






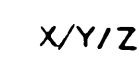























LEGEND

NOTE: FOR LEGEND BY CONSULTANT, SEE SHEET TWO

-  Auger Boring Location - Plan View.
-  Press and / or Drive Sample and / or Core Boring 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/Z
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.
Z = Number of Blows for Third 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.
-  V Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

-  Coal
-  Weathered Sandstone
-  Weathered Mudstone or Claystone
-  Sandstone
-  Mudstone or Claystone
-  Leached Dolomite
-  Weathered Shale
-  Dolomite
-  Shale
-  Leached Limestone
-  Weathered Siltstone
-  Limestone
-  Siltstone
-  Boulders or Cobbles

GEOLOGY OF THE SITE

THE STRUCTURE SITE IS LOCATED ON THE FLAT GLACIATED LAKE PLAIN, WHERE SHALLOW LACUSTRINE DEPOSITS OVERLIE CLAYSHALE BEDROCK OF DEVONIAN AGE. IN 1964 AN AREA OF POOR DRAINAGE WAS OBSERVED TO OCCUR IN THE REAR PORTION OF THE STRUCTURE SITE.

EXPLORATION

THE EXPLORATION CONSISTED OF TWO DRIVE AND PRESS SAMPLE-CORE BORINGS MADE BY MEANS OF A MECHANICALLY POWERED HOLLOW STEM ROTARY AUGER MOUNTED ON A MOBILE PLATFORM, PERFORMED ON NOVEMBER 6, 7, 13 AND 14, 1991.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

THE TEST BORINGS DISCLOSED THAT INTERVALS OF LOOSE TO EXTREMELY DENSE UNSATURATED BASIC CLAY, ELASTIC CLAY, AND SILT MODIFIED WITH SAND, GRAVEL, AND VARYING AMOUNTS OF EACH OTHER THAT IN BORING B-1 GRADUALLY INCREASE IN DENSITY WITH INCREASE IN DEPTH, AND IN BORING B-2 FLUCTUATE ERRATICALLY IN DENSITY WITH INCREASE IN DEPTH, OVERLIE GENTLY SLOPING BEDROCK SURFACE. TEST BORING B-1 (MADE IN THE VICINITY OF THE REAR ABUTMENT) ENCOUNTERED BEDROCK SURFACE AT 37.5 FOOT DEPTH, ELEVATION 641.7 FEET AND CONTINUED TO ADVANCE TO A TOTAL DEPTH OF 65.0 FEET, ELEVATION 614.2 FEET WHERE THE BORING WAS TERMINATED AFTER HAVING PENETRATED 27.5 FEET BELOW BEDROCK SURFACE. SHELBY TUBE SAMPLES FOR TESTING UNDISTURBED MATERIALS WERE TAKEN AT 25.0 AND 30.0 FOOT DEPTHS, ELEVATIONS 654.2 AND 649.2 FEET, RESPECTIVELY. TEST BORING B-2 (LOCATED IN THE VICINITY OF THE FORWARD ABUTMENT) ENCOUNTERED BEDROCK SURFACE AT 18.5 FOOT DEPTH, ELEVATION 637.5 FEET AND CONTINUED TO ADVANCE TO A TOTAL DEPTH OF 42.5 FEET, ELEVATION 612.5 FEET WHERE THE BORING WAS TERMINATED AFTER HAVING PENETRATED 25.0 FEET BELOW BEDROCK SURFACE. SHELBY TUBE SAMPLES WERE TAKEN FOR TESTING OF UNDISTURBED MATERIALS AT 5.0 AND 10.0 FOOT DEPTHS, ELEVATIONS 652.5 AND 647.5 FEET, RESPECTIVELY.

IF IT IS THE INTENTION TO FOUND PIER SUBSTRUCTURE UNITS ON BEDROCK, IT IS CONSIDERED ADVISABLE THAT THE 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, DUE TO THE FACT THAT WHILE THIS CLAYSHALE BEDROCK IS GENERALLY FIRM IN PLACE, IT IS SUSCEPTIBLE TO DISINTEGRATION UPON EXPOSURE TO THE ATMOSPHERE AND WATER.

NO FREE WATER OBSERVATIONS WERE MADE IN EITHER OF THE TEST BORINGS PERFORMED DURING, OR AT THE CONCLUSION OF DRILLING OPERATIONS.

UNCONFINED COMPRESSION TESTS ON CORE SAMPLES INDICATE COMPRESSION STRENGTHS ON THE ORDER OF 450 TONS PER SQUARE FOOT FOR THE CLAYSHALE OCCURRING AT OR BELOW ELEVATION 622.7 FEET FOR TEST BORING B-1 AND ON THE ORDER OF 225 TONS PER SQUARE FOOT FOR THE CLAYSHALE OCCURRING AT OR BELOW ELEVATION 621.5 FEET FOR TEST BORING B-2.

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.

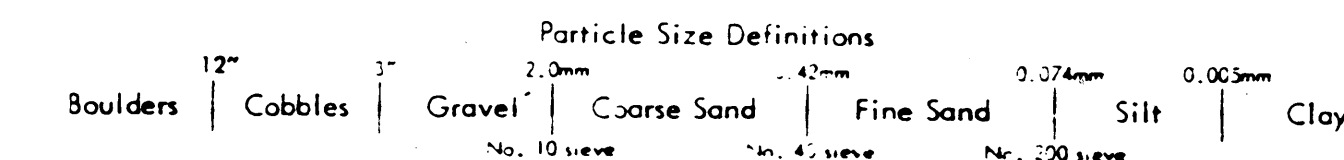
Drive Sample Borings - Drive-Press Sample Borings

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 18 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 three 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.



NOTE - ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATION SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE, THE BUREAU OF TESTS AT 1600 WEST BROAD STREET, THE PAVEMENT AND SOILS SECTION OF THE BUREAU OF LOCATION AND DESIGN OR IN THE BRIDGE BUREAU AT 25 SOUTH FRONT STREET.

NOTE - Information shown by this subsurface investigation was obtained solely 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 a part of the plans governing construction of the project.

OHIO DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - TESTING LABORATORY
1600 WEST BROAD STREET, COLUMBUS, OHIO 43223

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. LAK-91-0423
OVER CONRAIL, AND N & W RR
SEC. LAK-91-4.23

CHECKED BY A.F.	REVIEWED BY M.R.S.	DATE 12/30/91
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