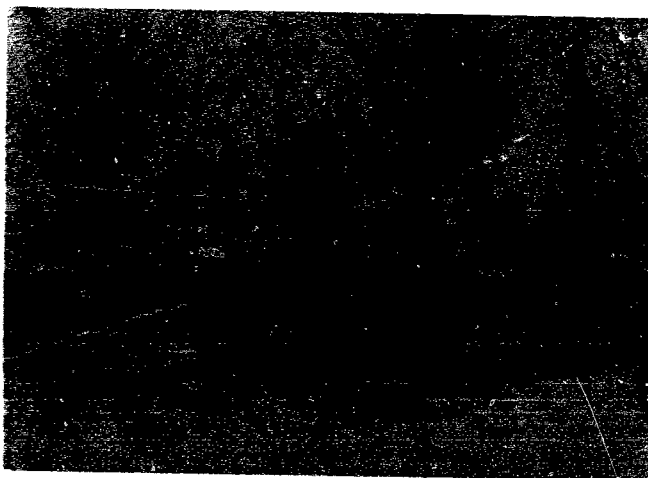
WAT/gc
Encls.

W. Trow

William A. Trow, P.Eng.



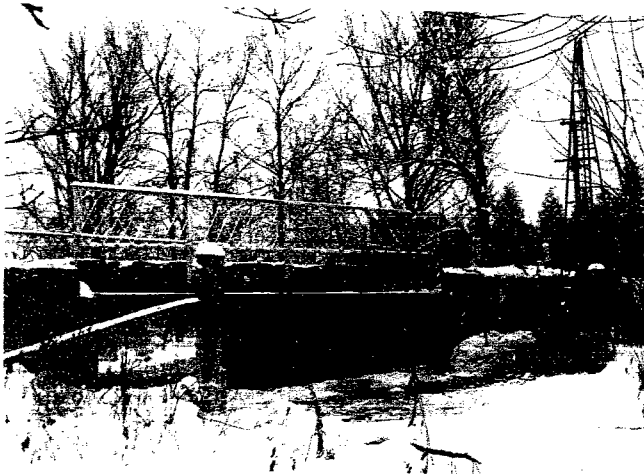
Looking East - Drill on B.H. 1



South Side of Ex. Bridge - Drill on B.H. 1



Looking East - Drill on B.H. 1



South Side of Ex. Bridge - Drill on B.H. 1



North Side of Ex. Bridge
Stick in Ground Indicates B.H. 2



North Side of Ex. Bridge
Stick in Ground Indicates B.H. 2

WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS · SOIL MECHANICS CONSULTATION

DRAWING No. 2
PROJECT No. J1013

LEGEND

PENETRATION RESISTANCE

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

SHEAR STRENGTH

UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE ⊕
UNCONFINED COMPRESSION ⊗
VANE TEST AND SENSITIVITY (S) +^s

NATURAL MOISTURE CONTENT AND LIQUIDITY INDEX X^{LI}

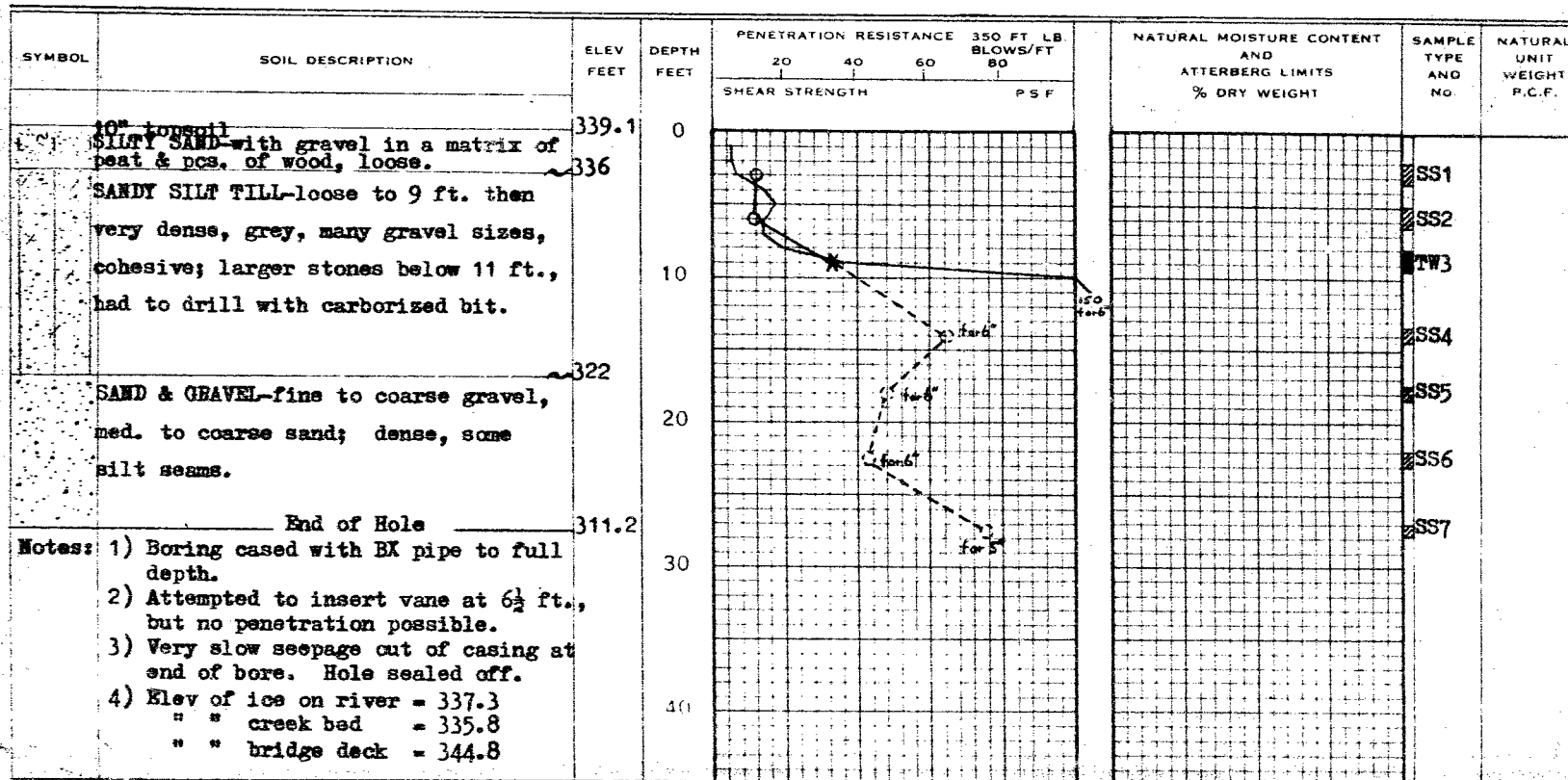
ATTERBERG LIMITS

LIQUID LIMIT —○—
PLASTIC LIMIT ———

SAMPLE TYPE

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

BOREHOLE No. 1
PROJECT Proposed Crossing, Glen Elbe Creek,
LOCATION Hwy. 42, Athens, Ontario
HOLE LOCATION See Dwg. 1.
HOLE ELEVATION 339.1 ft.
DATUM _____



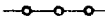
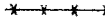

WILLIAM A. TROW & ASSOCIATES LTD.

SITE INVESTIGATIONS SOIL MECHANICS CONSULTATION




DRAWING NO. 3
PROJECT NO. J1013

LEGEND

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 

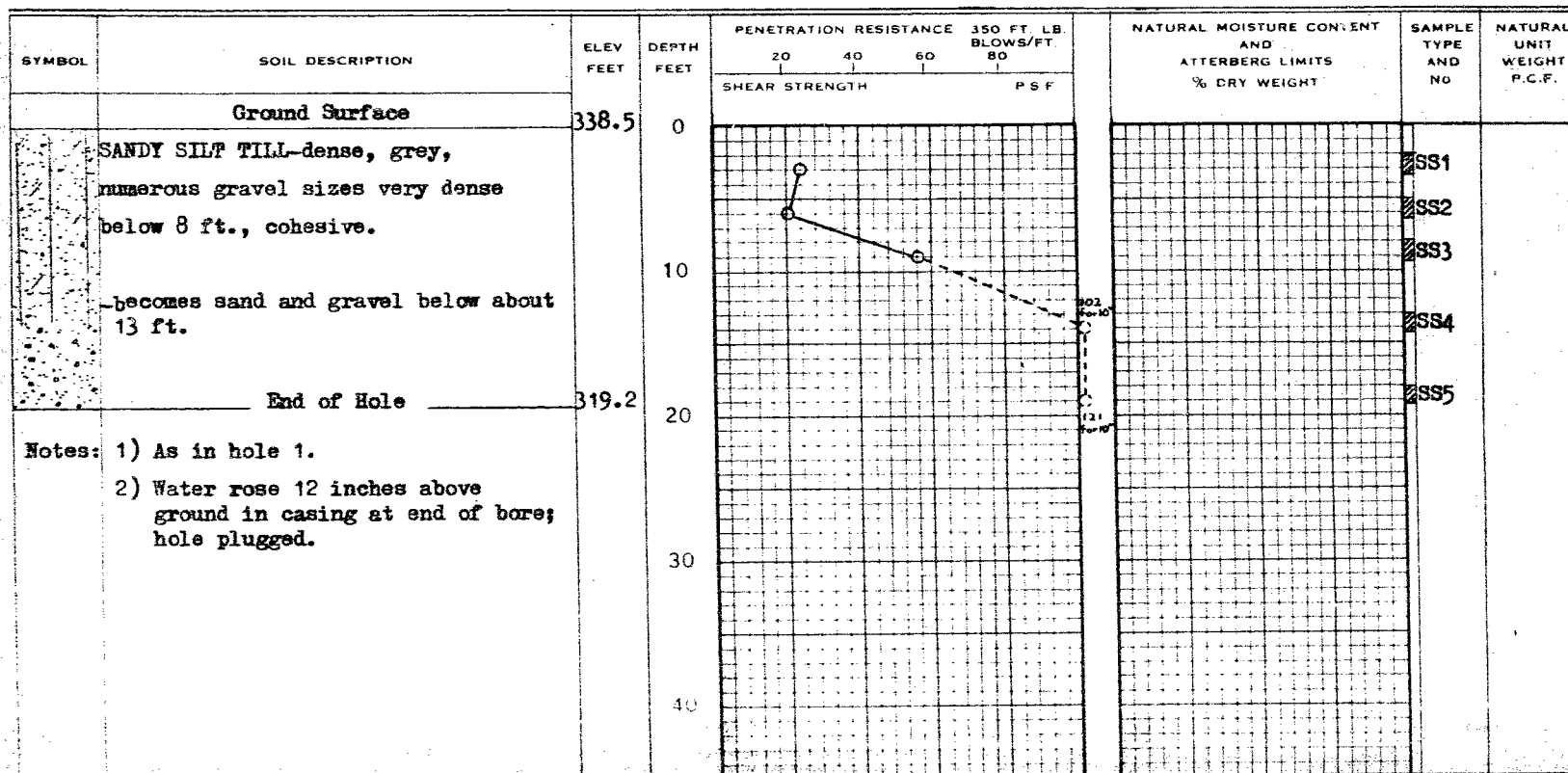
ATTERBERG LIMITS

LIQUID LIMIT 
PLASTIC LIMIT 

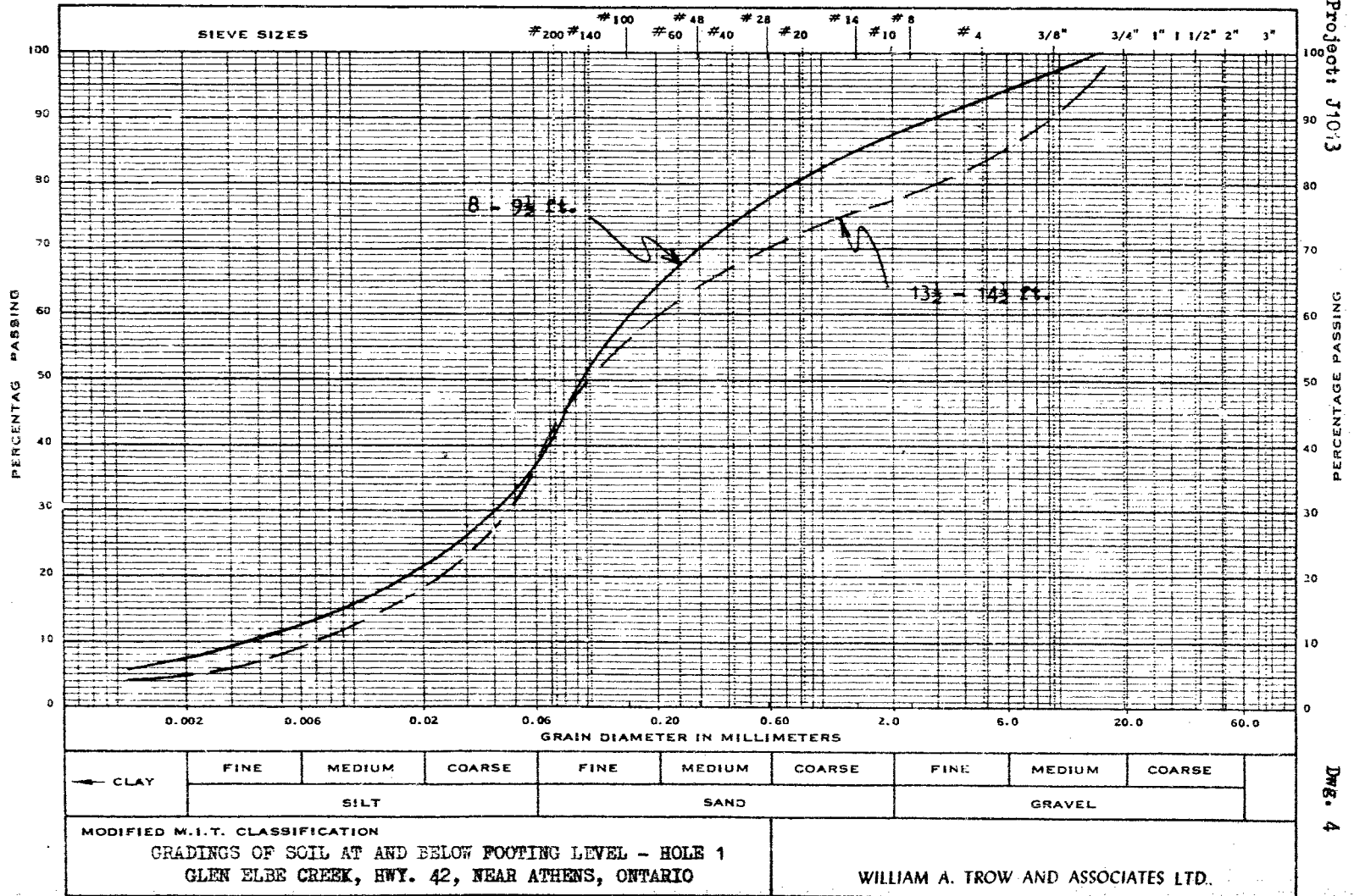
SAMPLE TYPE

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

BOREHOLE NO. 2
PROJECT Proposed Crossing, Glen Elbe Creek
LOCATION Hwy. 42, Athens, Ontario
HOLE LOCATION See Dwg. 1.
HOLE ELEVATION 338.5 ft.
DATUM _____



MECHANICAL ANALYSIS



MECHANICAL ANALYSIS

