

#63-F-276 M

CULVERT SITE

TOWN LINE

BRIDGE CONTIV

BLENHEIM TWP.

WILLIAM A. TROW AND ASSOCIATES LTD.

SITE INVESTIGATIONS
LABORATORY TESTING
SOIL MECHANICS CONSULTATION

BA 1598

63-F-276M

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

1850 JANE ST.,
WESTON, ONT.

Project: J1018

January 18, 1963

CH. 1-4644

C.C. Parker and Associates Ltd.,
795 Main Street West,
Hamilton, Ontario

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

Re: Culvert Site - Town Line Bridge, Concession
Township of Elenheim, South West of Drummond, Ontario

Dear Sirs:

This letter constitutes our final report on the subsoil conditions encountered at this bridge site. The information contained in this submission is essentially similar to the preliminary advice mailed to you in our letter of December 24th. Consequently we shall take the liberty to be very brief.

SITE AND PROJECT

The site of this creek crossing lies in very swampy ground a few hundred feet south of Hwy. 401 on the above noted township road. The existing timber plank bridge is only about 14 inches above the level of the stream. The flow of the creek is sluggish and it passes in an easterly direction at this point.

It is proposed to replace this structure either with a flexible culvert bearing on a granular bed, or with a pile-supported small bridge. The choice of design will be determined, in large part, by the depth of organic deposits below the creek bed.

SUBSOIL

One cased boring was made at the north east corner of the bridge to a sampled depth of 35 feet and to a penetration depth of 40 feet. The results of this boring are presented in Dwg. 2, and the location of the hole is indicated on Dwg. 1.

| | |
|----------------------------------------|-------------------|
| C. C. PARKER AND ASSOCIATES LIMITED | |
| REC'D | <i>March 8/63</i> |
| READ BY | |
| COPY TO | |
| REPLY BY | |
| ROUTING | |

It is noted that organic silty mud, with organic fibres and pieces of wood, extends to a depth of approximately 13 feet, or about 11 feet below the stream bed. It is underlain by medium dense to dense medium to coarse sand, which contains thin layers of clayey till between 19 and 30 feet.

Refusal to the two inch cone was encountered at a depth of 40 feet. Sampling was terminated at 35 feet in dense coarse sand and gravel.

FOUNDATIONS

In our letter of December 24th, we suggested that a flexible culvert was feasible at this site, since only about 13 feet of organic material had to be removed. Since the organic swamp deposits seemed quite fibrous, we felt that the sides of the underwater excavation should remain reasonably stable, although some sloughing would occur. In order to ensure positive penetration through any remaining mud slurry after the excavation was completed, we recommended that the first two to three feet of granular fill should consist of large stones. The mud should be displaced into the voids of the stones, which in turn should develop positive contact with the underlying sand. Well graded pit-run gravel could be used above this level to provide a base for the culvert.

This granular pad should extend a sufficient distance beyond the extremities of the culvert in order to ensure that all load is carried by it. Consequently the backfilled area should extend out from the bearing surface a distance approximately equal to $\frac{3}{4}$ the depth of the granular fill below invert level. This recommendation is based upon a load spread of 37 degrees, which is quite conservative.

Compaction of the granular fill will not be obtained underwater, and therefore some small amounts of settlement can be anticipated after traffic has passed over the bridge. Light rip-rap protection should be provided around the entry and exit parts of the culvert.

The alternative method of support is timber piles driven into the dense sand and gravel underlying the swamp deposits. It is anticipated that refusal will be encountered at an approximate depth of 30 feet. A safe load of 20 tons per pile should be available at this level.

We shall be pleased to discuss any queries you may have after you have examined this information.

Yours very truly,

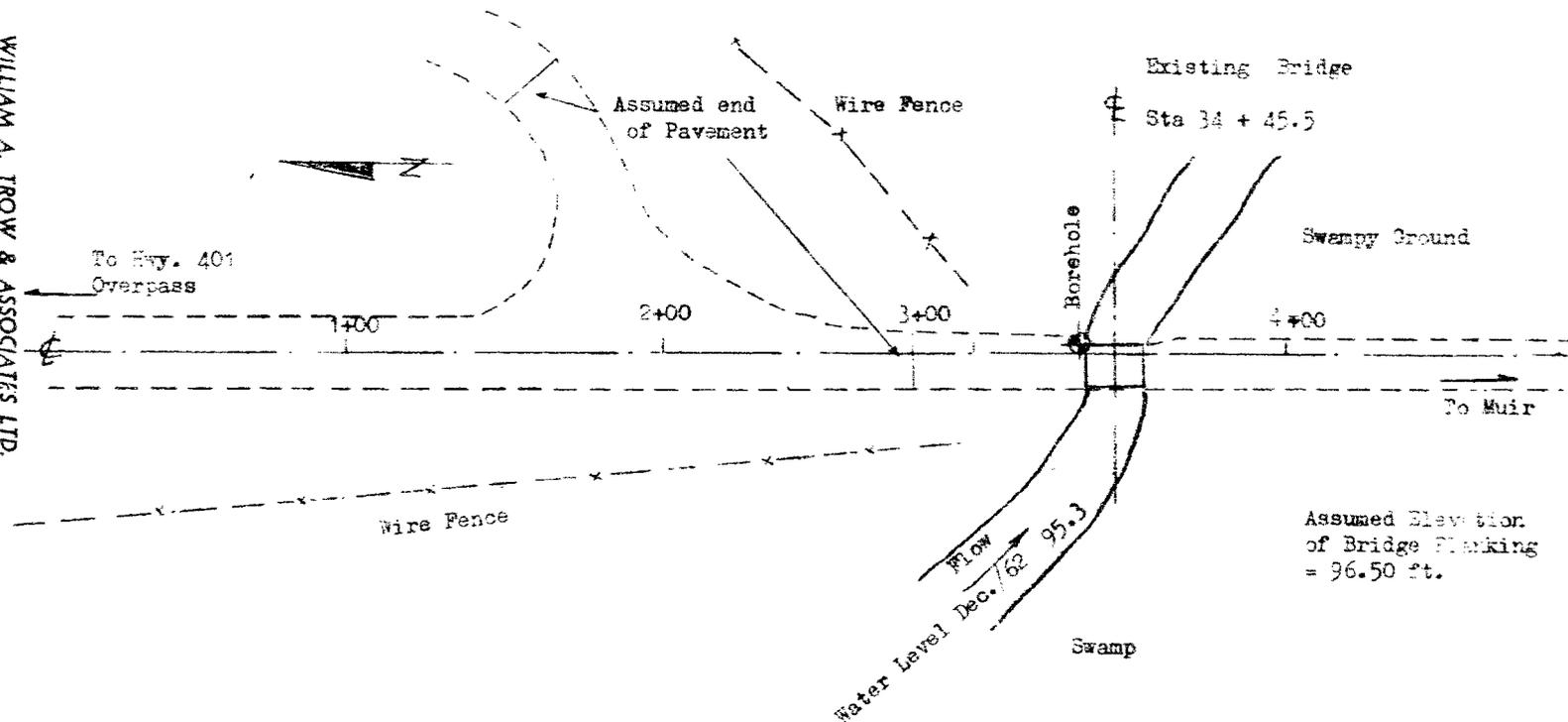


WAT

William A. Trow, P.Eng.

WAT/gc
Encls. DwgS. 1 & 2

WILLIAM A. TROW & ASSOCIATES LTD.



BOREHOLE LOCATION PLAN OF CULVERT SITE

S.W. DRUMBO NEAR HIGHWAY 401

Scale 1" = 50'

PROJECT NO. J1018

DRAWING NO. 1

WILLIAM A. TROW & ASSOCIATES LTD.

SOIL INVESTIGATIONS SOIL MECHANICS CONSULTATION

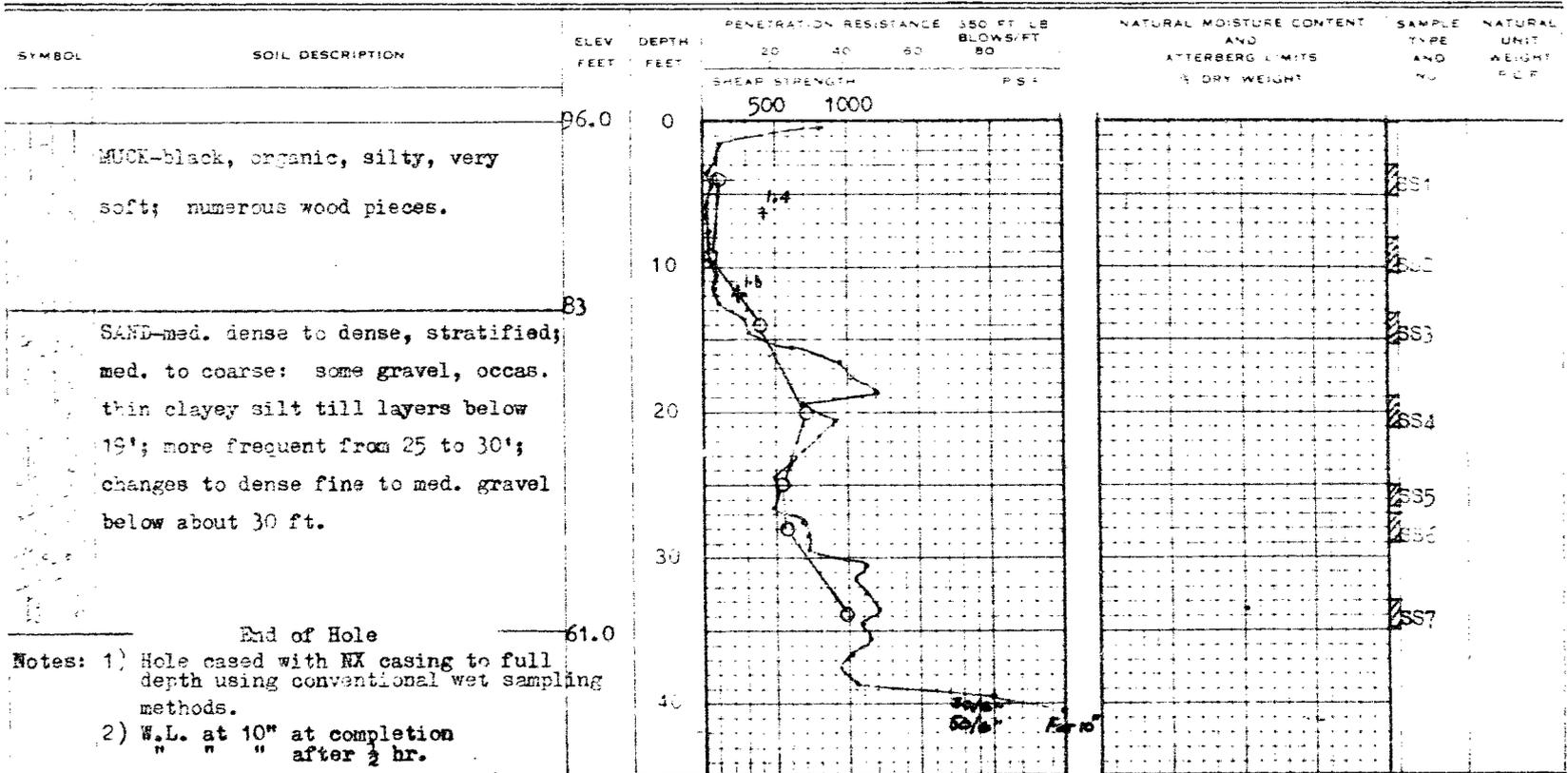
DRAWING NO. 2
PROJECT NO. 1018

LEGEND

BOREHOLE NO. 1
PROJECT Culvert Site
LOCATION S.W. of Drumbo, near Hwy. 401
HOLE LOCATION N.E. corner of Existing Bridge
HOLE ELEVATION See Dwg. 1.
DATUM Deck of existing bridge; Assumed - 96.5'
(See Dwg. 1.)

PENETRATION RESISTANCE
 2" O.D. SPLIT TUBE 
 3" O.D. SHELBY TUBE 
 2" DIA. CONE 
 SHEAR STRENGTH
 UNDRAINED TRIAXIAL AT OVERBURDEN PRESSURE 
 UNCONFINED COMPRESSION 
 VANE TEST AND SENSITIVITY  ^s

NATURAL MOISTURE CONTENT AND LIQUID LIMIT 
 ATTERBERG LIMITS
 LIQUID LIMIT 
 PLASTIC LIMIT 
 SAMPLE TYPE
 2" O.D. SPLIT TUBE 
 2" O.D. SHELBY TUBE 
 3" O.D. SHELBY TUBE 



Notes: 1) Hole cased with NX casing to full depth using conventional wet sampling methods.
 2) W.L. at 10" at completion
 " " " after 1/2 hr.
 3) Elev. of stream bed approx. El 94 ft.