TE - 118
600 - 4 - 66

39
50

CUYAHOGA COUNTY
CUY-80-15.81
CUY-176-10.14

GEOLOGY OF THE SITES

THE STRUCTURE SITES ARE LOCATED ON THE HIGHLAND AREA OF THE GLACIATED MISSISSIPPI VALLEY PLAIN, IN THE VICINITY OF CUYAHOGA RIVER, IN AN AREA WHERE MODERATELY DEEP GLACIAL-DERIVED SOILS OVERLIE SHALE BEDROCK, OF THE BEDFORD FORMATION.

EXPLORATION

THE EXPLORATION CONSISTED OF THREE DRIVE SAMPLE-CORE BORINGS, MADE BETWEEN JUNE 18 AND 26, 1968, AND NINE MECHANICALLY DRIVEN ROD PENETRATION TESTS AND EIGHT HAND DRIVEN PROBES, MADE BETWEEN JUNE 20 AND 26, 1968. SUPPLEMENTAL BORINGS WERE MADE ON JUNE 10, 1969 AND ONE AUGUST 12 AND 13, 1969.

INVESTIGATIONAL FINDINGS

BORINGS DISCLOSED THAT SLOPING BEDROCK SURFACE, ENCOUNTERED AT 21-FOOT DEPTH, ELEVATION 727 FEET, IN THE REAR PORTION OF THE STRUCTURE SITE, AND 49-FOOT DEPTH, ELEVATION 701 FEET, IN THE FORWARD PORTION OF THE STRUCTURE SITE, IS OVERLAIN BY MEDIUM-STIFF AND STIFF CLAYS AND SOME DENSE AND VERY DENSE SANDS, SILTS AND GRAVELS. THE BORINGS WERE TERMINATED AT 30 TO 60-FOOT DEPTHS, ELEVATIONS 718 TO 690 FEET, AFTER PENETRATING 9 TO 20 FEET BELOW BEDROCK SURFACE.

THE ROD SOUNDINGS LOCATED AT THE ABUTMENTS ENCOUNTERED GRADUAL INCREASE IN RESISTANCE WITH INCREASE IN DEPTH AND WERE TERMINATED UPON ENCOUNTER WITH REFUSAL AND NEAR-REFUSAL TO PENETRATION AT 27 AND 47-FOOT DEPTHS, ELEVATIONS 737 AND 702 FEET. THE HAND DRIVEN PROBES LOCATED AT THE PIER LOCATIONS ENCOUNTERED REFUSAL TO PENETRATION AT 1 AND 6-FOOT DEPTHS, ELEVATIONS 728 AND 715 FEET. THE ROD SOUNDINGS AND HAND DRIVEN PROBES ARE CONSIDERED TO HAVE TERMINATED ON BEDROCK SURFACE, AS REVEALED BY THE BORINGS.

TUXEDO AVENUE

THE BORINGS DISCLOSED THAT SLOPING BEDROCK SURFACE, OCCURRING AT 26-FOOT DEPTH, ELEVATION 732 FEET, IN THE FORWARD PORTION OF THE STRUCTURE SITE, SLOPES DOWNWARD TO THE REAR PORTION ENCOUNTERED AT 49-FOOT DEPTH, ELEVATION 701 FEET, IS OVERLAIN BY MEDIUM-STIFF AND STIFF CLAYS AND MEDIUM-DENSE TO VERY DENSE SILTS. THE BORINGS WERE TERMINATED AT 50 AND 60-FOOT DEPTHS, ELEVATIONS 707 AND 690 FEET, AFTER PENETRATING 11 AND 24 FEET BELOW BEDROCK SURFACE.

THE ROD SOUNDINGS ENCOUNTERED GRADUAL INCREASE IN RESISTANCE WITH INCREASE IN DEPTH AND WERE TERMINATED UPON ENCOUNTER WITH ABRUPT REFUSAL TO PENETRATION AT 16 AND 36-FOOT DEPTHS, ELEVATION 796 AND 713 FEET, CONSIDERED TO BE ON OR SLIGHTLY ABOVE BEDROCK SURFACE, AS REVEALED BY THE BORINGS.

NO FREE WATER WAS ENCOUNTERED IN ANY OF THE ROD SOUNDING HOLES.

RETAINING WALL LANE JN-OBE

BORINGS DISCLOSED SLOPING BEDROCK, ENCOUNTERED AT 5 AND 15-FOOT DEPTHS, ELEVATIONS 730 AND 739 FEET, RESPECTIVELY, IS OVERLAIN BY STIFF CLAYS. THE BORINGS WERE TERMINATED AT 20 AND 30-FOOT DEPTHS, ELEVATIONS 715 AND 724 FEET, AFTER PENETRATING 15 FEET OF BEDROCK.

IF IT IS THE INTENTION TO FOUND SUBSTRUCTURE UNITS ON BEDROCK, IT IS CONSIDERED ADVISABLE THAT THE OPEN EXCAVATIONS BE INSPECTED IN THE FIELD IN ORDER TO INSURE THAT THE EXCAVATIONS HAVE BEEN EXTENDED TO ROCK THROUGHOUT THE ENTIRE FOUNDING AREA. IT IS FURTHER SUGGESTED THAT THE AREA OF THE FOOTING CONTACT NOT BE SUBJECTED TO PROLONGED ATMOSPHERIC EXPOSURE, AND THAT THE EXCAVATION BE WELL DRAINED AT ALL TIMES.

UNCONFINED COMPRESSION TESTS ON SIMILAR SHALE BEDROCK INDICATE A CRUSHING STRENGTH ON THE ORDER OF 100 TONS PER SQUARE FOOT.

LEGEND

- Auger Boring Location - Plan View.
- Press and / or Drive Sample and / or Core Boring Location - Plan View.
- Drive Rod Penetration Resistance Sounding Location - Plan View.
- Capped Pile
- Footing
- Footing on Pile
- TR — Top of Rock
- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- X/Y — Figures Beside the Boring Log in Profile Indicate the Number of Blows for Standard Penetration Test.
  X = Number of Blows for First 6 inches.
  Y = Number of Blows for Second 6 inches.
- Drive Rod Penetration Resistance Sounding Log - Profile
- Casing
- Resistance "R" < 10,000 lbs.
- Resistance "R" > 10,000 lbs.
- Z — Indicates Final Measurement of Penetration, in Inches.
- W — Indicates Free Water Elevation.
- Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

- Coal
- Weathered Indurated Clay
- Indurated Clay
- Weathered Shale
- Shale
- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

GENERAL INFORMATION

Drive Rod Penetration Sounding Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface condition may be evaluated.

Drive Sample Borings - Drive-Press Sample Borings

Drive sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and / or 5-foot depth intervals, driven by means of a 140 - pound drop-hammer with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The boring log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depth of press samples, field sample number, sample description - based on laboratory tests and the Casagrande AC classification system-and gradation, plasticity, and moisture content determinations. Results of strength and consolidation testing, if performed, appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.

Particle Size Definitions

Boulders	Cobbles	Gravel	Coarse Sand	Fine Sand	Silt	Clay
8"	3"	2.0mm (No. 10 sieve)	0.42mm (No. 40 sieve)	0.074mm (No. 200 sieve)	0.005mm	

LOG OF BORING

Date Started 8-13-69 — Sampler Type SS — Dia. 1 3/8" — Water Elev. —
Date Completed 8-13-69 — Casing: Length 20' — Dia. 3 1/2" — Surface Elev 747.6'
Boring No. B-1 — Station & Offset 11+92,30' Lt. (Rear Abutment)

Elev.	Depth	Std. Pen. (N)	Rec. ft	Loss ft	Description	Sample No.	% Agg	% C.S	% F.S	% Silt	% Clay	L.L.	P.I.	W.C	SHTL Class.
747.6	0														
	2														
	4														
742.6	6	10/19			Gray Gravelly Sandy Silt	1	27	17	16	16	24	NP	NP	18	A-4a
	8														
737.6	10	50/*			Brown Gravelly Sandy Silt	2	21	7	26	17	29	24	8	20	A-4a
735.1	12	(0.8')													
	14	12/4			Brown Clayey Sandy Gravel	3	36	13	13	14	24	30	11	22	A-6a
732.6	16	10/10			Gray Silty Gravelly Sand	4	32	21	16	12	19	NP	NP	25	A-2-4
730.1	18														
	20	5/4			Gray Sandy Silt, Trace of Organic	5	5	10	13	32	40	NP	NP	34	A-4a
727.6		50"			Gray Silty Sand and Stone Fragments	6	33	15	13	18	21	28	7	23	A-4a
726.9	22	(0.7')			TOP OF ROCK										
	24		2.4	1.9											
	26				Shale, black, firm, carbonaceous, argillaceous, micaceous, pyritiferous in part, slightly fissile, thin-bedded, jointed, interbedded with thin clay seams. Core Loss 22%.										
	28		4.8	0.2											
717.6	30				BOTTOM OF BORING										

*Refusal

LOG OF BORING

Date Started 6-10-69 — Sampler Type SS — Dia. 1 3/8" — Water Elev. —
Date Completed 6-10-69 — Casing: Length 15' — Dia. 3 1/2" — Surface Elev 753.7'
Boring No. B-1 R — Station & Offset 59+30', 5' Lt. (Retaining Wall (Lane JN-OBE)

Elev.	Depth	Std. Pen (N)	Rec. ft	Loss ft	Description	Sample No.	% Agg	% C.S	% F.S	% Silt	% Clay	L.L.	P.I.	W.C	SHTL Class
753.7	0														
	2														
	4														
748.7	6	4/7			Brown Silty Clay	1	0	3	8	17	72	42	19	23	A-7-6
	8														
743.7	10	7/10			Gray Silt and Clay	2	0	3	7	30	60	32	13	29	A-6a
	12														
738.7	14				TOP OF WEATHERED ROCK										
	16	50/4"			Gray Weathered Shale TOP OF ROCK	3	—	—	—	—	—	—	—	9	Bedrock
	18														
	20		1.9	2.6											
	22														
	24		4.3	0.7	Shale, black, medium-firm to firm, carbonaceous, argillaceous, pyritiferous, thin-bedded, jointed, highly broken, interbedded with thin clay seams, dense argillaceous, shale. Core Loss 24%.										
	26														
	28		5.0	0.0											
723.7	30				BOTTOM OF BORING										

*Refusal

LOG OF BORING

Date Started 8-12-69 — Sampler Type SS — Dia. 1 3/8" — Water Elev. —
Date Completed 8-13-69 — Casing: Length — Dia. — (Lane JN-OBE)
Boring No. B-2R — Station & Offset 59+58, 30' Lt. (Retaining Wall) — Surface Elev 734.8'

Elev.	Depth	Std. Pen (N)	Rec. ft	Loss ft	Description	Sample No.	% Agg	% C.S	% F.S	% Silt	% Clay	L.L.	P.I.	W.C	SHTL Class
734.8	0														
	2														
	4														
730.3					TOP OF ROCK										
729.8	6				Shale, broken										
	8		3.4	1.6											
	10														
	12		4.6	0.4	Shale, black, firm, carbonaceous, argillaceous, micaceous, pyritiferous in part, thin-bedded, interbedded with thin clay seams. Core Loss 13%.										
	14														
	16														
	18		5.0	0.0											
	20														
714.8					BOTTOM OF BORING										

Revised 11-13-68 Revised 8-5-69

NOTE: Information shown by this subsurface investigation is considered adequate for the use in establishing design controls for the project. The state of Ohio does not guarantee the accuracy of this data and it is not to be construed as part of the plans governing construction of the project.

OHIO DEPARTMENT OF HIGHWAYS
TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. CUY-80-15.81 & CUY-176-10.14
UNDER GRADE SEPARATION & TUXEDO AVE.
RETAINING WALL LANE JN-OBE
SEC. CUY-80-15.81

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