J. D. LEE ENGINEERING LIMITED
CONSULTING ENGINEERS
P. O. BOX 1267
155 DIVISION STREET
KINGSTON, ONTARIO K7L 4Y8

TOWN OF NAPANEE
WATER POLLUTION CONTROL PLANT
STAGE 2 CONTRACT. SOIL INVESTIGATION

JOB #1796

OCTOBER 1977

SITE INVESTIGATION SERVICES
LIMITED

677 CROWN DRIVE PETERBOROUGH, ONT. PHONE 743-6850

October 5, 1977

J.D. LEE ENGINEERING LIMITED
Consulting Engineers
P. O. Box 1267
155 Division Street
KINGSTON, Ontario K7L 4Y8

Attention: Mr. J. D. Lee, P. Eng.

Re: Town of Napanee, Water Pollution Control Plant
Stage 2 Contract. Soil Investigation

Dear Sir:

We have completed an evaluation of soil conditions for the above project. This letter describes soil and groundwater conditions encountered in seven boreholes and discusses requirements for the design and construction of foundations for the proposed structures.

Borehole locations, as shown on Figure 1, were generally as shown on your drawing 1209C, sent to us on September 21, 1977. However, two of the boreholes had to be shifted to avoid trees and the existing sludge drying beds.

SOIL CONDITIONS

Soil Profile - Soil profile and test data at the boreholes are summarized on Figures 3 to 8 and a general soil profile is shown on Figure 2.

Native soils consist of 18 to 25 feet of layered silty clay underlain by 2 to 5 feet of layered sandy silt to silty fine sand. At holes 4, 5, 6 and 7 the silty sand - sandy silt stratum is underlain by bedrock while at borehole 1 there is a thin layer of stony clayey silty sand till separating the bedrock and sandy silt layer. Boreholes 2 and 3 were terminated in the silty sand stratum. The native soils have been covered by 4 to 6 feet of gravel fill and rubble fill near holes 1, 2 and 3.

The bottom of the silty clay stratum and the bedrock surface slope downward from north to south. In this regard the bedrock surface is near elevation 237 feet at boreholes 4 and 6 (north end) and below elevation 227 feet at boreholes 2 and 3 (south end). The silty clay - silty sand interface is near elevation 240 feet at holes 4 and 6 and below elevation 230 feet at borehole 3.

Silty Clay - The silty clay stratum consists primarily of layered to varved silty clay soils. However there are occasional clayey silt lenses and occasional thin (1/8 inch or less) partings of silty fine sand.

The upper several feet of clay is very stiff as indicated by standard penetration resistances of 12 to 24 blows per foot. The consistency decreases with depth. Vane shear strengths of 2000 to 2250 and standard penetration resistances of 4 to 7 were measured in the lower clay soils at boreholes 2 and 3. These soils are classified as stiff to very stiff.

Sand - Silt - The soil stratum below the silty clay is coarsest near boreholes 2 and 3 and generally becomes finer towards the north. However there are thin sandier seams in some of the northerly areas. The particle size range shown on Figure 10 is typical for the coarser soils in this stratum. Particle sized on Figure 11 are typical of the predominent non plastic sandy coarse silt found at the northerly end of the site.

There are some seams of silty clay in the sand - silt stratum. The frequency of the clay seams increases in a northerly direction.

Bedrock - Bedrock levels were inferred from depths where the augers met refusal. This refusal depth normally coincides with the bedrock surface.

Bedrock in the Napanee area consists of bedded limestone. The bedrock can be assumed to be sound for the purposes of this report.

GROUNDWATER CONDITIONS

Water level measurements were taken in the open boreholes after drilling. In addition piezometers were installed in the silty sand to sandy silt stratum (near the bedrock surface). Bentonite seals were placed in the silty clay stratum to ensure that hydrostatic pressures in the silty sand - sandy silt stratum are not relieved near the piezometer tips.

A slight artesian water pressure condition existed in the stily sand - sandy silt stratum on October 4, 1977. In this regard piezometric water levels in the piezometers near boreholes 5 and 7 were 2.5 to 3.5 feet higher than the groundwater levels measured in the adjacent open boreholes. The open borehole water levels reflect the groundwater level conditons in the upper clay soils.

Seasonal fluctuations of the artesian water levels will occur. Some idea of possible ranges can be obtained by monitoring the water level fluctuations in the piezometers until the plant is built. Monthly or bi-monthly readings are recommended.

DESIGN AND CONSTRUCTION CONSIDERATIONS

General - All of the inorganic native soils are competent to support the relatively light structure loads (less than 2000 pounds per square foot). Settlements should be small provided that the subsoils are not disturbed during construction. Careful, planned excavation procedures are required to ensure against subsoil disturbance. Potential excavation problems are discussed in the following section.

Excavations - The silty clay stratum acts as an impervious blanket and probably will prevent relief of water pressures in the underlying silty sand - sandy silt stratum. In deeper excavations, where the base is within several feet of the silty sand - sandy silt stratum, the artesian water pressures can cause the base of the excavation to fail. Characteristically the failure consists of a heave of the unexcavated clay above the silty sand - sandy silt stratum or a base heave accompanied by a slump of the surrounding excavation slopes. Once the silty clay heaves, the silty sand and sandy silt will boil through cracks and fissures.

The stability of the base can be ensured by keeping hydrostatic water levels in the silty sand - sandy silt stratum close to or below the base of the excavation. Such a decline might occur naturally during dry periods. We expect, however, that vacuum wellpoints or some alternative dewatering procedure will be required to control water levels.

The above described problem condition is most severe near boreholes 1, 4, 5 and 6 where the structure base is close to the silty sand - sandy silt stratum. This is illustrated on Figure 2. The problem is less severe near holes 2, 3 and 7 where the excavation depth is less and the clay layer extends to a deeper elevation. In actual fact we expect that the shallower excavations near holes 2, 3 and 7 could be completed without dewatering if artesian water levels during construction are a few feet lower than those measured on October 4, 1977.

Dewatering requirements for the artesian aquifer could be decreased by shifting the structure to the deeper clay zones near the river. However, problems with water in the upper fill zones could occur in this area.

Uplift on Structures - Artesian pressures in the silty sand - sandy silt stratum should be considered when computing the uplift of deeper structure areas near holes 1, 4, 5 and 6. In these areas it is conceivable that the artesian pressures could lift the overlying soil and the empty structures. If there is any concern about uplift resistance we would suggest that some form of underdrainage system be provided to relieve partially the artesian pressures. An underdrainage system could consist of two 4 to 5 foot trenches below the northerly part of the structure. These narrow trenches would intersect the silty sand - sandy silt soils and permit relief of water pressure. The trenches should be backfilled with concrete sand. The concrete sand will act as a filter that will prevent migration of the fine sands and silts.

Working Surface - If 3/4 inch stone is used for a working surface it should be underlain by at least 8 inches of concrete sand or granular B close to concrete sand limits. The sand will prevent material from silt or fine sand seams from migrating into the crushed stone.

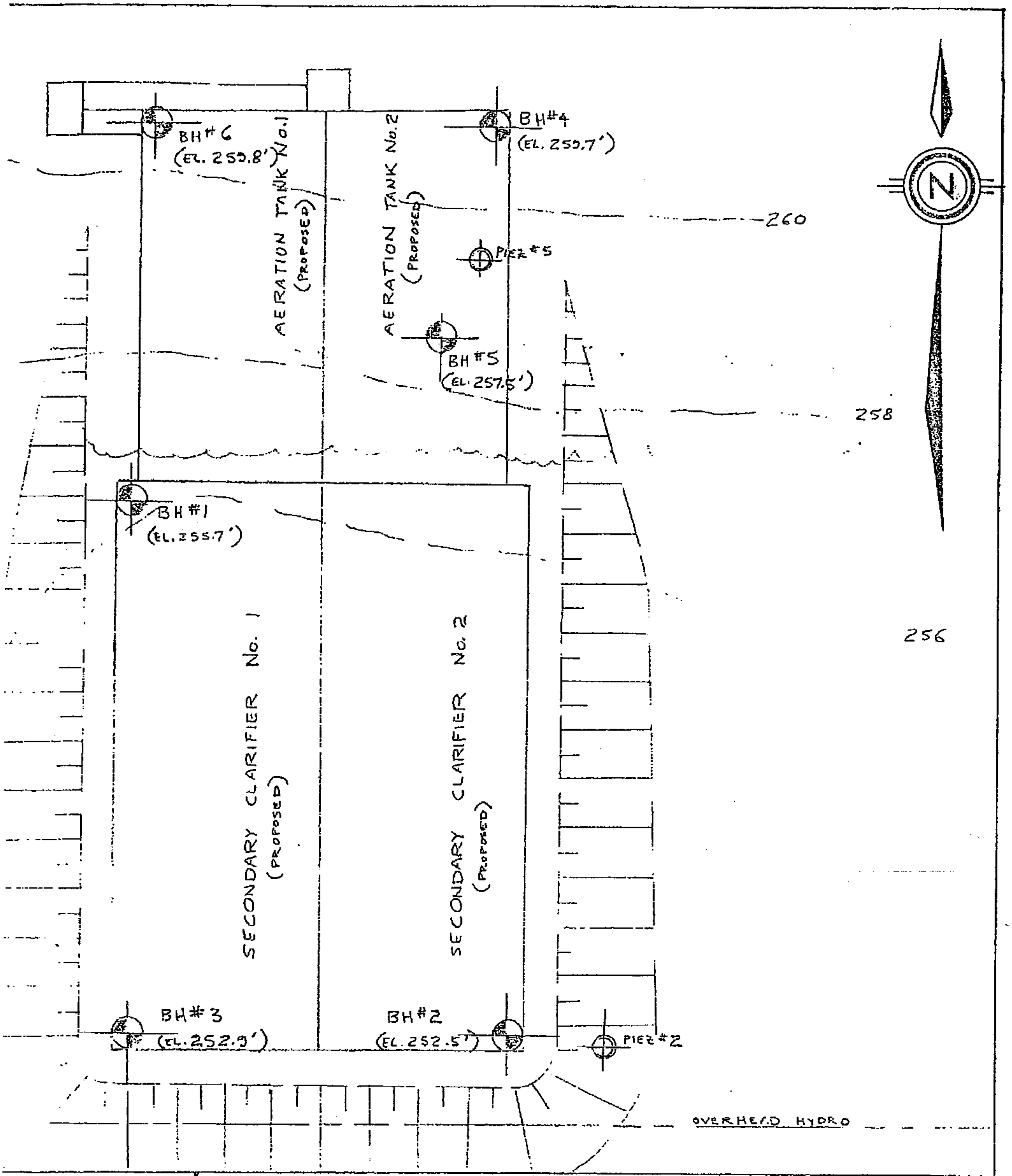
I trust that the information in this letter - report is adequate for your requirements. However, should you have any queries or should you wish us to review dewatering and uplift designs, please do not hesitate to contact us.

Yours very truly,

R. Marttila

R. Marttila, P. Eng.
SITE INVESTIGATION SERVICES LIMITED

RM/lp
4 c.c.



CALE

HORIZ. 1" = 20'

VERT.

RAWN BY R E M

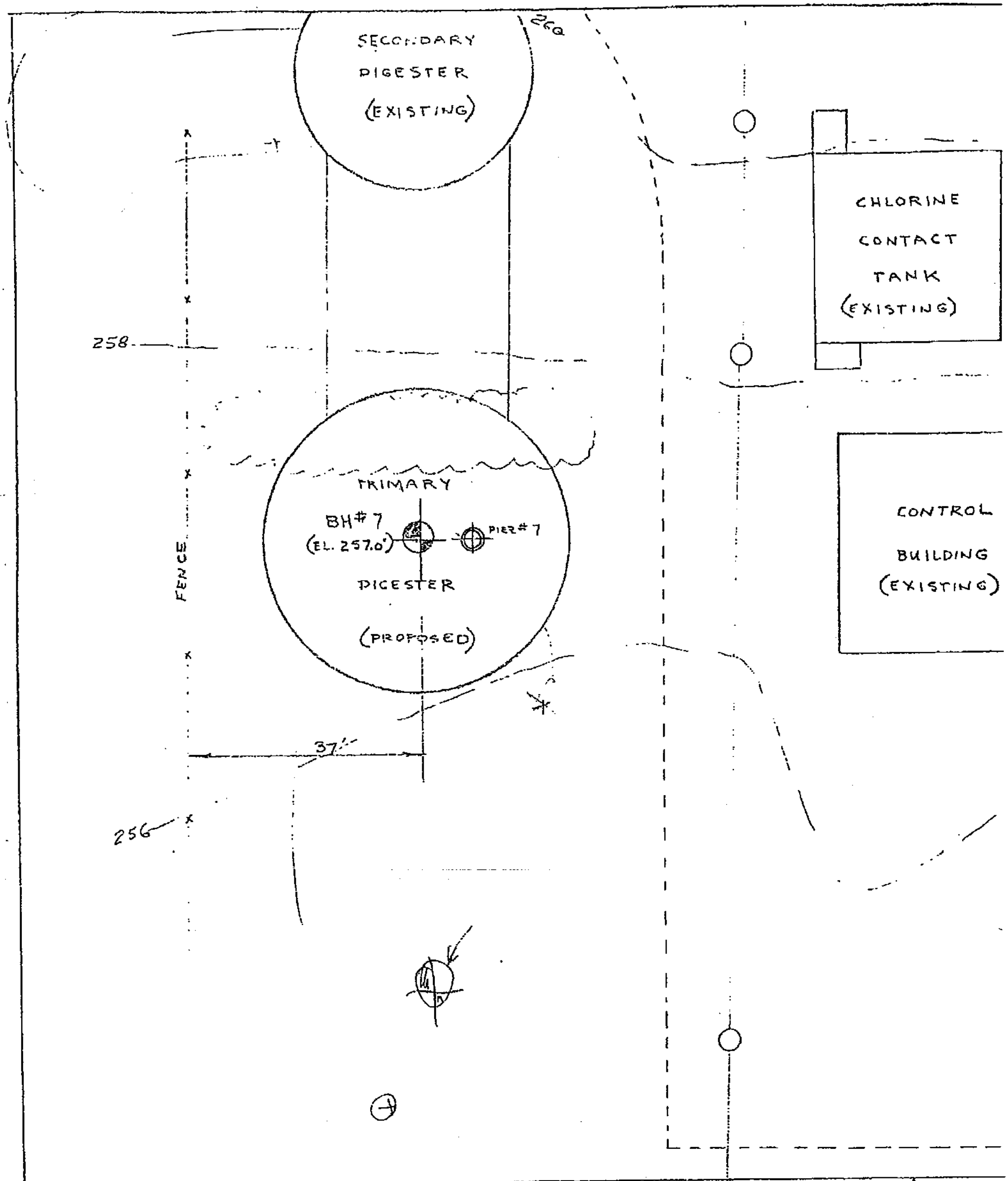
SITE INVESTIGATION SERVICES LIMITED

NAPANEE W. P. C. P ... STAGE 2 CONTRACT

BOREHOLE LOCATION PLAN

FIGURE

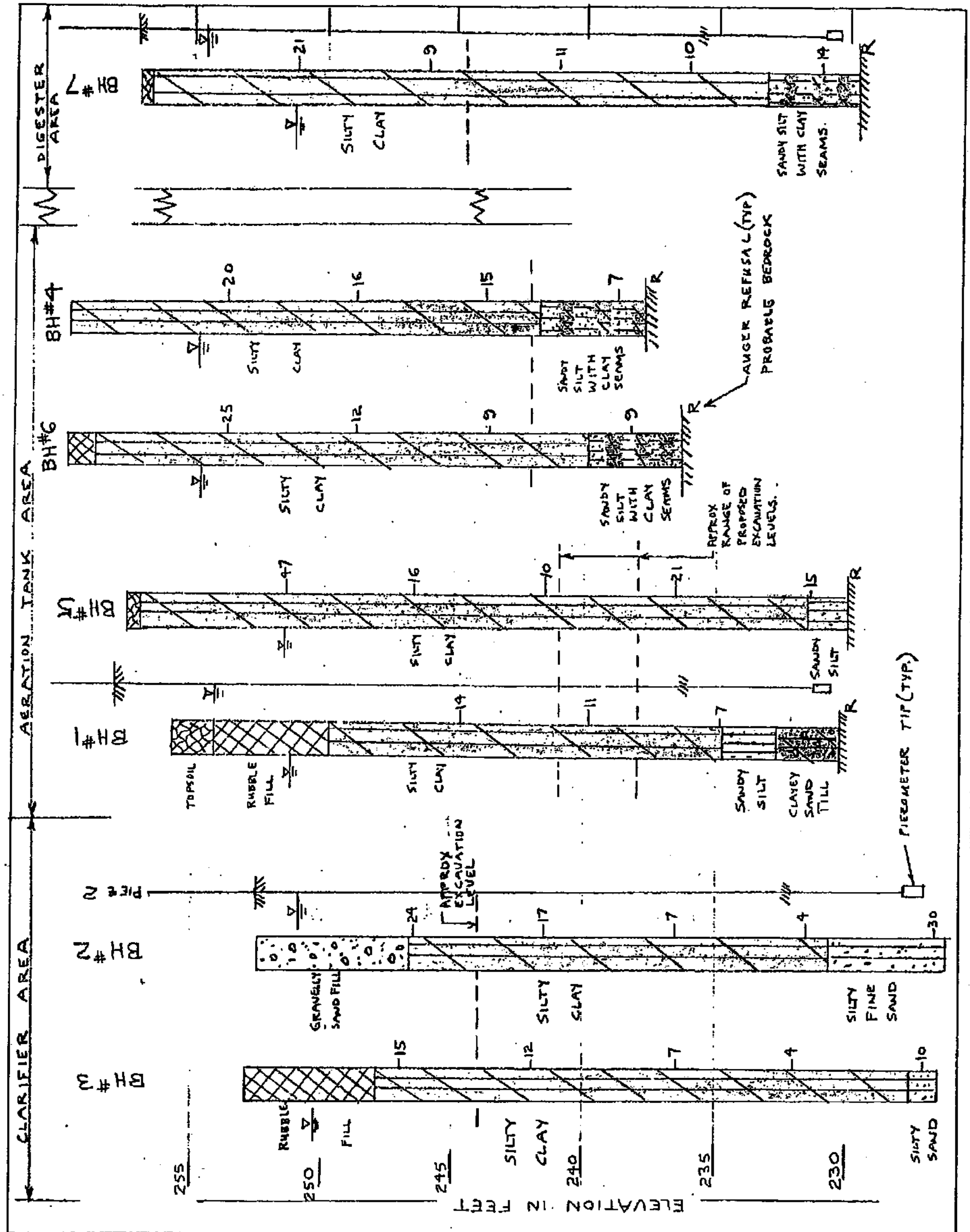
1.



JOB NO.

DATE oc

APP'D BY



SITE INVESTIGATION SERVICES LIMITED

NAPANEE WATER POLLUTION CONT. PLANT

SCALE: HORIZ - N.T.S.
VERT 1"=5'

DATE: OCT '77

SUMMARY SOIL PROFILE

DRAWN: R.E.M.

FIGURE: 2

BOREHOLE DATA and TEST SUMMARY

SITE INVESTIGATION SERVICES Ltd. **JOB No:** 1796 **BOREHOLE No:** 1 **FIGURE No:** 3

Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

JOB No: 1796 **BOREHOLE No:** 1

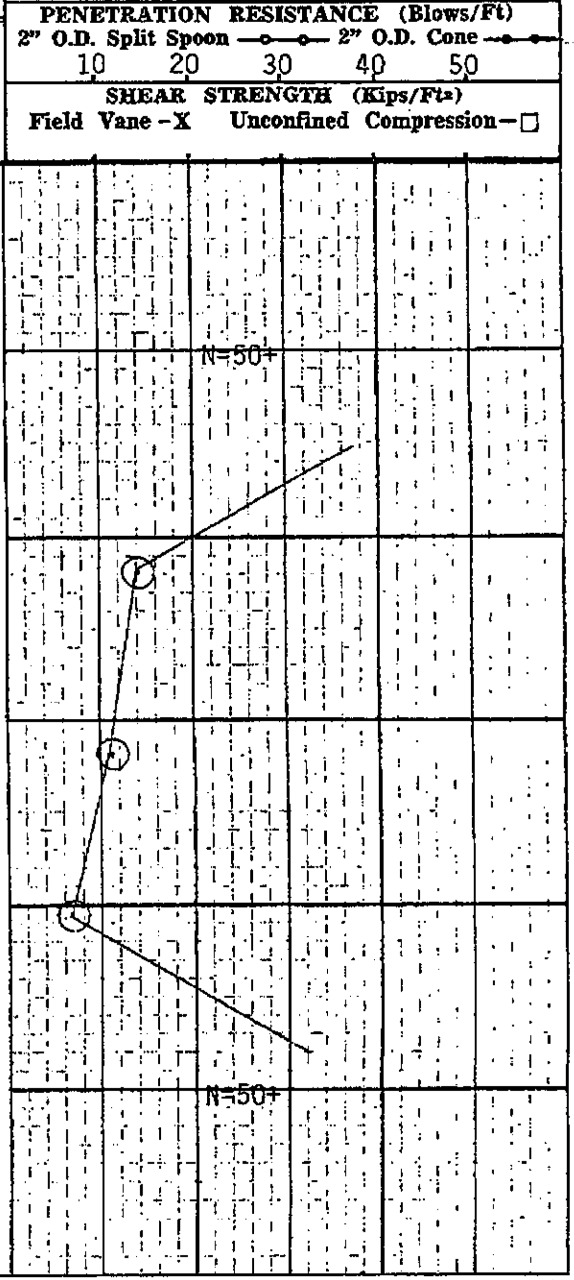
LEGEND
Gravel ▨ Sand ▨ ▥ Clay ▨
(See Appendix "A" for Other Symbols)

PENETRATION RESISTANCE (Blows/Ft)
2" O.D. Split Spoon —○—○— 2" O.D. Cone —●—●—
SHEAR STRENGTH (Kips/Ft²)
Field Vane - X Unconfined Compression - □

MOISTURE CONTENT and ATTERBERG LIMITS (%)
Plastic Limit — Moisture Content — Liquid Limit

LAB. TESTS

SOIL DESCRIPTION	ELEVATION IN FEET	DEPTH IN FEET	SAMPLE TYPE AND NUMBER
	255.7		
TOPSOIL			
RUBBLE FILL -Mixed brick and concrete rubble	▽	5	1
SILTY CLAY -Brown layered silty clay -Some thin (1/8") sand seams or partings -Grey below 13 feet -Very stiff to stiff		10	2 (D S)
		15	3 (D S)
		20	4
SANDY SILT -Brown sandy silt -Wet. Compact			
SANDY SILT TILL -Brown stony clayey sandy silt till -Compact		25	5
NO FURTHER PROGRESS (presumed bedrock)		30	



BOREHOLE DATA and TEST SUMMARY

Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

JOB No: 1796 **BOREHOLE No:** 2

LEGEND
Gravel ▨ Sand ▨ ▥ Clay ▨
(See Appendix "A" for Other Symbols)

SOIL DESCRIPTION

SLUDGE

GRAVELLY SAND FILL

SILTY CLAY

-Brown layered silty clay

-Occasional thin sand partings

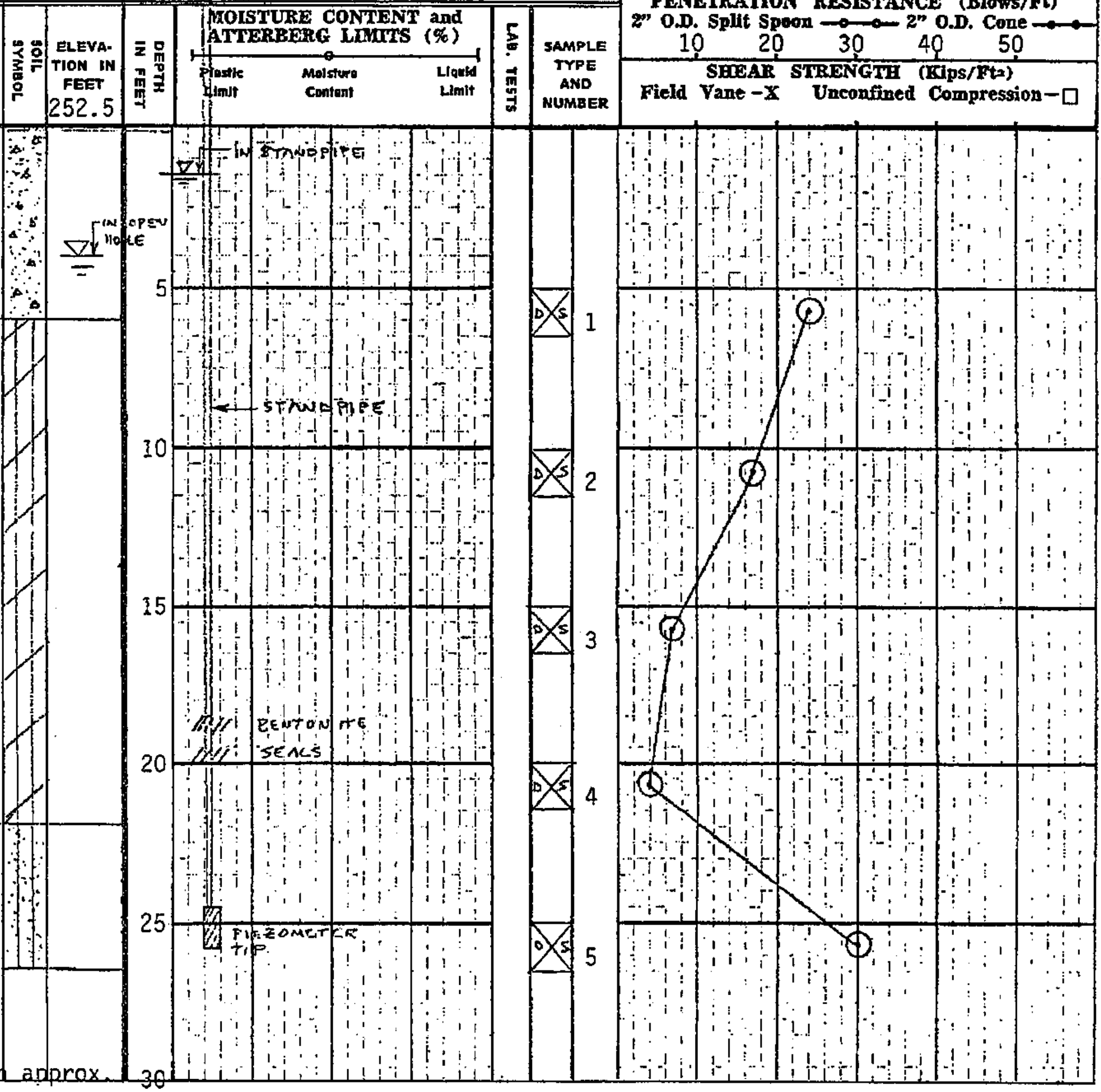
-Grey and thinly bedded below 12 feet

-Very stiff to firm

SILTY SAND

-Greyish brown silty very fine sand
-Saturated. Dense

END OF HOLE
NOTE: Piezometer installed to 26 feet depth 15 feet east of borehole No. 2. Bentonite seal at 20 feet depth approx.



SITE INVESTIGATION SERVICES Ltd. **JOB No:** 1796 **BOREHOLE No:** 2 **FIGURE No:** 4

BOREHOLE DATA and TEST SUMMARY

Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

JOB No: 1796 **BOREHOLE No:** 3

LEGEND
Gravel ▨ Sand ▨ ▥ Clay ▨
(See Appendix "A" for Other Symbols)

SOIL DESCRIPTION

SLUDGE

GRAVELLY SAND FILL

-Brown cobbly gravelly sand fill

SILTY CLAY

-Brown layered silty clay

-Occasional thin sand partings

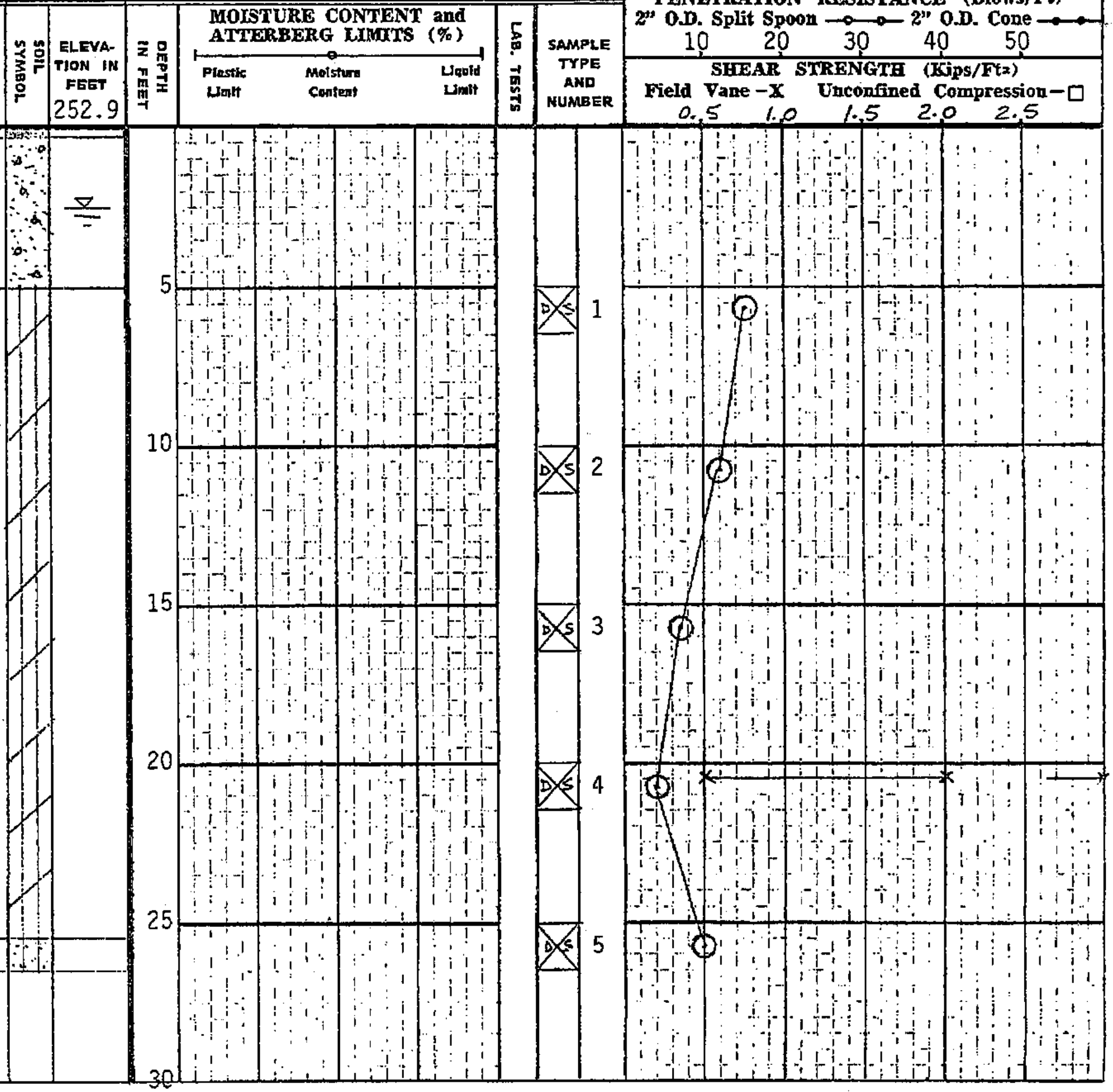
-Grey below 13 feet

-Very stiff to stiff

SILTY SAND

-Brown silty very fine sand
-Compact

END OF HOLE



SITE INVESTIGATION SERVICES Ltd. **JOB No:** 1796 **BOREHOLE No:** 3 **FIGURE No:** 5

BOREHOLE DATA and TEST SUMMARY

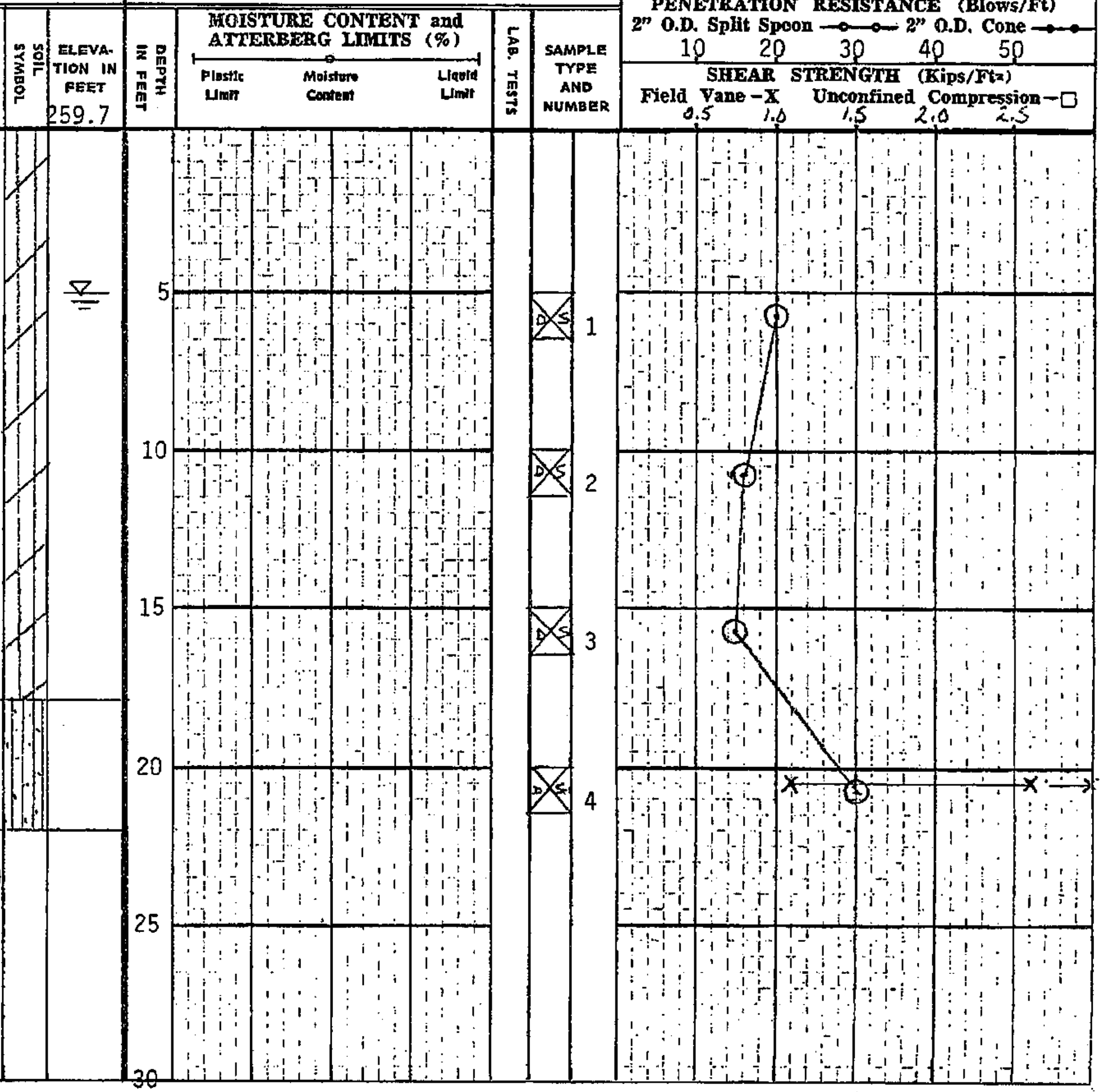
Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

JOB No: 1796 **BOREHOLE No:** 4

LEGEND
Gravel ▨ Sand ▨ ▥ Clay ▨
(See Appendix "A" for Other Symbols)

SOIL DESCRIPTION	ELEVATION IN FEET
	259.7
SILTY CLAY -Brown layered silty clay -Some thin sand seams -Grey below 15 feet -Very stiff to stiff	
SANDY SILT -Brown layers of sandy coarse silt to clayey silt. Some thin silty sand seams	
NO FURTHER PROGRESS (presumed bedrock)	



SITE INVESTIGATION SERVICES Ltd.	JOB No: 1796	BOREHOLE No: 4	FIGURE No: 6

BOREHOLE DATA and TEST SUMMARY

Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

JOB No: 1796 **BOREHOLE No:** 5

LEGEND
Gravel ▨ **Sand** ▨ ▥ **Clay** ▨
(See Appendix "A" for Other Symbols)

SOIL DESCRIPTION

TOPSOIL

SILTY CLAY-CLAYEY SILT

-Brown layered silty clay to clayey silt

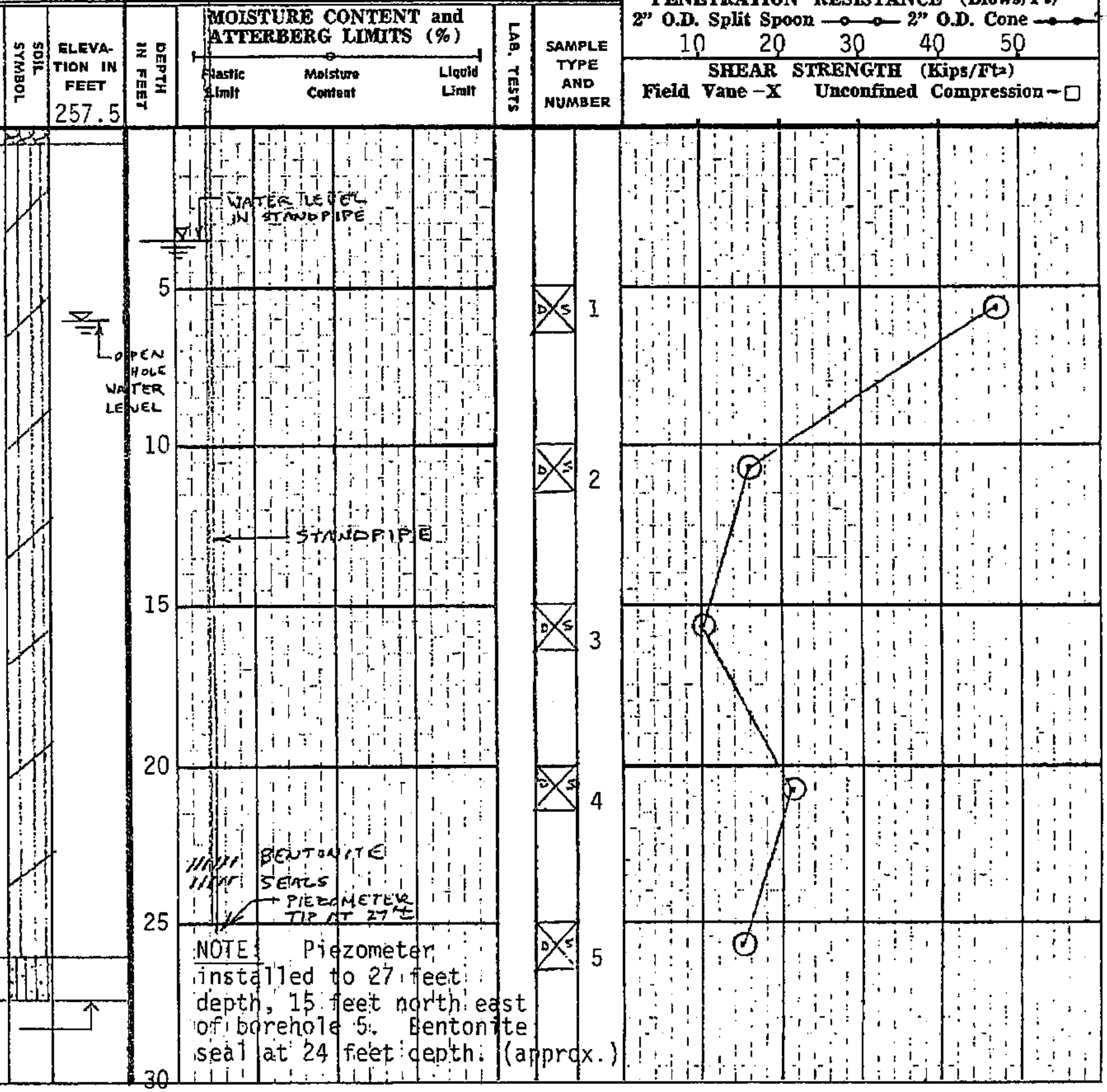
-Grey below 15 feet

-Some thin sand seams below 15.5 feet

-Very stiff to stiff

SANDY SILT
-Brown layered sandy coarse silt. Some thin clay layers.
-Saturated. Compact

NO FURTHER PROGRESS (presumed bedrock)



NOTE: Piezometer installed to 27 feet depth, 15 feet north east of borehole 5. Bentonite seal at 24 feet depth. (approx.)

SITE INVESTIGATION SERVICES Ltd. **JOB No:** 1796 **BOREHOLE No:** 5 **FIGURE No:** 7

BOREHOLE DATA and TEST SUMMARY

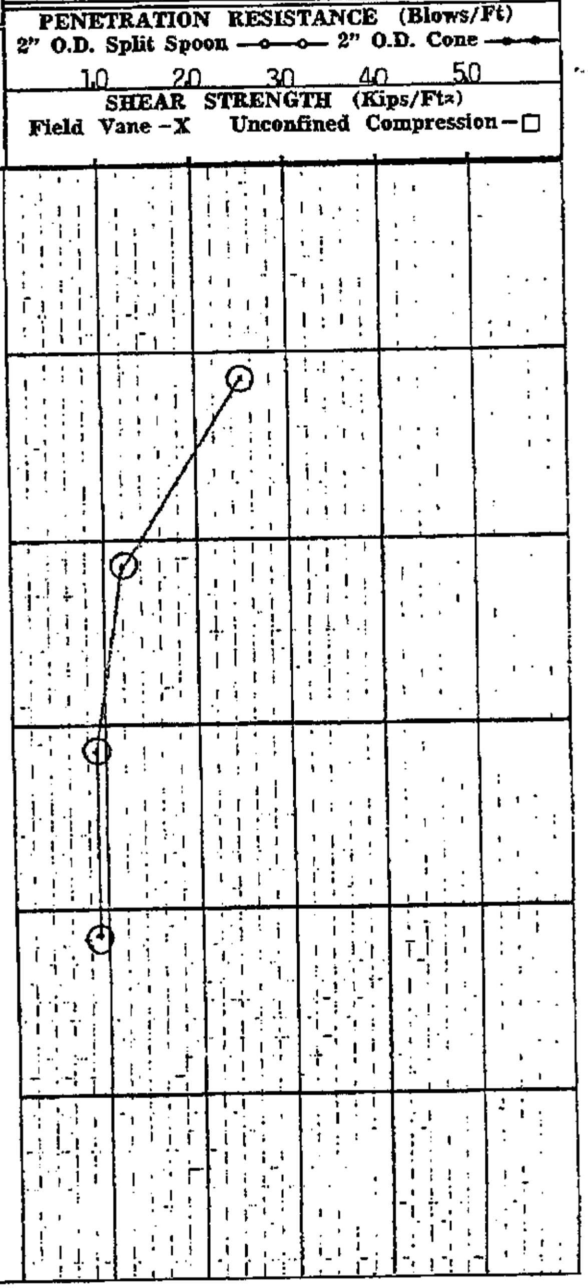
JOB No: 1796 **BOREHOLE No:** 6

Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

LEGEND
Gravel ▨ Sand ▨ ▥ Clay ▨
(See Appendix "A" for Other Symbols)

SOIL DESCRIPTION	SOIL SYMBOL	ELEVATION IN FEET	DEPTH IN FEET	MOISTURE CONTENT and ATTERBERG LIMITS (%) Plastic Limit – Moisture Content – Liquid Limit	LAB. TESTS	SAMPLE TYPE AND NUMBER
CLAYEY SILT FILL		259.8				
SILTY CLAY -Brown layered silty clay -Some thin sand seams -Grey below 13.5 feet -Very stiff to stiff			5			DS 1
			10			DS 2
			15			DS 3
SANDY SILT -Brown sandy coarse silt -Some clay layers. Compact			20			DS 4
NO FURTHER PROGRESS (presumed bedrock)			25			
			30			



SITE INVESTIGATION SERVICES Ltd. **JOB No:** 1796 **BOREHOLE No:** 6 **FIGURE No:** 8

BOREHOLE DATA and TEST SUMMARY

SITE INVESTIGATION SERVICES Ltd. **JOB No:** 1796 **BOREHOLE No:** 7 **FIGURE No:** 9

Project - NAPANEE W.P.C.P.
Location - STAGE 2 CONTRACT
Hole Location - SEE PLAN

Date - SEPTEMBER, 1977
Elevation Datum -
Type of Drill - HOLLOW STEM AUGER (D-1)

JOB No: 1796 **BOREHOLE No:** 7

LEGEND
Gravel ▨ Sand ▨ ▥ Clay ▨
(See Appendix "A" for Other Symbols)

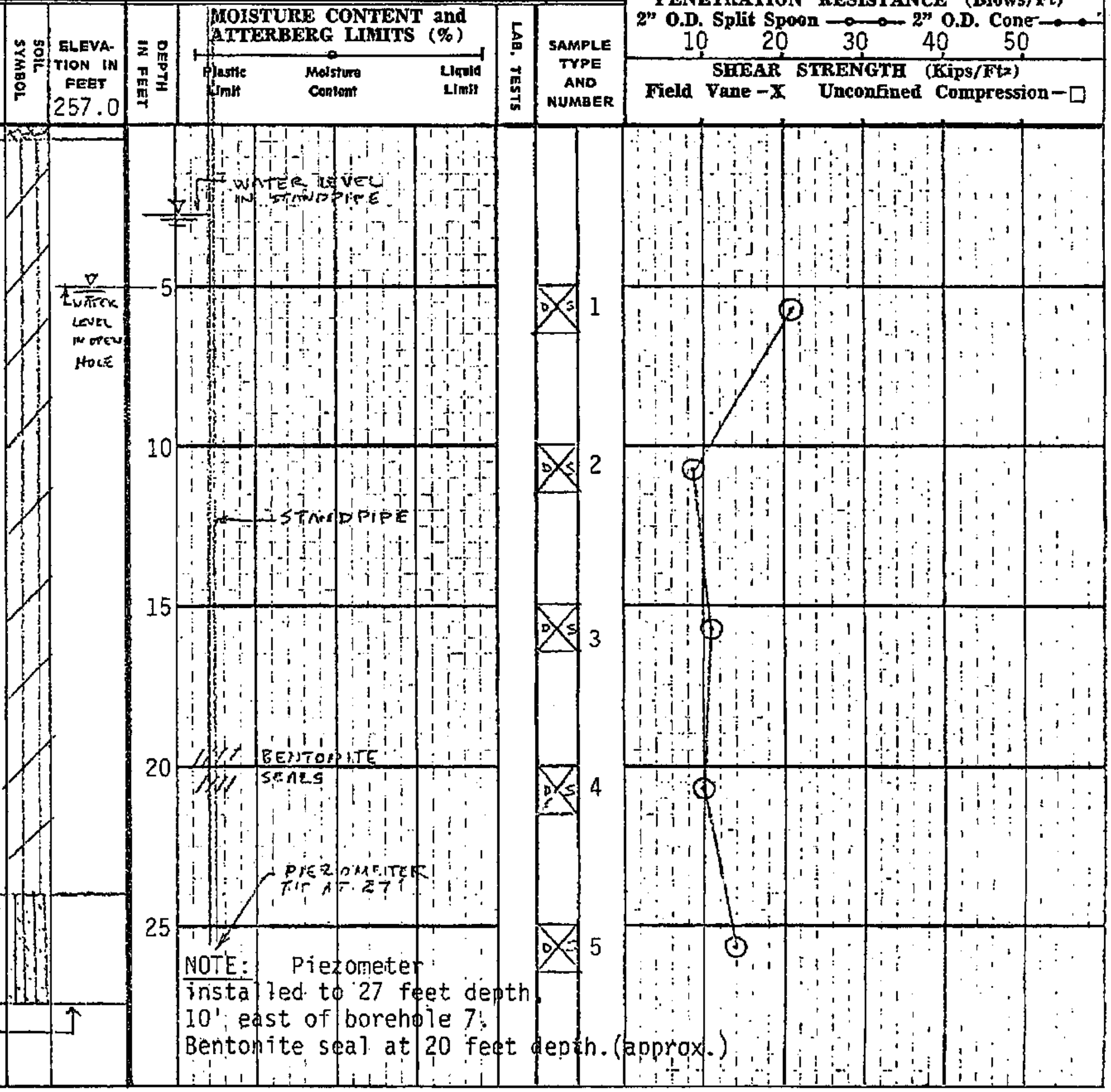
SOIL DESCRIPTION

TOPSOIL

SILTY CLAY
-Brown layered silty clay
-Some thin sand seams
-Grey below 17 feet
-Very stiff to stiff

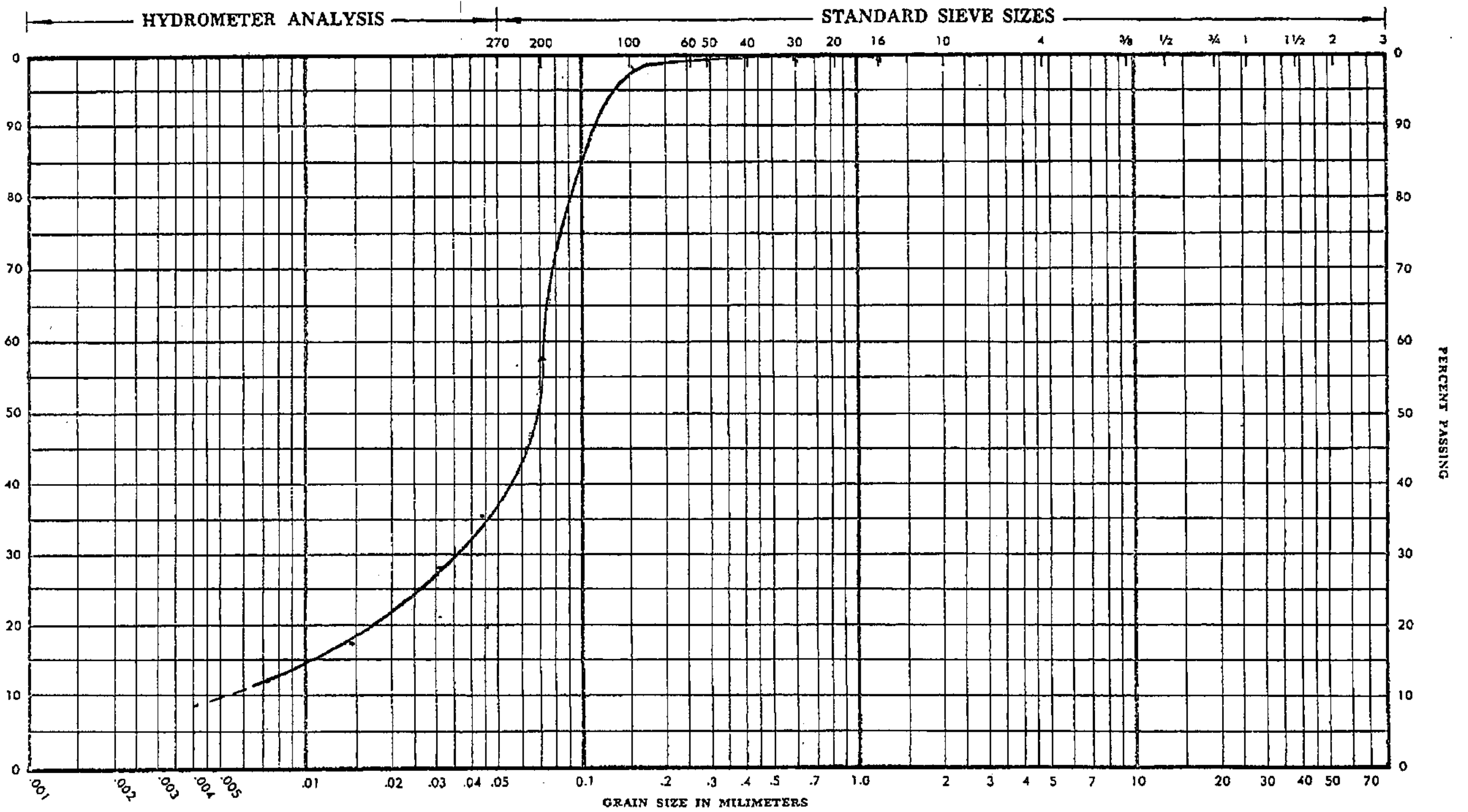
SANDY SILT
-Brown sandy coarse silt to silty fine sand
-Some clay seams
-Compact

NO FURTHER PROGRESS (presumed bedrock)



NOTE: Piezometer installed to 27 feet depth, 10' east of borehole 7. Bentonite seal at 20 feet depth.(approx.)

SITE INVESTIGATION SERVICES LTD. PETERBOROUGH ONT



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<tr><td colspan="7">Clay & Silt</td><td colspan="4">Fine Sand</td><td colspan="4">Medium Sand</td><td>Coarse Sand</td><td>Fine Gravel</td><td>Coarse Gravel</td><td>UNIFIED SYSTEM</td></tr>
<tr><td>Clay</td><td colspan="2">Fine Silt</td><td>Medium Silt</td><td colspan="2">Coarse Silt</td><td colspan="3">Fine Sand</td><td colspan="4">Medium Sand</td><td colspan="2">Coarse Sand</td><td colspan="3">Gravel</td><td>M.I.T SYSTEM</td></tr>
</table>

JOB NO. 1796 LOCATION ______

REMARKS ______

DATE ______ TECH. ______

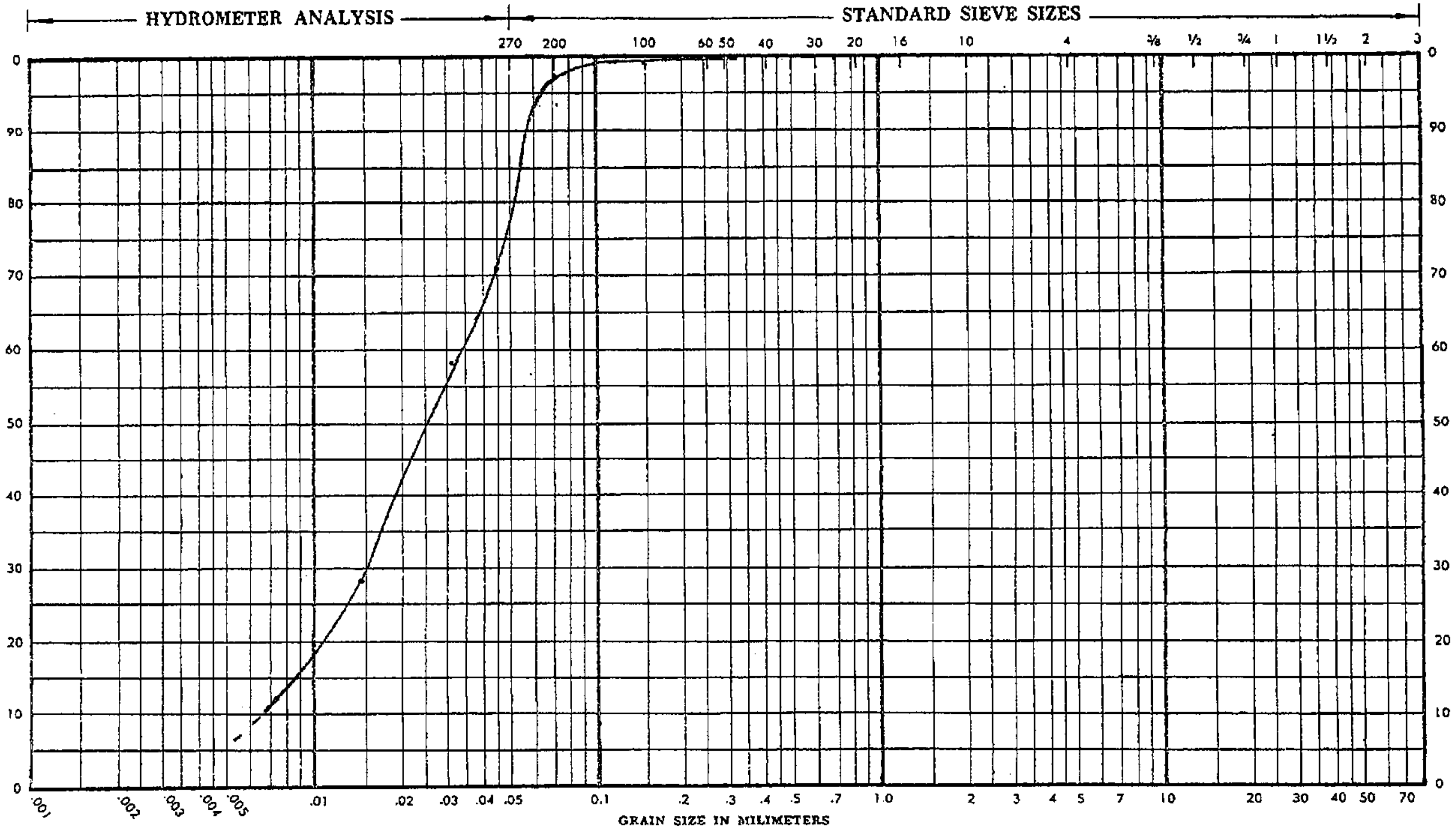
SAMPLE No. 5 HOLE No. 2 DEPTH 25'-26½'

FMC(w) ____ %, L.L. ____ %, P.L. ____ %, P.I. ____ %

% Gravel ____, % Sand ____, % Very Fine Sand & Silt ____

% Silt ____, % Clay ____, Unified Soil Symbol ____

FIGURE 10



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<tr><td>Clay</td><td colspan="2">Fine Silt</td><td>Medium Silt</td><td colspan="2">Coarse Silt</td><td colspan="3">Fine Sand</td><td colspan="4">Medium Sand</td><td colspan="2">Coarse Sand</td><td colspan="3">Gravel</td><td>M.I.T SYSTEM</td></tr>
</table>

JOB NO. 1796 LOCATION NAPANEE

REMARKS

DATE OCT. 1977 TECH. L.P.

SAMPLE No. 4 HOLE No. 5 DEPTH 20'-21 1/2'

FMC(w) ____ %, L.L. ____ %, P.L. ____ %, P.I. ____ %

% Gravel ____, % Sand ____, % Very Fine Sand & Silt ____

% Silt ____, % Clay ____, Unified Soil Symbol ____

SITE INVESTIGATION SERVICES LTD. PETERBOROUGH, ONT.

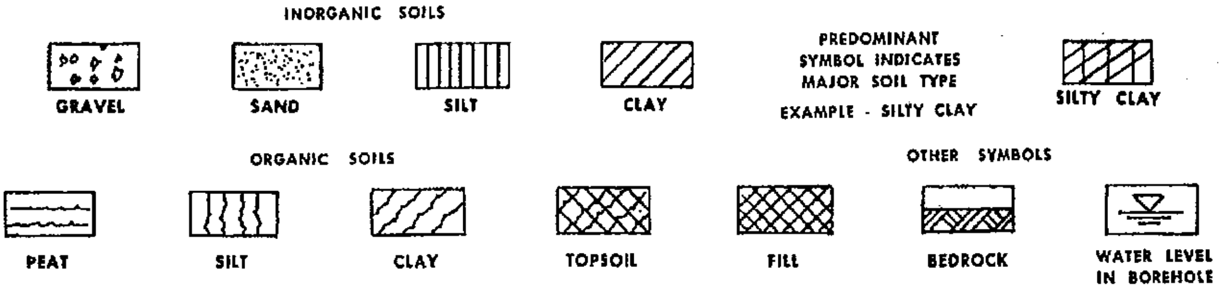
FIGURE 11

Appendix A

EXPLANATION OF SYMBOLS AND TEST DATA

SOIL DESCRIPTION

A description of visible characteristics of the soil as determined in the field and altered, if necessary, on the basis of laboratory classification tests.



SAMPLES

Condition:

Type:

D.S. - 1⅜" ID Drive Sample
A.S. - Auger Sample
U - Thin-walled Tube Sample
UP - Piston Sample

PENETRATION RESISTANCE:

(N) Indicates number of blows, of a 140-lb. hammer falling 30 inches, required to drive a 2" OD Drive Sampler a distance of 1 foot into the soil. This resistance is used to assess the relative density of cohesionless soils and the relative consistency of cohesive soils.

OTHER TESTS

M - Grain size analysis using seives or hydrometer or both - plotted graphically on a separate sheet.

V_1 - laboratory vane tests.

γ_d - dry unit weight.

C - consolidation test - results on separate sheet.

T - triaxial compression test - results on a separate sheet.

P - proctor compaction test.

K - laboratory permeability test.

SOILS PROFILES:

Where soil profiles are shown on drawings the soil profile applies only to the borehole location and may be different at intermediate locations on the site.

GROUND WATER:

Ground Water levels are generally measured in the open boreholes and apply to conditions at the time of drilling. Seasonal ground water fluctuations should be expected at most sites.

INSPEC-SOL INC. 9-626 Cataraqui Woods Dr., Kingston, Ont. K7P 1T8 Tel.: (613) 389-9812 Fax: (613) 389-5287

GEOTECHNICAL INVESTIGATION
PROPOSED TANK INSTALLATION
NAPANEE PLANT – 300 WATER STREET
NAPANEE, ONTARIO

NOVEMBER, 1999

INSPEC-SOL INC. 9-626 Cataraqui Woods Dr., Kingston, Ont. K7P 1T8 Tel.: (613) 389-9812 Fax: (613) 389-5287

Report No. 8131-K6151-A

November 15, 1999

Greater Napanee Water Supply &
Pollution Control Board
P.O. Box 7
11 Market Square
Napanee, Ontario
K7R 3L4

Attention: Mr. Al Lucas, Project Manager

RE: Geotechnical Investigation
Proposed Tank Installation
Napanee Plant – 300 Water Street
Napanee, Ontario

Dear Sir:

Inspec-Sol Inc. has completed the fieldwork and engineering for the geotechnical investigation for the above captioned project and we are pleased to submit the following report.

Fieldwork

The scope of work involved the drilling the drilling of two boreholes to 10m or refusal whichever was shallower. The actual depths were approximately 6m where refusal on assumed bedrock was encountered. The logs of the boreholes are attached as Enclosures 1 and 2 and the plan showing the approximate location of the two boreholes is presented as drawing K6151-1

The boreholes were located on the north side of an existing sewage treatment tank and the ground surface had a slope, grading from dropping from north to south. The detailed soil conditions found the boreholes are contained on the attached borehole logs.

Soil and Groundwater Conditions

In summary, the conditions consisted of a fill material that was brown, clay material with pockets of organic staining, gravel sizes and brick fragments. The fill material appeared to be relatively compact. The fill material was present in borehole BH1 to depths of approximately 4m and only 2m in borehole BH2.

The soils underlying the clay fill consisted of a stiff to very stiff clay which contained seams and/or pockets of silt and sand. In many samples retrieved from the boreholes the silt and sands were very thin but the sample from BH2 at 4.5m there was significant amount of sand retrieved in the sampler.

Refusal was encountered at 5.8 and 5.9m in BH1 and BH2 respectively. It is assumed that refusal is due to bedrock.

The boreholes filled with water during the during the drilling of the borings. The levels were measured on completion or a short time after and were measured at approximately 3 to 3.6m below the ground surface.

The ground surface elevations of the boreholes were measured relative to the top of the rim of the concrete sewage treatment tank. The elevation provided by the clients representative was geodetic elevation 264.0m. The ground surface elevations of the boreholes was then 264.2 and 264.4m for BH1 and BH2 respectively. Based upon this information, the elevation of the measured water levels is 261.2 and 260.8 metres respectively.

Discussions and Conclusions

We understand the client is proposing to install a new treatment tank in the location and will be approximately 4.5m deep. The borehole information suggests that the tank installation will require the removal of fill to reach the native soils. The sides of the excavation will require to be cut back or require shoring. We understand that the contractor selected for this project will be installing a shoring liner system consisting of precast concrete manhole sections and advancing the excavation from within these sections. We understand that the manhole sections will then be part of the permanent tank.

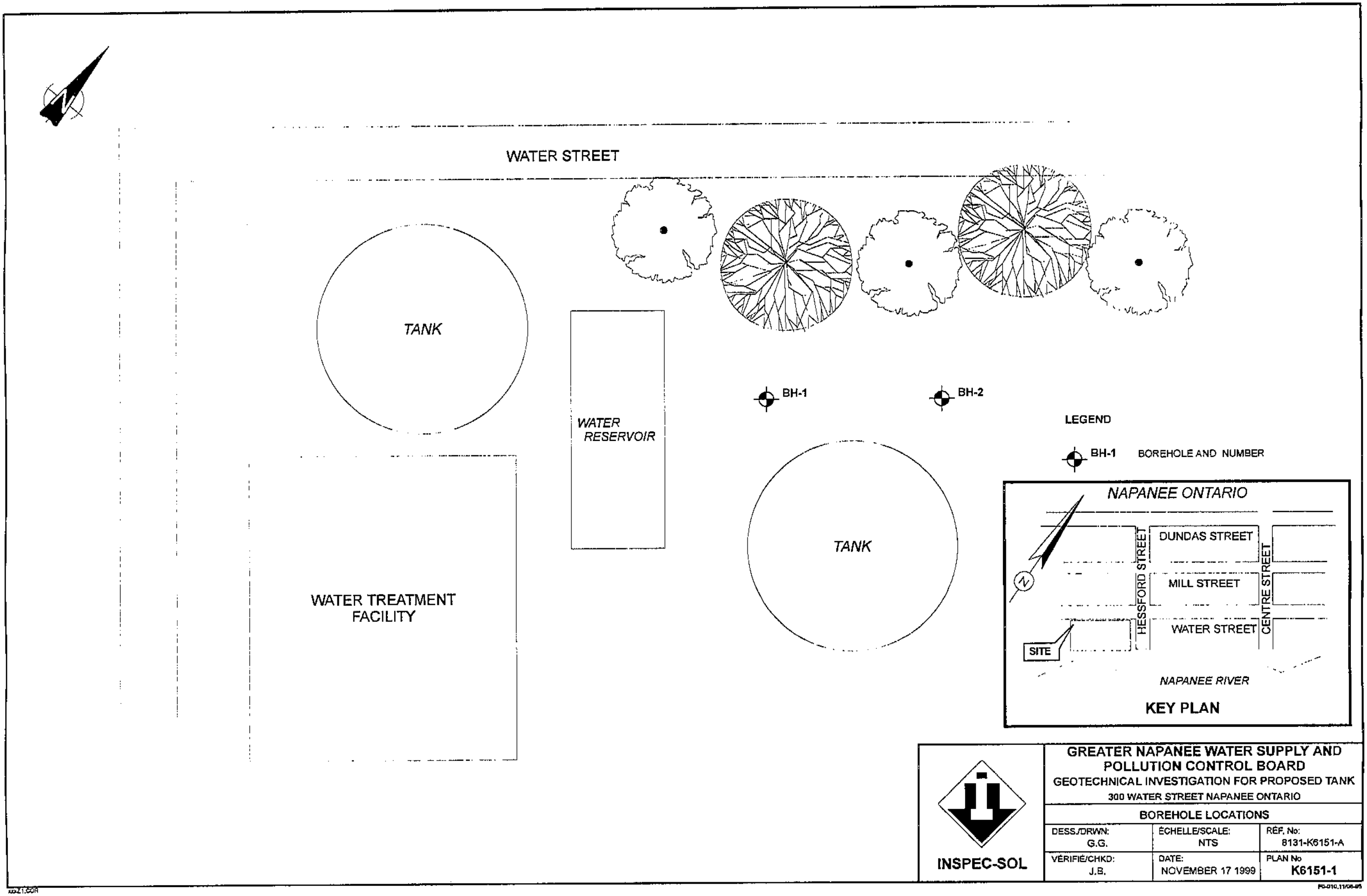
The contractor must be prepared to control groundwater flow as excavations penetrate into the native clay deposit due to wet sand seams. There may also be perched water within the fill soils, especially during wet seasonal periods.

The native soils are considered capable of supporting a bearing pressure of 200kPa(4000psf) for normal spread and strip footings or a mat footing. If higher pressures are required for economical footing design, bearing onto bedrock by spread footings or pile foundations may be an option.

We suggest that this office be retained to review the design concept proposed by the contractor for our comments.

We trust that these comments meet your requirements but should any questions arise please do not hesitate to contact our office.

Yours very truly,
INSPEC-SOL INC.
Joseph B. Bennett, P. Eng.,
Manager
By fax/mail (613) 354-2836



INSPEC-SOL

GREATER NAPANEE WATER SUPPLY AND POLLUTION CONTROL BOARD
GEOTECHNICAL INVESTIGATION FOR PROPOSED TANK
300 WATER STREET NAPANEE ONTARIO

BOREHOLE LOCATIONS

DESS./DRWN: G.G.	ÉCHELLE/SCALE: NTS	RÉF. No: 8131-K6151-A
VÉRIFIÉ/CHKD: J.B.	DATE: NOVEMBER 17 1999	PLAN No **K6151-1**

REFERENCE No.: 8131-K6151-A

ENCLOSURE No.: 1

INSPEC-SOL

BOREHOLE No.: BH-1
ELEVATION: 258.2m

BOREHOLE REPORT

Page 1 of 1

CLIENT: TOWN OF NAPANEE

PROJECT: PROPOSED SEWAGE TREATMENT TANK

LOCATION: WATER SEWAGE TREATMENT PLANT, NAPANEE, ONTARIO

DESCRIBED BY: SHANE CASSIDY

CHECKED BY: J. BENNETT

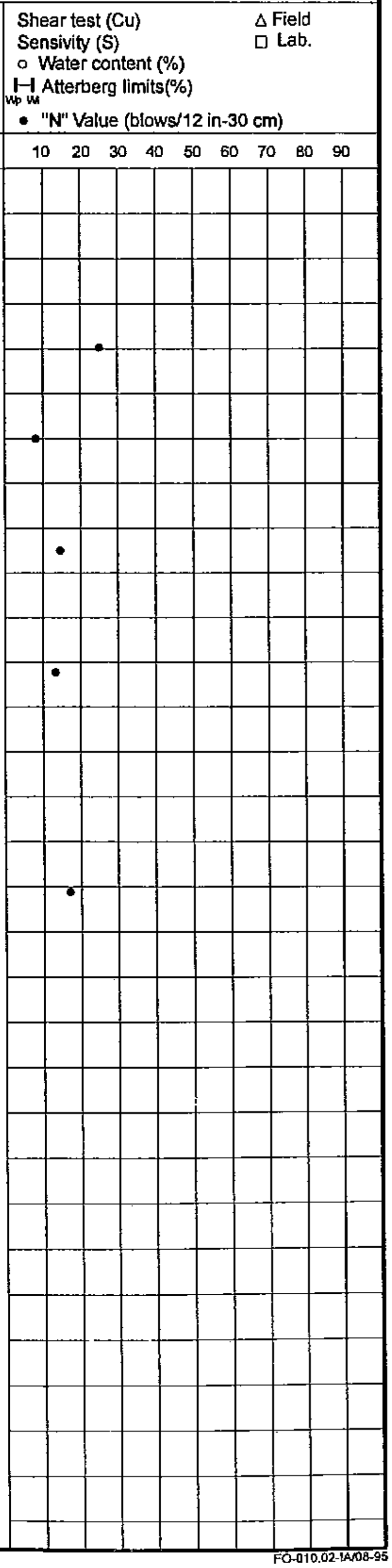
DATE (START): NOVEMBER 5, 1999

DATE (FINISH): NOVEMBER 5, 1999

LEGEND

☒ SS SPLIT SPOON
▨ ST SHELBY TUBE
◫ RC ROCK CORE
▽ WATER LEVEL

STRATIGRAPHY					SAMPLE				TEST RESULTS	
DEPTH Feet	DEPTH Metres	ELEVATION	STRATIGRAPHY	DESCRIPTION OF SOILS AND BEDROCK	STATE	TYPE AND NUMBER	RECOVERY %	OTHER TESTS	BLOWS 6 in/15 cm or RQD	PENETRATION INDEX N
		258.2		GROUND SURFACE						
0	0		☒	FILL: SILTY CLAY, BROWN, GRAVEL MOIST, COMPACT,						
					☒	SS-1	13		9-9-1-5-14	24
					☒	SS-2	30		2-4-5-7	9
					☒	SS-3	93		3-4-9-11	13
					☒	SS-4	50		2-3-4-5	7
	4,0	254.1	▨	GREY SILTY CLAY WITH SILT AND SAND SEAMS, MOIST TO WET, VERY STIFF						
					☒	SS-5	92		2-5-11-17	16
20	6,0	252.3		Refusal - Probable Bedrock END OF BOREHOLE **NOTES**: Water Level at 3.6m 1 hr after after completion						



REFERENCE No.: 8131-K6151-A ENCLOSURE No.: 1

INSPEC-SOL

BOREHOLE No.: BH-2
ELEVATION: 258.4m

BOREHOLE REPORT

Page 1 of 1

CLIENT: TOWN OF NAPANEE
PROJECT: PROPOSED SEWAGE TREATMENT TANK
LOCATION: WATER SEWAGE TREATMENT PLANT, NAPANEE, ONTARIO
DESCRIBED BY: SHANE CASSIDY CHECKED BY: J. BENNETT
DATE (START): NOVEMBER 5, 1999 DATE (FINISH): NOVEMBER 5, 1999

LEGEND

- ☒ SS SPLIT SPOON
- ▨ ST SHELBY TUBE
- ◫ RC ROCK CORE
- ▼ WATER LEVEL

ELEVATION	DESCRIPTION OF SOILS AND BEDROCK	STATE	TYPE AND NUMBER	RECOVERY %	OTHER TESTS	BLOWS 6 in/15 cm or RQD	PENETRATION INDEX N
258.4	GROUND SURFACE						
	FILL: SILTY CLAY, BROWN, GRAVEL MOIST, COMPACT,	☒	SS-1	65		7-13-9-10	22
		☒	SS-2	90		4-7-11-15	18
	GREY SILTY CLAY WITH SILT AND SAND SEAMS, MOIST TO WET, VERY STIFF	☒	SS-3	95		10-10-12-21	22
		☒	SS-4	80		5-10-18-18	28
254.1	Sand seam						
		☒	SS-5	100		7-17-22-26	39
252.5	Refusal - Probable Bedrock END OF BOREHOLE						

NOTES:
Water Level at 3.0m on completion