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73-11079(c)

31F-64

ARNPRIOR GENERATING STATION

GEO-TECHNICAL INVESTIGATIONS FOR  
HIGHWAY 17 BRIDGE

July 1973

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
by Acres Consulting Services Limited

ARNPRIOR GENERATING STATION

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## INTRODUCTION

The proposed Highway 17 bridge, to be built in conjunction with the Arnprior Hydro Development Project, will be located over the Madawaska River at approximately the same location as the present bridge.

The tailrace control weir will be located immediately downstream from the bridge. Both structures will be constructed in the dry by means of common cofferdams.

The proposed bridge superstructure will be concrete, supported by concrete piers at about 100-foot intervals. The bridge will have a length of 700 feet and a width of 66 feet, sufficient for a 4-lane highway. The bridge foundation will consist of six piers and two abutments.

The foundation conditions in the general area of the existing Highway 17 bridge have been investigated for construction of the bridge, weir and the accompanying cofferdams. Drawing NAF9 DEE 10175-0126 is a plan view of the area showing the bridge location, bedrock and overburden contours, and borehole locations.

This report is restricted to a geotechnical appraisal of the foundations for the bridge. However, conditions are considered to be similar in the area of the weir and cofferdams.

An explanation of terms is given in Appendix A. Rock core data sheets and overburden drill logs are contained in Appendix B.

## GEOTECHNICAL INVESTIGATIONS

The geotechnical investigation of the bridge area consisted of a marine sounding survey, drilling and diver's inspections of the riverbed.

Echo sounding was performed and interpreted by Termarex Limited and was used to obtain river bottom and bedrock contours. Land surface contours are based on aerial survey maps prepared by The Hydro-Electric Power Commission of Ontario.

The boreholes were drilled by Canadian Longyear Limited along the new bridge alignment, using wire line, triple core barrel diamond drill equipment. A drum raft was utilized for holes located in the riverbed. All boreholes are vertical except holes TR-47, TR-57, TR-83 and TR-68, which were inclined at 35 degrees from the horizontal. Angle holes were required to provide better definition of near vertical joint sets in the bedrock.

In vertical holes through overburden, samples were taken in with thin wall Shelby tubes or split spoons at 5-foot intervals. Standard penetration tests were normally performed while driving the split spoon sampler. Overburden samples were not taken in the angled holes.

Continuous sampling was carried out in the bedrock from which percentage core recovery and rock quality designation (RQD) data were obtained. Water return for each run was also recorded. Packer tests of 5-foot lengths were performed at 5-foot intervals to give an indication of the permeability of the bedrock investigated.

Overburden drill logs and rock core data summaries are presented in Appendix B. Only the holes in the immediate vicinity of the bridge are presented in this report. Logs of other holes in the tailrace which are shown on the location plan are available from Acres upon request.

## GEOLOGY

### 1 - General

The geology of the bridge site consists of a generally thin cover of sand and gravel overlying Precambrian Crystalline Limestone bedrock. In one area underlying and upstream of the west bridge abutment, a deposit of interlayered silty sand and marine clay is encountered to a depth of nearly 60 feet (see hole TR-58). However, this deposit is not expected to pose a problem for the bridge as careful positioning of the cofferdam should isolate the overburden and permit a straightforward excavation of the bedrock surface.

The evaluation of the bedrock at the bridge site is based on:

- (a) - Drilling at the site as described in the previous section;
- (b) - Geological mapping of scattered rock outcrops along the riverbanks;
- (c) - The detailed investigation which has been carried out at the main damsite located 1 mile upstream in the same limestone deposit. The investigations included geological mapping, diamond drilling and in situ borehole photography.

Additional information concerning the general nature of the crystalline limestone bedrock has also been obtained from examination of rock surfaces exposed in the excavation for the sluiceway structure of the main dam, which is located one mile upstream from the bridge site. An isometric view of the west bulkhead foundation area adjacent to the sluiceway excavation is included in this report on drawing No. NAF9 DDE 10172-0232. The view shows the geology of an excavated face and information interpreted from logging and in situ photography of 6 borings located adjacent to the excavation.

### 2 - Overburden

The overburden in the area of the right (east) abutment and the two adjacent piers consists of a thin deposit of sand and gravel. This deposit is considered to be fill material which was probably placed for the existing Highway 17 bridge approach. Overburden is generally absent from the riverbed between piers No. 2 and 6.

The west half of the riverbed is formed by a 6-foot deposit of soft, sensitive sandy clay overlying the bedrock surface. At the location of the west abutment this sandy clay layer is overlain by about 12 feet of silty sand. The clay layer eventually pinches out in the west bank of the river.

Overburden comprising the west bank consists in descending order of irregular deposits of sand and gravel (probably fill), silty clay, silty sand, sand, and sandy clay. As seen on Sections C, F and G on drawing No. NAF9 DEE 10175-0127, the stratigraphy of the west bank deposits is complex and considerable variation may occur between borings.

### 3 - Bedrock

The bedrock is generally a light gray, medium to coarse, metamorphosed limestone of Precambrian age, having a crystalline structure and exhibiting faint irregular metamorphic banding. Rock Quality Designation values range from 36 per cent to 100 per cent with an average RQD in excess of 90 per cent. Granite and Amphibolite dikes measuring up to 2 feet in width are frequently intruded in the limestone, oriented parallel to the northwest trending joint set. An altered skarn contact is occasionally observed at the boundary of the dikes and infrequently the contact is weathered to a soft condition. The list of the amphibolite dikes is shown on drawing No. NAF9 DEE 10175-0127. Two major joint sets are present, one striking northwest and dipping between 70 and 90 degrees in both directions from vertical. The other major joint set strikes east-west and also dips between 70 and 90 degrees in both directions from the vertical. Both major joint sets are locally open due to removal of material by solution weathering processes. At the main damsite, local cavities up to 4 feet in width have been encountered. Cavities may be empty or filled with a mixture of silt, sand and clay.

Three less prominent joint sets are also present. One of the minor sets strikes northeasterly and dips between 60 and 90 degrees. A second set follows the foliation which assumes widely varying strikes with dips ranging generally between 30 and 90 degrees.

The third minor joint set has been encountered in several drill holes (drawing No. NAF9 DEE 10175-0127) and has been exposed in excavated rock faces at the damsite (see drawing No. NAF9 DDE-10172-0232). This set could present a problem for the bridge foundations in view of the near horizontal orientation and open conditions of some of the joints. This set exists at orientations ranging between horizontal and a dip to 30 degrees. Several joints were observed to have

openings up to 6 inches and they may be filled with sand or clay, thus presenting a potential for settlement of a heavily loaded foundation. The range of opening and amount of filling in these joints are very difficult to identify in drilling, and therefore no conclusive statement can be made at this time as to whether subhorizontal joints may be present in the individual bridge foundation areas. Detailed examination of the exposed bedrock at the time of dewatering will be necessary in order to evaluate the presence of this joint set.



## GEOTECHNICAL CONDITIONS OF BRIDGE FOUNDATIONS

### 1 - East Abutment

The ground surface (Sections E and F) is nearly horizontal at the location of the east abutment and has an average elevation of 273 feet. Overburden consists of 2 feet of sand at the south end of the abutment and about 5 feet of sand overlying 3.5 feet of gravel at the north end. The limestone bedrock surface slopes northwards at about 7 degrees. There is evidence of loose rock and weathering in the top few feet of rock, which may require excavation.

The occurrence of closely spaced jointing in boreholes TR-53 and TR-81, and to a lesser extent TR-82, is an indication of the presence of similar zones throughout the site. These subhorizontally dipping features could contain sand or clay filling and, if this should prove to be true consolidation grouting or rock excavation will be required to below these features.

Final evaluation should be made at the time of construction, based on observation of exposed rock in the adjacent tailrace excavation.

### 2 - Pier No. 1

The ground surface elevation is approximately 270 feet, sloping gently southwards. Overburden consists of sand and gravel overlying bedrock at about elevation 260 feet. The bedrock is subhorizontal, with dips ranging up to 7 degrees westerly. Borehole TR-83 indicates competent bedrock throughout. The closely spaced joint zone underlying the east abutment may extend into the region of Pier 1; however, the channel excavation will remove rock to below this level.

### 3 - Pier No. 2

Overburden consists of sand and gravel to a depth of approximately 10 feet or less. The bedrock surface is located in the range of elevation 240 - 250 feet, which is at or below the level of the tailrace channel. Weathering at this location has resulted in deterioration to a depth of approximately 5 feet. Inspection and local excavation will be necessary at the time of construction. The bedrock below this surface zone of weathering is considered to be competent limestone.

#### 4 - Pier No. 3

Overburden is very thin or absent at this location. The bedrock is light gray, medium- to coarse-grained crystalline limestone. Foliation dips between 30 and 70 degrees. The bedrock surface is at about elevation 245 feet. Rock quality designation values (35 per cent) from borehole TR-49 indicate poor rock quality in the top 5 to 10 feet of bedrock. Local excavation may therefore be required in this zone to obtain a suitable foundation.

#### 5 - Pier No. 4

There is no overburden at this location. The bedrock surface rises northwards across the pier location from about elevation 240 feet at the south end, to about elevation 245 feet at the north end. Borehole TR-86 drilled at the south tip of the pier indicates excellent rock quality generally, with the exception of a closely spaced subhorizontal joint zone observed at depth of 13 feet.

#### 6 - Pier No. 5

The southern half of pier No. 5 is located partly on an island where bedrock is exposed. The island reaches an elevation of 257.4 feet and a shallow excavation may therefore be required for the tailrace channel. The foliation in this area dips at 22 to 50 degrees. Borehole TR-50, which is located 90 feet south of the pier, indicates excellent rock quality and therefore no unusual problems are anticipated at this location.

#### 7 - Pier No. 6

Seven feet of soft silty clay overburden were encountered directly overlying bedrock in hole TR-85. The bedrock surface is situated at elevation 236 feet. Competent limestone similar to previous descriptions was encountered in this hole.

#### 8 - West Abutment

In the present scheme, the west abutment is located in part in a local bedrock depression. At the north end of the abutment, rock is exposed at elevation 240 feet, while at the south end the bedrock elevation is about 226 feet. From this point the bedrock surface dips slightly southwards.

The overburden stratigraphy is shown on drawing No. NAF9 DEE 10175-0127 (Sections B, C, F and G). Maximum depth of overburden at the abutment centre line is 20 - 25 feet, and consists of interlayered clay and sand. The maximum depth is located at the south end of the abutment where the rock surface is lowest. Towards the north end of the abutment, overburden thins to 5 feet of silty sand.

The riverbank rises at a slope of 35 degrees to the west from the abutment centre line. The bank is 26 feet high and is composed of an 8-foot thick deposit of sandy clay overlying sand and underlying gravel and assorted random fill (see drawing No. NAF9 DEE 10175-0127). The stability of this slope should be checked during the design of the cofferdam enclosure. It is probable that the cofferdam will have to be extended across the deposit and tied into the higher bedrock surface.

The bedrock underlying the south end of the abutment is limestone with granite and amphibolite dike intrusions from 10 to 19 feet below the bedrock surface. The limestone cored in boreholes TR-75, TR-76 and TR-87 was competent with widely spaced tight joints and no significant weathering. RQD values were high (over 90 per cent). Calcite veins are present throughout the rock mass. A 1-foot thick micaceous amphibolite dike was intercepted at elevation 217 feet in hole TR-76. No weathering was observed along the contact. Foliation dips at 20 - 40 degrees. The top few feet of bedrock are generally less competent rock of "poor" to "fair" rock quality, and depending on examination at the time of construction, some local excavation of excessively jointed or decomposed rock may be required.

## SOIL CONDITIONS - BRIDGE APPROACHES

### 1 - East Approach

The surface topography east of the bridge along the approach is essentially flat at an elevation of about 272 feet.

Overburden consists of a thin layer of sand and gravel suspected fill material, which is less than 5 feet in thickness at the bridge, increasing to about 8 feet along the northern side of the approach. Bedrock is generally exposed along the southern limit of the bridge approach and the bedrock surface slopes in a northerly direction across the approach at about 7 degrees.

Two standard penetration tests carried out in boreholes TR-81 and TR-82 gave N-values of 10 and 17, indicating a medium dense condition.

### 2 - West Approach

The surface topography of the west approach area is generally flat up to the riverbank. The stratigraphy of the overburden and bedrock is shown on Sections B, C, F and G on drawing No. NAF9 DEE 10175-0127.

Boreholes TR-61 and TR-87 situated in the approach area indicate a 10-foot surface deposit of sand and gravel fill with some clay present. Underlying this deposit and extending to bedrock are layers of sandy silty clay, silty sand and silty clay of varying thicknesses.

Soil test data for this area are given in Table 1.

## SUMMARY AND CONCLUSIONS

The following conclusions can be drawn regarding the geotechnical conditions of the proposed Highway 17 bridge across the Madawaska River:

- (a) - Construction will be carried out in dry conditions established by the installation of cofferdams across the river. This report does not deal with conditions associated with cofferdaming.
- (b) - All foundations, comprising two abutments and six piers will be situated on bedrock. Overburden must therefore be removed from the location of each foundation. The overburden is generally thin (less than 10 feet) except possibly in local depressions and at the location of the west abutment.
- (c) - Overburden consisting of layers of sand and sensitive clay exists to a depth of nearly 60 feet in the west river bank adjacent to the west abutment, and to a depth of 20 to 25 feet directly under the proposed abutment location. This deposit is not expected to cause a problem provided that the bank is maintained against the upstream cofferdam which should be extended to tie into high rock formations situated near the downstream end of the abutment. The stability of this deposit should be checked as part of the design of the upstream cofferdam.
- (d) - Bedrock consists of a generally competent crystalline limestone. Most joints dip steeply and should not pose a difficulty with respect to stability or settlement of structures. However, subhorizontal open joints have been observed in some of the holes drilled at the bridge site and this type of jointing has been confirmed to exist in the main dam area, located approximately 1 mile upstream from the bridge site. Similar joints may occur under any of the piers and abutments. Excavation of bedrock or local excavation and treatment will therefore be necessary if such conditions are encountered.
- (e) - The subhorizontal joint set may contain soil filling and, therefore, if present at the bridge site could present stability and settlement problems, depending on the nature and depth of the joint in relation to the structure. Consideration should be given in the design of each abutment and pier on the effect on a structure of a soil filled subhorizontal joint, and the requirement for excavation beyond that which is required for the

tailrace channel should then be evaluated. Detailed examination should be made of the exposed rock at the time of construction and an assessment made of the rock conditions with a view to excavating to a suitable foundation level.

TABLE 1 .

## SOIL TEST RESULTS -- WEST APPROACH

Borehole	Depth ft	Composition			Atterberg Limits			Undrained Triaxial Tests		Remarks
		%	%	%				Undrained Strain		
		Clay	Silt	Sand	LL%	PL%	Nat.M.C.	Triaxial Strength psf	at Failure %	
TR-58	3	55	40	5	45.3	24.0				
TR-61	11	30	38	32	36.3	23.2				Some organic, some gravel
TR-61	16	(EL. 255)			40.9	18.2	29.8	1,048	6	Silty clay - some fine sand
TR-61	21	(EL. 250)			25.9	16.6	28.3	3,325	4	CL. SILT WITH SAND (Silty sand with silty clay layer)
TR-61	26	(EL. 245)			27.7	15.4	29.2	998	6	CLAYEY SILT (Silty clay)
TR-66	7				40.1	21.5	28.1	2,848	20	Silty clay - some sandy silt. Poor sample
TR-66	17				37.4	15.7	35.5	3,073	1.5	Silty clay
TR-66	27				25.0	15.0	31.2	1,181	10	CLAYEY SILT (Silty clay - fine silt layers)
TR-75	21				22.5	18.1				
TR-76	16	(EL. 229)			74.8	47.9	77.1	370	6	ORGANIC SILT Dark brown fine sandy silt - plenty of wood chips
TR-77	16				25.7	14.6				
TR-77	26				41.6	21.0				

## APPENDIX A EXPLANATION OF TERMS

### 1 - Rock Core Data Sheets

The rock core data sheets are summaries of information obtained from the diamond drilling performed during the geological investigations. These sheets are found in Appendix B.

The sheets are divided into six columns--stratigraphy, bore-hole camera data, permeability, RQD and per cent recovery, weathering and remarks. A brief description of the columns is given below.

#### 1.1 - Stratigraphy

The stratigraphy column is divided into three subcolumns. The first subcolumn is the "core log", and is a graphical description of the rock types found in the drill core.

Fracture frequencies were computed by counting the total number of fractures in a given core run (open and tight joints) and dividing the number of fractures by the length of hole drilled. For example, if 10 fractures were recorded in an 8-foot run, the fracture frequency plotted would be  $10/8 = 1.25$  fractures per foot. The number of joints recorded in the log as "open joints" per core run were similarly calculated and plotted, using a separate symbol.

Fractures considered to have been caused by the drilling action were not counted in the fracture plots.

#### 1.2 - Permeability

The permeability column is divided into six columns labelled from  $10^{-7}$  centimetres per second to  $10^{-1}$  centimetres per second. The permeabilities as calculated from the water rest results have then been plotted for each test interval.

#### 1.3 - RQD and Per Cent Recovery

This column represents the rock quality designation and total core recovery, both expressed as a percentage of the core run. Rock quality designation (RQD) is defined as the percentage of rock core greater than 4 inches long.



The numerical values of RQD and the corresponding rock quality are as follows:

<u>RQD (per cent)</u>	<u>Rock Quality</u>
0- 25	very poor
25- 50	poor
50- 75	fair
75- 90	good
90-100	excellent




#### 1.4 - Laboratory Tests

Unconfined compression tests on selected rock samples are being performed in Acres laboratory and the results will be available upon request.

#### 2 - Drill Cores and Original Logs

Original logs and the diamond drill cores are available for inspection on request from Acres Consulting Services Limited.

APPENDIX B

ELEV. IN FEET	DEPTH IN FEET	STRATIGRAPHY				BOREHOLE CAMERA DATA	PERMEABILITY K = cm./sec.				R.Q.D. %			REMARKS		
		CORE LOG	BOREHOLE CAMERA LOG	NUMBER OF FRACTURES PER 10 FT.			1 X 10 <sup>-7</sup>	1 X 10 <sup>-5</sup>	1 X 10 <sup>-3</sup>	10 <sup>-1</sup>	0	50	100			
				0	10	20	>25					% RECOVERY				
												60	80	100		
263.9	5														LIGHT GREY, MEDIUM TO COARSE GRAINED CRYSTAL LINE LIMESTONE. JOINTS ARE MOSTLY TIGHT AND MODERATELY TO WIDELY SPACED. WEATHERING IS NIL AND FOLIATION IS AT 40° TO THE CORE AXIS.	
261.1	10															
258.2	15															
255.3	20															
252.4	25														24' TO 24.3' - VOID	
249.6	30															133.4' TO 138.2' - SEVERAL MICROFAULTS
246.7	35														221.7' - MICROFAULT	
243.8	40														222.2' - MICROFAULT	
240.9	45														260.7' TO 262.8' - AMPHIBOLITE	
238.1	50														267.9' TO 268.6' - AMPHIBOLITE	
235.2	55														270.2' - AMPHIBOLITE STRINGER	
232.2	60															
229.5	65															
226.6	70															

# LEGEND

## ORDOVICIAN

LIMESTONE

SHALE

## PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

## SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT

OPEN JOINTS PER 10 FT.

% RECOVERY

R.Q.D. %

DIRECTION OF BORING S 65° W  
INCLINATION OF BORING 35°

16 JUL 73	DATA FOR TENDERERS	CH APP APP
DATE	No	REVISIONS

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET

TR-47

DATE JUNE 1973

SCALE NONE

DEPT. N.S. CLAMISE

ACRES DRAWING No.

PROJECT

SHEET 1 OF 5

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0037

REV.

ELEV. IN FEET	DEPTH IN FEET	STRATIGRAPHY				BOREHOLE CAMERA DATA				PERMEABILITY				R. Q. D. %			REMARKS	
		CORE LOG	BOREHOLE CAMERA LOG	NUMBER OF FRACTURES PER 10 FT.	JOINT FREQUENCY	REMARKS	K = cm./sec.				% RECOVERY							
							0	10	20	>25	0	10	20	>25	1X10 <sup>-7</sup>	1X10 <sup>-5</sup>		1X10 <sup>-3</sup>
223.7	75																	
220.9	80																	
218.0	85																	
215.1	90																	
212.2	95																	
209.4	100																	
206.5	105																	
203.6	110																	
200.7	115																	
197.9	120																	
195.0	125																	
192.1	130																	
189.3	135																	
186.4	140																	

LEGEND

ORDOVICIAN

LIMESTONE

SHALE

PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R. Q. D. %

DIRECTION OF BORING S 65° W  
INCLINATION OF BORING 35°

16 JUL 73	No	DATA FOR TENDERERS	CH/APP/APP	ACRES CONSULTING SERVICES LIMITED
DATE	No	REVISIONS		

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA

ROCK CORE DATA SHEET

TR-47

DATE JUNE 1973

SCALE NONE

DEPT N. S. C. & S. E.

ACRES DRAWING No.

SHEET 2 OF 5

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0038

REV.

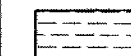
ELEV. IN FEET	DEPTH IN FEET	STRATIGRAPHY				BOREHOLE CAMERA DATA				PERMEABILITY				R. Q. D. %			REMARKS		
		CORE LOG	BOREHOLE CAMERA LOG	NUMBER OF FRACTURES PER 10 FT.	JOINT FREQUENCY	REMARKS	K = cm./sec.				% RECOVERY								
							0	10	20	>25	0	10	20	>25	1X10 <sup>-7</sup>	1X10 <sup>-5</sup>		1X10 <sup>-3</sup>	10 <sup>-1</sup>
183.5	145																		
180.6	150																		
177.8	155																		
175.0	160																		
172.1	165																		
169.2	170																		
166.3	175																		
163.5	180																		
160.5	185																		
157.7	190																		
154.8	195																		
152.0	200																		
149.1	205																		
146.2	210																		

LEGEND

ORDOVICIAN

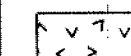


LIMESTONE

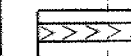


SHALE

PRECAMBRIAN



GRANITE



PEGMATITE VEINLETS



SCHIST



CRYSTALLINE LIMESTONE



SKARN



OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE



OTHER

SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.  
OPEN JOINTS PER 10 FT.

% RECOVERY  
R.Q.D. %

DIRECTION OF BORING S 65° N  
INCLINATION OF BORING 35°

16 JUL 73	DATA FOR TENDERERS	8.1	15c
DATE	No	REVISIONS	CH APP APP

ACRES		THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO	
		ARNPRIOR GENERATING STATION (NAF9)	
TAILRACE AREA ROCK CORE DATA SHEET TR-47			
DATE JUNE 1973		SCALE NONE	
DEPT 78C Land		ACRES DRAWING No.	
PROJECT		SHEET 3 OF 5	
ACRES CONSULTING SERVICES LIMITED		ONT. HYDRO DRAWING No.	
		NAF9 DBE 10175-0039	



ELEV. IN FEET	DEPTH IN FEET	STRATIGRAPHY				BOREHOLE CAMERA DATA				PERMEABILITY				R. Q. D. %			REMARKS			
		CORE LOG	BOREHOLE CAMERA LOG	NUMBER OF FRACTURES PER 10 FT.	JOINT FREQUENCY	REMARKS	K = cm./sec.				% RECOVERY									
							0	10	20	>25	0	10	20	>25	1X10 <sup>-7</sup>	1X10 <sup>-5</sup>		1X10 <sup>-3</sup>	10 <sup>-1</sup>	60
143.4	215																			
140.5	220																			
137.7	225																			
134.7	230																			
131.8	235																			
129.0	240																			
126.1	245																			
123.3	250																			
120.4	255																			
117.5	260																			
114.7	265																			
111.8	270																			
108.9	275																			
106.1	280																			

# LEGEND

## ORDOVICIAN

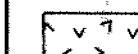


LIMESTONE



SHALE

## PRECAMBRIAN



GRANITE



PEGMATITE  
VEINLETS



SCHIST



CRYSTALLINE  
LIMESTONE



SKARN



OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE



OTHER

## SYMBOLS

~~~~~ FAULT ZONE, SHEAR ZONE, SCHIST ZONE

••••• HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

✕ JOINT (DIRECTION OF DIP, VERTICAL)

✕ BEDDING (DIRECTION OF DIP, VERTICAL)

✕ FOLIATION (DIRECTION OF DIP, VERTICAL)

— GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

● VOID (FILLED)

○ VOID (OPEN)

▨ INTENSE JOINTING

▨ FRACTURES  
PER 10 FT.

▨ OPEN JOINTS  
PER 10 FT.

▨ % RECOVERY

▨ R.Q.D. %

DIRECTION OF BORING S 65° W  
INCLINATION OF BORING 35°

|           |    |                    |        |            |
|-----------|----|--------------------|--------|------------|
| 16 JUL 73 | 0  | DATA FOR TENDERERS | BL 73C | CH APP APP |
| DATE      | No | REVISIONS          |        |            |

|                                                                                                   |                                                                                                  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>ACRES</b> THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO<br>ARNPRIOR GENERATING STATION (NAF9) |                                                                                                  |
| TAILRACE AREA<br>ROCK CORE DATA SHEET<br>TR-47                                                    |                                                                                                  |
| DATE JUNE 1973<br>DEPT 73 C<br>PROJECT                                                            | SCALE NONE<br>ACRES DRAWING No.<br>SHEET 4 OF 5<br>ONT. HYDRO DRAWING No.<br>NAF9 DBE 10175-0040 |

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |  | BOREHOLE CAMERA DATA |  |         |  | PERMEABILITY<br>K = cm./sec. |                    |                    |                  | R. Q. D. % |  |  | REMARKS |
|---------------|---------------|--------------|---------------------|--------------------------------|--|----------------------|--|---------|--|------------------------------|--------------------|--------------------|------------------|------------|--|--|---------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |  | JOINT FREQUENCY      |  | REMARKS |  | 1X10 <sup>-7</sup>           | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | % RECOVERY |  |  |         |
| 103.2         | 285           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 100.3         | 290           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 97.4          | 300           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 94.5          | 300           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 91.7          | 305           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 88.8          | 310           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 85.0          | 315           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |
| 83.1          | 320           |              |                     |                                |  |                      |  |         |  |                              |                    |                    |                  |            |  |  |         |

**LEGEND**

**ORDOVICIAN**

LIMESTONE

SHALE

**PRECAMBRIAN**

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

**SYMBOLS**

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FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R. Q. D. %

DIRECTION OF BORING S 65° W  
INCLINATION OF BORING 35°

|           |    |                    |            |
|-----------|----|--------------------|------------|
| 16 JUL 73 | 0  | DATA FOR TENDERERS | CH APP APP |
| DATE      | No | REVISIONS          |            |

**ACRES** THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-47

DATE JUNE 1973 SCALE NONE

DEPT *Mr. Campbell* ACRES DRAWING No.

SHEET 5 OF 5

ONT. HYDRO DRAWING No. NAF9 DBE 10175-0041

PROJECT *Rock Core*

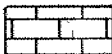


ONT. HYDRO DRAWING No. NAF9 DBE 10175-0041

REV. ACRES DRAWING No. 0

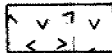

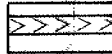

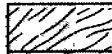

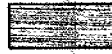

SHEET 5 OF 5

# LEGEND


## ORDOVICIAN


|                                                                                     |           |                                                                                     |            |
|-------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------|------------|
|  | LIMESTONE |  | OVERBURDEN |
|  | SHALE     |                                                                                     |            |

## PRECAMBRIAN










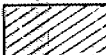
|                                                                                     |                          |                                                                                     |              |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|--------------|
|  | GRANITE                  |  | AMPHIBOLITE  |
|  | PEGMATITE<br>VEINLETS    |  | BRECCIA ZONE |
|  | SCHIST                   |  | OTHER        |
|  | CRYSTALLINE<br>LIMESTONE |                                                                                     |              |
|  | SKARN                    |                                                                                     |              |

## SYMBOLS


 FAULT ZONE, SHEAR ZONE, SCHIST ZONE


HEM HEM  
 MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE


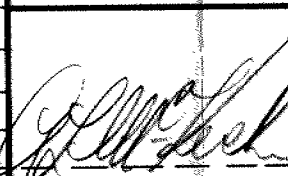

|                                                                                                                                              |                                                                                       |                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
|                                                           |    | JOINT (DIRECTION OF DIP, VERTICAL)     |
|                                                          |   | BEDDING (DIRECTION OF DIP, VERTICAL)   |
|                                                         |  | FOLIATION (DIRECTION OF DIP, VERTICAL) |
|  GEOLOGICAL BOUNDARY (DEFINED,<br>APPROXIMATE, ASSUMED) |                                                                                       |                                        |
|  VOID (FILLED)                                          |                                                                                       |                                        |
|  VOID (OPEN)                                            |                                                                                       |                                        |
|  INTENSE JOINTING                                       |                                                                                       |                                        |

ONT. HYDRO DRAWING No  
NAF9 DBE 10175-0042

 % RECOVERY

 R. Q. D. %

|           |    |                    |    |     |
|-----------|----|--------------------|----|-----|
|           | △  |                    |    |     |
|           | △  |                    |    |     |
|           | △  |                    |    |     |
|           | △  |                    |    |     |
| 16 JUL 73 | △  | DATA FOR TENDERERS | BL | JRC |
| DATE      | No | REVISIONS          | CH | APP |

|                                                                                                                              |  |                                                                                                                                           |            |                                                    |                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------|----------------------------------------------------------------------------------------------|
|                                         |  | <h1 style="margin: 0;">THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO</h1> <h2 style="margin: 0;">ARNPRIOR GENERATING STATION (NAF9)</h2> |            |                                                    |                                                                                              |
| <h3 style="margin: 0;">TAILRACE AREA</h3> <h3 style="margin: 0;">ROCK CORE DATA SHEET</h3> <h3 style="margin: 0;">TR-48</h3> |  |                                                                                                                                           |            |                                                    |                                                                                              |
|                                         |  | DATE                                                                                                                                      | JUNE 1973  | SCALE                                              | NONE                                                                                         |
|                                                                                                                              |  | DEPT                                                                                                                                      | his change | SHEET         OF     <br>ONT. HYDRO    DRAWING No. |                                                                                              |
|                                                                                                                              |  | PROJECT                                                                                                                                   | Archie     |                                                    |                                                                                              |
| ACRES CONSULTING SERVICES LIMITED                                                                                            |  | NAF9 DBE 10175-0042                                                                                                                       |            |                                                    | REV<br> |



| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |                 |         | BOREHOLE CAMERA DATA |    |    |     | PERMEABILITY |    |    |     | R. Q. D. %         |                    |                    | REMARKS |                  |    |    |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------|---------------|--------------|---------------------|--------------------------------|-----------------|---------|----------------------|----|----|-----|--------------|----|----|-----|--------------------|--------------------|--------------------|---------|------------------|----|----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. | JOINT FREQUENCY | REMARKS | K = cm./sec.         |    |    |     | % RECOVERY   |    |    |     |                    |                    |                    |         |                  |    |    |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|               |               |              |                     |                                |                 |         | 0                    | 10 | 20 | >25 | 0            | 10 | 20 | >25 | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> |         | 10 <sup>-1</sup> | 60 | 80 | 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 231.8         | 5             |              |                     |                                |                 |         |                      |    |    |     |              |    |    |     |                    |                    |                    |         |                  |    |    |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# LEGEND

## ORDOVICIAN

LIMESTONE

SHALE

## PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

## SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

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JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R.Q.D. %

DIRECTION OF BORING  
INCLINATION OF BORING 90°

|           |     |                    |              |
|-----------|-----|--------------------|--------------|
| 16 JUL 73 | 0   | DATA FOR TENDERERS | B.L. REC     |
| DATE      | No. | REVISIONS          | CH. APP. APP |

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-49

DATE JUNE 1973

SCALE NONE

DEPT. M.S. CLAUDE

ACRES DRAWING No.

PROJECT

SHEET 1 OF 1  
ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0043

REV







| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |    | BOREHOLE CAMERA DATA |     |                 |    | PERMEABILITY |     |                    |                    | R. Q. D. %         |                  |            | REMARKS |    |                                                                                                                                                                                                                            |
|---------------|---------------|--------------|---------------------|--------------------------------|----|----------------------|-----|-----------------|----|--------------|-----|--------------------|--------------------|--------------------|------------------|------------|---------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    |                      |     | JOINT FREQUENCY |    |              |     | K = cm./sec.       |                    |                    |                  | % RECOVERY |         |    |                                                                                                                                                                                                                            |
|               |               |              |                     | 0                              | 10 | 20                   | >25 | 0               | 10 | 20           | >25 | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | 60         |         | 80 | 100                                                                                                                                                                                                                        |
| 267.4         | 5             |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    | LIGHT GREY MEDIUM TO COARSE GRAINED CRYSTALLINE LIMESTONE. ROCK IS GENERALLY SOUND WITH WIDELY SPACED MOSTLY TIGHT JOINTS. WEATHERING IS NIL EXCEPT AROUND 45' AND 58'. FOLIATION IS INCLINED 40° TO 60° TO THE CORE AXIS. |
| 262.4         | 10            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 257.4         | 15            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 252.4         | 20            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 247.4         | 25            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    | 20.2' TO 24.7' - CLOSELY JOINTED.<br><br>62.5' TO 64.4' - CLOSELY JOINTED.                                                                                                                                                 |
| 242.4         | 30            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 237.4         | 35            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 232.4         | 40            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 227.4         | 45            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    | END OF HOLE ST 64.4'                                                                                                                                                                                                       |
| 222.4         | 50            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 217.4         | 55            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 212.4         | 60            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |
| 207.4         | 65            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                            |

# LEGEND

## ORDOVICIAN

LIMESTONE

SHALE

## PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

## SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

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JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R. Q. D. %

DIRECTION OF BORING  
INCLINATION OF BORING 90°

|           |                    |            |
|-----------|--------------------|------------|
| 16 JUL 73 | DATA FOR TENDERERS | CH APP APP |
| DATE      | No                 | REVISIONS  |

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-54

DATE JUNE 1973

DEPT. Mr. Candler

PROJECT

SCALE NONE

ACRES DRAWING No.

SHEET 1 OF 1  
ONT. HYDRO DRAWING No.


NAF9 DBE 10175-0051

REV.

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0051

SHEET 1 OF 1

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY                                                                       |                     |                                |    | BOREHOLE CAMERA DATA |     |                 |    | PERMEABILITY |     |              |                    | R. Q. D. %         |                    |                  | REMARKS |    |                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------|---------------|------------------------------------------------------------------------------------|---------------------|--------------------------------|----|----------------------|-----|-----------------|----|--------------|-----|--------------|--------------------|--------------------|--------------------|------------------|---------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |               | CORE LOG                                                                           | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    |                      |     | JOINT FREQUENCY |    |              |     | K = cm./sec. |                    |                    |                    | % RECOVERY       |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
|               |               |                                                                                    |                     | 0                              | 10 | 20                   | >25 | 0               | 10 | 20           | >25 | REMARKS      | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> |         | 60 | 80                                                                                                                                                                                                                                                                                                                                                                                            |
| 227.5         | 75            |  |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    | LIGHT GREY, MEDIUM TO COARSE GRAINED CRYSTALLINE LIMESTONE. ROCK IS GENERALLY SOUND WITH WIDELY SPACED MOSTLY TIGHT JOINTS. WEATHERING IS SLIGHT OR NIL AND FOLIATION IS INCLINED 10° TO 20° TO THE CORE AXIS.<br><br>158.1' - MICROFAULT<br><br>166.6' TO 168.1' - AMPHIBOLITE<br><br>184.4' TO 184.7' - AMPHIBOLITE<br><br>207.0' TO 207.4' - GRANITE<br><br>219.6' TO 222.4' - AMPHIBOLITE |
| 224.7         | 80            |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 221.8         | 85            |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 218.9         | 90            |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 216.0         | 95            |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 213.2         | 100           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 210.3         | 105           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 207.4         | 110           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 204.5         | 115           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 201.7         | 120           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 198.8         | 125           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 195.9         | 130           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 193.1         | 135           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |
| 190.2         | 140           |                                                                                    |                     |                                |    |                      |     |                 |    |              |     |              |                    |                    |                    |                  |         |    |                                                                                                                                                                                                                                                                                                                                                                                               |

# LEGEND

## ORDOVICIAN



LIMESTONE

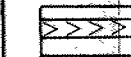


SHALE

## PRECAMBRIAN



GRANITE



PEGMATITE VEINLETS



SCHIST



CRYSTALLINE LIMESTONE



SKARN



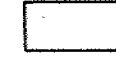
OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE

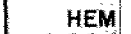


OTHER

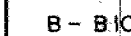
## SYMBOLS



FAULT ZONE, SHEAR ZONE, SCHIST ZONE



HEM MINERALIZED BED OR SEAM (HEMATITE)



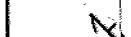
B - BIOTITE, M - MICA, Pyr. - PYRITE



JOINT (DIRECTION OF DIP, VERTICAL)



BEDDING (DIRECTION OF DIP, VERTICAL)



FOLIATION (DIRECTION OF DIP, VERTICAL)



GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)



VOID (FILLED)



VOID (OPEN)



INTENSE JOINTING



FRACTURES PER 10 FT.



OPEN JOINTS PER 10 FT.



% RECOVERY



R.Q.D. %

DIRECTION OF BORING S 80° E  
INCLINATION OF BORING 35°

|           |                    |               |                                   |
|-----------|--------------------|---------------|-----------------------------------|
| 16 JUL 73 | DATA FOR TENDERERS | CH. APP. APP. | ACRES CONSULTING SERVICES LIMITED |
| DATE      | No                 | REVISIONS     |                                   |



THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-57

DATE JUNE 1973

SCALE NONE

ACRES DRAWING No.

PROJECT

REPT. No. 100

NAF9 DBE 10175-0055

SHEET 1 OF 3

ONT. HYDRO DRAWING No.

REV.

NAF9 DBE 10175-0055

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |    | BOREHOLE CAMERA DATA |     |         |              | PERMEABILITY |    |     |                      | R. Q. D. %           |                      |                  | REMARKS |   |    |
|---------------|---------------|--------------|---------------------|--------------------------------|----|----------------------|-----|---------|--------------|--------------|----|-----|----------------------|----------------------|----------------------|------------------|---------|---|----|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    | JOINT FREQUENCY      |     | REMARKS | K = cm./sec. |              |    |     | % RECOVERY           |                      |                      |                  |         |   |    |
|               |               |              |                     | 0                              | 10 | 20                   | >25 |         | 0            | 10           | 20 | >25 | 1 X 10 <sup>-7</sup> | 1 X 10 <sup>-5</sup> | 1 X 10 <sup>-3</sup> | 10 <sup>-1</sup> |         | 0 | 50 |
|               |               |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 187.3         | 145           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 184.4         | 150           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 181.6         | 155           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 178.8         | 160           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 175.9         | 165           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 173.0         | 170           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 170.1         | 175           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 167.3         | 180           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 164.3         | 185           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 161.5         | 190           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 158.6         | 195           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 155.8         | 200           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 152.9         | 205           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |
| 150.0         | 210           |              |                     |                                |    |                      |     |         |              |              |    |     |                      |                      |                      |                  |         |   |    |

# LEGEND

## ORDOVICIAN

LIMESTONE

SHALE

## PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

## SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R.Q.D. %

DIRECTION OF BORING S 80° E  
INCLINATION OF BORING 35°

|           |      |     |                    |           |               |                                   |
|-----------|------|-----|--------------------|-----------|---------------|-----------------------------------|
| 16 JUL 73 | DATE | No. | DATA FOR TENDERERS | REVISIONS | CH. APP. APP. | ACRES CONSULTING SERVICES LIMITED |
|-----------|------|-----|--------------------|-----------|---------------|-----------------------------------|

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-57

DATE JUNE 1973

SCALE NONE

DEPT. NAF9

ACRES DRAWING No.

PROJECT

SHEET 2 OF 3

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0056

REV.





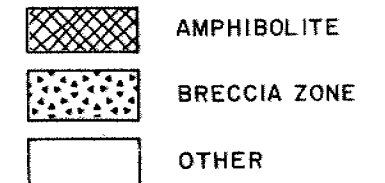
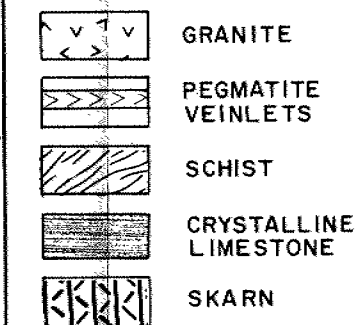
| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |    | BOREHOLE CAMERA DATA |                 |   |    | PERMEABILITY  |     |                    |                    | R. Q. D. %         |                  |    | REMARKS                                                                                                                                     |
|---------------|---------------|--------------|---------------------|--------------------------------|----|----------------------|-----------------|---|----|---------------|-----|--------------------|--------------------|--------------------|------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    |                      | JOINT FREQUENCY |   |    | K = cm. /sec. |     |                    |                    | % RECOVERY         |                  |    |                                                                                                                                             |
|               |               |              |                     | 0                              | 10 | 20                   | >25             | 0 | 10 | 20            | >25 | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | 60 |                                                                                                                                             |
| 264.3         | 5             |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    | LIGHT GREY, MEDIUM TO COARSE GRAINED CRYSTALLINE LIMESTONE. ROCK IS SOUND WITH MODERATELY SPACED TIGHT JOINTS. WEATHERING IS SLIGHT OR NIL. |
| 259.3         | 10            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 254.3         | 15            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 249.3         | 20            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 244.3         | 25            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 239.3         | 30            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 234.3         | 35            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 229.3         | 40            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 224.3         | 45            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 219.3         | 50            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 214.3         | 55            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 209.3         | 60            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    | END OF HOLE AT 66.7'                                                                                                                        |
| 204.3         | 65            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |
| 199.3         | 70            |              |                     |                                |    |                      |                 |   |    |               |     |                    |                    |                    |                  |    |                                                                                                                                             |

# LEGEND

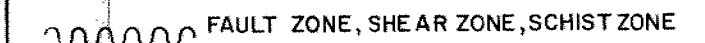
## ORDOVICIAN



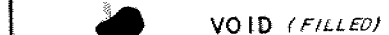
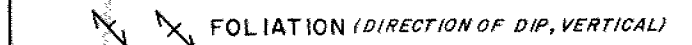
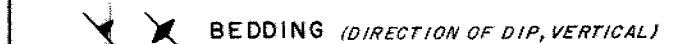
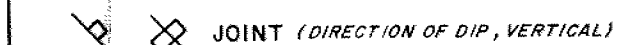
## PRECAMBRIAN



# SYMBOLS



B - BIOTITE, M - MICA, Pyr. - PYRITE



DIRECTION OF BORING  
INCLINATION OF BORING 90°

| DATE      | No. | REVISIONS | CH. | APP. |
|-----------|-----|-----------|-----|------|
| 16 JUL 73 | 0   |           |     |      |
|           |     |           |     |      |
|           |     |           |     |      |
|           |     |           |     |      |

|                                                                                                   |                                                                                                  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>ACRES</b> THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO<br>ARNPRIOR GENERATING STATION (NAF9) |                                                                                                  |
| TAILRACE AREA<br>ROCK CORE DATA SHEET<br>TR-58                                                    |                                                                                                  |
| DATE JUN 1973<br>DEPT. AB Clandu<br>PROJECT                                                       | SCALE NONE<br>ACRES DRAWING No.<br>SHEET 1 OF 1<br>ONT. HYDRO DRAWING No.<br>NAF9 DBE 10175-0058 |
| 16 JUL 73<br>DATE No.                                                                             | DATA FOR TENDERERS<br>REVISIONS                                                                  |



ONT. HYDRO DRAWING No.  
NAF9 DBE 10175-0061

# LEGEND

## ORDOVICIAN

|  |           |  |            |
|--|-----------|--|------------|
|  | LIMESTONE |  | OVERBURDEN |
|  | SHALE     |  |            |

## PRECAMBRIAN

|  |                          |  |              |
|--|--------------------------|--|--------------|
|  | GRANITE                  |  | AMPHIBOLITE  |
|  | PEGMATITE<br>VEINLETS    |  | BRECCIA ZONE |
|  | SCHIST                   |  | OTHER        |
|  | CRYSTALLINE<br>LIMESTONE |  |              |
|  | SKARN                    |  |              |

## SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM  
 MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

|  |  |                                        |
|--|--|----------------------------------------|
|  |  | JOINT (DIRECTION OF DIP, VERTICAL)     |
|  |  | BEDDING (DIRECTION OF DIP, VERTICAL)   |
|  |  | FOLIATION (DIRECTION OF DIP, VERTICAL) |

GEOLOGICAL BOUNDARY (DEFINED,  
APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)


INTENSE JOINTING

|     | % RECOVERY | R.Q.D. % |
|-----|------------|----------|
| 1   | 100        | 100      |
| 2   | 100        | 100      |
| 3   | 100        | 100      |
| 4   | 100        | 100      |
| 5   | 100        | 100      |
| 6   | 100        | 100      |
| 7   | 100        | 100      |
| 8   | 100        | 100      |
| 9   | 100        | 100      |
| 10  | 100        | 100      |
| 11  | 100        | 100      |
| 12  | 100        | 100      |
| 13  | 100        | 100      |
| 14  | 100        | 100      |
| 15  | 100        | 100      |
| 16  | 100        | 100      |
| 17  | 100        | 100      |
| 18  | 100        | 100      |
| 19  | 100        | 100      |
| 20  | 100        | 100      |
| 21  | 100        | 100      |
| 22  | 100        | 100      |
| 23  | 100        | 100      |
| 24  | 100        | 100      |
| 25  | 100        | 100      |
| 26  | 100        | 100      |
| 27  | 100        | 100      |
| 28  | 100        | 100      |
| 29  | 100        | 100      |
| 30  | 100        | 100      |
| 31  | 100        | 100      |
| 32  | 100        | 100      |
| 33  | 100        | 100      |
| 34  | 100        | 100      |
| 35  | 100        | 100      |
| 36  | 100        | 100      |
| 37  | 100        | 100      |
| 38  | 100        | 100      |
| 39  | 100        | 100      |
| 40  | 100        | 100      |
| 41  | 100        | 100      |
| 42  | 100        | 100      |
| 43  | 100        | 100      |
| 44  | 100        | 100      |
| 45  | 100        | 100      |
| 46  | 100        | 100      |
| 47  | 100        | 100      |
| 48  | 100        | 100      |
| 49  | 100        | 100      |
| 50  | 100        | 100      |
| 51  | 100        | 100      |
| 52  | 100        | 100      |
| 53  | 100        | 100      |
| 54  | 100        | 100      |
| 55  | 100        | 100      |
| 56  | 100        | 100      |
| 57  | 100        | 100      |
| 58  | 100        | 100      |
| 59  | 100        | 100      |
| 60  | 100        | 100      |
| 61  | 100        | 100      |
| 62  | 100        | 100      |
| 63  | 100        | 100      |
| 64  | 100        | 100      |
| 65  | 100        | 100      |
| 66  | 100        | 100      |
| 67  | 100        | 100      |
| 68  | 100        | 100      |
| 69  | 100        | 100      |
| 70  | 100        | 100      |
| 71  | 100        | 100      |
| 72  | 100        | 100      |
| 73  | 100        | 100      |
| 74  | 100        | 100      |
| 75  | 100        | 100      |
| 76  | 100        | 100      |
| 77  | 100        | 100      |
| 78  | 100        | 100      |
| 79  | 100        | 100      |
| 80  | 100        | 100      |
| 81  | 100        | 100      |
| 82  | 100        | 100      |
| 83  | 100        | 100      |
| 84  | 100        | 100      |
| 85  | 100        | 100      |
| 86  | 100        | 100      |
| 87  | 100        | 100      |
| 88  | 100        | 100      |
| 89  | 100        | 100      |
| 90  | 100        | 100      |
| 91  | 100        | 100      |
| 92  | 100        | 100      |
| 93  | 100        | 100      |
| 94  | 100        | 100      |
| 95  | 100        | 100      |
| 96  | 100        | 100      |
| 97  | 100        | 100      |
| 98  | 100        | 100      |
| 99  | 100        | 100      |
| 100 | 100        | 100      |

|           |    |                    |    |     |
|-----------|----|--------------------|----|-----|
|           | △  |                    |    |     |
|           | △  |                    |    |     |
|           | △  |                    |    |     |
|           | △  |                    |    |     |
| 16 JUL 73 | ○  | DATA FOR TENDERERS | SL | ABC |
| DATE      | Nº | REVISIONS          | CH | APP |

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)


TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-61


|         |           |            |                                                                                           |
|---------|-----------|------------|-------------------------------------------------------------------------------------------|
| DATE    | JUNE 1973 | SCALE      | NONE                                                                                      |
| DEPT    | 713 Caudy | ACRES      | DRAWING No.                                                                               |
| PROJECT | Chaulk    | SHEET      | 1 OF 1                                                                                    |
| ED      |           | ONT. HYDRO | DRAWING No.                                                                               |
|         |           | NAF9 DBE   | 10175-0061                                                                                |
|         |           |            | REV  |

|                       |                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------|
| ONT. HYDRO DRAWING No | REV. ACRES DRAWING No                                                             |
| NAF9 DBE 10175-0068   |  |
|                       | SHEET OF                                                                          |

SHEET 1 OF 1

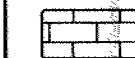
NAF9 DBE 10175-0068

|         |             |                   |                                                                                            |
|---------|-------------|-------------------|--------------------------------------------------------------------------------------------|
| DATE    | JUNE 1973   | SCALE             | NONE                                                                                       |
| DEPT    | W & Climate | ACRES DRAWING No. |                                                                                            |
| PROJECT | De Long     | SHEET             | OF                                                                                         |
|         |             | ONT. HYDRO        | DRAWING No.                                                                                |
|         |             | NAF9 DBE          | 10175-0068                                                                                 |
|         |             |                   | REV.  |

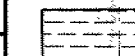
| ELEV. IN FEET            | DEPTH IN FEET | STRATIGRAPHY                                                                       |                     |                                |                 | BOREHOLE CAMERA DATA |              |                    |                    | PERMEABILITY       |                  |            |    | R. Q. D. % |     |   | REMARKS |
|--------------------------|---------------|------------------------------------------------------------------------------------|---------------------|--------------------------------|-----------------|----------------------|--------------|--------------------|--------------------|--------------------|------------------|------------|----|------------|-----|---|---------|
|                          |               | CORE LOG                                                                           | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. | JOINT FREQUENCY | REMARKS              | K = cm./sec. | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | % RECOVERY |    |            |     |   |         |
|                          |               |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  | 0          | 10 | 20         | >25 | 0 |         |
| 265.7                    | 5             |  |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 262.9                    | 10            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 260.0                    | 15            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 257.1                    | 20            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 254.2                    | 25            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 251.4                    | 30            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 248.5                    | 35            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 245.6                    | 40            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 242.7                    | 45            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 239.9                    | 50            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 237.0                    | 55            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 234.1                    | 60            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 231.3                    | 65            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| 228.4                    | 70            |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |
| BEDROCK SURFACE AT 69.5' |               |                                                                                    |                     |                                |                 |                      |              |                    |                    |                    |                  |            |    |            |     |   |         |

# LEGEND

## ORDOVICIAN

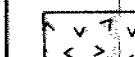


LIMESTONE

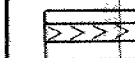


SHALE

## PRECAMBRIAN



GRANITE



PEGMATITE VEINLETS



SCHIST



CRYSTALLINE LIMESTONE



SKARN



OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE



OTHER

## SYMBOLS

~~~~~ FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr - PYRITE

⚡ ⚡ JOINT (DIRECTION OF DIP, VERTICAL)

⚡ ⚡ BEDDING (DIRECTION OF DIP, VERTICAL)

⚡ ⚡ FOLIATION (DIRECTION OF DIP, VERTICAL)

— GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

● VOID (FILLED)

○ VOID (OPEN)

▨ INTENSE JOINTING

BEDROCK SURFACE  
AT 69.5'

▨ FRACTURES  
PER 10 FT.

▨ OPEN JOINTS  
PER 10 FT.

▨ % RECOVERY

▨ R. Q. D. %

DIRECTION OF BORING S 82° E  
INCLINATION OF BORING 35°

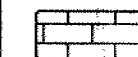
|           |     |                    |           |              |
|-----------|-----|--------------------|-----------|--------------|
| 16 JUL 73 | 0   | DATA FOR TENDERERS | B. J. ZAC | CH. APP. APP |
| DATE      | No. | REVISIONS          |           |              |

|   |  |
|---|--|
| <b>ACRES</b> THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO<br>ARNPRIOR GENERATING STATION (NAF9) |  |
| TAILRACE AREA<br>ROCK CORE DATA SHEET<br>TR-68  |  |
| DATE JUNE 1973<br>DEPT. <i>NAF9</i><br>PROJECT <i>NAF9</i>  | SCALE NONE<br>ACRES DRAWING No.<br>SHEET 1 OF 2<br>ONT. HYDRO DRAWING No.<br>NAF9 DBE 10175-0070 |
| REV. <i>0</i>   | REV. <i>0</i>  |

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |                 | BOREHOLE CAMERA DATA |                    |                    |                    | PERMEABILITY     |            |    |     | R. Q. D. % |     |   | REMARKS |
|---------------|---------------|--------------|---------------------|--------------------------------|-----------------|----------------------|--------------------|--------------------|--------------------|------------------|------------|----|-----|------------|-----|---|---------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. | JOINT FREQUENCY | REMARKS              | K = cm./sec.       |                    |                    |                  | % RECOVERY |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | 0          | 50 | 100 |            |     |   |         |
|               |               |              |                     | 0 10 20 >25                    | 0 10 20 >25     |                      |                    |                    |                    |                  |            |    | 60  | 80         | 100 |   |         |
| 225.5         | 75            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     | LIGHT GREY, MEDIUM TO COARSE GRAINED CRYSTALLINE LESTONE. ROCK IS SOUND WITH MODERATELY SPACED TIGHT AND OPEN JOINTS.<br><br>WEATHERING IS NIL AND FOLIATION DIPS 15° TO 25° TO THE CORE AXIS.<br><br>—END OF HOLE AT 95.5' |         |
| 222.7         | 80            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
| 219.8         | 85            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
| 216.9         | 90            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
| 214.0         | 95            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
| 211.2         | 100           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |
|               |               |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |     |   |         |

# LEGEND

## ORDOVICIAN

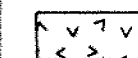


LIMESTONE

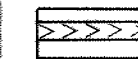


SHALE

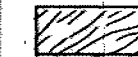
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GRANITE



PEGMATITE VEINLETS



SCHIST



CRYSTALLINE LIMESTONE



SKARN



OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE



OTHER

# SYMBOLS

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B - BIOTITE, M - MICA, Pyr. - PYRITE

◇ ◇ JOINT (DIRECTION OF DIP, VERTICAL)

▲ ▲ BEDDING (DIRECTION OF DIP, VERTICAL)

↗ ↘ FOLIATION (DIRECTION OF DIP, VERTICAL)

— GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

● VOID (FILLED)

○ VOID (OPEN)

▨ INTENSE JOINTING

▨ FRACTURES PER 10 FT.

▨ OPEN JOINTS PER 10 FT.

▨ % RECOVERY

▨ R. Q. D. %

DIRECTION OF BORING S 28° E  
INCLINATION OF BORING 35°

|           |                    |            |
|-----------|--------------------|------------|
| 16 JUL 73 | DATA FOR TENDERERS | CH APP APP |
| DATE      | No                 | REVISIONS  |




THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-68

|                        |                   |
|------------------------|-------------------|
| DATE JUNE 1973         | SCALE NONE        |
| DEPT. <i>Acres</i>     | ACRES DRAWING No. |
| PROJECT <i>Acres</i>   | SHEET 2 OF 2      |
| ONT. HYDRO DRAWING No. | REV.              |



|                        |                                                                                   |                   |
|------------------------|-----------------------------------------------------------------------------------|-------------------|
| ONT. HYDRO DRAWING No. | REV.                                                                              | ACRES DRAWING No. |
| NAF9 DBE 10175-0079    |  | SHEET 1 OF 1      |

 % RECOVERY

 R. Q. D. %

|           |    |                    |    |     |
|-----------|----|--------------------|----|-----|
|           | △  |                    |    |     |
|           | △  |                    |    |     |
|           | △  |                    |    |     |
|           | △  |                    |    |     |
| 16 JUL 73 | △  | DATA FOR TENDERERS | bl | mc  |
| DATE      | No | REVISIONS          | CH | APP |

 INTENSE JOINTING

5.4' TO 5.8' -  
MICROFAULT  
END OF HOLE AT 23.8

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-74

NAF9 DBE 10175-0079

REV

ACRES CONSULTING SERVICES LIMITED

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |    | BOREHOLE CAMERA DATA |     |                 |    | PERMEABILITY |              |     |                    | R.Q.D. %           |                    |                  | REMARKS |                                                                                                                                                                                                                                                                                                           |
|---------------|---------------|--------------|---------------------|--------------------------------|----|----------------------|-----|-----------------|----|--------------|--------------|-----|--------------------|--------------------|--------------------|------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    |                      |     | JOINT FREQUENCY |    | REMARKS      | K = cm./sec. |     |                    |                    | % RECOVERY         |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     | 0                              | 10 | 20                   | >25 | 0               | 10 |              | 20           | >25 | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> |         | 60                                                                                                                                                                                                                                                                                                        |
| 240.7         | 5             |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         | LIGHT GREY MEDIUM TO COARSE GRAINED FOLIATED CRYSTALLINE LIMESTONE. ROCK IS SOUND WITH MODERATELY TO WIDELY SPACED TIGHT JOINTS. WEATHERING IS NIL AND FOLIATION IS INCLINED 60° TO 70° TO THE CORE AXIS.<br><br>21.6' TO 22.3' - AMPHIBOLITE<br><br><br><br><br><br><br><br><br><br>END OF HOLE AT 44.3' |
| 235.7         | 10            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 230.7         | 15            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 225.7         | 20            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 220.7         | 25            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 215.7         | 30            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 210.7         | 35            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 205.7         | 40            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
| 200.7         | 45            |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
|               |               |              |                     |                                |    |                      |     |                 |    |              |              |     |                    |                    |                    |                  |         |                                                                                                                                                                                                                                                                                                           |
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**LEGEND**  
 ORDOVICIAN  
 LIMESTONE  
 SHALE  
 PRECAMBRIAN  
 GRANITE  
 PEGMATITE VEINLETS  
 SCHIST  
 CRYSTALLINE LIMESTONE  
 SKARN  
 OVERBURDEN  
 AMPHIBOLITE  
 BRECCIA ZONE  
 OTHER

**SYMBOLS**  
 FAULT ZONE, SHEAR ZONE, SCHIST ZONE  
 HEM HEM  
 MINERALIZED BED OR SEAM (HEMATITE)  
 B - BIOTITE, M - MICA, Pyr. - PYRITE  
 JOINT (DIRECTION OF DIP, VERTICAL)  
 BEDDING (DIRECTION OF DIP, VERTICAL)  
 FOLIATION (DIRECTION OF DIP, VERTICAL)  
 GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)  
 VOID (FILLED)  
 VOID (OPEN)  
 INTENSE JOINTING

FRACTURES PER 10 FT.  
 OPEN JOINTS PER 10 FT.

% RECOVERY  
 R.Q.D. %

DIRECTION OF BORING  
INCLINATION OF BORING 90°



|           |                    |           |
|-----------|--------------------|-----------|
| 16 JUL 73 | DATA FOR TENDERERS | BL 73C    |
| DATE      | No                 | REVISIONS |
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**THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO**  
**ARNPRIOR GENERATING STATION (NAF9)**

TAILRACE AREA  
 ROCK CORE DATA SHEET  
 TR-75

|                           |                                            |
|---------------------------|--------------------------------------------|
| DATE JULY 1973            | SCALE NONE                                 |
| DEPT. <i>7.6 Clandage</i> | ACRES DRAWING No.                          |
| PROJECT <i>One</i>        | SHEET 1 OF 1                               |
| CH. APP. APP.             | ONT. HYDRO DRAWING No. NAF9 DBE 10175-0080 |

ONT. HYDRO DRAWING No. NAF9 DBE 10175-0080  
REV. ACRES DRAWING No. 0  
SHEET 1 OF 1

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY                                                                      |                                                                                   |                                |    | BOREHOLE CAMERA DATA |     |                 |    | PERMEABILITY |     |                      |                      | R. Q. D. %           |                  |            | REMARKS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|               |               | CORE LOG                                                                          | BOREHOLE CAMERA LOG                                                               | NUMBER OF FRACTURES PER 10 FT. |    |                      |     | JOINT FREQUENCY |    |              |     | K = cm./sec.         |                      |                      |                  | % RECOVERY |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| 240.0         | 5             |  |  |                                |    |                      |     |                 |    |              |     |                      |                      |                      |                  |            |         | LIGHT GREY, MEDIUM TO COARSE GRAINED CRYSTALLINE LIMESTONE. ROCK IS SOUND, WITH MODERATELY TO WIDELY SPACED MOSTLY TIGHT JOINTS. WEATHERING IS NIL AND FOLIATION IS INCLINED 50° TO 70° TO THE CORE AXIS.<br><br>26.8' TO 27.7' - AMPHIBOLITE<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><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|     |

LIGHT GREY, MEDIUM TO COARSE GRAINED CRYSTAL LINE LIMESTONE. ROCK IS SOUND, WITH MODERATELY TO WIDELY SPACED MOSTLY TIGHT JOINTS. WEATHERING IS NIL AND FOLIATION IS INCLINED 50° TO 70° TO THE CORE AXIS.

26.8' TO 27.7' - AMPHIBOLITE

END OF HOLE AT 42.3'

LEGEND

ORDOVICIAN

LIMESTONE

SHALE

PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM

HEM

MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R.Q.D. %

DIRECTION OF BORING INCLINATION OF BORING 90°

|           |                    |               |
|-----------|--------------------|---------------|
| 16 JUL 73 | DATA FOR TENDERERS | CH. APP. APP. |
| DATE      | No                 | REVISIONS     |

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-76

DATE JULY 1973

DEPT. J.B. Clavie

PROJECT

SCALE NONE

ACRES DRAWING No.

SHEET 1 OF 1

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0081





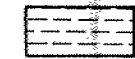
| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |    | BOREHOLE CAMERA DATA |     |         |              | PERMEABILITY |    |     |                    | R. Q. D. %         |                    |                  | REMARKS |   |    |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    | JOINT FREQUENCY      |     | REMARKS | K = cm./sec. |              |    |     | % RECOVERY         |                    |                    |                  |         |   |    |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|               |               |              |                     | 0                              | 10 | 20                   | >25 |         | 0            | 10           | 20 | >25 | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> |         | 0 | 50 | 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|               |               |              |                     |                                |    |                      |     |         |              |              |    |     |                    |                    |                    |                  |         |   |    |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# LEGEND

## ORDOVICIAN

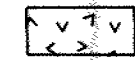


LIMESTONE



SHALE

## PRECAMBRIAN



GRANITE



PEGMATITE VEINLETS



SCHIST



CRYSTALLINE LIMESTONE



SKARN



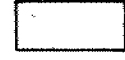
OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE



OTHER

## SYMBOLS



FAULT ZONE, SHEAR ZONE, SCHIST ZONE



HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE



JOINT (DIRECTION OF DIP, VERTICAL)



BEDDING (DIRECTION OF DIP, VERTICAL)



FOLIATION (DIRECTION OF DIP, VERTICAL)



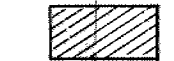
GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)



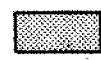
VOID (FILLED)



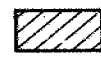
VOID (OPEN)



INTENSE JOINTING



FRACTURES PER 10 FT.



OPEN JOINTS PER 10 FT.



% RECOVERY



R. Q. D. %

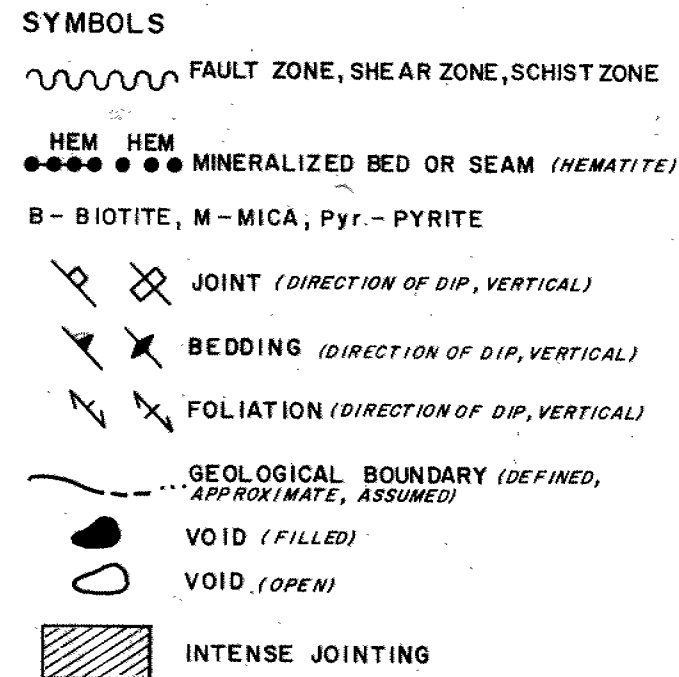
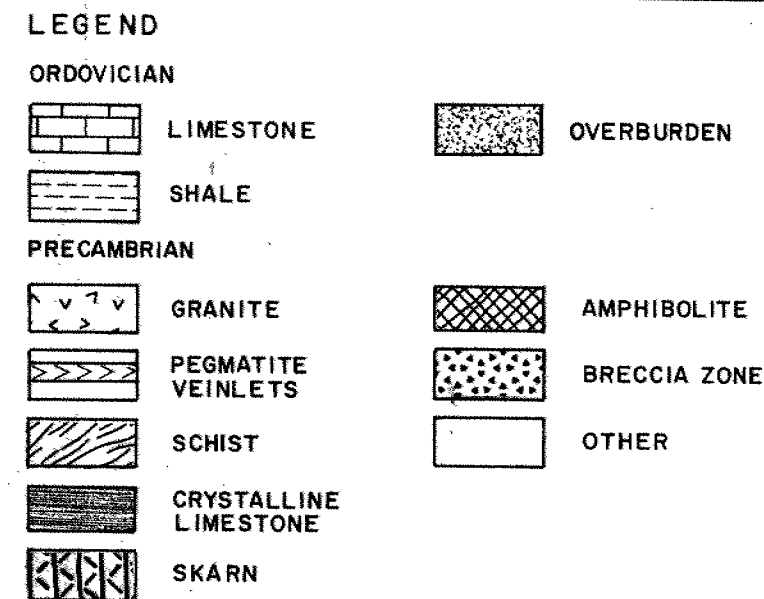
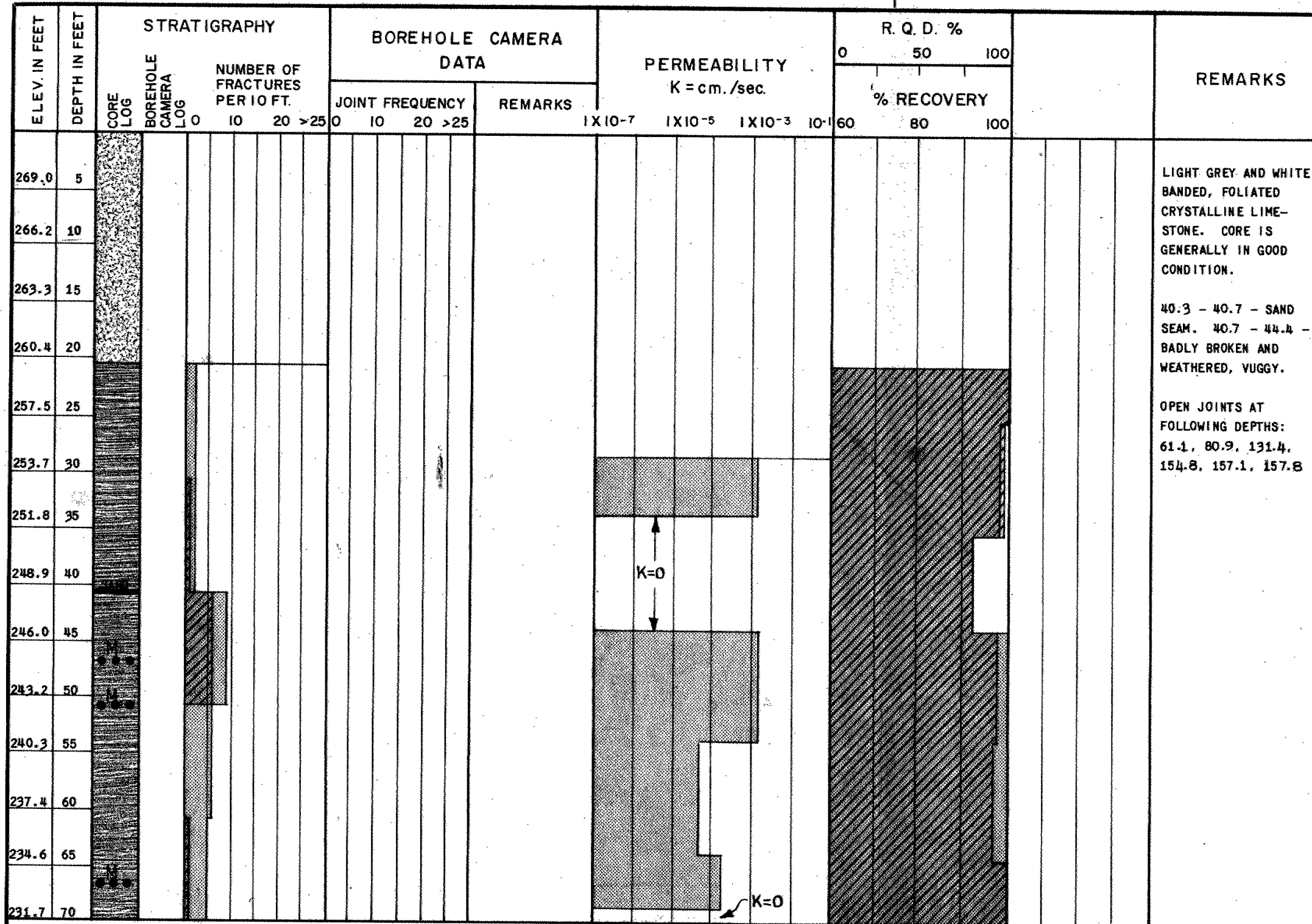
DIRECTION OF BORING  
INCLINATION OF BORING

90°

|           |                    |              |
|-----------|--------------------|--------------|
| 16 JUL 73 | DATA FOR TENDERERS | B. L. ZAC    |
| DATE      | No                 | REVISIONS    |
|           |                    | CH. APP. APP |

|                                                                                                   |                                                                                                  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>ACRES</b> THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO<br>ARNPRIOR GENERATING STATION (NAF9) |                                                                                                  |
| TAILRACE AREA<br>ROCK CORE DATA SHEET<br>TR-81                                                    |                                                                                                  |
| DATE JULY 1973<br>DEPT. <i>AB Claude</i><br>PROJECT <i>Archer</i>                                 | SCALE NONE<br>ACRES DRAWING No.<br>SHEET 1 OF 1<br>ONT. HYDRO DRAWING No.<br>NAF9 DBE 10175-0091 |





DIRECTION OF BORING

INCLINATION OF BORING

N 79° W

35°

|           |      |    |                    |           |              |
|-----------|------|----|--------------------|-----------|--------------|
| 20 JUL 73 | DATE | No | DATA FOR TENDERERS | REVISIONS | CH. APP. APP |
|           |      |    |                    |           |              |
|           |      |    |                    |           |              |
|           |      |    |                    |           |              |
|           |      |    |                    |           |              |

**ACRES** THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA

ROCK CORE DATA SHEET

TR-83

DATE JULY 1973

SCALE NONE

DEPT. *W. & C. Davis*

ACRES DRAWING No.

PROJECT *D. R. D. R.*

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0093

SHEET 1 OF 3

REV.

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0093

REV. ACRES DRAWING No.

SHEET 1 OF 3

| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |                 | BOREHOLE CAMERA DATA |                    |                    |                    | PERMEABILITY     |            |    |     | R. Q. D. % |  |  | REMARKS |
|---------------|---------------|--------------|---------------------|--------------------------------|-----------------|----------------------|--------------------|--------------------|--------------------|------------------|------------|----|-----|------------|--|--|---------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. | JOINT FREQUENCY | REMARKS              | K = cm./sec.       |                    |                    |                  | % RECOVERY |    |     |            |  |  |         |
|               |               |              |                     |                                |                 |                      | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | 60         | 80 | 100 |            |  |  |         |
| 228.8         | 75            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 226.0         | 80            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 223.1         | 85            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 220.2         | 90            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 217.3         | 95            |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 214.5         | 100           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 211.6         | 105           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 208.7         | 110           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 205.8         | 115           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 203.0         | 120           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 200.1         | 125           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 197.2         | 130           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 194.4         | 135           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |
| 191.5         | 140           |              |                     |                                |                 |                      |                    |                    |                    |                  |            |    |     |            |  |  |         |

# LEGEND

## ORDOVICIAN



LIMESTONE



SHALE

## PRECAMBRIAN



GRANITE



PEGMATITE VEINLETS



SCHIST



CRYSTALLINE LIMESTONE



SKARN



OVERBURDEN



AMPHIBOLITE



BRECCIA ZONE



OTHER

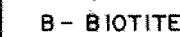
## SYMBOLS



FAULT ZONE, SHEAR ZONE, SCHIST ZONE



HEM HEM MINERALIZED BED OR SEAM (HEMATITE)



B - BIOTITE, M - MICA, Pyr. - PYRITE



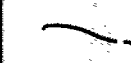
JOINT (DIRECTION OF DIP, VERTICAL)



BEDDING (DIRECTION OF DIP, VERTICAL)



FOLIATION (DIRECTION OF DIP, VERTICAL)



GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)



VOID (FILLED)



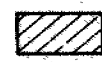
VOID (OPEN)



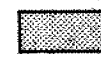
INTENSE JOINTING



FRACTURES PER 10 FT.



OPEN JOINTS PER 10 FT.



% RECOVERY



R. Q. D. %

DIRECTION OF BORING  
INCLINATION OF BORING

N 79° W  
35°

|           |    |                    |         |     |   |
|-----------|----|--------------------|---------|-----|---|
| 20 JUL 73 | 0  | DATA FOR TENDERERS | BL      | 20  | 2 |
| DATE      | No | REVISIONS          | CH. APP | APP |   |

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO  
ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA  
ROCK CORE DATA SHEET  
TR-83

DATE JULY 1973

SCALE NONE

DEPT 203 Claude

ACRES DRAWING No.

PROJECT

SHEET 2 OF 3

ONT. HYDRO DRAWING No.

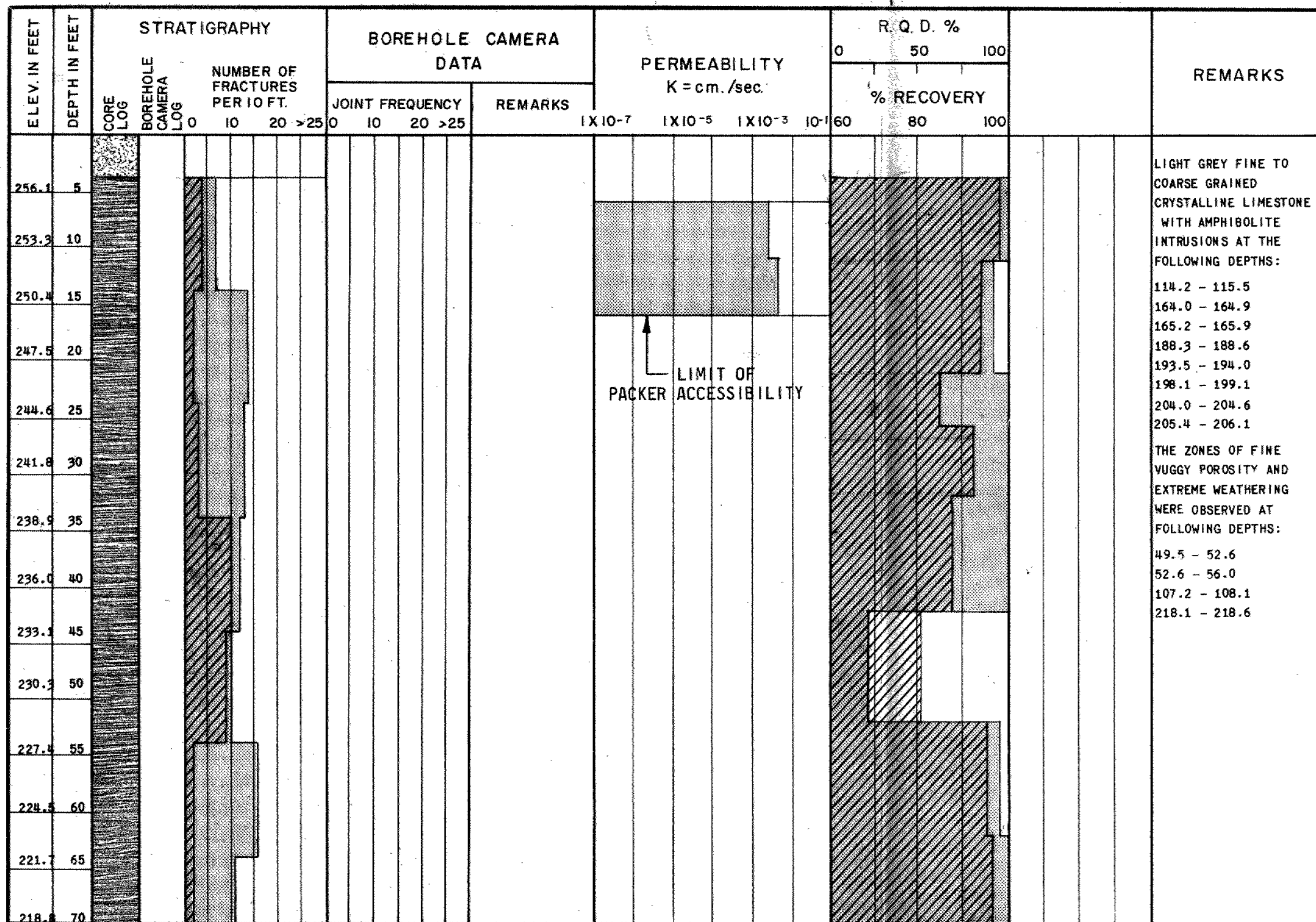
NAF9 DBE 10175-009H

REV.

ONT. HYDRO DRAWING No. NAF9 DBE 10175-009H  
REV. ACRES DRAWING No. 0  
SHEET 2 OF 3







# LEGEND

## ORDOVICIAN

LIMESTONE

SHALE

## PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

## SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

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JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R. Q. D. %

DIRECTION OF BORING N 46° E  
INCLINATION OF BORING 35°

|           |                    |               |
|-----------|--------------------|---------------|
| 16 JUL 73 | DATA FOR TENDERERS | CH. APP. APP. |
| DATE      | No                 | REVISIONS     |

|                                                                                                   |                                                                                                  |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>ACRES</b> THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO<br>ARNPRIOR GENERATING STATION (NAF9) |                                                                                                  |
| TAILRACE AREA<br>ROCK CORE DATA SHEET<br>TR-84                                                    |                                                                                                  |
| DATE JULY 1973<br>DEPT. N.B. Clancy<br>PROJECT                                                    | SCALE NONE<br>ACRES DRAWING No.<br>SHEET 1 OF 4<br>ONT. HYDRO DRAWING No.<br>NAF9 DBE 10175-0096 |





| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |                 | BOREHOLE CAMERA DATA |              |                    |                    | PERMEABILITY       |                  |    |    | R. Q. D. % |  |  | REMARKS |
|---------------|---------------|--------------|---------------------|--------------------------------|-----------------|----------------------|--------------|--------------------|--------------------|--------------------|------------------|----|----|------------|--|--|---------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. | JOINT FREQUENCY | REMARKS              | K = cm./sec. | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | 60 | 80 | 100        |  |  |         |
|               |               |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 175.7         | 145           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 172.8         | 150           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 170.0         | 155           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 167.2         | 160           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 164.3         | 165           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 161.4         | 170           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 158.5         | 175           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 155.7         | 180           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 152.7         | 185           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 149.9         | 190           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 147.0         | 195           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 144.2         | 200           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 141.3         | 205           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |
| 138.4         | 210           |              |                     |                                |                 |                      |              |                    |                    |                    |                  |    |    |            |  |  |         |

LEGEND

ORDOVICIAN

LIMESTONE

SHALE

PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R. Q. D. %

DIRECTION OF BORING  
INCLINATION OF BORING

N 46° E  
35°

|           |    |                    |               |
|-----------|----|--------------------|---------------|
| 16 JUL 73 | No | DATA FOR TENDERERS | CH. APP. APP. |
| DATE      | No | REVISIONS          |               |

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA

ROCK CORE DATA SHEET

TR-84

DATE JULY 1973

SCALE NONE

ACRES DRAWING No.

SHEET 3 OF 4

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0098

REV.



| ELEV. IN FEET | DEPTH IN FEET | STRATIGRAPHY |                     |                                |    | BOREHOLE CAMERA DATA |     |                 |    | PERMEABILITY |     |                    |                    | R. Q. D. %         |                  |            | REMARKS |    |                                                                                                                                                                                                                                          |
|---------------|---------------|--------------|---------------------|--------------------------------|----|----------------------|-----|-----------------|----|--------------|-----|--------------------|--------------------|--------------------|------------------|------------|---------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |               | CORE LOG     | BOREHOLE CAMERA LOG | NUMBER OF FRACTURES PER 10 FT. |    |                      |     | JOINT FREQUENCY |    |              |     | K = cm. /sec.      |                    |                    |                  | % RECOVERY |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     | 0                              | 10 | 20                   | >25 | 0               | 10 | 20           | >25 | 1X10 <sup>-7</sup> | 1X10 <sup>-5</sup> | 1X10 <sup>-3</sup> | 10 <sup>-1</sup> | 60         |         | 80 | 100                                                                                                                                                                                                                                      |
| 237.9         | 5             |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    | LIGHT GREY, MEDIUM TO COARSE GRAINED FOLIATED CRYSTALLINE LIMESTONE. JOINTS ARE CLOSELY TO MODERATELY SPACED AND TIGHT. ROCK IS SOUND AND UNWEATHERED, AND FOLIATION INCLINED 60° TO 70° TO THE CORE AXIS.<br><br>— END OF HOLE AT 26.8' |
| 232.9         | 10            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
| 227.9         | 15            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
| 222.9         | 20            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
| 217.9         | 25            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
| 212.9         | 30            |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |
|               |               |              |                     |                                |    |                      |     |                 |    |              |     |                    |                    |                    |                  |            |         |    |                                                                                                                                                                                                                                          |

LIGHT GREY, MEDIUM TO COARSE GRAINED FOLIATED CRYSTALLINE LIMESTONE. JOINTS ARE CLOSELY TO MODERATELY SPACED AND TIGHT. ROCK IS SOUND AND UNWEATHERED, AND FOLIATION INCLINED 60° TO 70° TO THE CORE AXIS.

END OF HOLE AT 26.8'

LEGEND

ORDOVICIAN

LIMESTONE

SHALE

PRECAMBRIAN

GRANITE

PEGMATITE VEINLETS

SCHIST

CRYSTALLINE LIMESTONE

SKARN

OVERBURDEN

AMPHIBOLITE

BRECCIA ZONE

OTHER

SYMBOLS

FAULT ZONE, SHEAR ZONE, SCHIST ZONE

HEM HEM MINERALIZED BED OR SEAM (HEMATITE)

B - BIOTITE, M - MICA, Pyr. - PYRITE

JOINT (DIRECTION OF DIP, VERTICAL)

BEDDING (DIRECTION OF DIP, VERTICAL)

FOLIATION (DIRECTION OF DIP, VERTICAL)

GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE, ASSUMED)

VOID (FILLED)

VOID (OPEN)

INTENSE JOINTING

FRACTURES PER 10 FT.

OPEN JOINTS PER 10 FT.

% RECOVERY

R. Q. D. %

DIRECTION OF BORING INCLINATION OF BORING 90°

|           |      |    |                              |              |                                   |
|-----------|------|----|------------------------------|--------------|-----------------------------------|
| 16 JUL 73 | DATE | No | DATA FOR TENDERERS REVISIONS | CH. APP. APP | ACRES CONSULTING SERVICES LIMITED |
|-----------|------|----|------------------------------|--------------|-----------------------------------|

ACRES

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

ARNPRIOR GENERATING STATION (NAF9)

TAILRACE AREA

ROCK CORE DATA SHEET

TR-85

DATE JULY 1973

SCALE NONE

ACRES DRAWING No.

SHEET 1 OF 1

ONT. HYDRO DRAWING No.

NAF9 DBE 10175-0100









# Field Borehole Log

G/S 273.7

B/R 273.53

TR-53

1 of 1

CLIENT Ontario Hydro

PROJECT Graptio G.S.

SITE Tail Race E.B. Bridge Aft.

LOCATION (LATITUDE) (DEPARTURE) BEARING

CONTRACTOR Canadian Longyear

METHOD SOIL Diamond Drilling

OF BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-53 SHEET No. 1 OF 5

WEATHER Cloudy & Cool INSPECTOR G. Dantigny

TEMP. 55 °F STARTED 1500 M. MAY 8 1973

DIP 90 ° FINISHED 1530 M. MAX 9 1973

ELEVATIONS: DATUM

CASING DIAM. N.W. DRILL PLATFORM 0

CORE DIAM. N.G. GROUND SURFACE 2'9"

WATER LEVELS 2'8"

| LOG LEGEND | * SAMPLE CONDITION | ** SAMPLING METHOD | ** SHIPPING CONTAINER |
|------------|--------------------|--------------------|-----------------------|
| - SILT     | - GOOD             | A - SPLIT TUBE     | M - INSERT            |
| - SAND     | - DISTURBED        | E - AUGER          | R - CLOTH BAG         |
| - CLAY     | - FAIR             | B - THIN WALL TUBE | O - TUBE              |
| - GRAVEL   | - LOST             | C - PISTON SAMPLER | P - WATER CONTENT TIN |
|            |                    | D - CORE BARREL    | K - SLOTTED SAMPLER   |
|            |                    |                    | Q - GLASS JAR         |
|            |                    |                    | S - PLIOFILM BAG      |
|            |                    |                    | Y - CORE BOX          |
|            |                    |                    | Z - DISCARDED         |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODDOR; ETC. | ELEV.<br>DEPTH | SAMPLE |         |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|---------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | #      | ** TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 0              |        |         |     |               |                |                        |                                                                                                                 |
|     | DRILL Platform                                                                                                         |                |        |         |     |               |                |                        |                                                                                                                 |
|     | Ground Surface - 9"                                                                                                    | 1              |        |         |     |               |                |                        |                                                                                                                 |
|     | Overburden                                                                                                             | 2              |        |         |     |               |                |                        |                                                                                                                 |
|     | Gravel, coarse grain                                                                                                   | 3              |        |         |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 4              |        |         |     |               |                |                        |                                                                                                                 |
|     | Redrock - 3'11"                                                                                                        | 5              |        |         |     |               |                |                        |                                                                                                                 |
|     | Crystalline limestone                                                                                                  | 6              |        |         |     |               |                |                        |                                                                                                                 |
|     | Light grey                                                                                                             | 7              |        |         |     |               |                |                        |                                                                                                                 |
|     | Crystalline limestone                                                                                                  | 8              |        |         |     |               |                |                        |                                                                                                                 |
|     | Light grey                                                                                                             | 9              |        |         |     |               |                |                        |                                                                                                                 |
|     | Core in good condition                                                                                                 | 10             |        |         |     |               |                |                        |                                                                                                                 |
|     | 3 Machine breaks                                                                                                       | 11             |        |         |     |               |                |                        |                                                                                                                 |
|     | 1 Hammer break                                                                                                         | 12             |        |         |     |               |                |                        |                                                                                                                 |
|     | 1 tight joint                                                                                                          | 13             |        |         |     |               |                |                        |                                                                                                                 |
|     | Signs of weathering                                                                                                    | 14             |        |         |     |               |                |                        |                                                                                                                 |
|     | from 3'5" to 4'10"                                                                                                     | 15             |        |         |     |               |                |                        |                                                                                                                 |
|     | Multiple breaks.                                                                                                       | 16             |        |         |     |               |                |                        |                                                                                                                 |
|     | Crystalline limestone                                                                                                  | 17             |        |         |     |               |                |                        |                                                                                                                 |
|     | Light grey                                                                                                             | 18             |        |         |     |               |                |                        |                                                                                                                 |

REC'D MAY 28 1973



## Field Borehole Log

G/S 272.4

B/P 252.15

TR-54

1042

CLIENT ONTARIO HydroJOB No. P-3026 HOLE No. TR-54 SHEET No. 1 OF 1PROJECT Acropia G.S.WEATHER Sunny & Mild INSPECTOR G. DoughtySITE Trail Race E.B. BRIDGE APT.TEMP. 60 ° STARTED 1600 M. May 12 1973

LOCATION (LATITUDE) (DEPARTURE) BEARING

DIP 90 ° FINISHED 2230 M. May 14 1973CONTRACTOR Canadian Longyear

ELEVATIONS: DATUM

METHOD SOIL

CASING DIAM. N.W. DRILL PLATFORM 0OF BORING: ROCK Diamond DrillingGROUND SURFACE 6"CORE DIAM. N.W. WATER LEVELS 9'4"

| LOG LEGEND | * SAMPLE CONDITION | ** SAMPLING METHOD  | ** SHIPPING CONTAINER |
|------------|--------------------|---------------------|-----------------------|
| - SILT     | - GOOD             | A - SPLIT TUBE      | N - INSERT            |
| - SAND     | - DISTURBED        | E - AUGER           | R - CLOTH BAG         |
| - CLAY     | - LOST             | B - THIN WALL TUBE  | O - TUBE              |
| - GRAVEL   | - FAIR             | F - WASH            | S - PLIOFILM BAG      |
|            |                    | C - PISTON SAMPLER  | P - WATER CONTENT TIN |
|            |                    | D - CORE BARREL     | Q - GLASS JAR         |
|            |                    | X - SLOTTED SAMPLER | Y - CORE BOX          |
|            |                    |                     | Z - DISCARDED         |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>—<br>DEPTH | S A M P L E |    |       |          |               | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT. ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|----|-------|----------|---------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                     | *           | ** | TYPE  | No.      | SIZE<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 0                   |             |    | DRILL | Platform |               |                        |                                                                                                                 |
|     |                                                                                                                        | 1                   |             |    |       |          |               |                        |                                                                                                                 |
|     | GRAVEL                                                                                                                 | 2                   |             |    |       |          |               |                        |                                                                                                                 |
|     | <del>Gravel</del> + Sand                                                                                               | 3                   |             |    |       |          |               |                        |                                                                                                                 |
|     | FILL Material                                                                                                          | 4                   |             |    |       |          |               |                        |                                                                                                                 |
|     | Material                                                                                                               | 5                   |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 6                   |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 7                   |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 8                   |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 9                   |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 10                  |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 11                  |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 12                  |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 13                  |             |    |       |          |               |                        |                                                                                                                 |
|     |                                                                                                                        | 14                  |             |    |       |          |               |                        |                                                                                                                 |













# Field Borehole Log


TR-54

2 of 2

CLIENT Ontario Hydro  
PROJECT Arnprior G.S.  
SITE Tail Race E.B. Bridge Abt.  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR Canadian Longyear  
METHOD SOIL  
OF  
BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-54 SHEET No. 2 OF 2  
WEATHER Sunny & Mild INSPECTOR G. Dantigny  
TEMP. 60 °F STARTED 1600 M. May 12 1973  
DIP 90 ° FINISHED 0830 M. May 14 1973  
ELEVATIONS: DATUM  
CASING DIAM. 1 1/2 DRILL PLATFORM 0  
GROUND SURFACE 6"  
CORE DIAM. NO WATER LEVELS 9"

| LOG LEGEND                                                                       |        | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                  |
|----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|  | - SILT |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  | - CLAY |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                  |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | X - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                  |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE                                                                               |     |               |               |  | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------|-----|---------------|---------------|--|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>TYPE                                                                            | No. | SIZE<br>(IN.) | RETD<br>(IN.) |  |                        |                                                                                                                 |
|     |                                                                                                                        | 15             |                                                                                      |     |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 16             |                                                                                      |     |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 17             |                                                                                      |     |               |               |  |                        | Advanced casing<br>to 21'4"                                                                                     |
|     |                                                                                                                        | 18             |                                                                                      |     |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 19             |                                                                                      |     |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 20             |                                                                                      |     |               |               |  |                        | NOTE FOR ROCK DATA SEE<br>DWG NAF9 DBE 10175-0051                                                               |
|     | BEDROCK 20'9"                                                                                                          | 20'9"          |  |     |               |               |  |                        |                                                                                                                 |
|     | Crystalline limestone<br>Light grey                                                                                    | 21             |                                                                                      |     |               |               |  |                        | Length of Run - 6'6"<br>Core Recovery - 6'5"<br>- 93.7%                                                         |
|     | From 20'9" - 24'7"<br>the core is vuggy                                                                                | 23             | 0Y                                                                                   | 1   | 1 1/2         | 6'5"          |  |                        | RQD - 93.6%                                                                                                     |
|     | 16 Machine breaks<br>3 tight joints                                                                                    | 24             |                                                                                      |     |               |               |  |                        |                                                                                                                 |
|     | No sign of<br>weathering                                                                                               | 25             |                                                                                      |     |               |               |  |                        | 100% Water Return                                                                                               |
|     |                                                                                                                        | 26             |                                                                                      |     |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 27             | END OF RUN<br>START OF CORE RUN                                                      |     |               |               |  |                        | Run Ends - 27'3"                                                                                                |
|     | Crystalline Limestone                                                                                                  | 28             |                                                                                      |     |               |               |  |                        |                                                                                                                 |



# Field Borehole Log

REC'D MAY 28 1973

G/S 270.6  
B/P 208.84

TR-57 1042  
11/5/73

CLIENT ONTARIO HYDRO  
PROJECT ARNPRIOL G.S.  
SITE EAST RIVER BANK  
LOCATION (LATITUDE) (DEPARTURE) BEARING 100°  
CONTRACTOR LONGYEAR  
METHOD SOIL  
OF BORING: ROCK DIAMOND

JOB No. P3176 HOLE No. TR-57 SHEET No. 1 OF 11  
WEATHER Cloudy & Showers INSPECTOR J.D.  
TEMP. 55° STARTED 0800 A.M. May 11 19 73  
DIP 35° FINISHED 1400 P.M. May 14 19 73  
ELEVATIONS: DATUM  
CASING DIAM. NW DRILL PLATFORM  
GROUND SURFACE  
CORE DIAM. NW WATER LEVELS

LOG LEGEND \* SAMPLE CONDITION \*\* SAMPLING METHOD \*\* SHIPPING CONTAINER  
- SILT - SAND - GOOD - DISTURBED A - SPLIT TUBE E - AUGER N - INSERT R - CLOTH BAG  
- CLAY - GRAVEL - FAIR - LOST B - THIN WALL TUBE F - WASH O - TUBE S - PLIOFILM BAG  
C - PISTON SAMPLER K - SLOTTED SAMPLER P - WATER CONTENT TIN Y - CORE BOX  
D - CORE BARREL Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE   |            |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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OF BORING: ROCK DIAMOND DRILL

GROUND SURFACE .....

CORE DIAM. NW WATER LEVELS .....

| LOG LEGEND |          | * SAMPLE CONDITION |             | ** SAMPLING METHOD |                    | ** SHIPPING CONTAINER |                       |
|------------|----------|--------------------|-------------|--------------------|--------------------|-----------------------|-----------------------|
|            | - SILT   |                    | - GOOD      |                    | A - SPLIT TUBE     |                       | R - CLOTH BAG         |
|            | - SAND   |                    | - DISTURBED |                    | B - THIN WALL TUBE |                       | S - PLIOFILM BAG      |
|            | - CLAY   |                    | - FAIR      |                    | C - PISTON SAMPLER |                       | P - WATER CONTENT TIN |
|            | - GRAVEL |                    | - LOST      |                    | D - CORE BARREL    |                       | Q - GLASS JAR         |
|            |          |                    |             |                    |                    |                       | X - SLOTTED SAMPLER   |
|            |          |                    |             |                    |                    |                       | Z - DISCARDED         |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>—<br>DEPTH | S A M P L E |            |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                     | *<br>—      | **<br>TYPE | No. | SIZE<br>(IN.) | RETD.<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 105                 |             |            |     |               |                |                        |                                                                                                                 |
|     | FIRST 12" OF CORE<br>IS COBBLES. THAT NW.                                                                              | 106                 |             |            |     |               |                |                        |                                                                                                                 |
|     | CASING WAS DRILLED<br>THAT PASSED                                                                                      | 107                 |             |            |     |               |                |                        | NOTE: FOR ROCK DATA SEE DWG.<br>NAF 9 DRE 10175-0054                                                            |
|     | BEDROCK 107'8"                                                                                                         | 108                 |             |            |     |               |                |                        | 1ST RUN                                                                                                         |
|     | LIGHT GREY<br>CRYSTALLINE<br>LIMESTONE                                                                                 | 109                 |             |            |     |               |                |                        | 107'8" TO 115'8"                                                                                                |
|     | 113' 6" TIGHT GREEN<br>STAINED                                                                                         | 110                 |             |            |     |               |                |                        | 8 FEET RUN OF CORE<br>100% RECOVERY OF CORE<br>RQD 100%                                                         |
|     | 115' 3" TIGHT ROUGH                                                                                                    | 111                 |             |            |     |               |                |                        | 100% WATER RETURN                                                                                               |
|     |                                                                                                                        | 112                 |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 113                 |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 114                 |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 115                 |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 116                 |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 117                 |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 118                 |             |            |     |               |                |                        | OVER                                                                                                            |



# Field Borehole Log

REC'D MAY 28 1973

G/S 269.3

B/P 212.63

TR-58

1044

CLIENT ONTARIO HYDRO  
PROJECT ARNPRIOR G.S.  
SITE WEST RIVER BANK  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR LONGYEAR  
METHOD OF BORING: SOIL WASH BORING  
ROCK DIAMOND DRILL

JOB No. P3176 HOLE No. TR-58 SHEET No. 1 of 5  
WEATHER SUNNY INSPECTOR TR  
TEMP. 45 ° STARTED 800 A.M. MAY 16 1973  
DIP 90 ° FINISHED 930 A.M. MAY 17 1973  
ELEVATIONS: DATUM  
CASING DIAM. NW DRILL PLATFORM  
GROUND SURFACE  
CORE DIAM. WATER LEVELS

## LOG LEGEND

- SILT  
 - SAND  
 - CLAY  
 - GRAVEL

## \* SAMPLE CONDITION

- GOOD  
 - DISTURBED  
 - FAIR  
 - LOST

## \*\* SAMPLING METHOD

A - SPLIT TUBE  
B - THIN WALL TUBE  
C - PISTON SAMPLER  
D - CORE BARREL

E - AUGER  
F - WASH  
K - SLOTTED SAMPLER

## \*\* SHIPPING CONTAINER

M - INSERT  
O - TUBE  
P - WATER CONTENT TIN  
Q - GLASS JAR  
R - CLOTH BAG  
S - PLIOFILM BAG  
Y - CORE BOX  
Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE    |           |              |               |   | BLOWS<br>PER<br>6 INCH         | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-----------|--------------|---------------|---|--------------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>TYPE | **<br>No. | SIZE<br>(IN) | RET'D<br>(IN) |   |                                |                                                                                                                 |
|     | ONE FOOT TOPSOIL                                                                                                       | 0              |           |           |              |               |   |                                | ALL MEASUREMENT ARE                                                                                             |
|     |                                                                                                                        | 1              |           |           |              |               |   |                                | TAKEN FROM GROUND LEVEL                                                                                         |
|     |                                                                                                                        | 2'             |           |           |              |               |   |                                | ADVANCED NW CASING                                                                                              |
|     | STIFF BROWNISH GREY                                                                                                    |                | X         | AQ 1      | 1 1/2"       | 20"           | 1 | USING 140 LB HAMMER (30" DROP) |                                                                                                                 |
|     | BRITTLE CLAY, TRACE OF                                                                                                 |                |           |           |              |               | 3 | TO DRIVE SPLIT TUBE            |                                                                                                                 |
|     | SILT FISSURES                                                                                                          |                |           |           |              |               | 4 |                                |                                                                                                                 |
|     |                                                                                                                        | 4'             |           |           |              |               | 7 |                                |                                                                                                                 |
|     |                                                                                                                        | 5              |           |           |              |               |   |                                |                                                                                                                 |
|     | AT 6' FEET A                                                                                                           | 6              |           |           |              |               |   |                                |                                                                                                                 |
|     | FINE SAND MIXED                                                                                                        |                |           |           |              |               |   |                                |                                                                                                                 |
|     | WITH SOME CLAY                                                                                                         | 7              |           |           |              |               |   |                                | ADVANCED NW CASING                                                                                              |
|     | (WASHING MATERIAL)                                                                                                     |                |           |           |              |               |   |                                | TO 9'                                                                                                           |
|     |                                                                                                                        | 8              |           |           |              |               |   |                                |                                                                                                                 |
|     |                                                                                                                        | 9              |           |           |              |               |   |                                |                                                                                                                 |
|     | FIRM BROWNISH GREY                                                                                                     |                | X         | AQ 2      | 1 1/2"       | 17"           | 1 |                                |                                                                                                                 |
|     | CLAY SAND, VERY FINE                                                                                                   |                |           |           |              |               | 1 |                                |                                                                                                                 |
|     | SAND (SILTY SAND)                                                                                                      |                |           |           |              |               | 2 |                                |                                                                                                                 |
|     |                                                                                                                        | 11             |           |           |              |               | 3 |                                |                                                                                                                 |
|     |                                                                                                                        | 12             |           |           |              |               |   |                                | ADVANCED NW TO                                                                                                  |
|     |                                                                                                                        | 13             |           |           |              |               |   |                                | 14'                                                                                                             |
|     |                                                                                                                        | 14             |           |           |              |               |   |                                |                                                                                                                 |



# Field Borehole Log

TR-58

2 of 4

CLIENT ONTARIO HYDRO  
PROJECT ARN PRIOR  
SITE WEST RIVER BANK  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR  
METHOD SOIL DRILLING NW (SPLIT TUBE)  
OF SAMPLING  
BORING: ROCK

JOB No. P3176 HOLE No. TR-58 SHEET No. 2 OF 5  
WEATHER SUNNY INSPECTOR JM  
TEMP. 50 ° STARTED 11 : 19  
DIP 90 ° FINISHED 11 : 19  
ELEVATIONS: DATUM  
CASING DIAM. NW DRILL PLATFORM  
GROUND SURFACE  
CORE DIAM. WATER LEVELS

| LOG LEGEND | * SAMPLE CONDITION | ** SAMPLING METHOD | ** SHIPPING CONTAINER |
|------------|--------------------|--------------------|-----------------------|
| - SILT     | - SAND             | - GOOD             | - DISTURBED           |
| - CLAY     | - GRAVEL           | - FAIR             | - LOST                |
|            |                    | A - SPLIT TUBE     | E - AUGER             |
|            |                    | B - THIN WALL TUBE | F - WASH              |
|            |                    | C - PISTON SAMPLER | K - SLOTTED SAMPLER   |
|            |                    | D - CORE BARREL    | M - INSERT            |
|            |                    |                    | O - TUBE              |
|            |                    |                    | P - WATER CONTENT TIN |
|            |                    |                    | Q - GLASS JAR         |
|            |                    |                    | R - CLOTH BAG         |
|            |                    |                    | S - PLIOFILM BAG      |
|            |                    |                    | Y - CORE BOX          |
|            |                    |                    | Z - DISCARDED         |

| LOG | DESCRIPTION: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, ODOUR, ETC. | ELEV. DEPTH | * TYPE | ** No. | SIZE (IN.) | RET'D (IN.) | BLOWS PER 6 INCH | NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-------------------------------------------------------------------------------------------------------------------|-------------|--------|--------|------------|-------------|------------------|-----------------------------------------------------------------------------------------------------------|
|     | CLAY SAND TO 14'6"                                                                                                | 14          |        |        |            |             | 2                |                                                                                                           |
|     | LIGHT GREY SAND                                                                                                   | 15          |        |        |            |             | 1                |                                                                                                           |
|     | LAYER FROM 14'6" TO 15'5"                                                                                         | 15          |        |        |            |             | 3                |                                                                                                           |
|     | SOME SILTY CLAY AT BOTTOM OF SAMPLE                                                                               | 16          |        |        |            |             | 2                |                                                                                                           |
|     |                                                                                                                   | 17          |        |        |            |             |                  |                                                                                                           |
|     | SILTY SANDS                                                                                                       | 18          |        |        |            |             |                  |                                                                                                           |
|     | SOME CLAY                                                                                                         | 18          |        |        |            |             |                  | ADVANCED NW CASING TO 19'                                                                                 |
|     |                                                                                                                   | 19          |        |        |            |             | 1                |                                                                                                           |
|     | LIGHT GREY SILTY SANDS WITH SOME CLAY                                                                             | 19          |        |        |            |             | 2                |                                                                                                           |
|     |                                                                                                                   | 20          |        |        |            |             | 3                |                                                                                                           |
|     |                                                                                                                   | 21          |        |        |            |             | 4                |                                                                                                           |
|     |                                                                                                                   | 22          |        |        |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 23          |        |        |            |             |                  | ADVANCED NW CASING TO 24'                                                                                 |
|     |                                                                                                                   | 24          |        |        |            |             | 1                |                                                                                                           |
|     | LIGHT GREY SILTY SAND " WITH SOME CLAY                                                                            | 24          |        |        |            |             | 3                |                                                                                                           |
|     |                                                                                                                   | 25          |        |        |            |             | 5                |                                                                                                           |
|     |                                                                                                                   | 26          |        |        |            |             | 4                |                                                                                                           |
|     |                                                                                                                   | 27          |        |        |            |             |                  | ADVANCED NW CASING TO 29'                                                                                 |
|     |                                                                                                                   | 28          |        |        |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 29          |        |        |            |             |                  |                                                                                                           |











# Field Borehole Log

TR-58 3 of 4

CLIENT ONTARIO HYDRO  
PROJECT ARNPRIOR G.S.  
SITE WEST RIVER BANK  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR LONGYEAR  
METHOD SOIL DRILLING (SPLIT TUBE)  
OF BORING: ROCK

JOB No. P3176 HOLE No. TR-38 SHEET No. 3 OF 5  
WEATHER SUNNY INSPECTOR JM  
TEMP. °F STARTED M. 19  
DIP 90 ° FINISHED M. 19  
ELEVATIONS: DATUM  
CASING DIAM. NW DRILL PLATFORM  
GROUND SURFACE  
CORE DIAM. WATER LEVELS

| LOG LEGEND                                                                              |                                                                                            | * SAMPLE CONDITION                                                                       |                                                                                               | ** SAMPLING METHOD |                     | ** SHIPPING CONTAINER |                  |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------|---------------------|-----------------------|------------------|
|  - SILT |  - SAND   |  - GOOD |  - DISTURBED | A - SPLIT TUBE     | E - AUGER           | H - INSERT            | R - CLOTH BAG    |
|  - CLAY |  - GRAVEL |  - FAIR |  - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                         |                                                                                            |                                                                                          |                                                                                               | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                         |                                                                                            |                                                                                          |                                                                                               | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG                        | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | S A M P L E |       |                      |                    | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT. ETC. |
|----------------------------|------------------------------------------------------------------------------------------------------------------------|----------------|-------------|-------|----------------------|--------------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|                            |                                                                                                                        |                | *<br>TYPE   | No.   | SIZE<br>(IN.)        | RET'D<br>(IN.)     |                        |                                                                                                                 |
| 11                         |                                                                                                                        | 29             | AQ          | 6     | 1 1/2                | 24"                | 3                      |                                                                                                                 |
|                            | TOP 6" OF SAMPLE                                                                                                       | 3              |             |       |                      |                    |                        |                                                                                                                 |
|                            | SILTY GREY SAND & CLAY                                                                                                 | 3              |             |       |                      |                    |                        |                                                                                                                 |
|                            | BOTTOM 18" OF SAMPLE                                                                                                   | 3              |             |       |                      |                    |                        |                                                                                                                 |
|                            | MAINLY ALL FINE GREY SAND                                                                                              | 31             |             | 8     | HARDER LAYER OF SAND |                    |                        |                                                                                                                 |
|                            |                                                                                                                        | 32             |             |       | AFTER TAKING SAMPLE  |                    |                        |                                                                                                                 |
|                            |                                                                                                                        |                |             |       | 6 ADVANCED NW TO     |                    |                        |                                                                                                                 |
|                            |                                                                                                                        | 33             |             |       | 34'                  |                    |                        |                                                                                                                 |
|                            |                                                                                                                        |                |             |       |                      |                    |                        |                                                                                                                 |
|                            |                                                                                                                        | 34             | AQ          | 7     | 1 1/2                | 24"                | 1                      |                                                                                                                 |
|                            | TOP 12" OF SAMPLE SILTY                                                                                                | 1              |             |       |                      |                    |                        |                                                                                                                 |
|                            | GREY SAND WITH MIXTURE                                                                                                 | 3              |             |       |                      |                    |                        |                                                                                                                 |
| OF CLAY (6" LAYER OF SAND) | 3                                                                                                                      |                |             |       |                      |                    |                        |                                                                                                                 |
|                            | 36                                                                                                                     |                |             |       |                      |                    |                        |                                                                                                                 |
|                            | 37                                                                                                                     |                |             |       |                      | ADVANCED NW CASING |                        |                                                                                                                 |
|                            |                                                                                                                        |                |             |       |                      | TO 39'             |                        |                                                                                                                 |
|                            | 38                                                                                                                     |                |             |       |                      |                    |                        |                                                                                                                 |
|                            | 39                                                                                                                     | AQ             | 8           | 1 1/2 | 24"                  | 2                  |                        |                                                                                                                 |
| SILTY SANDY LAYERS         | 4                                                                                                                      |                |             |       |                      |                    |                        |                                                                                                                 |
| WITH SOME CLAY             | 10                                                                                                                     |                |             |       |                      | DENSE              |                        |                                                                                                                 |
|                            | 10                                                                                                                     |                |             |       |                      |                    |                        |                                                                                                                 |
|                            | 41                                                                                                                     |                |             |       |                      |                    |                        |                                                                                                                 |
|                            | 42                                                                                                                     |                |             |       |                      |                    |                        |                                                                                                                 |
|                            | 43                                                                                                                     |                |             |       |                      |                    |                        |                                                                                                                 |











# Field Borehole Log

TR-58 4044

CLIENT ONTARIO HYDRO  
PROJECT ARNPRIOR G.S.  
SITE WEST RIVER BANK  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR  
METHOD SOIL  
OF BORING: ROCK

JOB No. P3176 HOLE No. TR-58 SHEET No. 4 OF 5  
WEATHER SUNNY INSPECTOR JM  
TEMP. 20 °F STARTED        M.        19         
DIP 90 ° FINISHED        M.        19         
ELEVATIONS: DATUM  
CASING DIAM. N/A DRILL PLATFORM  
CORE DIAM. N/A GROUND SURFACE  
WATER LEVELS

| LOG LEGEND                                                                       |        | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                  |
|----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|  | - SILT |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | H - INSERT            | R - CLOTH BAG    |
|  | - CLAY |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                  |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                  |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR, CONSISTENCY<br>DENSITY, TEXTURE, STRUCTURE, SHAPE AND<br>SURFACE CONDITION OF GRAINS, ODOUR, ETC. | ELEV.<br>DEPTH | SAMPLE |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | * TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 44             |        |     |               |                |                        | ADVANCED NW. TO 45'                                                                                             |
|     |                                                                                                                        | 45             |        |     |               |                | 7                      | lost rest of sample<br>from split tubes.                                                                        |
|     | Silty wet sand<br><del>silty sand</del><br>"with some clay"                                                            |                | AQ     | 9   | 1 1/2"        | 3"             | 16                     |                                                                                                                 |
|     |                                                                                                                        |                |        |     |               |                | 20                     |                                                                                                                 |
|     |                                                                                                                        | 47             |        |     |               |                | 17                     |                                                                                                                 |
|     |                                                                                                                        | 48             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 49             |        |     |               |                |                        | ADVANCED CASING TO<br>50'                                                                                       |
|     |                                                                                                                        | 50             |        |     |               |                | 10                     |                                                                                                                 |
|     | HARD silty sand<br>with of some clay<br>trace of gravel<br>approx 90% sand                                             |                | AQ     | 10  | 1 1/2"        | 2 1/4"         | 19                     |                                                                                                                 |
|     |                                                                                                                        | 52             |        |     |               |                | 15                     |                                                                                                                 |
|     |                                                                                                                        |                |        |     |               |                | 10                     |                                                                                                                 |
|     |                                                                                                                        | 53             |        |     |               |                |                        |                                                                                                                 |
|     | Between 53' + 56' 6"<br>gray silty clay                                                                                |                |        |     |               |                |                        | ADVANCED CASING TO<br>55'                                                                                       |
|     |                                                                                                                        | 54             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 55             |        |     |               |                |                        |                                                                                                                 |
|     | at 56' 4" TO 56' 8"<br>BED ROCK gravel                                                                                 |                | AQ     | 11  | 1 1/2"        | 20"            | 1                      |                                                                                                                 |
|     |                                                                                                                        |                |        |     |               |                | 3                      |                                                                                                                 |
|     |                                                                                                                        |                |        |     |               |                | 4                      |                                                                                                                 |
|     | NOTE: FOR ROCK DATA SEE<br>DWG NAF9 DBE 10175-005R                                                                     |                |        |     |               |                | 8                      | HLT BEDROCK<br>REFUSAL AT 56' 8"                                                                                |





# Field Borehole Log

G/S 261.5  
B/P 233.3

TR-61

1 of 2

CLIENT ONTARIO Hydro

JOB No. P3176 HOLE No. TR-61 SHEET No. 1 OF 5

PROJECT ARNPRIOR G.S.

WEATHER CLOUDY INSPECTOR DM

SITE WEST RIVER NEAR BRIDGE

TEMP. 45 °F STARTED MAY 17 P.M. 1530 1973

LOCATION TRAIL RACE AREA 1 BEARING -  
(LATITUDE) (DEPARTURE)

DIP 90 ° FINISHED M 19-

CONTRACTOR -

ELEVATIONS: DATUM -

METHOD SOIL -

CASING DIAM. NW DRILL PLATFORM -

OF BORING: ROCK -

GROUND SURFACE -

CORE DIAM. NW WATER LEVELS -

## LOG LEGEND

## \* SAMPLE CONDITION

## \*\* SAMPLING METHOD

## \*\* SHIPPING CONTAINER

|        |          |        |             |                    |                     |                       |                  |
|--------|----------|--------|-------------|--------------------|---------------------|-----------------------|------------------|
| - SILT | - SAND   | - GOOD | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
| - CLAY | - GRAVEL | - FAIR | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|        |          |        |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|        |          |        |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODDUR; ETC. | ELEV.<br>DEPTH | SAMPLE |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | * TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 0              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 1              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 2              |        |     |               |                |                        |                                                                                                                 |
|     | FILL MATERIAL                                                                                                          |                |        |     |               |                |                        |                                                                                                                 |
|     | GRAVEL SMALL                                                                                                           |                |        |     |               |                |                        |                                                                                                                 |
|     | COBBLES                                                                                                                |                |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 3              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 4              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 5              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 6              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 7              |        |     |               |                |                        |                                                                                                                 |
|     | AT 7' BROWN SILTY<br>CLAY                                                                                              |                |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 8              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 9              |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 10             |        |     |               |                |                        |                                                                                                                 |
|     | BROWNISH GREY SILTY<br>CLAY, TRACE OF                                                                                  |                |        |     |               |                |                        |                                                                                                                 |
|     | WOOD IN SAMPLE                                                                                                         |                |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 12             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 13             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 14             |        |     |               |                |                        |                                                                                                                 |



# Field Borehole Log

TR-61 2 of 2

CLIENT ONTARIO Hydro  
PROJECT ARNPRIOR G.S.  
SITE WEST RIVER BANK  
LOCATION (LATITUDE) (DEPARTURE) BEARING   
CONTRACTOR   
METHOD SOIL DRILLING  
OF BORING: ROCK

JOB No. P3176 HOLE No. TR-61 SHEET No. 3 OF 5  
WEATHER OVERCAST RAIN INSPECTOR JM  
TEMP.  °F STARTED  M.  19   
DIP 9.0 ° FINISHED  M.  19   
ELEVATIONS: DATUM   
CASING DIAM. NW DRILL PLATFORM   
GROUND SURFACE   
CORE DIAM.  WATER LEVELS

LOG LEGEND \* SAMPLE CONDITION \*\* SAMPLING METHOD \*\*\* SHIPPING CONTAINER  
- SILT - SAND - GOOD - DISTURBED A - SPLIT TUBE E - AUGER N - INSERT R - CLOTH BAG  
- CLAY - GRAVEL - FAIR - LOST B - THIN WALL TUBE F - WASH O - TUBE S - PLIOFILM BAG  
C - PISTON SAMPLER K - SLOTTED SAMPLER P - WATER CONTENT TIN Y - CORE BOX  
D - CORE BARREL Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | * TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     | TOP OF SAMPLE TRACE OF<br>GRAVEL & BROWNISH SANDY CLAY                                                                 | 15             | CO     | 3   | 2 7/8         | 14"            |                        | TOP 4" OF SAMPLE DISTURBED<br>15'4" TO 16'6"                                                                    |
|     | BOTTOM OF SAMPLE SAND                                                                                                  | 16'6"          |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 17             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 18             |        |     |               |                |                        | ADVANCED CASING TO<br>19'6"                                                                                     |
|     |                                                                                                                        | 19             |        |     |               |                |                        |                                                                                                                 |
|     | STIFF SANDY SILTY<br>CLAY (MAINLY SAND)                                                                                | 20             | CO     | 4   | 2 3/8         | 14"            |                        | SAMPLE # 4 20' TO 21'6"<br>PUSHED 18" USING HYDRAULIC                                                           |
|     |                                                                                                                        | 21'6"          |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 22             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 23             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 24             |        |     |               |                |                        | ADVANCED NW CASING<br>TO 24'6"                                                                                  |
|     |                                                                                                                        | 25             |        |     |               |                |                        |                                                                                                                 |
|     | FINE GREY SILTY SAND<br>WITH SOME CLAY                                                                                 | 26'6"          | CO     | 5   | 2 3/8         | 18"            |                        |                                                                                                                 |
|     |                                                                                                                        | 27             |        |     |               |                |                        |                                                                                                                 |
|     | BEDROCK 28'2"                                                                                                          | 28             |        |     |               |                |                        | NOTE FOR ROCK DATA SEE DWG<br>NAF9 DBE 10175 - 0061                                                             |



# Field Borehole Log

G/S 268.4

B/R 225.9 TR-66

1 of 4

CLIENT Ontario Hydro

PROJECT Alenpica G.S.

SITE Trail Race

LOCATION (LATITUDE) (DEPARTURE) BEARING

CONTRACTOR Canadian Longyear

METHOD SOIL

OF BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-66 SHEET No. 1 OF 4

WEATHER Sunny & Warm INSPECTOR G. Dantigny

TEMP. 75 ° STARTED 0700 M. May 27 1973

DIP 90 ° FINISHED 1800 M. May 30 1973

ELEVATIONS: DATUM

CASING DIAM. N.W. DRILL PLATFORM 0

GROUND SURFACE 1

CORE DIAM. N.Q. WATER LEVELS

## LOG LEGEND

- SILT - SAND - GOOD - DISTURBED  
 - CLAY - GRAVEL - FAIR - LOST

## \* SAMPLE CONDITION

## \*\* SAMPLING METHOD

## \*\* SHIPPING CONTAINER

A - SPLIT TUBE E - AUGER N - INSERT R - CLOTH BAG  
B - THIN WALL TUBE F - WASH O - TUBE S - PLIOFILM BAG  
C - PISTON SAMPLER K - SLOTTED P - WATER CONTENT TIN Y - CORE BOX  
D - CORE BARREL SAMPLER Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE    |          |              |               |     | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|-----------|----------|--------------|---------------|-----|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>TYPE | No.      | SIZE<br>(IN) | RET'D<br>(IN) |     |                        |                                                                                                                 |
|     |                                                                                                                        | 0              | Drill     | Platform |              |               |     |                        |                                                                                                                 |
|     | Ground Surface 1'                                                                                                      | 1              |           |          |              |               |     |                        |                                                                                                                 |
|     | Dark brown sand<br>Mixed with roots.                                                                                   | 2              | X         | AQ       | 1            | 1"            | 9"  | 2                      | Did split spoon                                                                                                 |
|     | Coarse grained<br>Loosely packed                                                                                       | 3              |           |          |              |               |     | 4                      | from ground surface                                                                                             |
|     |                                                                                                                        | 4              |           |          |              |               |     | 3                      | Sample 1 - 1'0" - 2'6"                                                                                          |
|     |                                                                                                                        | 5              |           |          |              |               |     |                        |                                                                                                                 |
|     |                                                                                                                        | 6              |           |          |              |               |     |                        | Advanced casing to<br>5'6" & washed to 6'0"                                                                     |
|     | Brownish clay<br>VERY Hard                                                                                             | 7              | X         | CU       | 2            | 2 3/4"        | 10" |                        | Shelby Tube - 1' of clay ex-<br>posed. Sample 2 - 6' - 7'6"                                                     |
|     |                                                                                                                        | 8              |           |          |              |               |     |                        |                                                                                                                 |
|     |                                                                                                                        | 9              |           |          |              |               |     |                        |                                                                                                                 |
|     |                                                                                                                        | 10             |           |          |              |               |     |                        | Advanced casing to 10'6"<br>& washed to 11'0"                                                                   |
|     | Silty clay                                                                                                             | 11             |           |          |              |               |     |                        |                                                                                                                 |
|     | Clay is light<br>brown. Very                                                                                           | 12             | X         | AQ       | 3            | 1"            | 14" | 4                      | Split spoon.                                                                                                    |
|     | Firm.                                                                                                                  | 13             |           |          |              |               |     | 3                      |                                                                                                                 |
|     |                                                                                                                        | 14             |           |          |              |               |     | 6                      | Sample 3 - 11'0" - 12'6"                                                                                        |
|     |                                                                                                                        | 15             |           |          |              |               |     |                        |                                                                                                                 |
|     |                                                                                                                        | 16             |           |          |              |               |     |                        |                                                                                                                 |



# Field Borehole Log

TR-66 2 of 4

CLIENT Ontario Hydro

PROJECT Anderson G.S.

SITE Tail Race

LOCATION..... (LATITUDE)..... (LONGITUDE)..... BEARING.....

CONTRACTOR.....Canadian Longyear

METHOD SOIL.....

OF BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-66 SHEET No. 1 OF 1

WEATHER Sunny & Warm INSPECTOR G. Denton

TEMP. 70 °, STARTED 0700 .M. MAY 29 1973









DIP 90 ° FINISHED 1200 M. MAY 30 1973

ELEVATIONS: DATUM .....

CASING DIAM. NW DRILL PLATFORM Q

GROUND SURFACE.....

CORE DIAM. NO WATER LEVELS

| LOG LEGEND                                                                              |                                                                                            | * SAMPLE CONDITION                                                                       |                                                                                               | ** SAMPLING METHOD |                     | ** SHIPPING CONTAINER |                  |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------|---------------------|-----------------------|------------------|
|  - SILT |  - SAND   |  - GOOD |  - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  - CLAY |  - GRAVEL |  - FAIR |  - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                         |                                                                                            |                                                                                          |                                                                                               | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                         |                                                                                            |                                                                                          |                                                                                               | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE   |      |              |               | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|----------|------|--------------|---------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>No. | TYPE | SIZE<br>(IN) | RETD.<br>(IN) |                        |                                                                                                                 |
|     |                                                                                                                        | 15             |          |      |              |               |                        | Advanced casing to<br>15'6" & washed to 16'0"                                                                   |
|     | Light grey sand<br>Medium fine<br>Loosely packed                                                                       | 16             | X        | CO   | 4            | 2 3/4         | 1 1/2"                 | Shelby Tube - 12" Recovery                                                                                      |
|     |                                                                                                                        | 17             |          |      |              |               |                        | Sample 4 - 16'0" - 17'6"                                                                                        |
|     |                                                                                                                        | 18             |          |      |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 19             |          |      |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 20             |          |      |              |               |                        | Advanced casing to<br>20'6" & washed to 21'0"                                                                   |
|     | Light grey sand<br>Some silt. Medium<br>Fine sand                                                                      | 21             | X        | AG   | 5            | 1"            |                        | Split spoon                                                                                                     |
|     |                                                                                                                        | 22             |          |      |              |               |                        | Sample 5 - 21'0" - 22'6"                                                                                        |
|     |                                                                                                                        | 23             |          |      |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 24             |          |      |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 25             |          |      |              |               |                        |                                                                                                                 |
|     | Light grey sand<br>Very fine. Loosely<br>packed                                                                        | 26             | X        | CO   | 6            | 2 3/4         | 1 1/4"                 | Shelby Tube - 14" Recovery                                                                                      |
|     |                                                                                                                        | 27             |          |      |              |               |                        | Sample 6 - 26'0" - 27'6"                                                                                        |



# Field Borehole Log

TR-66

3 of 4

CLIENT Ontario Hydro  
PROJECT Ampthorn G.S.  
SITE Tail Race  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR Canadian Langyear  
METHOD SOIL  
OF BORING: ROCK Diamond Drilling

JOB No. P-3126 HOLE No. TR-66 SHEET No. 3 OF 4  
WEATHER Sunny & Warm INSPECTOR G. Donigan  
TEMP. 70 °F STARTED 0700 M. MAY 29 1973  
DIP 90 ° FINISHED 1100 M. MAY 30 1973  
ELEVATIONS: DATUM  
CASING DIAM. NW DRILL PLATFORM 0  
CORE DIAM. NW GROUND SURFACE 1'  
WATER LEVELS

## LOG LEGEND

- SILT - SAND  
 - CLAY - GRAVEL

## \* SAMPLE CONDITION

- GOOD - DISTURBED  
 - FAIR - LOST

## \*\* SAMPLING METHOD

A - SPLIT TUBE E - AUGER  
B - THIN WALL TUBE F - WASH  
C - PISTON SAMPLER K - SLOTTED SAMPLER  
D - CORE BARREL

## \*\* SHIPPING CONTAINER

M - INSERT R - CLOTH BAG  
O - TUBE S - PLOFILM BAG  
P - WATER CONTENT TIN Y - CORE BOX  
Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>—<br>DEPTH | SAMPLE      |            |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|------------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                     | *<br>—<br>— | **<br>TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 29                  |             |            |     |               |                |                        | Advanced casing to 30'6"<br>2 washed to 31'0"                                                                   |
|     |                                                                                                                        | 30                  |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 31                  |             |            |     |               |                |                        |                                                                                                                 |
|     | Light grey sand                                                                                                        | 31                  | X           | A9         | 7   | 1"            | 16"            | 2                      | Split spoon                                                                                                     |
|     | Very Fine                                                                                                              | 32                  |             |            |     |               |                | 1                      |                                                                                                                 |
|     | Loosely packed                                                                                                         |                     |             |            |     |               |                | 1                      | Sample 7-31'-32'6"                                                                                              |
|     |                                                                                                                        | 33                  |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 34                  |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 35                  |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 36                  |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 37                  |             |            |     |               |                |                        | Advanced casing<br>to 38' and struck a<br>boulder.                                                              |
|     | Boulder                                                                                                                | 38                  |             |            |     |               |                |                        |                                                                                                                 |
|     | Coarse grained<br>gravel                                                                                               | 39                  |             |            |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 40                  |             |            |     |               |                |                        |                                                                                                                 |
|     | Split spoon sample                                                                                                     | 41                  |             |            |     |               |                |                        |                                                                                                                 |
|     | impossible to<br>take.                                                                                                 | 42                  |             |            |     |               |                |                        |                                                                                                                 |



4 64

Quo Ends - 53' 8"





# Field Borehole Log

REC'D JUN 15 1973

G/S 268.6

B/R 229.02

TR-68

146

CLIENT Ontario Hydro

JOB No. P-3126 HOLE No. 63 SHEET No. 1 OF 1

PROJECT Appropriation G.S.

WEATHER Sunny & Warm INSPECTOR G. Dantigny

SITE Tail Race

TEMP. 70 °F STARTED 1200 M. May 30 1973

LOCATION (LATITUDE) (DEPARTURE) BEARING 98

DIP 35 ° FINISHED 1730 M. May 31 1973

CONTRACTOR Canadian Longyear

ELEVATIONS: DATUM         









METHOD SOIL         

CASING DIAM. NW DRILL PLATFORM 0

OF BORING: ROCK Diamond Drilling

GROUND SURFACE 2'0"

CORE DIAM. NW WATER LEVELS 24'0"

| LOG LEGEND                                                                       |         | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                  |
|----------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|  | - SILTY |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  | - CLAY  |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                  |         |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | X - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                  |         |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | S A M P L E |           |               |               |  | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----------|---------------|---------------|--|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>TYPE   | **<br>No. | SIZE<br>(IN.) | RETD<br>(IN.) |  |                        |                                                                                                                 |
|     |                                                                                                                        | 1              |             |           |               |               |  |                        |                                                                                                                 |
|     | Dark brown topsoil                                                                                                     | 2              |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 3              |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 4              |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 5              |             |           |               |               |  |                        | Advanced casing<br>to 71'6"                                                                                     |
|     |                                                                                                                        | 6              |             |           |               |               |  |                        |                                                                                                                 |
|     | Light grey clay                                                                                                        | 7              |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 8              |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 9              |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 10             |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 11             |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 12             |             |           |               |               |  |                        |                                                                                                                 |
|     |                                                                                                                        | 13             |             |           |               |               |  |                        |                                                                                                                 |



# Field Borehole Log

TR-68 246

CLIENT Ontario Hydro  
PROJECT Appropriation G.S.  
SITE Tail Race  
LOCATION (LATITUDE) (DEPARTURE) BEARING 98  
CONTRACTOR Canadian Longyear  
METHOD SOIL  
OF BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-68 SHEET No. 2 OF  
WEATHER Sunny & Warm INSPECTOR G. Dantigny  
TEMP. 70 °F STARTED 11:00 M. May 30 1973  
DIP 35 ° FINISHED 17:30 M. May 31 1973  
ELEVATIONS: DATUM  
CASING DIAM. N.W. DRILL PLATFORM 0  
GROUND SURFACE 2' 0"  
CORE DIAM. N.Q. WATER LEVELS 24' 0"

LOG LEGEND \* SAMPLE CONDITION \*\* SAMPLING METHOD \*\* SHIPPING CONTAINER  
- SILT - SAND - GOOD - DISTURBED A - SPLIT TUBE E - AUGER N - INSERT R - CLOTH BAG  
- CLAY - GRAVEL - FAIR - LOST B - THIN WALL TUBE F - WASH O - TUBE S - PLIOFILM BAG  
C - PISTON SAMPLER K - SLOTTED SAMPLER P - WATER CONTENT TIN Y - CORE BOX  
D - CONE BARREL Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; GDOUR; ETC. | ELEV.<br>—<br>DEPTH | S A M P L E |                      |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT. ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|----------------------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                     | *<br>—<br>— | **<br>—<br>—<br>TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
| 1   |                                                                                                                        | 15                  |             |                      |     |               |                |                        |                                                                                                                 |
| 2   |                                                                                                                        | 16                  |             |                      |     |               |                |                        |                                                                                                                 |
| 3   |                                                                                                                        | 17                  |             |                      |     |               |                |                        |                                                                                                                 |
| 4   |                                                                                                                        | 18                  |             |                      |     |               |                |                        |                                                                                                                 |
| 5   |                                                                                                                        | 19                  |             |                      |     |               |                |                        |                                                                                                                 |
| 6   | Light grey clay                                                                                                        | 20                  |             |                      |     |               |                |                        |                                                                                                                 |
| 7   |                                                                                                                        | 21                  |             |                      |     |               |                |                        |                                                                                                                 |
| 8   |                                                                                                                        | 22                  |             |                      |     |               |                |                        |                                                                                                                 |
| 9   |                                                                                                                        | 23                  |             |                      |     |               |                |                        |                                                                                                                 |
| 10  |                                                                                                                        | 24                  |             |                      |     |               |                |                        |                                                                                                                 |
| 11  |                                                                                                                        | 25                  |             |                      |     |               |                |                        |                                                                                                                 |
| 12  |                                                                                                                        | 26                  |             |                      |     |               |                |                        |                                                                                                                 |
| 13  |                                                                                                                        | 27                  |             |                      |     |               |                |                        |                                                                                                                 |
| 14  |                                                                                                                        | 28                  |             |                      |     |               |                |                        |                                                                                                                 |



# Field Borehole Log

TR-68

3 of 6

CLIENT Ontario Hydro  
PROJECT Aspenica G.S.  
SITE Tail Race  
LOCATION                      BEARING 98  
CONTRACTOR Canadian Longyear  
METHOD SOIL                       
OF                       
BORING: ROCK Diamond Drilling

JOB No. P-376 HOLE No. TR-68 SHEET No. 3 OF             
WEATHER Sunny & Warm INSPECTOR G. Dentigny  
TEMP. 70 °F STARTED 1100 H. MAY 30 1973  
DIP 35 ° FINISHED 1730 H. MAY 31 1973  
ELEVATIONS: DATUM                       
CASING DIAM. 1 1/4" DRILL PLATFORM 0  
CORE DIAM. N.A. GROUND SURFACE 2' 0"  
WATER LEVELS 2' 0"

LOG LEGEND      \* SAMPLE CONDITION      \*\* SAMPLING METHOD      \*\* SHIPPING CONTAINER

|        |          |        |             |                    |                     |                       |                  |
|--------|----------|--------|-------------|--------------------|---------------------|-----------------------|------------------|
| - SILT | - SAND   | - GOOD | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | M - INSERT            | R - CLOTH BAG    |
| - CLAY | - GRAVEL | - FAIR | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|        |          |        |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|        |          |        |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOR; ETC. | ELEV.<br>DEPTH | S A M P L E |           |               |                | BLOWS<br>PER<br>SINCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-----------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----------|---------------|----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                       |                | *<br>TYPE   | **<br>No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                       |                                                                                                                 |
|     |                                                                                                                       | 29             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 30             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 31             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 32             |             |           |               |                |                       |                                                                                                                 |
|     | Light grey clay                                                                                                       | 33             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 34             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 35             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 36             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 37             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 38             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 39             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 40             |             |           |               |                |                       |                                                                                                                 |
|     |                                                                                                                       | 41             |             |           |               |                |                       |                                                                                                                 |



# Field Borehole Log

TR-68

4 of 6

CLIENT Ontario Hydro  
PROJECT Amnoria G.S.  
SITE Tail Race  
LOCATION (LATITUDE) (DEPARTURE) BEARING 98  
CONTRACTOR Canadian Longyear  
METHOD SOIL Diamond Drilling  
OF BORING: ROCK Diamond Drilling

JOB No. 0-3170 HOLE No. TR-68 SHEET No. 4 OF 4  
WEATHER Sunny & Warm INSPECTOR G. Dantigny  
TEMP. 20 ° STARTED 1100 M. May 30 1973  
DIP 35 ° FINISHED 1730 M. May 31 1973  
ELEVATIONS: DATUM 0  
CASING DIAM. NW DRILL PLATFORM 0  
CORE DIAM. NQ GROUND SURFACE 24'0"  
WATER LEVELS 24'0"

| LOG LEGEND |        | * SAMPLE CONDITION |          | ** SAMPLING METHOD |        | ** SHIPPING CONTAINER |             |
|------------|--------|--------------------|----------|--------------------|--------|-----------------------|-------------|
|            | - SILT |                    | - SAND   |                    | - GOOD |                       | - DISTURBED |
|            | - CLAY |                    | - GRAVEL |                    | - FAIR |                       | - LOST      |
|            |        |                    |          | A - SPLIT TUBE     |        | E - AUGER             |             |
|            |        |                    |          | B - THIN WALL TUBE |        | F - WASH              |             |
|            |        |                    |          | C - PISTON SAMPLER |        | K - SLOTTED SAMPLER   |             |
|            |        |                    |          | D - CORE BARREL    |        | N - INSERT            |             |
|            |        |                    |          |                    |        | O - TUBE              |             |
|            |        |                    |          |                    |        | P - WATER CONTENT TM  |             |
|            |        |                    |          |                    |        | Q - GLASS JAR         |             |
|            |        |                    |          |                    |        | R - CLOTH BAG         |             |
|            |        |                    |          |                    |        | S - PLIOFILM BAG      |             |
|            |        |                    |          |                    |        | T - CORE BOX          |             |
|            |        |                    |          |                    |        | Z - DISCARDED         |             |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOR; ETC. | ELEV.<br>DEPTH | S A M P L E |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-----------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                       |                | * TYPE      | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                       | 43             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 44             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 45             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 46             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 47             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 48             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 49             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 50             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 51             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 52             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 53             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 54             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 55             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 56             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 57             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 58             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 59             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 60             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 61             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 62             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 63             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 64             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 65             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 66             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 67             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 68             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 69             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 70             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 71             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 72             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 73             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 74             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 75             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 76             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 77             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 78             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 79             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 80             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 81             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 82             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 83             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 84             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 85             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 86             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 87             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 88             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 89             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 90             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 91             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 92             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 93             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 94             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 95             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 96             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 97             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 98             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 99             |             |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 100            |             |     |               |                |                        |                                                                                                                 |



# Field Borehole Log

TR-68 546

CLIENT ONTARIO Hydro  
PROJECT Appalachian G.S.  
SITE Tail Race  
LOCATION (LATITUDE) (DEPARTURE) BEARING 98  
CONTRACTOR Canadian Langyear  
METHOD SOIL  
OF BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-68 SHEET No. 5 OF 5  
WEATHER Sunny + Warm INSPECTOR G. Dantigny  
TEMP. 70 °F STARTED 1100 M. May 30 1973  
DIP 35 ° FINISHED 1730 M. May 31 1973  
ELEVATIONS: DATUM  
CASING DIAM. N.V. DRILL PLATFORM 0  
GROUND SURFACE 2' 0"  
CORE DIAM. N.R. WATER LEVELS 2' 0"

| LOG LEGEND |        | * SAMPLE CONDITION |          | ** SAMPLING METHOD |                     | ** SHIPPING CONTAINER |                  |
|------------|--------|--------------------|----------|--------------------|---------------------|-----------------------|------------------|
|            | - SILT |                    | - SAND   |                    | - GOOD              |                       | - DISTURBED      |
|            | - CLAY |                    | - GRAVEL |                    | - FAIR              |                       | - LOST           |
|            |        |                    |          | A - SPLIT TUBE     | E - AUGER           | H - INSERT            | R - CLOTH BAG    |
|            |        |                    |          | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|            |        |                    |          | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|            |        |                    |          | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE |     |               |                | BLOWS<br>PER<br>5 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | * TYPE | No. | SIZE<br>(IN.) | RETD.<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 51             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 53             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 55             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 57             |        |     |               |                |                        |                                                                                                                 |
|     | Silty sand                                                                                                             | 59             |        |     |               |                |                        |                                                                                                                 |
|     | Light grey                                                                                                             | 60             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 61             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 62             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 63             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 64             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 65             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 66             |        |     |               |                |                        |                                                                                                                 |
|     | Sand & coarse                                                                                                          | 67             |        |     |               |                |                        |                                                                                                                 |
|     | grained gravel                                                                                                         | 68             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 69             |        |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 70             |        |     |               |                |                        |                                                                                                                 |











# Field Borehole Log

TR-68 6 of 6

CLIENT Ontario Hydro  
PROJECT Arnprior G.S.  
SITE Tail Race  
LOCATION (LATITUDE) (DEPARTURE) BEARING 98  
CONTRACTOR Canadian Longyear  
METHOD SOIL  
OF BORING: ROCK Diamond Drilling

JOB No. P-3126 HOLE No. TR-68 SHEET No. 6 OF  
WEATHER Sunny & Warm INSPECTOR G. D. Ostry  
TEMP. 70 ° STARTED 11:00 M. May 30 1973  
DIP 35 ° FINISHED 1730 M. May 31 1973  
ELEVATIONS: DATUM  
CASING DIAM. N.W. DRILL PLATFORM 0  
GROUND SURFACE 26'  
CORE DIAM. NQ WATER LEVELS 22'0"

| LOG LEGEND                                                                       |        | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                  |
|----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|  | - SILT |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  | - CLAY |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                  |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                  |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOR; ETC. | ELEV.<br>DEPTH | SAMPLE    |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-----------------------------------------------------------------------------------------------------------------------|----------------|-----------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                       |                | *<br>TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                       |                |           |     |               |                |                        | NOTE FOR ROCK DATA SEE DWG                                                                                      |
|     | BEDROCK                                                                                                               |                |           |     |               |                |                        | NAF9 DBE 10175-0070                                                                                             |
|     | Crystalline Limestone                                                                                                 | 71             |           |     |               |                |                        | Length of Run-5'2"                                                                                              |
|     | Light grey                                                                                                            | 72             |           |     |               |                |                        | Core Recovery-5'0"                                                                                              |
|     | 1 Machine break                                                                                                       | 73             | DY 1      |     | 1 1/2"        | 50"            |                        | -96.7%                                                                                                          |
|     | Multiple joints                                                                                                       | 74             |           |     |               |                |                        | RQD-35.6%                                                                                                       |
|     | and fractures.                                                                                                        | 75             |           |     |               |                |                        | 50% water return                                                                                                |
|     |                                                                                                                       | 76             |           |     |               |                |                        | Run Ends-76'2"                                                                                                  |
|     |                                                                                                                       | 77             |           |     |               |                |                        |                                                                                                                 |
|     | Crystalline Limestone                                                                                                 | 77             |           |     |               |                |                        | Length of Run-7'3"                                                                                              |
|     | Light grey                                                                                                            | 78             |           |     |               |                |                        | Core Recovery-7'2"                                                                                              |
|     | 3 Machine breaks                                                                                                      | 79             | DY 2      |     | 1 1/2"        |                |                        | -98.8%                                                                                                          |
|     | 2 tight joints                                                                                                        | 80             |           |     |               |                |                        | RQD-                                                                                                            |
|     | 1 open joint                                                                                                          | 81             |           |     |               |                |                        |                                                                                                                 |
|     | Core is in good                                                                                                       | 82             |           |     |               |                |                        | 50% water recovery                                                                                              |
|     | condition.                                                                                                            | 83             |           |     |               |                |                        | Core barrel blocked                                                                                             |
|     | No sign of water                                                                                                      | 84             |           |     |               |                |                        |                                                                                                                 |
|     | thinning                                                                                                              | 85             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 86             |           |     |               |                |                        | Run Ends-86'5"                                                                                                  |
|     |                                                                                                                       | 87             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 88             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 89             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 90             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 91             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 92             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 93             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 94             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 95             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 96             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 97             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 98             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 99             |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                       | 100            |           |     |               |                |                        |                                                                                                                 |















# Field Borehole Log

TR-75 2 of 3

CLIENT ONTARIO HYDRO  
PROJECT ARNPRIOR ONTARIO  
SITE TAIL RACE  
LOCATION                      BEARING -  
CONTRACTOR CANADIAN LONGYEAR  
METHOD SOIL WASH BORING  
OF  
BORING: ROCK DIAMOND DRILLING

JOB No. P3176 HOLE No. TR-75 SHEET No. 2 OF 4  
WEATHER SUNNY INSPECTOR                       
TEMP. 80 + 0, STARTED 146 M. JUNE 8 1973  
DIP 90 0 FINISHED 123.0 M. JUNE 12 1973  
ELEVATIONS: DATUM                       
CASING DIAM. H DRILL PLATFORM O  
GROUND SURFACE                       
CORE DIAM. NXL WATER LEVELS                     

| LOG LEGEND                                                                               |                                                                                            | * SAMPLE CONDITION                                                                       |                                                                                               | ** SAMPLING METHOD |                     | ** SHIPPING CONTAINER |                  |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------|---------------------|-----------------------|------------------|
|  - SILT |  - SAND   |  - GOOD |  - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  - CLAY |  - GRAVEL |  - FAIR |  - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                          |                                                                                            |                                                                                          |                                                                                               | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                          |                                                                                            |                                                                                          |                                                                                               | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | S A M P L E |     |              |               |    | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|-------------|-----|--------------|---------------|----|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>TYPE   | No. | SIZE<br>(IN) | RETD.<br>(IN) |    |                        |                                                                                                                 |
|     |                                                                                                                        | 13             |             |     |              |               |    |                        |                                                                                                                 |
|     |                                                                                                                        | 14             |             |     |              |               |    |                        | WASHED HOLE TO 15'<br>WITH CHOPPING BIT                                                                         |
|     |                                                                                                                        | 15             |             |     |              |               |    |                        |                                                                                                                 |
|     | SILTY SAND                                                                                                             | 16             | X           | AQ  | 2            | 1 1/2         | 6  | 12                     |                                                                                                                 |
|     | LIGHT GREY                                                                                                             |                | X           |     |              |               |    | 6                      |                                                                                                                 |
|     | MED FINE SAND                                                                                                          |                | X           |     |              |               |    | 1                      |                                                                                                                 |
|     | VERY SOFT                                                                                                              | 17             | X           |     |              |               |    | 1                      |                                                                                                                 |
|     |                                                                                                                        | 18             |             |     |              |               |    |                        | ADVANCED CASING<br>TO 20'                                                                                       |
|     |                                                                                                                        | 19             |             |     |              |               |    |                        |                                                                                                                 |
|     |                                                                                                                        | 20             |             |     |              |               |    |                        | WASHED CASING WITH<br>CHOPPING BIT.                                                                             |
|     | SANDY SILT TO 21'                                                                                                      | 21             | X           | AQ  | 3            | 1 1/2         | 21 | 3                      |                                                                                                                 |
|     | CLAY CONTACT AT 21'                                                                                                    |                | X           |     |              |               |    | 2                      | SPLIT SPOON                                                                                                     |
|     | LIGHT GREY SAND                                                                                                        | 22             | X           |     |              |               |    | {1}                    | 3RD SAMPLE 20' → 22'                                                                                            |
|     | VERY SOFT GREY CLAY                                                                                                    |                | X           |     |              |               |    |                        |                                                                                                                 |
|     |                                                                                                                        | 23             |             |     |              |               |    |                        |                                                                                                                 |
|     |                                                                                                                        | 24             |             |     |              |               |    |                        | DROVE CASING TO 25'                                                                                             |
|     |                                                                                                                        | 25             |             |     |              |               |    |                        | WASHED HOLE WITH<br>CHOPPING BIT TO 25'                                                                         |
|     |                                                                                                                        |                |             |     |              |               |    |                        | TRIED TO TAKE SHELBY                                                                                            |



# Field Borehole Log

TR-75 3 of 3

CLIENT ONTARIO HYDRO  
PROJECT ARNPRIOR GS  
SITE TAIL RACE  
LOCATION (LATITUDE) (DEPARTURE) BEARING -  
CONTRACTOR CANADIAN LONGYEAR  
METHOD SOIL WASH BORING  
OF BORING: ROCK DIAMOND DRILLING

JOB No P3176 HOLE No TR-75 SHEET No 3 OF 4  
WEATHER CLOUDY - 1st INSPECTOR J. Munni  
TEMP. 80 °F STARTED 1416 M. JUNE 9 1973  
DIP 90 ° FINISHED 1730 M. JUNE 12 1973  
ELEVATIONS: DATUM  
CASING DIAM. 1 1/2 DRILL PLATFORM 0  
GROUND SURFACE  
CORE DIAM. NXL WATER LEVELS

LOG LEGEND \* SAMPLE CONDITION \*\* SAMPLING METHOD \*\*\* SHIPPING CONTAINER  
- SILT - SAND - GOOD - DISTURBED A - SPLIT TUBE E - AUGER M - INSERT R - CLOTH BAG  
- CLAY - GRAVEL - FAIR - LOST B - THIN WALL TUBE F - WASH O - TUBE S - PLIOFILM BAG  
C - PISTON SAMPLER K - SLOTTED SAMPLER P - WATER CONTENT TIN V - CORE BOX  
D - CORE BARREL Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR, CONSISTENCY<br>DENSITY, TEXTURE, STRUCTURE, SHAPE AND<br>SURFACE CONDITION OF GRAINS, ODOUR, ETC. | ELEV.<br>DEPTH | * TYPE | ** No. | SIZE<br>(IN) | RET'D<br>(IN) | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC.       |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|--------|--------------|---------------|------------------------|-----------------------------------------------------------------------------------------------------------------------|
|     | BOULDER @ 25' 0"                                                                                                       |                |        |        |              |               |                        | AT 25' - HIT A BOULDER<br>NO RECOVERY - TRIED                                                                         |
|     |                                                                                                                        | 26             |        |        |              |               |                        |                                                                                                                       |
|     | SAND MIXED WITH<br>CLAY - LIGHT GREY                                                                                   | 27             | AR     | 4      | 1 1/2        | 16            | 3<br>2                 | CHIPPING BOULDER -<br><del>WAS</del> RAN NXL                                                                          |
|     | VERY SOFT                                                                                                              | 28             |        |        |              |               | 4<br>3                 | CORE BARREL THROUGH<br>BOULDER & TO 26 FT.                                                                            |
|     |                                                                                                                        | 29             |        |        |              |               |                        | TOOK SPLIT SPOON AT<br>26' TO 28'                                                                                     |
|     |                                                                                                                        | 30             |        |        |              |               |                        |                                                                                                                       |
|     | BED ROCK CONTACT<br>30' 1"                                                                                             | 31             |        |        |              |               |                        | ADVANCED "H" CASING<br>TO BED ROCK                                                                                    |
|     |                                                                                                                        | 32             |        |        |              |               |                        |                                                                                                                       |
|     |                                                                                                                        | 33             | DY     | 1      | 2 1/8        | 33"           |                        | RAN NXL CORE<br>BARREL APPROX. 3' IN<br>BED ROCK. CORE LEFT<br>IN HOLE. CORE BARREL<br>WAS SAVED IN THE<br>NX CASING. |
|     | LINE STONE<br>4 MACHINE BREAKS                                                                                         | 34             |        |        |              |               |                        |                                                                                                                       |
|     | 1 WEATHERED FRACTURE<br>AT 31.4, W/R 100%                                                                              | 35             |        |        |              |               |                        |                                                                                                                       |
|     | 2ND RUN                                                                                                                | 36             | DY     | 2      | 2 1/8        | 102"          |                        | RAN NXL CORE BARREL<br>FROM 33' 4" TO 43' 6"                                                                          |
|     | BLOCKED AT 43' 6"                                                                                                      | 37             |        |        |              |               |                        |                                                                                                                       |
|     | 3 MACHINE BREAKS                                                                                                       | 38             |        |        |              |               |                        |                                                                                                                       |
|     | 2 HAND BREAKS<br>SLIGHTLY WEATHERED                                                                                    | 39             |        |        |              |               |                        |                                                                                                                       |
|     | FRACTURES AT 34' 11"<br>& 42' 6"                                                                                       |                |        |        |              |               |                        |                                                                                                                       |

NOTE: FOR ROCK DATA SEE DWG.  
NAF9 DBE 1075-0080



# Field Borehole Log

TR-76

1 of 2

CLIENT ONTARIO HYDROJOB No. P3176 HOLE No. TR76 SHEET No. 1 OF 4PROJECT ARNPRIOR G.S.WEATHER SUNNY - WARM INSPECTOR J. J. J.SITE TAIL RISE - HWY 17 - W. BRIDGE ABUTMENT TEMP. 75 °, STARTED 1130 M. JUNE 13 1973LOCATION (LATITUDE) (DEPARTURE) BEARING - DIP 90 ° FINISHED 1530 M. JUNE 14 1973CONTRACTOR CANADIAN LONGYEAR

ELEVATIONS: DATUM

METHOD SOIL WASH BORINGCASING DIAM. H DRILL PLATFORMOF BORING: ROCK DIAMOND DRILLING

GROUND SURFACE

CORE DIAM. 1 1/2 WATER LEVELS

## LOG LEGEND

## \* SAMPLE CONDITION

## \*\* SAMPLING METHOD

## \*\* SHIPPING CONTAINER

|        |          |        |             |                    |                     |                       |                  |
|--------|----------|--------|-------------|--------------------|---------------------|-----------------------|------------------|
| - SILT | - SAND   | - GOOD | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
| - CLAY | - GRAVEL | - FAIR | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|        |          |        |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|        |          |        |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOR, ETC. | ELEV.<br>DEPTH | SAMPLE         |     |              |               |  | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-----------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----|--------------|---------------|--|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                       |                | * TYPE         | No. | SIZE<br>(IN) | RET'D<br>(IN) |  |                        |                                                                                                                 |
|     |                                                                                                                       |                | DRILL PLATFORM |     |              |               |  |                        |                                                                                                                 |
|     | RIVER SURFACE - 11'                                                                                                   | 1              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 2              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 3              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 4              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 5              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 6              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 7              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 8              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 9              |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 10             |                |     |              |               |  |                        |                                                                                                                 |
|     | BOTTOM OF RIVER<br>10.5" @ 1130 AM.                                                                                   | 11             |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 12             |                |     |              |               |  |                        |                                                                                                                 |
|     |                                                                                                                       | 13             |                |     |              |               |  |                        | DRIVE H. CASING<br>TO 15' 0"                                                                                    |
|     |                                                                                                                       | 14             |                |     |              |               |  |                        |                                                                                                                 |











# Field Borehole Log

TR-76 2 of 2

CLIENT ONTARIO HYDRO  
PROJECT ARNPrio GS  
SITE TAILRACE - Hwy 17 W BRIDGE ABUT.  
LOCATION (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR CANADIAN LONG-YEAR  
METHOD SOIL WASH BORING  
OF  
BORING: ROCK DIAMOND DRILLING

JOB No. P3176 HOLE No. TR 76 SHEET No. 2 OF 4  
WEATHER SUNNY INSPECTOR J. H. H.  
TEMP. 75 ° STARTED 1130 M. JUNE 13 1973  
DIP 90 ° FINISHED 1530 M. JUNE 14 1973  
ELEVATIONS: DATUM  
CASING DIAM. Nx DRILL PLATFORM  
GROUND SURFACE  
CORE DIAM. NxL WATER LEVELS

| LOG LEGEND                                                                        |        | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                 |
|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|-----------------|
|  | - SILT |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG   |
|  | - CLAY |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLOFILM BAG |
|                                                                                   |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX    |
|                                                                                   |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CORE BARREL    | Q - GLASS JAR       | Z - DISCARDED         |                 |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE    |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | *<br>TYPE | No. | SIZE<br>(IN.) | RET'D<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        |                |           |     |               |                |                        | WASHED HOLE TO 15'                                                                                              |
|     |                                                                                                                        | 15'            |           |     |               |                |                        |                                                                                                                 |
|     | DARK GREY SILT<br>+ SAWDUST<br>VERY SOFT                                                                               | 16'            | BO        | 1   | 2 1/4         | 15             |                        | TOOK SHELBY SAMPLE<br>15'0" TO 16'8"                                                                            |
|     |                                                                                                                        | 17'            |           |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 18'            |           |     |               |                |                        | DROVE H CASING<br>FROM 15'0" TO 19'6"                                                                           |
|     |                                                                                                                        | 19'            |           |     |               |                |                        | WASHED HOLE TO 19'6"                                                                                            |
|     |                                                                                                                        | 20'            |           |     |               |                | 2                      |                                                                                                                 |
|     | SANDY SILT<br>LIGHT GREY<br>SOFT                                                                                       | 21'            | AQ        | 2   | 1 1/2         | 24"            | 2<br>1                 | DROVE SPLIT SPOON<br>FROM 19'6" TO 21'6"                                                                        |
|     |                                                                                                                        | 22'            |           |     |               |                | 1                      |                                                                                                                 |
|     |                                                                                                                        | 23'            |           |     |               |                |                        | DROVE H CASING<br>FROM 19'6" TO 24'1"                                                                           |
|     |                                                                                                                        | 24'            |           |     |               |                |                        | WASHED HOLE TO 24'1"                                                                                            |
|     | BOULDERS @ 24'1"                                                                                                       | 25'            |           |     |               |                |                        | ENCOUNTERED ROCK @ 24'<br>(BOULDERS)                                                                            |
|     |                                                                                                                        | 26'            |           |     |               |                |                        | RAN Nx CASING INTO<br>BOULDER                                                                                   |
|     | BOULDERS; SAND +<br>GRAVEL 24'1" TO 27'7"                                                                              | 27'            | DY        | 3   | 2 1/8         | -              |                        |                                                                                                                 |
|     |                                                                                                                        | 28'            |           |     |               |                |                        | RAN NxL CORE BARREL<br>THROUGH BOULDER +<br>INTO BED ROCK: 24'1" -<br>28'7"                                     |
|     | BED ROCK 27'7"                                                                                                         | 29'            |           |     |               |                |                        |                                                                                                                 |

NOTE: FOR ROCK DATA

FORM 176 REV 1



# Field Borehole Log

TR-77

1 of 3

CLIENT ONTARIO HYDROJOB No. P3176 HOLE No. TR77 SHEET No. 1 OF 4PROJECT ARNPICK G-SWEATHER CLOUDY INSPECTOR JL. AmosSITE TAIL RISE - HWY 17 W. BRIDGE ABUT.TEMP. 72 °F STARTED 1230 M. JUNE 19 1973

LOCATION (LATITUDE) (DEPARTURE) BEARING

DIP 90 ° FINISHED 1430 M. JUNE 20 1973CONTRACTOR CANADIAN LONGYEAR

ELEVATIONS: DATUM

METHOD SOIL WASH BORINGCASING DIAM. N/L

DRILL PLATFORM

OF BORING: ROCK DIAMOND DRILLINGCORE DIAM. N/L

GROUND SURFACE

WATER LEVELS

## LOG LEGEND

## \* SAMPLE CONDITION

## \*\* SAMPLING METHOD

## \*\* SHIPPING CONTAINER

- SILT - SAND

- GOOD

- DISTURBED

A - SPLIT TUBE

E - AUGER

M - INSERT

R - CLOTH BAG

- CLAY - GRAVEL

- FAIR

- LOST

B - THIN WALL TUBE

F - WASH

O - TUBE

S - PLIOFILM BAG

C - PISTON SAMPLER

K - SLOTTED SAMPLER

P - WATER CONTENT TIN

Y - CORE BOX

D - CORE SAMPLER

Q - GLASS JAR

Z - DISCARDED

| LOG | DESCRIPTION: COLOUR, CONSISTENCY<br>DENSITY, TEXTURE, STRUCTURE, SHAPE AND<br>SURFACE CONDITION OF GRAINS, ODDOR, ETC. | ELEV.<br>—<br>DEPTH | SAMPLE         |     |               |                | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|---------------------|----------------|-----|---------------|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                     | *<br>TYPE      | No. | SIZE<br>(IN.) | RETD.<br>(IN.) |                        |                                                                                                                 |
|     |                                                                                                                        | 0                   | DRILL PLATFORM |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 1                   |                |     |               |                |                        | RIVER SURFACE $\approx$ 254.0                                                                                   |
|     |                                                                                                                        | 2                   |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 3                   |                |     |               |                |                        |                                                                                                                 |
|     | WATER 10" TO 8' 12"                                                                                                    | 4                   |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 5                   |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 6                   |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 7                   |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 8                   |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 9                   |                |     |               |                |                        | BOTTOM OF RIVER                                                                                                 |
|     |                                                                                                                        | 10                  |                |     |               |                |                        |                                                                                                                 |
|     |                                                                                                                        | 11                  |                |     |               |                |                        | DROVE 14 CASING<br>TO 15'                                                                                       |
|     |                                                                                                                        | 12                  |                |     |               |                |                        |                                                                                                                 |





# Field Borehole Log

TR-77 2 of 3

CLIENT ONTARIO HYDRO JOB No. P3176 HOLE No. TR-77 SHEET No. 2 OF 3  
PROJECT ARIPRIOR G.S. WEATHER CLOUDY INSPECTOR G. Brown  
SITE TAIL RACE - HWY. 11 W. BRIDGE ABUT. TEMP. 70 ° STARTED 1230 M. JUNE 19 1973  
LOCATION (LATITUDE) (DEPARTURE) BEARING DIP 90 ° FINISHED 1430 M. JUNE 20 1973  
CONTRACTOR CANADIAN LONG-LEAF ELEVATIONS: DATUM  
METHOD SOIL WASH BORING CASING DIAM. 1 1/2 DRILL PLATFORM  
OF GROUND SURFACE  
BORING: ROCK DIAMOND DRILLING CORE DIAM. 1 1/2 WATER LEVELS

LOG LEGEND \* SAMPLE CONDITION \*\* SAMPLING METHOD \*\*\* SHIPPING CONTAINER  
SILT - SAND GOOD - DISTURBED A - SPLIT TUBE E - AUGER W - INSERT R - CLOTH BAG  
CLAY - GRAVEL FAIR - LOST B - THIN WALL TUBE F - WASH O - TUBE S - PLIOFILM BAG  
C - PISTON SAMPLER K - SLOTTED SAMPLER P - WATER CONTENT TIN Y - CORE BOX  
D - CORE BARREL Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOR; ETC. | ELEV.<br>DEPTH | SAMPLE |     |              |               | BLOWS<br>PER<br>SINCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-----------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|--------------|---------------|-----------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                       |                | TYPE   | No. | SIZE<br>(IN) | RET'D<br>(IN) |                       |                                                                                                                 |
|     |                                                                                                                       | 14             |        |     |              |               |                       | WASHED HOLE TO 15'                                                                                              |
|     |                                                                                                                       | 15             |        |     |              |               |                       | TRIED SHELBY AT 15' -                                                                                           |
|     |                                                                                                                       | 16             |        |     |              |               |                       | MATERIAL TO SOFT - No. R                                                                                        |
|     | SAND WITH CLAY<br>GREY IN COLOUR                                                                                      | 16             | AQ     | 1   | 1 1/2        | 24"           | 0                     | DROVE SPLIT SPOON                                                                                               |
|     | VERY FINE SAND                                                                                                        | 17             |        |     |              |               | 0                     | FROM 15' - 17'                                                                                                  |
|     | VERY SOFT                                                                                                             | 17             |        |     |              |               | 1                     |                                                                                                                 |
|     |                                                                                                                       | 18             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                       | 19             |        |     |              |               |                       | DROVE H CASING                                                                                                  |
|     |                                                                                                                       | 20             |        |     |              |               |                       | TO 20'                                                                                                          |
|     | LIGHT GREY SAND                                                                                                       | 21             | AQ     | 2   | 1 1/2        | 26"           | WT. OF<br>RED         | DROVE SPLIT SPOON                                                                                               |
|     | VERY FINE                                                                                                             | 22             |        |     |              |               |                       | 20' TO 22'                                                                                                      |
|     | VERY SOFT                                                                                                             | 23             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                       | 24             |        |     |              |               |                       | DROVE CASING (H)                                                                                                |
|     |                                                                                                                       | 25             |        |     |              |               |                       | TO 25'                                                                                                          |
|     | LIGHT GREY SAND &<br>CLAY                                                                                             | 26             | AQ     | 3   | 1 1/2        | 24"           | 1                     |                                                                                                                 |
|     | VERY FINE SAND                                                                                                        |                |        |     |              |               | 1                     |                                                                                                                 |
|     | FIRM CLAY                                                                                                             |                |        |     |              |               | 2                     |                                                                                                                 |




# Field Borehole Log

TR-77 3 of 3

CLIENT ONTARIO HYDRO  
PROJECT ARNBRIOR G.S.  
SITE TAIL RACE - Hwy 17 - W BRIDGE ABUT.  
LOCATION (LATITUDE) (LONGITUDE) BEARING  
CONTRACTOR CANADIAN LONG-YEAR  
METHOD SOIL WASH BORING  
OF  
CORING: ROCK DIAMOND DRILLING

JOB No. P3176 HOLE No. TR77 SHEET No. 3 OF 4  
WEATHER SUNNY INSPECTOR J. Lewis  
TEMP. 70 °F STARTED 1330 M. JUNE 19 1972  
DIP 90 ° FINISHED 1430 M. JUNE 20 1972  
ELEVATIONS: DATUM  
CASING DIAM. Nx DRILL PLATFORM  
CORE DIAM. NxL GROUND SURFACE  
WATER LEVELS

| LOG LEGEND | * SAMPLE CONDITION | ** SAMPLING METHOD | ** SHIPPING CONTAINER |
|------------|--------------------|--------------------|-----------------------|
| - SILT     | - GOOD             | A - SPLIT TUBE     | M - INSERT            |
| - SAND     | - DISTURBED        | E - AUGER          | R - CLOTH BAG         |
| - CLAY     | - LOST             | B - THIN WALL TUBE | O - TUBE              |
| - GRAVEL   | - FAIR             | F - WASH           | S - PLIOFILM BAG      |
|            |                    | C - PISTON SAMPLER | P - WATER CONTENT TIN |
|            |                    | D - CORE BARREL    | K - SLOTTED SAMPLER   |
|            |                    |                    | Q - GLASS JAR         |
|            |                    |                    | Y - CORE BOX          |
|            |                    |                    | Z - DISCARDED         |

| LOG | DESCRIPTION: COLOUR, CONSISTENCY<br>DENSITY, TEXTURE, STRUCTURE, SHAPE AND<br>SURFACE CONDITION OF GRAINS, OCCUR, ETC.                                                   | ELEV.<br>DEPTH | S A M P L E                                                                          |     |              |               |             | BLOWS<br>PER<br>6 INCH                                | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------|-----|--------------|---------------|-------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                                                                          |                | *<br>TYPE                                                                            | No. | SIZE<br>(IN) | RETD.<br>(IN) |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 27             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 28             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 29             |                                                                                      |     |              |               |             |                                                       | DRIVE H. CASING<br>TO 30'                                                                                       |
|     |                                                                                                                                                                          | 30             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     | CLAY WITH SAND<br>GREY IN COLOUR<br>SOFT                                                                                                                                 | 31             | Aq                                                                                   | 4   | 1 1/2        | 18            | 1<br>2<br>2 |                                                       | DRIVE <del>SPIN</del> SPOON<br>TO 31' 6"                                                                        |
|     |                                                                                                                                                                          | 32             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 33             |                                                                                      |     |              |               |             |                                                       | DRIVE CASING<br>TO BEDROCK                                                                                      |
|     | BEDROCK 33' 8"                                                                                                                                                           | 34             |  |     |              |               |             |                                                       |                                                                                                                 |
|     | NOTE: FOR ROCK DATA SEE<br>DWG. NAF9ABE10175-0084                                                                                                                        | 35             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 36             |                                                                                      |     |              |               |             |                                                       | RAW 10' H&L CORE<br>BARREL FROM 33' 8"<br>TO 41' 9"                                                             |
|     | LIMESTONE<br>GREY IN COLOUR<br>9 MACHINE BREAKS<br>MULTIPLE SLIGHTLY<br>WEATHERED FRACTURES<br>FROM 39 TO 41' 9"<br>100% RECOVERY<br>100% WATER RETURN<br>GOOD CONDITION | 37             | Dy                                                                                   | 5   | 2 1/2        | 81'           |             | RQ.D. 47% FOR<br>THE FIRST 10' FT.<br>33' 8" - 43' 8" |                                                                                                                 |
|     |                                                                                                                                                                          | 38             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 39             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |
|     |                                                                                                                                                                          | 40             |                                                                                      |     |              |               |             |                                                       |                                                                                                                 |



## Field Borehole Log

TR-81 1 of 1

CLIENT Ontario Hydro  
 PROJECT Anniston G.S.  
 SITE Tail Race  
 LOCATION (LATITUDE) (DEPARTURE) BEARING -  
 CONTRACTOR Canadian Langyea  
 METHOD SOIL Washboring  
 OF BORING: ROCK Diamond Drilling

JOB No. P-376 HOLE No. TR-81 SHEET No. 1 OF 1  
 WEATHER Cloudy Mild INSPECTOR G. Dantigny  
 TEMP. 65 ° STARTED 0730 M. June 15 1973  
 DIP 90 ° FINISHED 1300 M. June 18 1973

ELEVATIONS: DATUM

CASING DIAM. N/A DRILL PLATFORM 0CORE DIAM. N/A GROUND SURFACE 8WATER LEVELS 9.6

LOG LEGEND \* SAMPLE CONDITION \*\* SAMPLING METHOD \*\*\* SHIPPING CONTAINER

|        |          |        |             |                    |                     |                       |                  |
|--------|----------|--------|-------------|--------------------|---------------------|-----------------------|------------------|
| - SILT | - SAND   | - GOOD | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
| - CLAY | - GRAVEL | - FAIR | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|        |          |        |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|        |          |        |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE |     |              |               | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|--------------|---------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | * TYPE | No. | SIZE<br>(IN) | RET'D<br>(IN) |                        |                                                                                                                 |
|     | Coarse grained<br>Sand & gravel                                                                                        | 1              |        |     |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 2              |        |     |              |               |                        |                                                                                                                 |
|     | Boulder - 2' 10"                                                                                                       | 3              |        |     |              |               |                        | Advanced casing to<br>4' 6" & washed to 5' 0"                                                                   |
|     |                                                                                                                        | 4              |        |     |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 5              |        |     |              |               |                        |                                                                                                                 |
|     | Sample was lost<br>because a stone<br>blocked split spoon                                                              | 6              | 29     | 1   | 1 1/2        | 0             | 2<br>4                 | Split spoon                                                                                                     |
|     |                                                                                                                        | 7              |        |     |              |               | 6                      | Sample 1 - 5' 0" - 6' 6"                                                                                        |
|     |                                                                                                                        | 8              |        |     |              |               |                        |                                                                                                                 |
|     |                                                                                                                        | 9              |        |     |              |               |                        | Advanced casing<br>to 10' 6" & washed to<br>11' 0"                                                              |
|     |                                                                                                                        | 10             |        |     |              |               |                        |                                                                                                                 |
|     | Light brown sand<br>mixed with soft<br>clay. sand is fine                                                              | 11             |        |     |              |               |                        | NOTE FOR ROCK DATA SEE<br>DWG NAF9 DBE 10175-0091                                                               |
|     |                                                                                                                        | 12             |        |     |              |               |                        | Split spoon<br>Sample 2 - 11' 0" - 11' 6"                                                                       |
|     | Crystalline Limestone<br>Light gray                                                                                    | 13             | DY     | 1   | 1 1/2        | 10 3/4        |                        | Length of Run - 10' 3"<br>Core Recovery - 10' 3"<br>- 100%                                                      |
|     |                                                                                                                        | 14             |        |     |              |               |                        |                                                                                                                 |



# Field Borehole Log

1973 JUN 20 1973

TR-82 1 of 1

CLIENT: Ontario Hydro  
PROJECT: Annapolis G.S.  
SITE: Tail Race  
LOCATION: (LATITUDE) (DEPARTURE) BEARING  
CONTRACTOR: Canadian Longyear  
METHOD: SOIL Washboreing  
OF  
BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-82 SHEET No. 2 OF 2  
WEATHER: Sunny & Mild INSPECTOR: G. Doughty  
TEMP: 65 ° STARTED: 1300 H. June 13 1973  
DIP: 90 ° FINISHED: 1130 H. June 19 1973  
ELEVATIONS: DATUM  
CASING DIAM. 1 1/2" DRILL PLATFORM 0  
GROUND SURFACE 3"  
CORE DIAM. NQ WATER LEVELS

| LOG LEGEND |          | * SAMPLE CONDITION |             | ** SAMPLING METHOD |                     | ** SHIPPING CONTAINER |                  |
|------------|----------|--------------------|-------------|--------------------|---------------------|-----------------------|------------------|
| - SILT     | - SAND   | - GOOD             | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
| - CLAY     | - GRAVEL | - FAIR             | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|            |          |                    |             | C - PISTON SAMPLER | X - SLOTTED SAMPLER | P - WATER CONTENT TIN | V - CORE BOX     |
|            |          |                    |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, ODOUR, ETC. | ELEV. DEPTH | SAMPLE         |     |            |             | BLOWS PER 6 INCH | NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-------------------------------------------------------------------------------------------------------------------|-------------|----------------|-----|------------|-------------|------------------|-----------------------------------------------------------------------------------------------------------|
|     |                                                                                                                   |             | * TYPE         | No. | SIZE (IN.) | RETD. (IN.) |                  |                                                                                                           |
|     |                                                                                                                   | 0           | Drill Platform |     |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 1           |                |     |            |             |                  |                                                                                                           |
|     | Light brown sand                                                                                                  | 2           |                |     |            |             |                  |                                                                                                           |
|     | Medium fine.                                                                                                      | 3           |                |     |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 4           |                |     |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 5           |                |     |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 6           |                |     |            |             |                  | Advanced casing to                                                                                        |
|     | Coarse grained gravel.                                                                                            | 7           | AR             | 1   | 1 1/2"     | 5'          | 6                | 5'6" & washed to 4'0"                                                                                     |
|     |                                                                                                                   | 8           |                |     |            |             | 9                | Sample 1- 6'0"-7'6"                                                                                       |
|     | Recovery was poor                                                                                                 | 9           |                |     |            |             |                  |                                                                                                           |
|     | because a stone                                                                                                   | 10          |                |     |            |             |                  |                                                                                                           |
|     | blocked split spoon                                                                                               | 11          |                |     |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 12          |                |     |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 13          |                |     |            |             |                  | NOTE: FOR ROCK DATA SEE                                                                                   |
|     |                                                                                                                   | 14          |                |     |            |             |                  | DWG NAE9 DBE 10/75-0092                                                                                   |
|     |                                                                                                                   |             | Bedrock 13'6"  |     |            |             |                  |                                                                                                           |











# Field Borehole Log

TR-84

1 of 1

CLIENT Ontario Hydro  
PROJECT Amnrior G.S.  
SITE Tail Race  
LOCATION (LATITUDE) (DEPARTURE) BEARING 46°  
CONTRACTOR Canadian Longyear  
METHOD SOIL  
OF BORING: ROCK Diamond Drilling

JOB No. P-3176 HOLE No. TR-84 SHEET No. 1 of 17  
WEATHER Cloudy & Warm INSPECTOR G. Dantigny  
TEMP. 75° STARTED 1300 M. June 21 1973  
DIP 35° FINISHED M. 19  
ELEVATIONS: DATUM  
CASING DIAM. NW DRILL PLATFORM 0'  
GROUND SURFACE 5.6'  
CORE DIAM. NQ WATER LEVELS

| LOG LEGEND                                                                        |        | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                  |
|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|  | - SILT |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | Z - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  | - CLAY |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                   |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|                                                                                   |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, ODOUR, ETC. | ELEV. DEPTH | SAMPLE |        |            |             | BLOWS PER 6 INCH | NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-------------------------------------------------------------------------------------------------------------------|-------------|--------|--------|------------|-------------|------------------|-----------------------------------------------------------------------------------------------------------|
|     |                                                                                                                   |             | * TYPE | ** No. | SIZE (IN.) | RET'D (IN.) |                  |                                                                                                           |
|     |                                                                                                                   | 1           |        |        |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 2           |        |        |            |             |                  |                                                                                                           |
|     | DARK brown top-soil                                                                                               | 3           |        |        |            |             |                  | Advanced casing to 9'6"                                                                                   |
|     |                                                                                                                   | 4           |        |        |            |             |                  |                                                                                                           |
|     | Light brown sand mixed with coarse grained gravel                                                                 | 5           |        |        |            |             |                  | Ground surface                                                                                            |
|     |                                                                                                                   | 6           |        |        |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 7           |        |        |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 8           |        |        |            |             |                  | NOTE: FOR BEDROCK DATA SEE DWG. NAFS DBE 10/75-0096                                                       |
|     |                                                                                                                   | 9           |        |        | 8'11"      |             |                  |                                                                                                           |
|     |                                                                                                                   | 10          |        |        | 8'11"      |             |                  |                                                                                                           |
|     | Crystalline Limestone light gray                                                                                  | 11          |        |        |            |             |                  | Length of Run - 72'                                                                                       |
|     | Machine break                                                                                                     | 12          | DY     | 1      | 12'        | 72'         |                  | Core Recovery - 72' - 100%                                                                                |
|     | 6 tight joints                                                                                                    | 13          |        |        |            |             |                  |                                                                                                           |
|     |                                                                                                                   | 14          |        |        |            |             |                  | RQD - 61.6%                                                                                               |

# Field Borehole Log

TR-85 1 of 2

CLIENT ONTARIO HYDRO

JOB No. P3176 HOLE No. TR85 SHEET No. 1 OF 3

PROJECT ARNPRIOR GS

WEATHER SUNNY..... INSPECTOR J. J. J......

SITE TAIL RACE HWY 17 BRIDGE

TEMP. 80 °, STARTED 0830 M. JUNE 21 1973

LOCATION..... BEARING.....

DIP 90 ° FINISHED 1560 JUN 21 1977

CONTRACTOR CANADIAN LONGYEAR

ELEVATIONS: DATUM.....









METHOD SOIL WASH BORING

CASING DIAM. 1 1/2 DRILL PLATFORM                     

OF  
BORING: ROCK DIAMOND DRILLING

..... GROUND SURFACE .....

CORE DIAM. NxL WATER LEVELS \_\_\_\_\_

| LOG LEGEND                                                                        |        | * SAMPLE CONDITION                                                                |          | ** SAMPLING METHOD                                                                |        | ** SHIPPING CONTAINER                                                             |             |                    |                     |                       |                  |
|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|  | - SILT |  | - SAND   |  | - GOOD |  | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | N - INSERT            | R - CLOTH BAG    |
|  | - CLAY |  | - GRAVEL |  | - FAIR |  | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|                                                                                   |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | C - PISTON SAMPLER | K - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - COKE BOX     |
|                                                                                   |        |                                                                                   |          |                                                                                   |        |                                                                                   |             | D - CONE BARREL    | Q - GLASS JAR       | Z - DISCARDED         |                  |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | S A M P L E |                |     |              | BLOWS<br>PER<br>6 INCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|-------------|----------------|-----|--------------|------------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | W           | TYPE           | No. | SIZE<br>(IN) |                        |                                                                                                                 |
|     |                                                                                                                        | 0              |             | DRILL PLATFORM |     |              |                        |                                                                                                                 |
|     | RIVER SURFACE - 10"                                                                                                    | 1              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 2              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 3              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 4              |             |                |     |              |                        |                                                                                                                 |
|     | WATER - 10" TO 12' 0"                                                                                                  | 5              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 6              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 7              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 8              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 9              |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 10             |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 11             |             |                |     |              |                        |                                                                                                                 |
|     | RIVER BOTTOM 12' 0"                                                                                                    | 12             |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        | 13             |             |                |     |              |                        |                                                                                                                 |
|     |                                                                                                                        |                |             |                |     |              |                        | DROVE A CASING<br>FROM 12' → 15'                                                                                |





# Field Borehole Log

TR-85

2 of 2

CLIENT ONTARIO HYDRO  
PROJECT ANAPRIK GS  
SITE TAIL RACE HWY 17 BRIDGE  
LOCATION \_\_\_\_\_ BEARING \_\_\_\_\_  
CONTRACTOR CANADIAN LONGYEAR  
METHOD SOIL WASH BORING  
OF BORING: ROCK DIAMOND DRILLING

JOB No. P3176 HOLE No. TR-85 SHEET No. 2 OF 3  
WEATHER SUNNY INSPECTOR J. HERRIN  
TEMP. 80 ° STARTED 0930 M. JUNE 21 1973  
DIP 90 ° FINISHED 1500 M. JUNE 21 1973  
ELEVATIONS: DATUM \_\_\_\_\_  
CASING DIAM. Nx2 DRILL PLATFORM \_\_\_\_\_  
CORE DIAM. Nx2 GROUND SURFACE \_\_\_\_\_  
WATER LEVELS \_\_\_\_\_

## LOG LEGEND

- SILT - SAND  
 - CLAY - GRAVEL

## \* SAMPLE CONDITION

- GOOD - DISTURBED  
 - FAIR - LOST

## \*\* SAMPLING METHOD

A - SPLIT TUBE E - AUGER  
B - THIN WALL TUBE F - WASH  
C - PISTON SAMPLER K - SLOTTED SAMPLER  
D - CORE BARREL

## \*\* SHIPPING CONTAINER

N - INSERT R - CLOTH BAG  
O - TUBE S - PLIOFILM BAG  
P - WATER CONTENT TIN Y - CORE BOX  
Q - GLASS JAR Z - DISCARDED

| LOG | DESCRIPTION: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, ODOUR, ETC. | ELEV. DEPTH | SAMPLE |         |           |           | BLOWS PER 6 INCH | NOTES: BORING, TESTING AND SAMPLING PROCEDURES; WATER LOSS AND GAIN; DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|-------------------------------------------------------------------------------------------------------------------|-------------|--------|---------|-----------|-----------|------------------|-----------------------------------------------------------------------------------------------------------|
|     |                                                                                                                   |             | * TYPE | No.     | SIZE (IN) | RETD (IN) |                  |                                                                                                           |
|     |                                                                                                                   | 14          |        |         |           |           |                  |                                                                                                           |
|     |                                                                                                                   | 15          |        |         |           |           |                  |                                                                                                           |
|     | NO RECOVERY                                                                                                       | 16          | AQ     | 1       | 1 1/2     | 0         | 1                | DROVE SPLIT SPOON                                                                                         |
|     | WOOD CHIPS IN HUE                                                                                                 | 17          |        |         |           |           | 1                | FROM 15' TO 17'                                                                                           |
|     |                                                                                                                   | 18          |        |         |           |           |                  |                                                                                                           |
|     | BED ROCK 18' 4"                                                                                                   | 19          | START  | 1ST RUN | 1 1/2     |           |                  | RAN NX CASING                                                                                             |
|     | NOTE: FOR ROCK DATA SEE DWG NAFS DBE 10175 - 0100                                                                 | 20          |        |         |           |           |                  | FROM 18' 4" => 19' 2"                                                                                     |
|     |                                                                                                                   | 21          |        |         |           |           |                  |                                                                                                           |
|     | LIMESTONE                                                                                                         | 22          |        |         |           |           |                  |                                                                                                           |
|     | VERY GOOD CONDITION                                                                                               | 23          | DY     | 2       | 2 1/2     | 10' 3"    |                  | RAN NXL CORE                                                                                              |
|     | 7 MACHINE BREAKS                                                                                                  | 24          |        |         |           |           |                  | BARREL FROM 18' 4"                                                                                        |
|     | 2 HAMMER BREAKS                                                                                                   | 25          |        |         |           |           |                  | TO 28' 7"                                                                                                 |
|     | LIGHT GREY IN COLOUR                                                                                              | 26          |        |         |           |           |                  |                                                                                                           |
|     |                                                                                                                   | 27          |        |         |           |           |                  |                                                                                                           |
|     |                                                                                                                   | 28          |        |         |           |           |                  |                                                                                                           |
|     | R.Q.D. 100%                                                                                                       | 29          |        |         |           |           |                  |                                                                                                           |
|     | 18' 4" - 28' 4"                                                                                                   | 30          |        |         |           |           |                  |                                                                                                           |



# Field Borehole Log

TR-87 1 of 2

CLIENT ONTARIO HYDRO  
PROJECT ARNBRICK G.S.  
SITE WEST ABUTMENT BRIDGE  
LOCATION (LATITUDE) (DEPARTURE) BEARING —  
CONTRACTOR LONGHEAR  
METHOD SOIL AUGERD  
OF BORING: ROCK DIAMOND DRILL

JOB No. PR76 HOLE No. TR-87 SHEET No. 1 OF 2  
WEATHER JUNY INSPECTOR —  
TEMP. 75 °F STARTED 8:00 AM JUNE 22 19 73  
DIP 90 ° FINISHED — M. 19 —  
ELEVATIONS: DATUM —  
CASING DIAM. — DRILL PLATFORM —  
CORE DIAM. 1.5 GROUND SURFACE —  
WATER LEVELS —

| LOG LEGEND |        | * SAMPLE CONDITION |          | ** SAMPLING METHOD |        | ** SHIPPING CONTAINER |             |                    |                     |                       |                  |
|------------|--------|--------------------|----------|--------------------|--------|-----------------------|-------------|--------------------|---------------------|-----------------------|------------------|
|            | - SILT |                    | - SAND   |                    | - GOOD |                       | - DISTURBED | A - SPLIT TUBE     | E - AUGER           | M - INSERT            | R - CLOTH BAG    |
|            | - CLAY |                    | - GRAVEL |                    | - FAIR |                       | - LOST      | B - THIN WALL TUBE | F - WASH            | O - TUBE              | S - PLIOFILM BAG |
|            |        |                    |          |                    |        |                       |             | C - PISTON SAMPLER | X - SLOTTED SAMPLER | P - WATER CONTENT TIN | Y - CORE BOX     |
|            |        |                    |          |                    |        |                       |             | D - CORE BARREL    |                     | Q - GLASS JAR         | Z - DISCARDED    |

| LOG | DESCRIPTION: COLOUR; CONSISTENCY<br>DENSITY; TEXTURE; STRUCTURE; SHAPE AND<br>SURFACE CONDITION OF GRAINS; ODOUR; ETC. | ELEV.<br>DEPTH | SAMPLE |     |              |               | BLOWS<br>PER<br>SINCH | NOTES: BORING, TESTING AND SAMPLING<br>PROCEDURES; WATER LOSS AND GAIN;<br>DRILLING AND TESTING EQUIPMENT, ETC. |
|-----|------------------------------------------------------------------------------------------------------------------------|----------------|--------|-----|--------------|---------------|-----------------------|-----------------------------------------------------------------------------------------------------------------|
|     |                                                                                                                        |                | * TYPE | No. | SIZE<br>(IN) | RET'D<br>(IN) |                       |                                                                                                                 |
|     |                                                                                                                        | 0              | GROUND |     |              |               |                       | ALL MEASUREMENT                                                                                                 |
|     |                                                                                                                        | 2              | EL     |     |              |               |                       | ARE TAKEN FROM                                                                                                  |
|     | 0' TO 10"                                                                                                              |                |        |     |              |               |                       | GROUND LEVEL.                                                                                                   |
|     | SAND, GRAVEL, CORBLES                                                                                                  | 4              |        |     |              |               |                       |                                                                                                                 |
|     | SOME CLAY                                                                                                              |                |        |     |              |               |                       |                                                                                                                 |
|     | (FILL MATERIAL)                                                                                                        | 6              |        |     |              |               |                       | USING AUGERS TO                                                                                                 |
|     |                                                                                                                        |                |        |     |              |               |                       | ADVANCE IN OVERBURDEN                                                                                           |
|     |                                                                                                                        | 8              |        |     |              |               |                       | TO BEDROCK.                                                                                                     |
|     |                                                                                                                        | 10             |        |     |              |               |                       |                                                                                                                 |
|     | 10' TO 20' MAINLY                                                                                                      | 12             |        |     |              |               |                       |                                                                                                                 |
|     | GRAVEL WITH SOME CLAY                                                                                                  |                |        |     |              |               |                       |                                                                                                                 |
|     | + SAND                                                                                                                 | 14             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 16             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 18             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 20             |        |     |              |               |                       |                                                                                                                 |
|     | 20' TO 25'                                                                                                             | 22             |        |     |              |               |                       |                                                                                                                 |
|     | SAND MIXED WITH                                                                                                        |                |        |     |              |               |                       |                                                                                                                 |
|     | CLAY; (MATERIAL DAMP)                                                                                                  | 24             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 26             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 28             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 30             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 32             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 34             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 36             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 38             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 40             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 42             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 44             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 46             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 48             |        |     |              |               |                       |                                                                                                                 |
|     |                                                                                                                        | 50             |        |     |              |               |                       |                                                                                                                 |



SOIL INVESTIGATION  
CONVENT GLEN COMMUNITY

---

COSTAIN ESTATES LIMITED  
RECONNAISSANCE SOIL INVESTIGATION  
CONVENT GLEN COMMUNITY  
ORLEANS ONTARIO.

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CONSULTING GEOTECHNICAL ENGINEERS

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REPORT  
TO  
COSTAIN ESTATES LIMITED  
ON  
RECONNAISSANCE SOIL INVESTIGATION  
CONVENT GLEN COMMUNITY  
ORLEANS ONTARIO.

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## ABSTRACT

The results of a reconnaissance soil investigation to determine the subsoil and groundwater conditions at the site of the proposed community of Convent Glen in Orleans, Ontario, are reported and recommendations on slope stability, foundations for low level and multi-storey structures, and the design and construction of site services are given.

The site is underlain by a deep deposit of highly plastic grey sensitive clay. From geological information and from the highly plastic nature of the clay, it is considered that this clay is of freshwater origin rather than the Leda clay of marine origin which is common to much of Ottawa. This grey silty clay has a stiff consistency. The upper portion of this deposit (10 to 15 foot depth) has been weathered to a very stiff crust of fissured brown to grey brown silty clay. The clay is underlain by a relatively shallow deposit of dense silty sand followed by limestone bedrock. The groundwater level within the clay stratum is within about 5 ft. of existing ground surface.

Due to the stiff consistency of the clay, steep slopes, resulting from active erosion in the area, are initially stable. With time and with the presence of a high water table, some readjustment of these slopes has taken place. In this report recommendations have been made for slopes which will be stable in the long term. Along the proposed watercourse, design slopes of  $2\frac{1}{2}$  and 3 horizontal to 1 vertical are recommended. Slopes along the Ottawa River frontage are 25 to 30 ft. high. The erosion at the toe of these slopes should be halted at this time by the provision of rip-rap rockfill. During development of the adjacent land, the river bank slope should be graded to about 5 horizontal to 1 vertical.

Due to the great thickness of the clay deposit at the site, it is recommended that high rise structures be founded on raft foundations. For preliminary design a net allowable bearing pressure of 1,500 lb/sq.ft. is recommended. Two and three storey structures at this site may be founded on spread footings. For planning purposes, the allowable bearing pressure for spread footings at 5 ft. depth may be taken as 2,000 lb/sq.ft.

Recommendations for the preliminary design of an earth fill dam, to pond water in the ravine located in the community core area, are given in this report.

Recommendations on the design and construction of site services such as bridges and sewers are also included in the report.

## INTRODUCTION

H. Q. Golder & Associates Ltd. have been retained, on the recommendation of Cumming-Cockburn & Associates Limited, by Costain Estates Limited to carry out a reconnaissance soil investigation for the proposed community of Convent Glen in Orleans, Ontario. The purpose of this investigation was to determine the soil and groundwater conditions at the site and, based on this information to make recommendations from a geotechnical viewpoint on:

- (i) the necessity for any special provisions to ensure slope stability along Ottawa River frontage west of Hiawatha Park Road.
- (ii) side slope geometry of the proposed watercourse.
- (iii) the stability of slopes along Bilberry Creek ravines
- (iv) The design and construction of the proposed lake and dam.
- (v) the suitability of the area south of the proposed lake for high rise buildings.
- (vi) the design and construction of site services, such as bridges and sewer excavations.

## PROCEDURE

The field work was carried out initially between July 12, and September 10, 1971, north of Highway 17. Eighteen

boreholes were put down using a mobile power auger drilling machine. Boreholes 1 to 8 inclusive were advanced to depths of from 30 to 75 ft. at the locations shown on Fig. 1 at the rear of this report. Boreholes L1 to L10 inclusive were put down to depths of from 8 to 20 ft. in the area of the proposed lake and dam. Two additional boreholes (numbered H.R.1 and H.R.2) were put down in the areas of proposed high rise structures to depths of from 120 to 200 ft. using a machine drill rig. During the period November 16 to 18, 1971, six boreholes, numbered 9 to 14 inclusive, were put down south of Highway 17. The machines, supplied and operated by the F. E. Johnston Drilling Co. Ltd. of Ottawa, were working under the full time supervision of a member of our engineering staff. Two inch diameter piston samples, 3 inch diameter thin-walled Shelby tube samples, and standard drive open samples were taken in the clay subsoil present at the site. In situ vane tests were performed at each borehole (with the exception of boreholes L1 to L10 inclusive) to determine the shear strength profile of the clay deposit. Piezometers were installed in boreholes 4, 5, H.R.1, and H.R.2 within the clay subsoil to determine the groundwater conditions existing at the time of the investigation. A standpipe was installed at depth in borehole H.R.2 to measure the groundwater level within the silty sand till stratum. The details

of these installations may be seen on the Record of Borehole sheets following the text of this report.

A detailed log of each boring and details of piezometer and standpipe installations are given on the Record of Borehole sheets following the text of this report. The locations of the borings together with sections of the inferred soil stratigraphy across the site are shown on Fig. 1.

The soil samples obtained during this investigation were brought to our laboratory for detailed examination and testing. The results of the laboratory testing are shown on the Record of Borehole sheets and on Figures 2 to 6.

The borehole locations and collar elevations given in this report were supplied to us by a Cumming-Cockburn & Associates Ltd. survey crew. These elevations are referred to Geodetic datum.

#### SITE AND GEOLOGY

The site is a tract of land about  $1\frac{1}{2}$  square miles in size, bounded on the north side by the Ottawa River and on the south side by old Highway No. 17 (St. Joseph Blvd.). It is situated in Gloucester Township about 4 miles east of the City of Ottawa. The topography of the area is generally flat. Active erosion by drainage courses has cut fairly steep sided ravines up to 25 ft. deep into this river terrace area.

From available geological information, it is known that the northeast portion of the area is underlain by limestone of the Ottawa formation and the southwest portion by dolomitic limestone of the Oxford formation (Ordovician Age). In general, bedrock is overlain by a thin layer of glacial till followed by 100 to 200 ft. of sensitive silty clays, of marine and freshwater origin, which extend to the ground surface.

The geomorphology map of Blackburn indicates that the upper portion of the clay (to about 60 foot depth) is of freshwater origin. Marine clay (Champlain Sea clay or Leda clay) exists below this depth.

#### SOIL CONDITIONS

The detailed soil stratigraphy encountered in each borehole is given on the Record of Borehole sheets and is illustrated on the stratigraphic section on Fig. 1. Following is a summarized account of soil conditions at the site.

##### Sensitive Silty Clay

The principal subsoil stratum at this site is the stiff grey sensitive silty clay which was found to be 105 ft. thick at borehole H.R.2 and 195 ft. thick at borehole H.R.1. The upper portion of this clay, some 8 to 15 ft. thick, has been weathered to a very stiff crust of fissured brown to grey



brown silty clay with occasional reddish brown layers. In ravine bottom areas the thickness of this crust decreases to about 4 to 7 feet. The water content of the weathered crust increases from about 25 percent near the ground surface to about 65 percent near the base of this desiccated stratum. Atterberg limit tests carried out indicate that the plasticity of this grey brown clay is high (liquid limits of about 70 and plasticity indices of about 45). The results of a grading test carried out on the crustal soil are shown on Fig. 4; and indicate the high clay content of this soil (75 percent clay sizes).

Below a depth of from 9 to 15 ft. the consistency of the silty clay decreases to stiff and the colour changes from grey brown to grey. The shear strength obtained by field vane laboratory tests are plotted on the Record of Borehole sheets and on Fig. 2, the Summary of Geotechnical Properties Plot. The axial strains to failure in the triaxial tests are generally about 2.5 to 3.5 percent, and, since strains to failure of undisturbed block samples of this clay are typically about 1 percent (Townsend, Sangrey, & Walker, 1968; Mitchell, 1970), it is believed that the triaxial test results are low due to unavoidable sample disturbance. In situ vane shear strength values below the very stiff crust generally range

from about 1,000 lb/sq.ft. to 2,000 lb/sq.ft. at depths greater than 50 ft. below existing ground surface.

A series of consolidated drained triaxial tests were carried out at low confining pressures and the results are shown on Fig. 3. The results indicate an effective angle of shearing resistance,  $\phi'$ , of 29 degrees and an effective cohesion intercept,  $c'$ , of about 100 lb/sq.ft.

Atterberg limit tests indicate that the grey silty clay is highly plastic and relatively uniform with depth (liquid limits of from 70 to 80 and plasticity indices of from 40 to 60). The natural water content of the grey silty clay at depths less than about 85 ft. varies typically between 60 and 70 percent, that is, less than the liquid limit value. Below this depth the water content decreases to as low as 50 percent. The unit weight of this soil is about 105 lb/cu.ft.

Consolidation tests were carried out on two 3 in. diameter samples, one each from boreholes H.R.1 and H.R.2, and the results are shown on Figures 5 and 6. The consolidation results from these two samples indicate that the past preconsolidation pressure is from 1.8 to 2.0 tons/sq.ft. in excess of the existing overburden pressure. The compression indices,  $C_c$ , of the samples are about 1.2 and 1.9. The recompression index,  $C_{cr}$ , of both samples is approximately

0.07 as determined from loading rebound cycles.

#### Silty Sand Till

The grey silty clay at borehole H.R.2 is underlain by about 8 ft. of dense grey medium sand followed by silty sand till which consists of silty sand, some gravel, cobbles, and boulders. Borehole H.R.2 was terminated within the silty sand till stratum.

#### GROUNDWATER CONDITIONS

Piezometers were installed in boreholes 4, 5, H.R.1, and H.R.2 to determine the groundwater conditions across the site at the time of the investigation. Details of these installations are given on the Record of Borehole sheets together with water levels obtained on September 22, 1971. All these piezometers were sealed into the silty clay stratum. Also the water level in the open boreholes in the clay was observed. The water level within this stratum was found to be from 1 to about 6 ft. below existing ground surface at the time of the investigation. In borehole H.R.2 a standpipe was sealed into the silty sand till and the groundwater level within the till was found to be about 16 ft. below present ground surface. The results in borehole H.R.2 indicate that the clay stratum is subjected to downward drainage of about 10 feet.

Prior to the construction of the Carillon Dam, the water level at the Ottawa River gauging station at Cumberland

ranged from a low of elevation 128 to a high of elevation 145 during some 25 years of recording. The Carillon Dam has raised the low water level to about elevation 133.

PROPOSED CONVENT GLEN COMMUNITY

a) General

It is understood that a satellite community is planned for the large tract of land previously operated as the Grey Nun's Farm and centred around Hiawatha Park Road. The community is to be known as Convent Glen and is to incorporate single family residential areas together with medium density residential sections and high rise apartment buildings. The commercial section of the community is to be centred around a lake area formed within a ravine which leads to Bilberry Creek. This flat tract of land is drained by two creeks, one of which is named "Bilberry Creek", flowing to the Ottawa River on the north side of the property. A watercourse to divert some of the drainage from the creek area is planned for the western section of the community. The proposed community plan layout is shown on Fig. 1 following the text of this report. Due to the presence of the relatively uniform clay deposits encountered in all the boreholes put down at the site, discussion and recommendation of a general nature for the whole site are possible.

b) Ottawa River Bank Stability

An inspection of the Ottawa River bank, west of Hiawatha Park Road to the western boundary of the proposed community, indicates that the Ottawa River is actively eroding the bank along this entire section. At the toe of the 25 to 30 ft. high clay bank the erosion is oversteepening the slope and has resulted in numerous slip areas many of which appear to have taken place within the last year or two. A survey profile of the existing bank indicates that the overall slope is of the order of 2 horizontal to 1 vertical. Boreholes 4 and 5 put down some 200 to 300 ft. behind the crest of this clay bank indicate that stiff highly plastic clay occurs from ground surface to at least 35 ft. below the base of the clay bank. Total stress stability analysis carried out for this 30 foot slope indicates that, in the short term only, the clay in this bank has sufficient undrained shear strength to be temporarily stable.

Piezometers installed in boreholes 4 and 5 near the slope crest indicate that high water levels exist within the bank, some 3 to 5 ft. below existing ground surface.

In order to determine the long term stability of this clay slope, an effective stress analysis is necessary. A series of consolidated drained triaxial tests were carried

out to determine the effective shear strength parameters for design and the results indicate an effective angle of shearing resistance of 29 degrees and an effective cohesion intercept of 100 lb/sq.ft. Using these parameters, together with a high groundwater level, as would exist during wet seasons of the year, an effective stress stability analysis was carried out on the clay bank. It was found that for the present high groundwater levels that an overall slope of about 5 horizontal to 1 vertical would be required to provide a minimal factor of safety against instability of the bank in the long term. The slope in front of the St. Louis residence to the east of Hiawatha Park Road is slightly flatter than this at about 5.5 horizontal to 1 vertical. To maintain this slope in the future and limit toe erosion it is recommended that rock fill rip rap be dumped in the shallow water at the toe to form a rock berm as shown on Fig. 7. The rock should be dumped to a level about 2 ft. above normal flood level and the rock exterior facing the waves should be at least 4 cu.ft. in size.

The installation of storm sewers should lower the high groundwater levels existing in these river bank slopes. This change in the groundwater level should be monitored to determine whether some modification in the recommended slope



can be accommodated. It is also recommended that site grading at the crest of the slope be carried out to ensure that the run-off from the crest area is carried back to the storm sewer system rather than being allowed to spill down the bank. The slope should be grassed to help limit surficial erosion. Also storm sewer outlets into the Ottawa River should be designed to prevent erosion of the clay bank.

c) Slope Stability along Bilberry Creek Ravines

A field inspection was made along the ravines formed by the two branches of Bilberry Creek. The average flow in the creeks is relatively minor except for periods of high water run-off such as the spring and possibly after heavy rains. In general, the slopes have a relatively good tree and bush cover. Along the outer banks of the creek, some local oversteepening due to creek erosion has taken place resulting in minor toe slips which are devoid of vegetation. It is considered that the surficial covering of the slopes is not being actively eroded except in localized areas near the outer bends of the creek. The overall height of these ravines is of the order of 20 ft. in the proposed community centre area. The average slope angle is about 18 degrees (3 horizontal to 1 vertical). No ravines exist in Neighbourhood 5 and the Western Industrial Park, south of

### Highway 17.

Based on the undrained and drained shear strength parameters of the clay, it is considered that the overall stability of ravine slopes up to 20 foot in height is adequate, however, remedial measures should be adopted to limit further toe erosion caused by the creek flow. In this regard it is recommended that the outside bends of the creek, where erosion is taking place, be protected by rockfill rip rap or gabions. It is also recommended that steps be taken to insure that the water inflow through the creeks not be significantly increased and that the natural slope is not extended and steepened by any additional fill at the crest, following development of the land area. Increased water flow could initiate further downcutting of the clay soil at the base of the ravines and oversteepening of these slopes adds to instability.

#### d) Proposed Watercourse

A new watercourse is planned for the western section of the area under development to intercept the major portion of the flow from the western branch of Bilberry Creek and to lead the flow to the Ottawa River. The watercourse is also to be designed to serve as an outlet for the storm drainage system serving the adjoining urban development. It is understood that the maximum depth of the watercourse is to be 18 ft.

below surrounding ground surface. From the results of boreholes 1 to 5 inclusive, it is expected that the watercourse will be excavated completely within the stiff clay that exists across the site, the upper 8 ft. of which has been weathered to a grey brown crust. Stability calculations carried out for the watercourse banks indicate that a 2.5 horizontal to 1 vertical slope may be used where the slope heights do not exceed 15 ft. For slope heights of 15 to 20 ft. the watercourse banks should be flattened to 3 horizontal to 1 vertical. It is recommended that provision be made for rip rapping the outer bends of the watercourse as required to limit toe erosion. The watercourse slopes should be grassed to limit surficial erosion. Storm sewer outlets into the watercourse should be designed to prevent erosion of the clay banks.

e) Proposed Lake and Dam

The boreholes put down at the dam site (L1 to L4 inclusive) indicate that the ravine bottom is covered by a minor organic surface, up to 2 ft. thick, followed by some 5 to 7 ft. of grey brown silty clay and stiff grey unweathered silty clay. An earth fill dam, some 15 ft. in overall height from the ravine floor, is planned for the site investigated. The earth fill structure should be constructed on a fresh clay surface completely devoid of any roots and organic material. The soil

investigation has indicated that, except for a minor surficial thickness, the water content of the clay stratum is well in excess of the plastic limit (and therefore the optimum water content) of the clay. If the relatively dry surface clay is to be used in earth dam construction, it would be necessary to carry out this construction in the dry summer period and to obtain the necessary relatively dry clay material by shallow stripping of a scraper operating in predetermined areas of suitable clay. The clay near optimum water content could be reasonably compacted using a sheepsfoot roller. Alternatively, impervious core material for the dam, either clay or glacial till, could be imported onto the site from an approved borrow area. For preliminary planning, a possible cross section for this dam is shown on Fig. 8. In this section, it should be noted that a cut off trench some 3 ft. deep is to be provided through the upper portion of the probably dry and fissured clay of the weathered crust to avoid excessive seepage along these joints. A spillway, possibly in the form of a gate controlled culvert pipe should be provided to prevent overtopping of this earth structure. An alternative design would be to consider a decant tower leading to a positive drainage conduit under the low dam. Details of the final design should only be

developed when the hydrology of the drainage area leading to the ravine has been established.

The borings throughout the ravine area indicate that clay exists below a thin surficial organic cover. The underlying grey clay is relatively impervious. The permeability of the grey brown weathered crust will be considerably higher than that for the grey clay due to the fissured nature of this upper zone of clay. Seepage calculations were carried out to make some estimate of seepage loss from the ravine lake for a water surface at elevation 159. It is estimated that the loss through the clay will be of the order of 500 gal./day.

f) Foundations

In the area of borehole H.R.1 immediately south of the lake, it is understood that high rise structures are planned. The borehole in this area indicates that the clay is exceedingly deep (200 ft.) and of stiff consistency within depths of engineering significance. The founding of a high rise structure on piles at this location would not be economical due to the great depth to the glacial till and bedrock strata. It is therefore recommended that consideration be given to founding high rise structures at this location on a raft foundation at about 15 ft. below existing ground surface,

that is, one deep basement depth. Based on the consolidation test results from this borehole, the clay is believed to be overconsolidated in excess of existing overburden pressure by about 1.8 tons/sq.ft. It is recommended that for preliminary design the net allowable bearing pressure (contact pressure less weight of soil excavated) for a raft at this location may be taken as 1,500 lb/sq.ft. At this net allowable bearing pressure, the settlements would be within tolerable limits.

At the location of borehole H.R.2, the depth to the till stratum is about 115 ft. As above, it is considered that a raft foundation would be the most economical foundation solution for this site. Based on the results of a consolidation test on a sample of grey silty clay from this borehole, a net allowable bearing pressure of 1,500 lb/sq.ft. may be used in preliminary foundation design.

Across the remainder of the site where low level structures such as a shopping plaza, high school, one storey industrial, row housing, etc. are to be provided, it is considered that spread footings founded in the clay stratum would be suitable foundation solution. For preliminary design, the allowable bearing pressure for spread footings founded at about 5 ft. below existing ground surface may be taken as 1.0 ton/sq.ft. Based on the results of the borings

and depending on the depth and size of footings, it is expected that allowable bearing values of 1.5 ton/sq.ft. or higher may be available at some locations across the site.

The water inflow into foundation excavations within the clay will be minor and can be readily handled by pumping from sumps. The clay is sensitive in nature and can be readily disturbed by construction traffic and by ponded water. It is recommended that a mud mat of lean concrete be poured on this clay as soon as foundation excavations are down to grade.

g) Site Services

Road crossings of the watercourse and ravine areas will be required. Due to the great depth of clay at the site, the founding of a bridge structure may be difficult. It is expected that friction piles installed in the clay would be necessary to support such a structure. An alternative creek crossing at this site would be the use of one or more corrugated steel or concrete culverts founded on a 2 ft. bedding of sand and gravel material above the grey clay.

Sewer excavations in the clay, up to about 20 ft. in depth, can be carried out in open cut with the men working within a protective box. The water inflow into the trenches should be minor and should be readily handled by pumping from sumps. To avoid importing large quantities of granular fill for backfilling of the trenches, consideration could be given to the use of the



grey brown clay for general backfill to subgrade level.

#### ADDITIONAL SOIL INVESTIGATION

The widely spaced boreholes put down in this reconnaissance soil investigation have encountered a relatively uniform deposit of stiff silty clay across the site. The soil conditions have been determined in sufficient detail for planning purposes, however, prior to final design it is recommended that additional soil investigation be carried out for the following structure types:

- a) high rise structures
- b) commercial structures
- c) school structures
- d) industrial structures
- e) recreational facilities
- f) bridges

For other than a high rise structure or a bridge, a soil investigation employing shallow borings or test pits should be sufficient.

GSW/FJH/ml  
71783  
December, 1971.



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## LIST OF ABBREVIATIONS

The abbreviations commonly employed on each "Record of Borehole," on the figures and in the text of the report, are as follows:

### I. SAMPLE TYPES

|           |                     |
|-----------|---------------------|
| <i>AS</i> | auger sample        |
| <i>CS</i> | chunk sample        |
| <i>DO</i> | drive open          |
| <i>DS</i> | Denison type sample |
| <i>FS</i> | foil sample         |
| <i>RC</i> | rock core           |
| <i>ST</i> | slotted tube        |
| <i>TO</i> | thin-walled, open   |
| <i>TP</i> | thin-walled, piston |
| <i>WS</i> | wash sample         |

### II. PENETRATION RESISTANCES

**Dynamic Penetration Resistance:** The number of blows by a 140-pound hammer dropped 30 inches required to drive a 2-inch diameter, 60 degree cone one foot, where the cone is attached to 'A' size drill rods and casing is not used.

**Standard Penetration Resistance, *N*:** The number of blows by a 140-pound hammer dropped 30 inches required to drive a 2-inch drive open sampler one foot.

|           |                                                  |
|-----------|--------------------------------------------------|
| <i>WH</i> | sampler advanced by static weight—weight, hammer |
| <i>PH</i> | sampler advanced by pressure—pressure, hydraulic |
| <i>PM</i> | sampler advanced by pressure—pressure, manual    |

### III. SOIL DESCRIPTION

#### (a) Cohesionless Soils

| <i>Relative Density</i> | <i>N, blows/ft.</i> |
|-------------------------|---------------------|
| Very loose              | 0 to 4              |
| Loose                   | 4 to 10             |
| Compact                 | 10 to 30            |
| Dense                   | 30 to 50            |
| Very dense              | over 50             |

#### (b) Cohesive Soils

| <i>Consistency</i> | <i>c<sub>u</sub>, lb./sq. ft.</i> |
|--------------------|-----------------------------------|
| Very soft          | Less than 250                     |
| Soft               | 250 to 500                        |
| Firm               | 500 to 1,000                      |
| Stiff              | 1,000 to 2,000                    |
| Very stiff         | 2,000 to 4,000                    |
| Hard               | over 4,000                        |

### IV. SOIL TESTS

|           |                                                      |
|-----------|------------------------------------------------------|
| <i>C</i>  | consolidation test                                   |
| <i>H</i>  | hydrometer analysis                                  |
| <i>M</i>  | sieve analysis                                       |
| <i>MH</i> | combined analysis, sieve and hydrometer <sup>1</sup> |
| <i>Q</i>  | undrained triaxial <sup>2</sup>                      |
| <i>R</i>  | consolidated undrained triaxial <sup>2</sup>         |
| <i>S</i>  | drained triaxial                                     |
| <i>U</i>  | unconfined compression                               |
| <i>V</i>  | field vane test                                      |

### NOTES:

<sup>1</sup>Combined analyses when 5 to 95 per cent of the material passes the No. 200 sieve.

<sup>2</sup>Undrained triaxial tests in which pore pressures are measured are shown as  $\bar{Q}$  or  $\bar{R}$ .

## LIST OF SYMBOLS

### I. GENERAL

|                           |                                       |
|---------------------------|---------------------------------------|
| $\pi$                     | $= 3.1416$                            |
| $e$                       | $=$ base of natural logarithms 2.7183 |
| $\log_e a$ or $\ln a$     | natural logarithm of $a$              |
| $\log_{10} a$ or $\log a$ | logarithm of $a$ to base 10           |
| $t$                       | time                                  |
| $g$                       | acceleration due to gravity           |
| $V$                       | volume                                |
| $W$                       | weight                                |
| $M$                       | moment                                |
| $F$                       | factor of safety                      |

### II. STRESS AND STRAIN

|                 |                                                        |
|-----------------|--------------------------------------------------------|
| $u$             | pore pressure                                          |
| $\sigma$        | normal stress                                          |
| $\sigma'$       | normal effective stress ( $\bar{\sigma}$ is also used) |
| $\tau$          | shear stress                                           |
| $\epsilon$      | linear strain                                          |
| $\epsilon_{xy}$ | shear strain                                           |
| $\nu$           | Poisson's ratio ( $\mu$ is also used)                  |
| $E$             | modulus of linear deformation (Young's modulus)        |
| $G$             | modulus of shear deformation                           |
| $K$             | modulus of compressibility                             |
| $\eta$          | coefficient of viscosity                               |

### III. SOIL PROPERTIES

#### (a) Unit weight

|            |                                                                 |
|------------|-----------------------------------------------------------------|
| $\gamma$   | unit weight of soil (bulk density)                              |
| $\gamma_s$ | unit weight of solid particles                                  |
| $\gamma_w$ | unit weight of water                                            |
| $\gamma_d$ | unit dry weight of soil (dry density)                           |
| $\gamma'$  | unit weight of submerged soil                                   |
| $G_s$      | specific gravity of solid particles $G_s = \gamma_s / \gamma_w$ |
| $e$        | void ratio                                                      |
| $n$        | porosity                                                        |
| $w$        | water content                                                   |
| $S_r$      | degree of saturation                                            |

#### (b) Consistency

|           |                                                          |
|-----------|----------------------------------------------------------|
| $w_L$     | liquid limit                                             |
| $w_P$     | plastic limit                                            |
| $I_P$     | plasticity index                                         |
| $w_S$     | shrinkage limit                                          |
| $I_L$     | liquidity index $= (w - w_P) / I_P$                      |
| $I_C$     | consistency index $= (w_L - w) / I_P$                    |
| $e_{max}$ | void ratio in loosest state                              |
| $e_{min}$ | void ratio in densest state                              |
| $D_r$     | relative density $= (e_{max} - e) / (e_{max} - e_{min})$ |

#### (c) Permeability

|     |                               |
|-----|-------------------------------|
| $h$ | hydraulic head or potential   |
| $q$ | rate of discharge             |
| $v$ | velocity of flow              |
| $i$ | hydraulic gradient            |
| $k$ | coefficient of permeability   |
| $j$ | seepage force per unit volume |

#### (d) Consolidation (one-dimensional)

|       |                                                                        |
|-------|------------------------------------------------------------------------|
| $m_v$ | coefficient of volume change<br>$= -\Delta e / (1 + e) \Delta \sigma'$ |
| $C_c$ | compression index $= -\Delta e / \Delta \log_{10} \sigma'$             |
| $c_s$ | coefficient of consolidation                                           |
| $T_v$ | time factor $= c_s t / d^2$ ( $d$ , drainage path)                     |
| $U$   | degree of consolidation                                                |

#### (e) Shear strength

|          |                                                     |
|----------|-----------------------------------------------------|
| $\tau_f$ | shear strength                                      |
| $c'$     | effective cohesion                                  |
| $\phi'$  | effective angle of shearing resistance, or friction |
| $c_u$    | apparent cohesion*                                  |
| $\phi_u$ | apparent angle of shearing resistance, or friction  |
| $\mu$    | coefficient of friction                             |
| $S_t$    | sensitivity                                         |

\*For the case of a saturated cohesive soil,  $\phi_u = 0$  and the undrained shear strength  $\tau_f = c_u$  is taken as half the undrained compressive strength.

RECORD OF BOREHOLE 1 & 2

LOCATION See Figure

BORING DATE JULY 12, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

[illegible]

VERTICAL SCALE  
1 IN. TO 10 FT.

**Golder Associates**

DRAWN D.N.  
CHECKED G.S.W.

# RECORD OF BOREHOLE 3 & 4

LOCATION See Figure 1

BORING DATE JULY 13-14, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE |                                                    |             | SAMPLES |         |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. |  |  |  | COEFFICIENT OF PERMEABILITY, K, CM./SEC. |  |  |  | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|--------------|----------------------------------------------------|-------------|---------|---------|-----------|-----------------|-------------------------------------------|--|--|--|------------------------------------------|--|--|--|-------------------------|--------------------------------------|
|                                     | ELEV'N DEPTH | DESCRIPTION                                        | STRAT. PLOT | NUMBER  | TYPE    | BLOWS/FT. |                 | 20 40 60 80                               |  |  |  | 1x10 1x10 1x10 1x10                      |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |         |           |                 | SHEAR STRENGTH Cu, LB./SQ. FT.            |  |  |  | WATER CONTENT, PERCENT                   |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |         |           |                 | NAT. V. - + C. - O<br>REM. V. - O U. - O  |  |  |  | w <sub>p</sub> w <sub>L</sub>            |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |         |           |                 | 500 1000 1500 2000                        |  |  |  |                                          |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) | 171.4        | GROUND SURFACE                                     |             |         |         |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 0.6          | TOP SOIL                                           |             | 1       | 2" DO   | 21        | 170             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 2       | "       | 8         |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 169.1        |                                                    |             | 3       | "       | 1         |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 83           |                                                    |             | 4       | "       | P.M.      | 160             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 5       | "       | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | STIFF GREY SILTY CLAY                              |             | 6       | "       | P.M.      | 150             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 141.4        |                                                    |             | 7       | "       | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 30.0         | END OF HOLE                                        |             |         |         |           | 140             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) | 165.9        | GROUND SURFACE                                     |             |         |         |           |                 |                                           |  |  |  |                                          |  |  |  | GROUND SURFACE          |                                      |
|                                     | 0.6          | TOP SOIL                                           |             | 1       | 2" DO   | 16        |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 2       | "       | 14        |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 157.9        |                                                    |             | 3       | "       | 6         | 160             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 3.0          |                                                    |             | 4       | "       | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 5       | 2" T.O. | P.M.      | 150             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 6       | 3" T.O. | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 7       | 2" T.O. | P.M.      | 140             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 8       | 2" DO   | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | STIFF TO VERY STIFF GREY SILTY CLAY                |             | 9       | 3" T.O. | P.M.      | 130             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 10      | 2" DO   | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 11      | 2" T.O. | P.M.      | 120             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 12      | 2" DO   |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 13      | "       |           | 110             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 14      | "       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 102.9        |                                                    |             |         |         |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 63.0         | END OF HOLE                                        |             |         |         |           | 100             |                                           |  |  |  |                                          |  |  |  |                         |                                      |

5  
10

5 Percent axial strain at failure

2400  
2400

2400  
2400

W.L. IN  
PIEZOMETER  
AT ELEV. 161.9  
SEPT. 22, 1971

5 Percent axial strain at failure

W.L. IN PIEZOMETER AT ELEV. 161.9 SEPT. 22, 1971

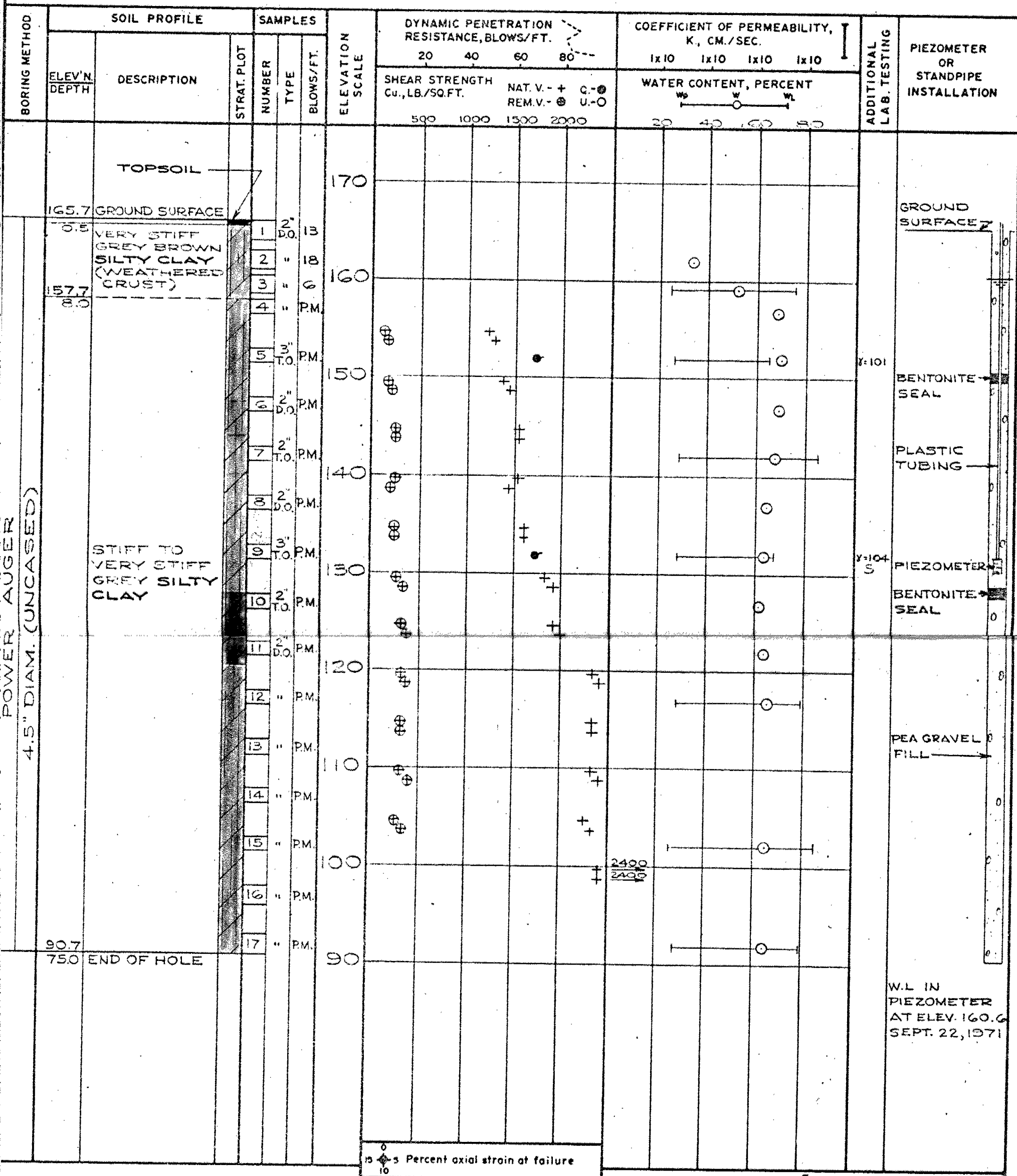
VERTICAL SCALE 1 IN. TO 10 FT.

Golder Associates

DRAWN D.N.  
CHECKED G.S.W.

# RECORD OF BOREHOLE 5

LOCATION See Figure 1 BORING DATE JULY 15 & 16, 1971 DATUM GEODETIC  
 SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.



Golder Associates

DRAWN D.N.  
 CHECKED G.S.W.

# RECORD OF BOREHOLE 6 & 7

LOCATION See Figure 1

BORING DATE JULY 19, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE |                                                    |             | SAMPLES |       |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. |  |  |  | COEFFICIENT OF PERMEABILITY, K, CM./SEC. |  |  |  | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|--------------|----------------------------------------------------|-------------|---------|-------|-----------|-----------------|-------------------------------------------|--|--|--|------------------------------------------|--|--|--|-------------------------|--------------------------------------|
|                                     | ELEV'N DEPTH | DESCRIPTION                                        | STRAT. PLOT | NUMBER  | TYPE  | BLOWS/FT. |                 | 20 40 60 80                               |  |  |  | 1x10 1x10 1x10 1x10                      |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           |                 | SHEAR STRENGTH Cu., LB./SQ.FT.            |  |  |  | WATER CONTENT, PERCENT                   |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           |                 | NAT. V. - + C. - ⊗<br>REM. V. - ⊗ U. - O  |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           |                 | 500 1000 1500 2000                        |  |  |  |                                          |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              |                                                    |             |         |       |           |                 | B.H. 6                                    |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 172.6        | GROUND SURFACE                                     |             |         |       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 0.3          | TOP SOIL                                           |             | 1       | 2" DO | 13        | 170             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 2       | "     | 13        |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 3       | "     | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 163.2        |                                                    |             | 4       | "     | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 9.4          |                                                    |             |         |       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | FIRM TO STIFF GREY SILTY CLAY                      |             | 5       | "     | P.M.      | 160             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 6       | "     | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 7       | "     | P.M.      | 150             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    | 8           | "       | P.M.  |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 137.6        |                                                    |             | 9       | "     | P.M.      | 140             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 35.0         | END OF HOLE                                        |             |         |       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           | 130             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              |                                                    |             |         |       |           |                 | B.H. 7                                    |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 165.6        | GROUND SURFACE                                     |             |         |       |           | 170             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 0.6          | TOP SOIL                                           |             | 1       | 2" DO | 15        |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 2       | "     | 8         | 160             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 159.1        |                                                    |             | 3       | "     | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 6.5          |                                                    |             |         |       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              | STIFF GREY SILTY CLAY                              |             | 4       | "     | P.M.      | 150             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 5       | "     | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             | 6       | "     | P.M.      | 140             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 135.6        |                                                    |             | 7       | "     | P.M.      |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     | 30.0         | END OF HOLE                                        |             |         |       |           |                 |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           | 130             |                                           |  |  |  |                                          |  |  |  |                         |                                      |
|                                     |              |                                                    |             |         |       |           |                 | 0 5 10 15 Percent axial strain at failure |  |  |  |                                          |  |  |  |                         |                                      |

W.L. IN OPEN BOREHOLE AT ELEV. 170.6 SEPT. 22, 1971

W.L. IN OPEN BOREHOLE AT ELEV. 162.6 SEPT. 22, 1971

15 10 5 Percent axial strain at failure

VERTICAL SCALE 1 IN. TO 10 FT.

Golder Associates

DRAWN D.N.  
CHECKED G.S.W.



## RECORD OF BOREHOLE 8


LOCATION See Figure

BORING DATE JULY 20, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE |                                                    |            | SAMPLES |         |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. | COEFFICIENT OF PERMEABILITY, K., CM./SEC.      |                        |  |  | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION                                                                                                                  |
|-------------------------------------|--------------|----------------------------------------------------|------------|---------|---------|-----------|-----------------|-------------------------------------------|------------------------------------------------|------------------------|--|--|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | ELEV'N DEPTH | DESCRIPTION                                        | STRAT. PLT | NUMBER  | TYPE    | BLOWS/FT. |                 | 20    40    60    80                      | 1x10    1x10    1x10    1x10                   |                        |  |  |                         |                                                                                                                                                       |
|                                     |              |                                                    |            |         |         |           |                 | SHEAR STRENGTH CU., LB./SQ.FT.            | NAT. V. - +    Q. - ●<br>REM. V. - ⊗    U. - ○ | WATER CONTENT, PERCENT |  |  |                         |                                                                                                                                                       |
|                                     |              |                                                    |            |         |         |           |                 | 500    1000    1500    2000               |                                                |                        |  |  |                         |                                                                                                                                                       |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              | TOPSOIL                                            |            |         |         |           | 170             |                                           |                                                |                        |  |  |                         | <div></div><br>W.L. IN OPEN BOREHOLE AT ELEV. 164.5 SEPT. 22, 1971 |
|                                     | 167.3        | GROUND SURFACE                                     |            |         |         |           |                 |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |
|                                     | 0.3          | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |            | 1       | 2" D.O. | 14        |                 |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |
|                                     |              |                                                    |            | 2       | "       | 7         |                 |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |
|                                     |              |                                                    |            | 3       | "       | 2         | 160             |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |
|                                     | 158.0        |                                                    |            | 4       | "       | P.M.      |                 |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |
|                                     | 9.3          |                                                    |            | 5       | "       | P.M.      |                 | ⊗                                         | +                                              |                        |  |  |                         |                                                                                                                                                       |
|                                     |              | STIFF GREY SILTY CLAY                              |            | 6       | "       | P.M.      | 150             | ⊗                                         | +                                              |                        |  |  |                         |                                                                                                                                                       |
|                                     |              |                                                    |            | 7       | "       | P.M.      |                 | ⊗                                         | +                                              |                        |  |  |                         |                                                                                                                                                       |
| 136.8                               |              |                                                    | 8          | "       | P.M.    | 140       |                 |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |
| 30.5                                | END OF HOLE  |                                                    |            |         |         | 130       |                 |                                           |                                                |                        |  |  |                         |                                                                                                                                                       |

## RECORD OF BOREHOLE 9 &amp; 10

LOCATION See Figure: 1

BORING DATE NOVEMBER 15 &amp; 16, 1971 DATUM GEODECTIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE  |                                                                                         |             | SAMPLES |         |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. |      |                                          |      | COEFFICIENT OF PERMEABILITY, K., CM./SEC. |      |      |      | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|---------------|-----------------------------------------------------------------------------------------|-------------|---------|---------|-----------|-----------------|-------------------------------------------|------|------------------------------------------|------|-------------------------------------------|------|------|------|-------------------------|--------------------------------------|
|                                     | ELEV'N. DEPTH | DESCRIPTION                                                                             | STRAT. PLOT | NUMBER  | TYPE    | BLOWS/FT. |                 | 20                                        | 40   | 60                                       | 80   | 1x10                                      | 1x10 | 1x10 | 1x10 |                         |                                      |
|                                     |               |                                                                                         |             |         |         |           |                 | SHEAR STRENGTH CU., LB./SQ.FT.            |      | NAT. V. - + Q. - ⊕<br>REM. V. - ⊗ U. - ○ |      | WATER CONTENT, PERCENT                    |      |      |      |                         |                                      |
|                                     |               |                                                                                         |             |         |         |           |                 | 500                                       | 1000 | 1500                                     | 2000 |                                           |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) | 200.4         | GROUND SURFACE                                                                          |             |         |         |           |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 0.0           | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST)                                      |             | 1       | 2" D.O. | 10        |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 188.4         |                                                                                         |             | 2       | "       | 8         |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 12.0          |                                                                                         |             | 3       | "       | P.M.      |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     |               | STIFF GREY SILTY CLAY                                                                   |             | 4       | "       | P.M.      | 180             | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                                                         |             | 5       | "       | P.M.      |                 | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 167.9         |                                                                                         |             | 6       | "       | P.M.      | 170             | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 32.5          | END OF HOLE                                                                             |             |         |         |           |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                                                         |             |         |         |           | 160             |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) | 188.1         | GROUND SURFACE                                                                          |             |         |         |           |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 0.0           | VERY STIFF BROWN TO GREY BROWN SILTY CLAY (WEATHERED CRUST) SOME SILTY FINE SAND LENSES |             | 1       | 2" D.O. | 12        |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 180.1         |                                                                                         |             | 2       | "       | 6         |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 8.5           | LOOSE GREY FINE SANDY SILT, SOME PEAT                                                   |             | 3       | "       | P.M.      |                 | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     |               | STIFF GREY SILTY CLAY                                                                   |             | 4       | "       | P.M.      | 170             | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                                                         |             | 5       | "       | P.M.      |                 | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 155.6         |                                                                                         |             | 6       | "       | P.M.      | 160             | ⊕                                         | +    |                                          |      |                                           |      |      |      |                         |                                      |
|                                     | 32.5          | END OF HOLE                                                                             |             |         |         |           |                 |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                                                         |             |         |         |           | 150             |                                           |      |                                          |      |                                           |      |      |      |                         |                                      |

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825

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835

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845

850

855

860

865

870

875

880

885

890

895

900

905

910

915

920

925

930

935

940

945

950

955

960

965

970

975

980

985

990

995

1000

Percent axial strain at failure

VERTICAL SCALE  
1 IN. TO 10 FT.

## **Golder Associates**

DRAWN D.N.  
CHECKED G.S.W.

RECORD OF BOREHOLE 11 & 12

LOCATION See Figure 1 BORING DATE NOVEMBER 17, 1971 DATUM GEODETIC  
SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN. PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE |                                                    |             | SAMPLES |         |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. |      |      |      | COEFFICIENT OF PERMEABILITY, K., CM./SEC. |      |      |      | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|--------------|----------------------------------------------------|-------------|---------|---------|-----------|-----------------|-------------------------------------------|------|------|------|-------------------------------------------|------|------|------|-------------------------|--------------------------------------|
|                                     | ELEV'N DEPTH | DESCRIPTION                                        | STRAT. PLOT | NUMBER  | TYPE    | BLOWS/FT. |                 | 20                                        | 40   | 60   | 80   | 1x10                                      | 1x10 | 1x10 | 1x10 |                         |                                      |
|                                     |              |                                                    |             |         |         |           |                 | SHEAR STRENGTH CU., LB./SQ.FT.            |      |      |      | WATER CONTENT, PERCENT                    |      |      |      |                         |                                      |
|                                     |              |                                                    |             |         |         |           |                 | 500                                       | 1000 | 1500 | 2000 |                                           |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              |                                                    |             |         |         |           | 190             | B.H. 11                                   |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 187.0        | GROUND SURFACE                                     |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 0.9          | TOP SOIL                                           |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |              | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 1       | 2" D.O. | 7         | 180             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 180.0        |                                                    |             | 2       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 7.0          |                                                    |             | 3       | " P.M.  |           | 170             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |              | STIFF GREY SILTY CLAY                              |             | 4       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |              |                                                    |             | 5       | " P.M.  |           | 160             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 156.5        |                                                    |             | 6       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 30.5         | END OF HOLE                                        |             |         |         |           | 150             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              |                                                    |             |         |         |           |                 | B.H. 12                                   |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 191.4        | GROUND SURFACE                                     |             |         |         |           | 190             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 0.9          | TOP SOIL                                           |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |              | LOOSE GREY BROWN SILTY FINE SAND                   |             | 1       | 2" D.O. | 6         | 180             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 184.4        |                                                    |             | 2       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 7.0          |                                                    |             | 3       | " P.M.  |           | 170             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |              | STIFF GREY SILTY CLAY                              |             | 4       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |              |                                                    |             | 5       | " P.M.  |           | 160             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 160.9        |                                                    |             | 6       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 30.5         | END OF HOLE                                        |             |         |         |           | 160             |                                           |      |      |      |                                           |      |      |      |                         |                                      |

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0 15 30 45 60 75 90 105 120 135 150 165 180 195 210 225 240 255 270 285 300  
Percent axial strain at failure

# RECORD OF BOREHOLE 13 & 14

LOCATION See Figure 1

BORING DATE NOVEMBER 17 & 18, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE  |                                                    |             | SAMPLES |         |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. |      |      |      | COEFFICIENT OF PERMEABILITY, K., CM./SEC. |      |      |      | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|---------------|----------------------------------------------------|-------------|---------|---------|-----------|-----------------|-------------------------------------------|------|------|------|-------------------------------------------|------|------|------|-------------------------|--------------------------------------|
|                                     | ELEV'N. DEPTH | DESCRIPTION                                        | STRAT. PLOT | NUMBER  | TYPE    | BLOWS/FT. |                 | 20                                        | 40   | 60   | 80   | 1x10                                      | 1x10 | 1x10 | 1x10 |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 | SHEAR STRENGTH CU., LB./SQ.FT.            |      |      |      | WATER CONTENT, PERCENT                    |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 | 500                                       | 1000 | 1500 | 2000 |                                           |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 179.0         | GROUND SURFACE                                     |             |         |         |           | 180             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 0.6           | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 1       | 2" D.O. | 14        |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 172.0         |                                                    |             | 2       | " P.M.  | 170       |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 7.0           |                                                    |             | 3       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               | STIFF GREY SILTY CLAY, OCCASIONAL SILT SEAMS       |             | 4       | " P.M.  | 160       |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    | 5           | " P.M.  |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 148.5         |                                                    |             | 6       | " P.M.  | 150       |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 30.5          | END OF HOLE                                        |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 175.6         | GROUND SURFACE                                     |             |         |         |           | 180             |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 0.9           | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 1       | 2" D.O. | 170       |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 168.6         |                                                    |             | 2       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 7.0           |                                                    |             | 3       | " P.M.  | 160       |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               | STIFF GREY BROWN SILTY CLAY                        |             | 4       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    | 5           | " P.M.  | 150     |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 145.1         |                                                    |             | 6       | " P.M.  |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     | 30.5          | END OF HOLE                                        |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           |                 |                                           |      |      |      |                                           |      |      |      |                         |                                      |
|                                     |               |                                                    |             |         |         |           | </              |                                           |      |      |      |                                           |      |      |      |                         |                                      |

W.L. IN OPEN BOREHOLE AT ELEV. 178.3 NOV. 18, 1971

W.L. IN OPEN BOREHOLE AT ELEV. 175.1 NOV. 18, 1971

0 15 10 Percent axial strain at failure

VERTICAL SCALE  
1 IN. TO 10 FT.

Golder Associates

DRAWN D.N.  
CHECKED G.S.W.

## RECORD OF BOREHOLE L1, L2 &amp; L3

LOCATION See Figure 1

BORING DATE SEPTEMBER 3, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE |                                                             |             | SAMPLES |       |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT.                             |  |  |  | COEFFICIENT OF PERMEABILITY, K., CM./SEC. |  |  |  | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|--------------|-------------------------------------------------------------|-------------|---------|-------|-----------|-----------------|-----------------------------------------------------------------------|--|--|--|-------------------------------------------|--|--|--|-------------------------|--------------------------------------|
|                                     | ELEV'N DEPTH | DESCRIPTION                                                 | STRAT. PLOT | NUMBER  | TYPE  | BLOWS/FT. |                 | 20 40 60 80                                                           |  |  |  | 1x10 1x10 1x10 1x10                       |  |  |  |                         |                                      |
|                                     |              |                                                             |             |         |       |           |                 | SHEAR STRENGTH Cu., LB./SQ. FT. NAT. V. - + Q. - ● REM. V. - ● U. - O |  |  |  | WATER CONTENT, PERCENT                    |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              | TOPSOIL                                                     |             |         |       |           | 150             | B.H. L1                                                               |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 145.1        | GROUND SURFACE                                              |             |         |       |           |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 0.3          | VERY STIFF TO STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 1       | DN    | 5         | 140             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 137.1        |                                                             |             | 2       | "     | 2         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 8.0          |                                                             |             | 3       | "     | 2         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     |              | STIFF GREY SILTY CLAY                                       |             | 4       | "     | 2         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              |                                                             |             | 5       | "     | 3         | 130             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 125.1        |                                                             |             | 6       | "     | 2         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 20.0         | END OF HOLE                                                 |             |         |       |           | 120             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     |              |                                                             |             |         |       |           | 150             | B.H. L2                                                               |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 144.6        | GROUND SURFACE                                              |             |         |       |           |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 0.0          | BROWN CLAYEY TOPSOIL                                        |             | 1       | 2" DO | 2         | 140             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) | 142.7        |                                                             |             | 2       | "     | 4         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 1.9          | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST)          |             | 3       | "     | 2         | 130             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 137.1        |                                                             |             | 4       | "     | 2         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 7.5          | STIFF GREY SILTY CLAY                                       |             |         |       |           | 120             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 124.6        |                                                             |             |         |       |           |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 20.0         | END OF HOLE                                                 |             |         |       |           |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |              | TOPSOIL                                                     |             |         |       |           | 160             | B.H. L3                                                               |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 155.6        | GROUND SURFACE                                              |             |         |       |           |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 0.3          | VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST)          |             | 1       | 2" DO | 16        | 150             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     |              |                                                             |             | 2       | "     | 14        |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 140.1        |                                                             |             | 3       | "     | 2         | 140             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 15.3         | STIFF GREY SILTY CLAY                                       |             | 4       | "     | 2         |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) | 135.6        |                                                             |             |         |       |           | 130             |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |
|                                     | 20.0         | END OF HOLE                                                 |             |         |       |           |                 |                                                                       |  |  |  |                                           |  |  |  |                         |                                      |

0

10

15

5

Percent axial strain at failure

0  
15 5 Percent axial strain at failure  
10

VERTICAL SCALE  
1 IN. TO 10 FT.

Golder Associates

DRAWN D.N.  
CHECKED G.S.W.

RECORD OF BOREHOLE L4, L5, L6 & L7

LOCATION See Figure 1

BORING DATE SEPTEMBER 9, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE                                                            |                                                                         |             | SAMPLES |        |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT. |    |    |    | COEFFICIENT OF PERMEABILITY, K, CM./SEC. |      |      |      | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------|---------|--------|-----------|-----------------|-------------------------------------------|----|----|----|------------------------------------------|------|------|------|-------------------------|--------------------------------------|
|                                     | ELEV'N DEPTH                                                            | DESCRIPTION                                                             | STRAT. PLOT | NUMBER  | TYPE   | BLOWS/FT. |                 | 20                                        | 40 | 60 | 80 | 1x10                                     | 1x10 | 1x10 | 1x10 |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           |                 | SHEAR STRENGTH Cu., LB./SQ.FT.            |    |    |    | WATER CONTENT, PERCENT                   |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           |                 | NAT. V. - + C. - ●<br>REM. V. - ● U. - O  |    |    |    | $w_p$ — $w$ — $w_L$                      |      |      |      |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |                                                                         |                                                                         |             |         |        |           |                 | B.H. L4                                   |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 152.9<br>0.0                                                            | GROUND SURFACE                                                          |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         | VERY STIFF<br>GREY BROWN<br>SILTY CLAY<br>(WEATHERED<br>CRUST)          |             | 1       | 2" DO. | PH        | 150             |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             | 2       | "      | PH        |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 143.4<br>9.5                                                            |                                                                         |             | 3       | "      | PH        | 140             |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         | STIFF GREY<br>SILTY CLAY                                                |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 132.9<br>20.0                                                           | END OF HOLE                                                             |             | 4       | "      | PH        | 130             |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           |                 | B.H. L5                                   |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 146.0<br>0.0                                                            | GROUND SURFACE                                                          |             |         |        |           | 150             |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         | VERY STIFF TO<br>STIFF GREY BROWN<br>SILTY CLAY<br>(WEATHERED<br>CRUST) |             | 1       | 2" DO. | 6         |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 140.0<br>6.0                                                            |                                                                         |             |         |        |           | 140             |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 138.0<br>8.0                                                            | STIFF GREY<br>SILTY CLAY                                                |             | 2       | A.S.   |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | 135.0<br>9.0                                                            | END OF HOLE                                                             |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           | B.H. L6         |                                           |    |    |    |                                          |      |      |      |                         |                                      |
| 146.6<br>0.0                        | GROUND SURFACE                                                          |                                                                         |             |         |        | 150       |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | VERY STIFF TO STIFF<br>GREY BROWN<br>SILTY CLAY<br>(WEATHERED<br>CRUST) |                                                                         | 1           | 2" DO.  | 5      |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
| 142.8<br>3.8                        |                                                                         |                                                                         |             |         |        | 140       |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | STIFF GREY<br>SILTY CLAY                                                |                                                                         |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
| 136.0<br>10.0                       | END OF HOLE                                                             |                                                                         | 2           | A.S.    | —      |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     |                                                                         |                                                                         |             |         |        |           | B.H. L7         |                                           |    |    |    |                                          |      |      |      |                         |                                      |
| 147.5<br>0.0                        | GROUND SURFACE                                                          |                                                                         |             |         |        | 150       |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | STIFF GREY<br>BROWN SILTY<br>CLAY (WEATHERED<br>CRUST)                  |                                                                         | 1           | 2" DO.  | 1      |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
| 143.5<br>4.0                        |                                                                         |                                                                         |             |         |        | 140       |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
|                                     | STIFF GREY<br>SILTY CLAY                                                |                                                                         |             |         |        |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |
| 137.5<br>10.0                       | END OF HOLE                                                             |                                                                         | 2           | A.S.    | —      |           |                 |                                           |    |    |    |                                          |      |      |      |                         |                                      |

0  
15  
30

Percent axial strain at failure

0  
15 5 Percent axial strain at failure  
10

VERTICAL SCALE  
1 IN. TO 10 FT.

Golder Associates

DRAWN D.N.  
CHECKED G.S.W.



# RECORD OF BOREHOLE L8, L9 & L10

LOCATION See Figure 1

BORING DATE SEPTEMBER 10, 1971

DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.

| BORING METHOD                       | SOIL PROFILE  |                                                                               |             | SAMPLES |         |           | ELEVATION SCALE | DYNAMIC PENETRATION RESISTANCE, BLOWS/FT.                              |          |  |    | COEFFICIENT OF PERMEABILITY, K, CM./SEC. |  |  |  | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|-------------------------------------|---------------|-------------------------------------------------------------------------------|-------------|---------|---------|-----------|-----------------|------------------------------------------------------------------------|----------|--|----|------------------------------------------|--|--|--|-------------------------|--------------------------------------|
|                                     | ELEV'N DEPTH  | DESCRIPTION                                                                   | STRAT. PLOT | NUMBER  | TYPE    | BLOWS/FT. |                 | 20 40 60 80                                                            |          |  |    | 1x10 1x10 1x10 1x10                      |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 | SHEAR STRENGTH Cu., LB./SQ.FT. NAT. V. - + C.F. - ● REM. V. - ● U. - O |          |  |    | WATER CONTENT, PERCENT                   |  |  |  |                         |                                      |
| POWER AUGER<br>4.5" DIAM. (UNCASED) |               |                                                                               |             |         |         |           |                 | B.H. L8                                                                |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 150.1<br>0.0  | GROUND SURFACE<br>VERY STIFF TO STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST) |             | 1       | 2" D.O. | 4         | 150             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 143.4<br>6.7  |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               | STIFF GREY SILTY CLAY                                                         |             |         |         |           | 140             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 135.6<br>14.5 | END OF HOLE                                                                   |             | 2       | A.S.    |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           | 130             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 | B.H. L9                                                                |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 149.2<br>0.0  | GROUND SURFACE<br>STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST)               |             | 1       | 2" D.O. | 5         | 150             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 143.4<br>5.8  |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 140.7<br>8.5  | STIFF GREY SILTY CLAY<br>END OF HOLE                                          |             | 2       | A.S.    |           | 140             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        | B.H. L10 |  |    |                                          |  |  |  |                         |                                      |
|                                     |               | TOPSOIL                                                                       |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 152.5<br>0.1  | GROUND SURFACE<br>VERY STIFF GREY BROWN SILTY CLAY (WEATHERED CRUST)          |             | 1       | 2" D.O. | PH        | 150             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 145.5<br>7.0  |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     | 143.5<br>9.0  | STIFF GREY SILTY CLAY<br>END OF HOLE                                          |             | 2       | A.S.    |           | 140             |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  |    |                                          |  |  |  |                         |                                      |
|                                     |               |                                                                               |             |         |         |           |                 |                                                                        |          |  | </ |                                          |  |  |  |                         |                                      |

5 Percent axial strain at failure

VERTICAL SCALE  
1 IN. TO 10 FT.

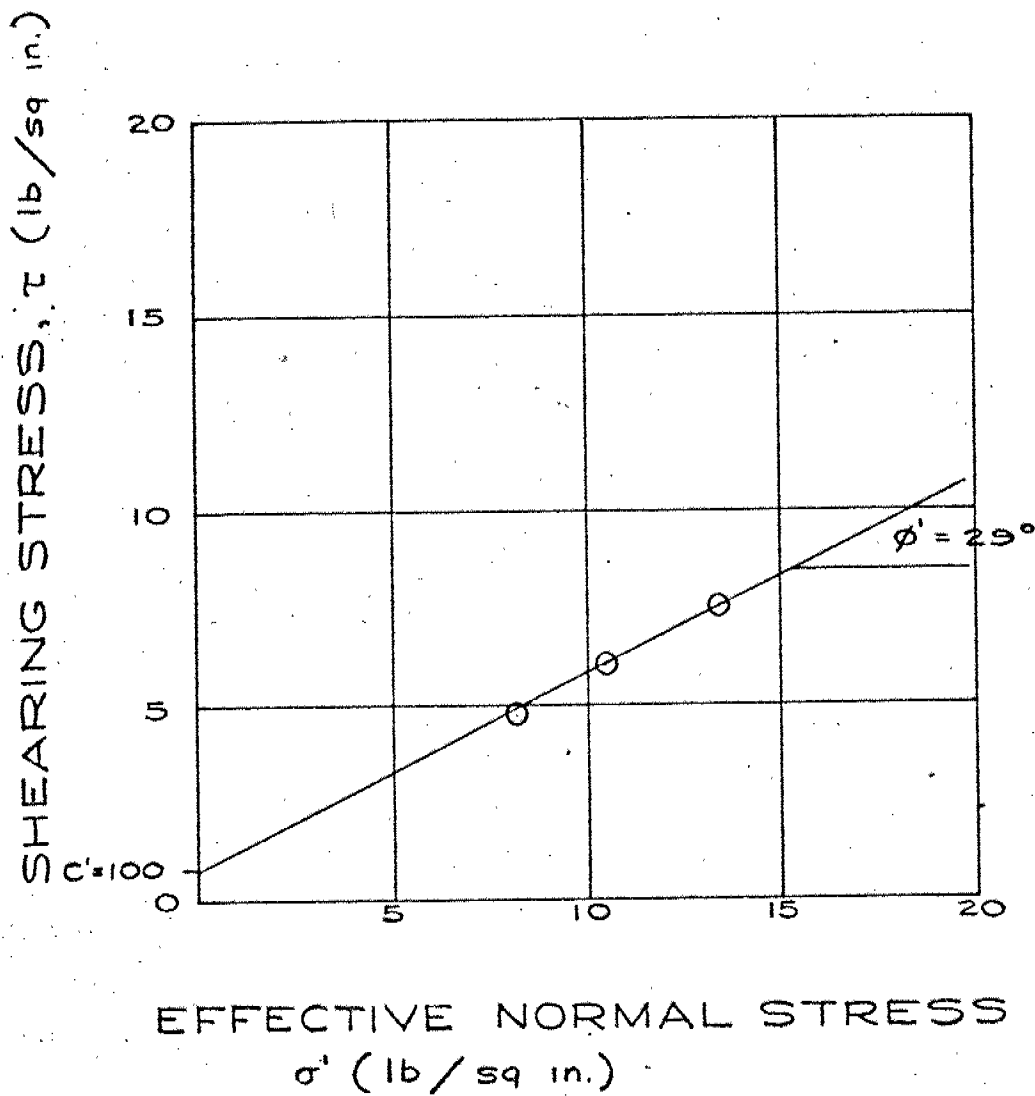
Golder Associates

DRAWN D.N.  
CHECKED G.S.W.



# DRAINED TRIAXIAL TEST RESULTS

FIGURE 3

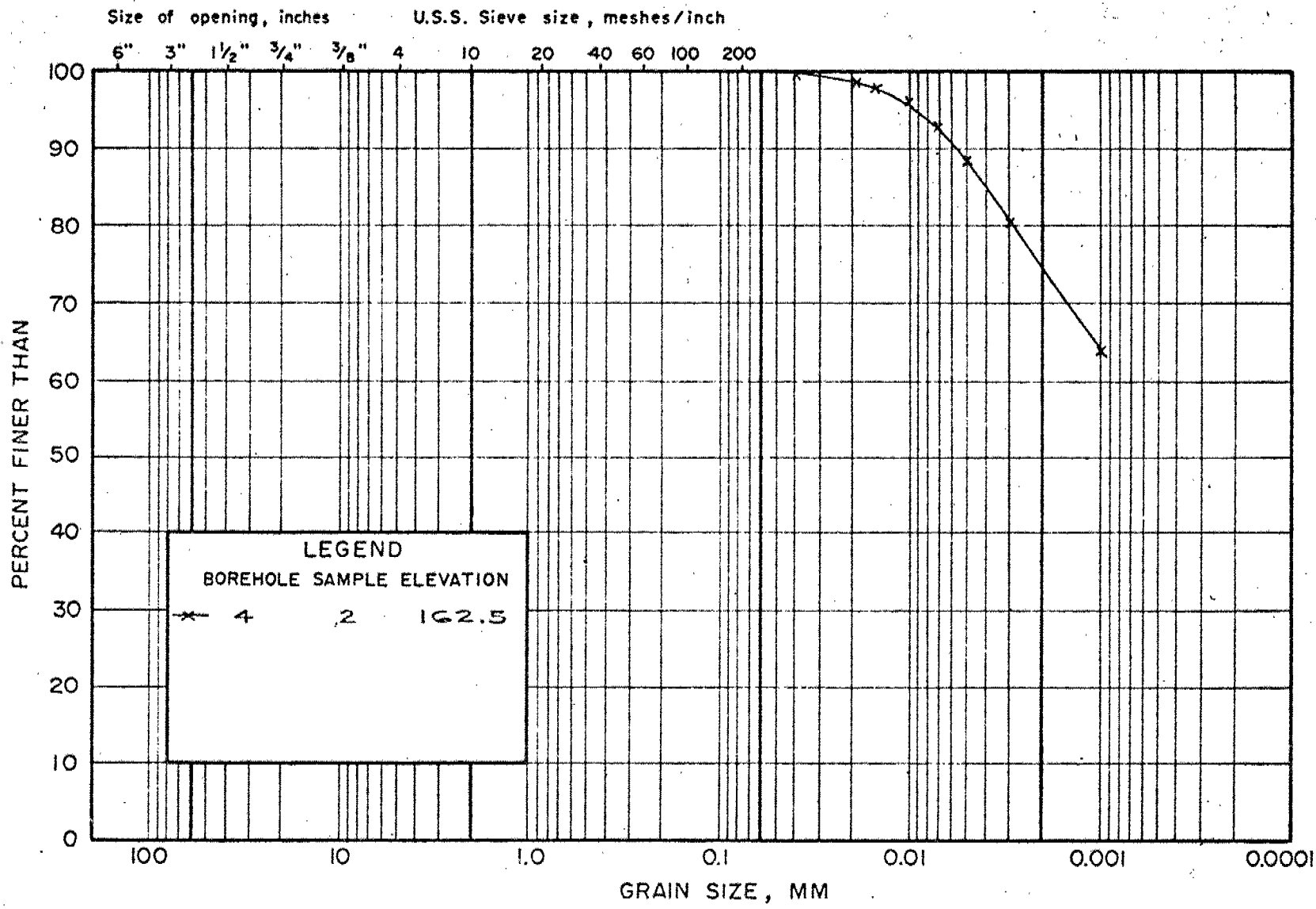


Date OCTOBER 28, 1971

Golder Associates

Drawn DN  
Chkd. GSW  
Appd. [Signature]

M.I.T. GRAIN SIZE SCALE



SILTY CLAY

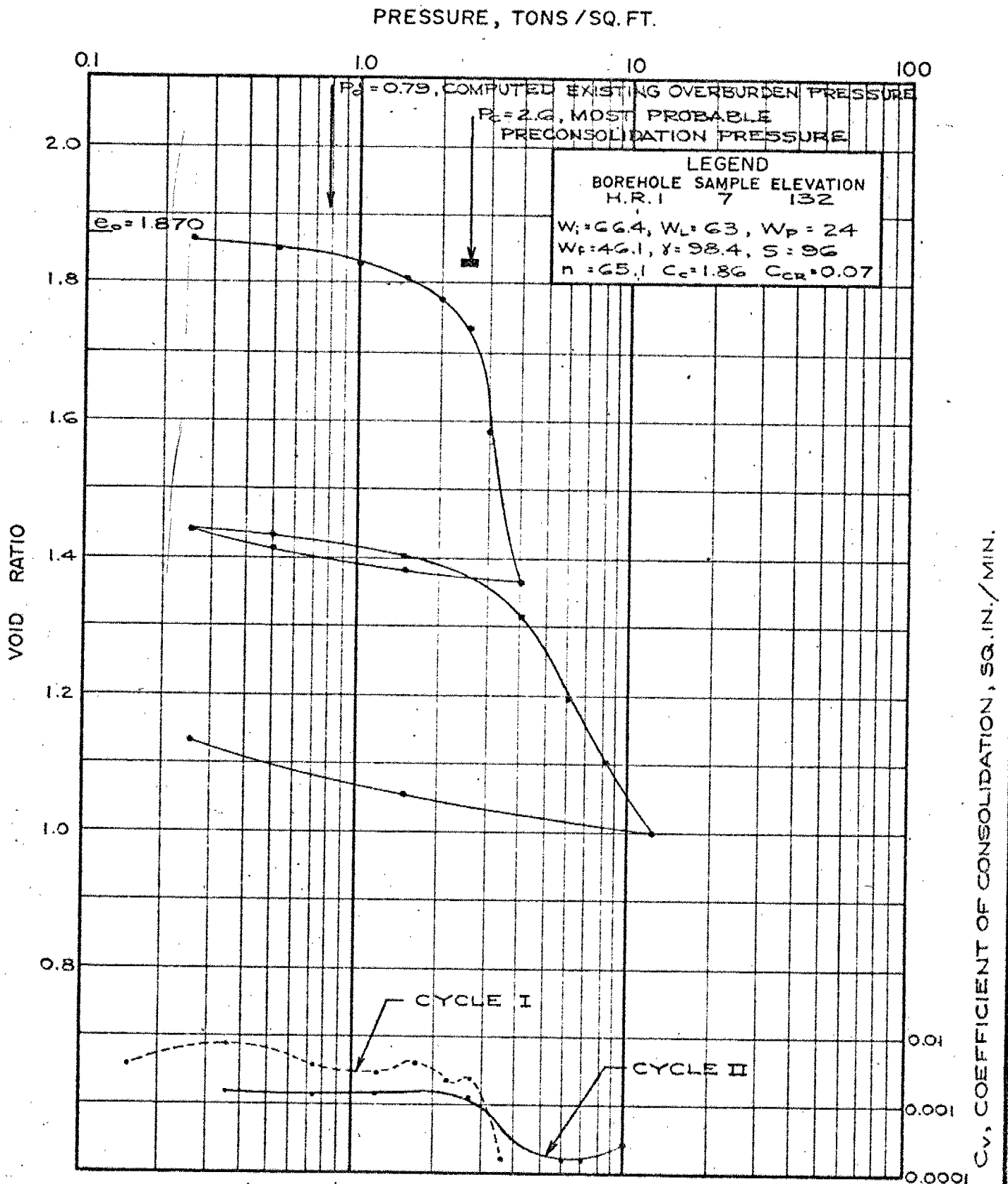
GRAIN SIZE DISTRIBUTION

FIGURE 4

| COBBLE<br>SIZE | COARSE      | MEDIUM | FINE | COARSE    | MEDIUM | FINE | SILT SIZE      |  | CLAY SIZE |  |
|----------------|-------------|--------|------|-----------|--------|------|----------------|--|-----------|--|
|                | GRAVEL SIZE |        |      | SAND SIZE |        |      | FINE GRAINED - |  |           |  |

# VOID RATIO - PRESSURE CURVES CONSOLIDATION TEST

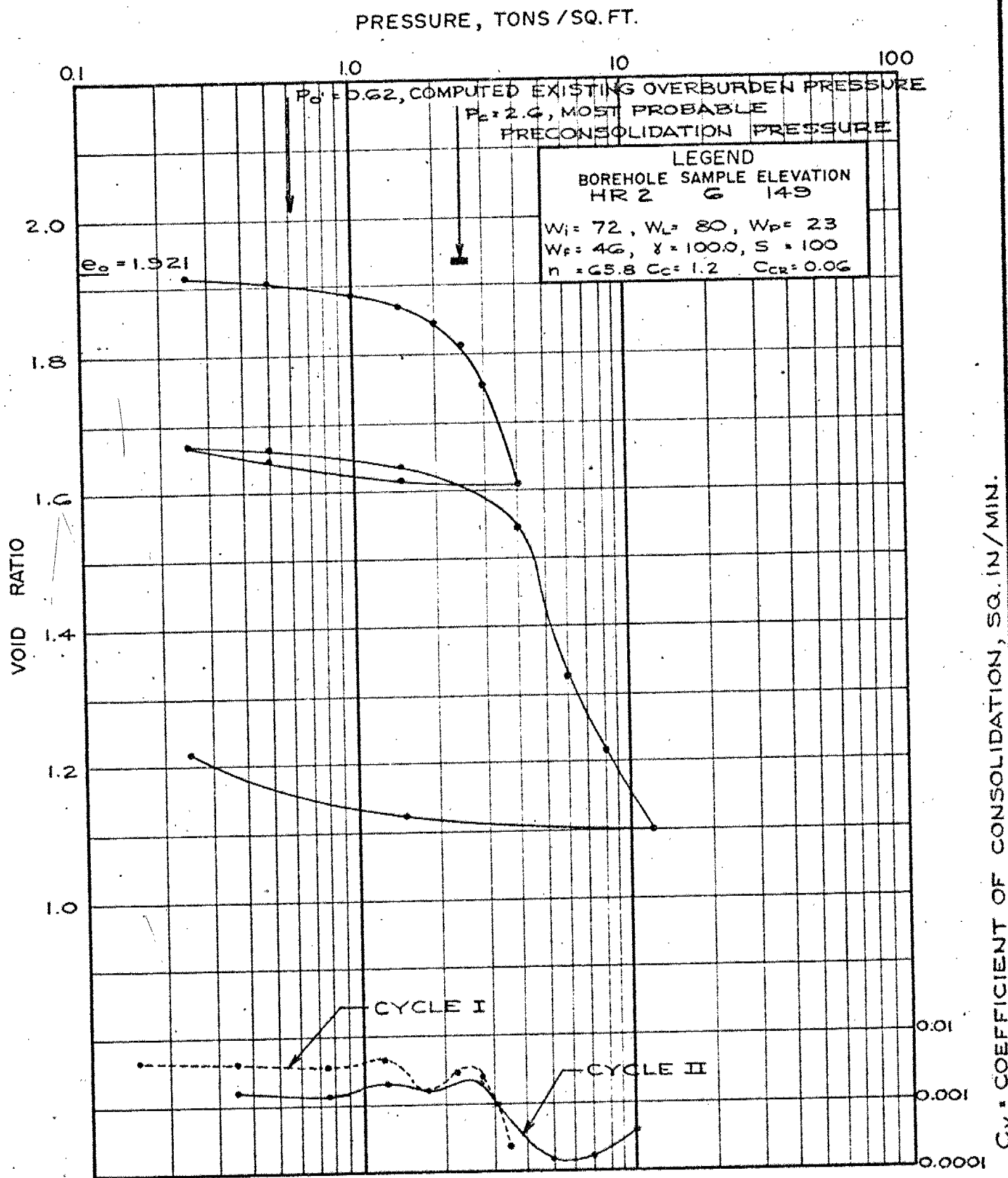
FIGURE 5



Golder Associates

# VOID RATIO - PRESSURE CURVES CONSOLIDATION TEST

FIGURE 6



Golder Associates

## RECORD OF BOREHOLE H.R.I.

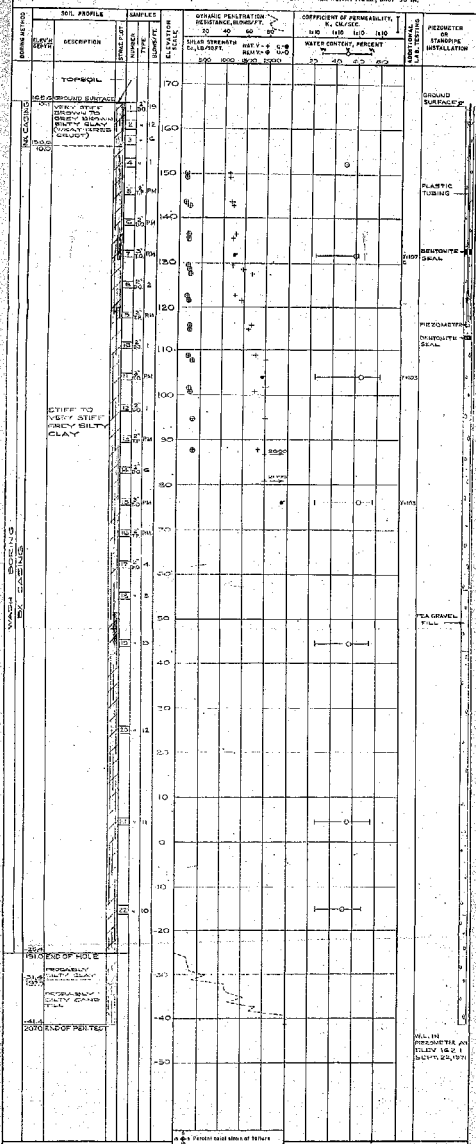
LOCATION See Figure

BORING DATE JULY 19-22, 1971

CATUN GENETIC

SAMPLER HAMMER WEIGHT 145 LB., DROP 30 IN.

13-22, 1971 CATION GEODETIC  
PENETRATION TEST HAMMER WEIGHT 140LB, DROP 30 IN.



VERTICAL SCALE  
1 IN. TO 10 FT.

**Golder Associates**

DRAWN H. H. H.  
CHECKED G. E. W.

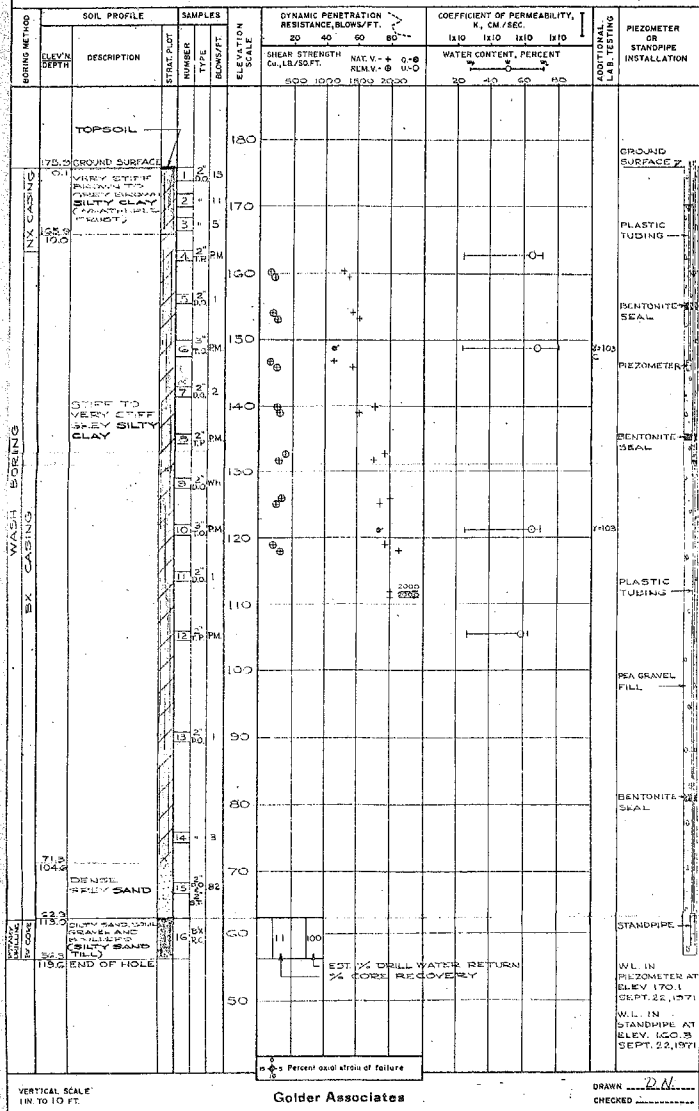
# RECORD OF BOREHOLE H.R. 2

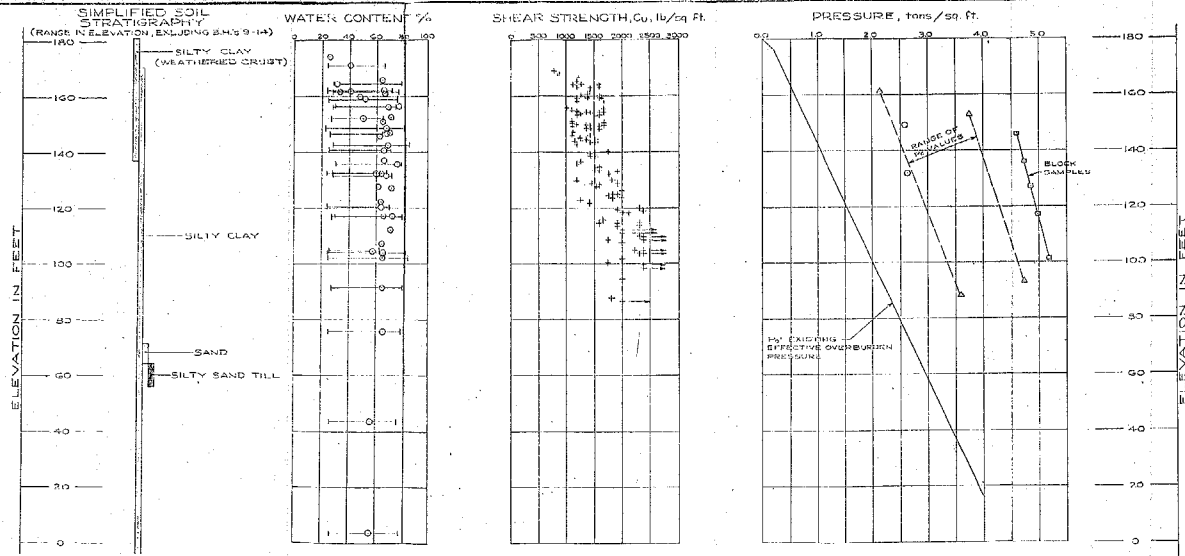
LOCATION See Figure 1

BORING DATE JULY 23 & 26, 1971 DATUM GEODETIC

SAMPLER HAMMER WEIGHT 140 LB., DROP 30 IN.

PENETRATION TEST HAMMER WEIGHT 140 LB., DROP 30 IN.





**SUMMARY OF  
GEOTECHNICAL PROPERTIES**

FIGURE 2

**LEGEND**

- $W_p$  - PLASTIC LIMIT  
 $W_L$  - LIQUID LIMIT  
 $W$  - NATURAL
- + IN SITU FIELD VANE TEST  
 Δ CRAWFORD, C.B. (1941)  
 D EDEN, W.J. (1970)  
 O GOLDER ASSOCIATES (1971)

Date OCTOBER 28, 1971

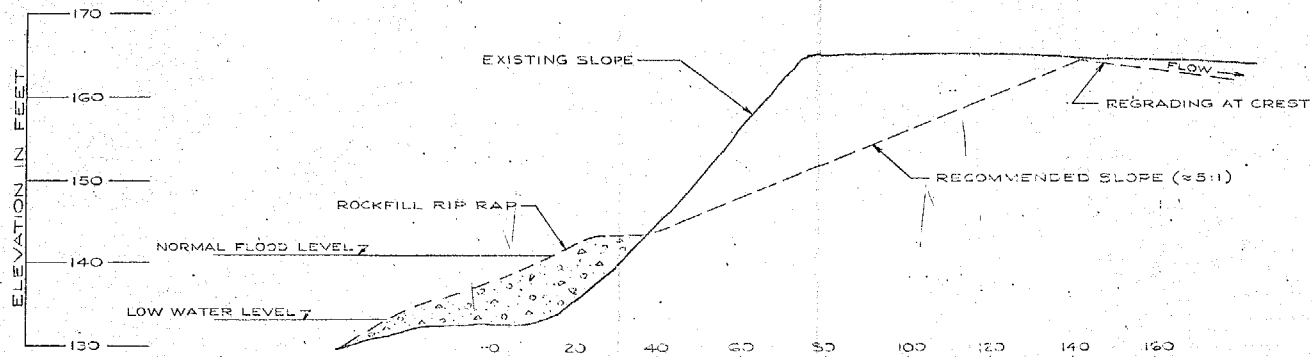
Golder Associates

Drawn: *R.M.*  
 Chkd: *G.S.*  
 Appd: *J.P.*



RECOMMENDED SLOPES  
OTTAWA RIVER BANK

FIGURE 7

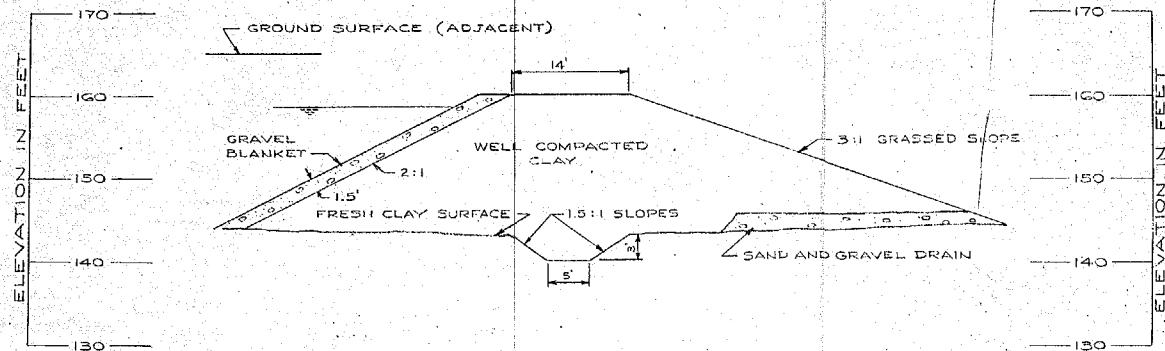


SCALE: HOR. 1" TO 20'  
VER. 1" TO 10'

Date: DECEMBER 1, 1971

Golder Associates

Drawn *D.N.*  
Chkd. *S.T.*  
Appd. *S.T.*

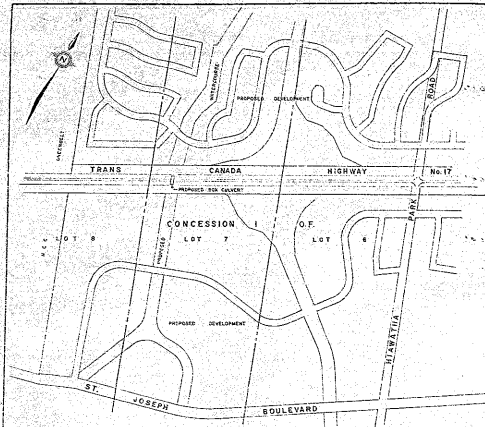


SCALE: HOR. 1" TO 10'  
VER. 1" TO 10'

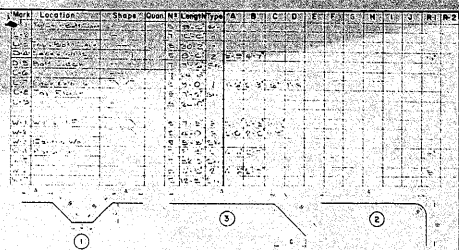
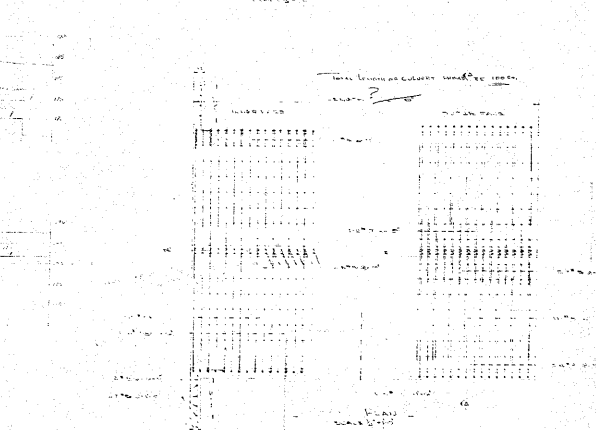
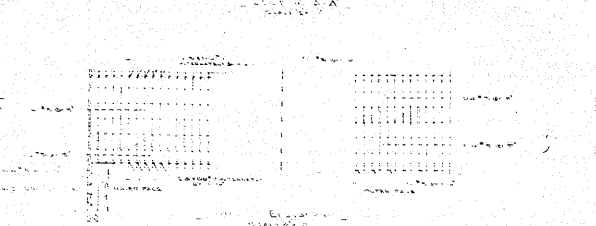
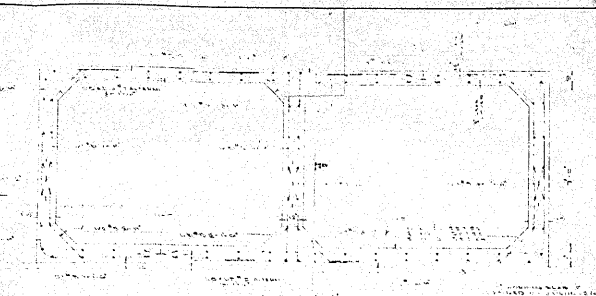
Date OCTOBER 25, 1971

Golder Associates

Drawn *DA*  
Chkd. *DA*  
Appd. *DA*



KEY PLAN  
SCALE: 1"=400'

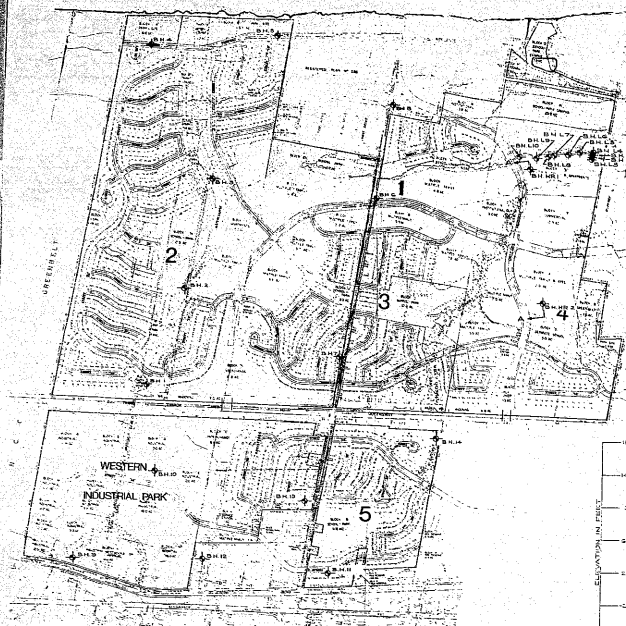
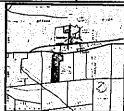


Note: Scale Reduced to 50%

#### Notes

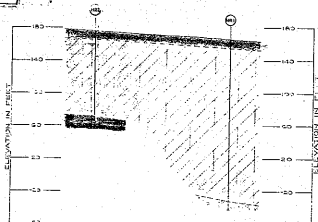
1. All concrete to be 3000 psi - 28 days with a maximum slump of 5" except the deck concrete which will have a maximum slump of 2 1/2"
2. All concrete to have 6% ± 1% approved air
3. All concrete with slump or air outside the limits as laid down in items 1 & 2 above or not in accordance with M.T.C. Form 3 (latest revision) will be rejected
4. Concrete must not be poured onto excavations, formwork and steel have been inspected and approved by the engineer
5. Reinforcing may be placed according to the discretion of the engineer. Strength of concrete in working arch to be 2000 psi at 28 days
6. Minimum up for reinforcing steel to be 30 bar diameter
7. All exposed corners and edges of concrete must be chamfered 1" and clear cover must be 2" unless otherwise indicated
8. Spalls must be placed and compacted simultaneously on both sides of structure
9. This structure to be built according to M.T.C. Form 3 (latest revision) and the Engineer's specifications

|                           |           |      |
|---------------------------|-----------|------|
| NO.                       | REVISIONS | DATE |
| TOWNSHIP OF GLOUCESTER    |           |      |
| ENGINEERING DEPARTMENT    |           |      |
| CUSTOMER: ESTATE LIMITED  |           |      |
| NEW TOWN OF GLENSIDE      |           |      |
| PROPOSED BOX CULVERT      |           |      |
| CUMMINGS - COCKBURN       |           |      |
| CONSULTING ENGINEERS      |           |      |
| 1000 BAYVIEW AVE. #100    |           |      |
| SCARBOROUGH, ONT. M1B 2B5 |           |      |
| D.R.S. 45-1004            |           |      |
| DRAWN BY: C.C.B.          |           |      |
| CHECKED BY: L.B.B.        |           |      |
| DATE: JANUARY, 1973       |           |      |
| FILE NO. 9862-500         |           |      |



- LEGEND**
- ◆ BENCHMARK IN PLANE
  - ⑤ BENCHMARK IN ELEVATION
  - ▲ WATER LEVEL IN ELEVATION

- THICK QUARRY**
- 1-10' 0" TO 10' 0" SANDY SILTY CLAY (WEATHERED QUARTZ)
  - 10-20' 0" TO 10' 0" SANDY SILTY CLAY
  - 20-30' 0" TO 10' 0" SANDY SILTY CLAY
  - 30-40' 0" TO 10' 0" SANDY SILTY CLAY
  - 40-50' 0" TO 10' 0" SANDY SILTY CLAY
  - 50-60' 0" TO 10' 0" SANDY SILTY CLAY
  - 60-70' 0" TO 10' 0" SANDY SILTY CLAY
  - 70-80' 0" TO 10' 0" SANDY SILTY CLAY
  - 80-90' 0" TO 10' 0" SANDY SILTY CLAY
  - 90-100' 0" TO 10' 0" SANDY SILTY CLAY



**SECTION A-A**

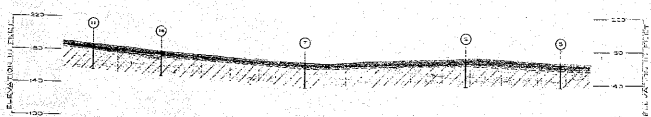
SCALE: HORIZ. 1" = 40' VERT. 1" = 40'



**SECTION ALONG PROPOSED WATER COURSE**

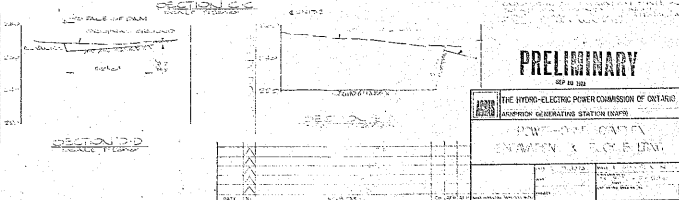
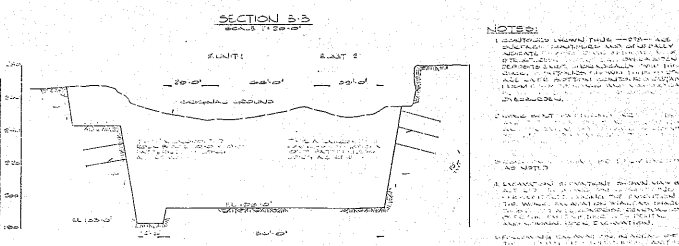
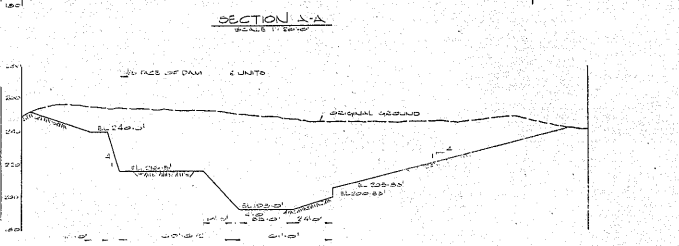
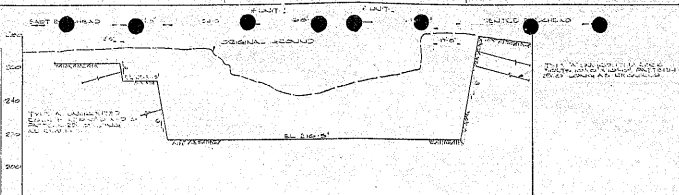
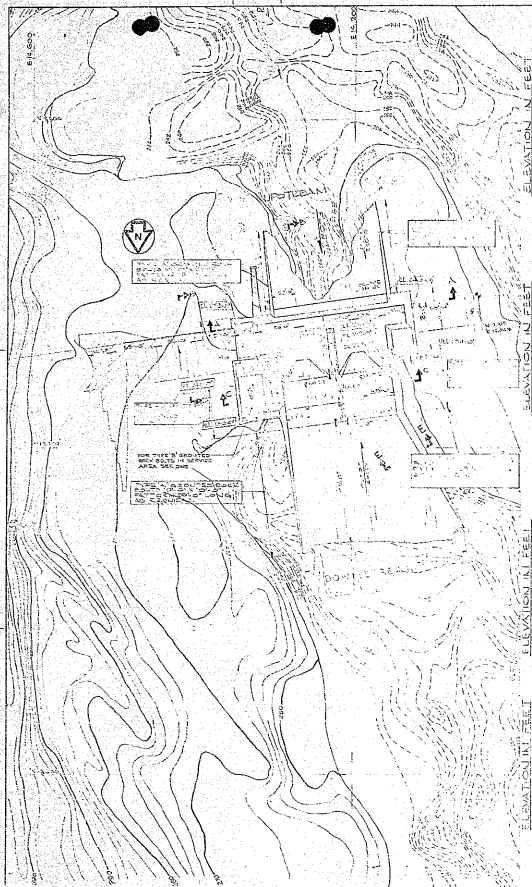
SCALE: HORIZ. 1" = 40' VERT. 1" = 40'

*Note: All Scales Reduced 8x 1/2*



**SECTION ALONG HIAWATHA PARK ROAD**

SCALE: HORIZ. 1" = 40' VERT. 1" = 40'



**NOTES:**

1. CONSTRUCTION OF DAM - SEE PLAN AND SECTION 1-A. THE DAM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.
2. THE DAM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.
3. THE DAM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.
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8. THE DAM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.
9. THE DAM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.
10. THE DAM SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.

**PRELIMINARY**  
SEP 20 1922

|                                                |             |
|------------------------------------------------|-------------|
| THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO |             |
| JACOBSON CONSULTING ENGINEERS                  |             |
| NEW YORK CITY                                  |             |
| CHARTERED & INCORPORATED                       |             |
| DATE                                           | SEP 20 1922 |
| BY                                             | JACOBSON    |
| CHECKED BY                                     | JACOBSON    |
| APPROVED BY                                    | JACOBSON    |

