



JOHN D. HYNES & ASSOCIATES, INC.

*Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing*

February 21, 2024

Kevin J. Shearon, P.E.
Davis, Moore, Shearon & Associates, LLC
P.O. Box 80
Centreville, Maryland 21617

Re: Report of Subsurface Exploration and Geotechnical Consulting Services
Kent Island Estates Beach Road Rehabilitation
Kent Island, Maryland
Project No.: JDH-10/23/358

Dear Kevin:

John D. Hynes & Associates, Inc. has completed the authorized subsurface exploration and geotechnical consulting services for the Kent Island Estates Beach Road Rehabilitation Project located in Kent Island, Maryland. Our services were performed, generally, in accordance with our proposal dated September 6, 2023.

This report describes the exploration methods employed, exhibits the data obtained and presents our evaluations and recommendations. This report contains our recommendations for pavement subgrade preparation, fill construction, pavement cross-section design, and revetment shoreline protection construction.

We appreciate the opportunity to be of service to you. If you have any questions regarding the contents of this report or if we may be of further assistance, please contact our office.

Respectfully,

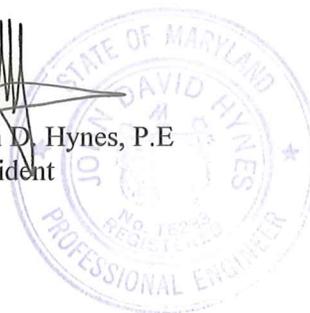
JOHN D. HYNES & ASSOCIATES, INC.

Kelly Childs

for: Evan H. Cross
Geologist

EHC: JDH/kc

[Signature]
John D. Hynes, P.E.
President





**REPORT OF
SUBSURFACE EXPLORATION
AND
GEOTECHNICAL CONSULTING SERVICES**

**KENT ISLAND ESTATES BEACH ROAD REHABILITATION
KENT ISLAND, MARYLAND**

**PREPARED FOR
DAVIS, MOORE, SHEARON & ASSOCIATES, INC.**

**FEBRUARY 21, 2024
PROJECT NO.: JDH-10/23/358**



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PURPOSE AND SCOPE

The subsurface exploration study was performed to evaluate the subsurface conditions with respect to the following:

1. General site and subgrade preparation;
2. Fill and backfill construction;
3. Revetment improvements;
4. Pavement subgrade preparation and cross-section design;
5. Location of groundwater; and
6. Other aspects of the design and construction for the proposed structures indicated by the exploration.

An evaluation of the site, with respect to potential construction problems and recommendations dealing with earthwork and inspection during construction, is included. The inspection is considered necessary both to confirm the subsurface conditions and to verify that the soils related construction phases are performed properly.

EXISTING SITE CONDITIONS

As shown on the Project Location Map (Drawing JDH-10/23/358-A) in the Appendix, the project site is the existing Beach Road that begins at the intersection with Oregon Road and extends north for 0.44 miles between the Chesapeake Bay and Price Creek. At the time of our exploration work, the project site was the existing Beach Road pavements and shoreline stone revetment. Topographically, Beach Road is the highest feature with elevation dropping on both sides to the west towards the Chesapeake Bay and east towards Price Creek. Otherwise, the project site is relatively flat. Residential houses border the northern portion of the project location to the west.

PROJECT CHARACTERISTICS

The proposed project includes the reconstruction of the Beach Road pavements and improvements to the shoreline revetments. We provide herein services for the pavement design and revetment improvement recommendations. We understand that vehicular traffic is expected to be light to typical subdivision street traffic. The road is considered a "local road section – Type III" for rural areas in critical and sensitive zones. The existing Chesapeake Bay shoreline is protected with what Doldon W. Moore & Associates describes as "dump and run rip-rap," concrete rubble, pipes, rubble, etc.

Attached please find a drawing for Section 4+00 existing (top) and proposed (bottom). The proposed sketch shows Class 1 and 2 rip-rap on top of existing rip-rap, and in the splash area, 11 feet wide. The drawing shows Class 3 (1000 to 1500 lb.) armor stone on the east slope and toe of the shoreline protection will be 28.5 feet from the roadway edge defined with a 12x12 inch timber curb. At the toe of the structure, the stone will extend ± 3 feet below the mudline, and will be approximately 5 feet in height at its tallest section. This sketch is an approximation of what will be constructed because of the variable existing conditions. Washouts have occurred at intervals along the shoreline.

FIELD EXPLORATION AND STUDY

In order to determine the characteristics of the subsurface conditions at the site, 8 test borings were drilled at the approximate locations shown on the Boring Location Plan (Drawing no. JDH-10/23/358-B) in the Appendix. Borings B-1, and B-4 through B-8 were drilled along Beach Road. Borings B-1 and B-5 were drilled to depths of 15.5 feet



below existing grade using a track mounted 3230 Geoprobe DT drill rig. Test borings B-4, B-6, B-7, and B-8 were drilled to a depth of 5 feet below existing grade using a hand auger. These borings were drilled along the west edges of the road. Test borings B-2 and B-3 were drilled on the east side of the road within the existing shoreline revetment structures to depths of 40.5 feet below existing grade using a track mounted 3230 Geoprobe DT drill rig. A bulk sample of soil was collected from 3 of the pavement boring locations for California Bearing Ratio (CBR) testing.

Soil sampling and testing were carried out in accordance with ASTM Specification D-1586. A brief description of our field procedures is included in the Appendix. The results of all boring and sampling operations are shown on the boring logs.

Samples of the subsurface soils were examined by our engineering staff and were visually classified in accordance with the Unified Soil Classification System (USCS). The USCS system nomenclature (CL, SM, etc.) is noted on the log sheets. Also included are reference sheets, which define the USCS terms and symbols used on the boring logs. We note that the test boring records represent our interpretation of the field data based on visual examination and selected soil classification tests. Indicated interfaces between materials may be gradual.

The field exploration data was supplemented with laboratory testing data. The laboratory at Hynes & Associates, Inc. performed 3 Natural Moisture Content tests and 3 Atterberg Limits (Liquid and Plastic) tests on selected samples. The test results are presented on the boring logs in the Appendix. We, also, performed 3 Modified Proctor and 3 California Bearing Ratio (CBR) tests. The test results are presented in the Appendix.

SUBSURFACE CONDITIONS

At the time of our field exploration, approximately 2 to 14 inches of organic bearing soil were encountered at the ground surface at some test boring locations. Varying thickness of organic bearing soil or other surficial materials may be encountered at other locations on site.

Below the organic bearing soil, the subsurface soils were visually classified in accordance with the USCS as interbedded layers of SAND (SP, SP-SM), Silty SAND (SM), SILT and SAND (SM-ML), Silty CLAY (CL, CH), CLAY and SILT (CL-ML), Clayey SILT (ML), and Organic SILT (OL) to the boring termination depths. The granular soil layers were characterized by Standard Penetration Test (SPT) values (N-values) ranging from 2 to 37 blows per foot indicating in-place relative densities of very loose to dense. N-values in the cohesive soil layers ranged from 2 to 20 blows per foot, indicating in-place consistencies of very soft very stiff.

Groundwater was encountered at depths ranging from 3 to 7 feet below existing grade during at the test boring locations. Groundwater elevations will vary at other times during the day and year depending on tidal fluctuations in the Chesapeake Bay.

RECOMMENDATIONS

The following recommendations are based on our understanding of the proposed construction, the data obtained from the exploration, and our previous experience with similar subsurface conditions and projects. If there are any significant changes to the project characteristics, such as revised pavement traffic usage, revetment modifications, elevations, etc., we request that this office be advised so the recommendations of this report can be re-evaluated.

A. Site Preparation

Prior to the construction of pavements, or the placement of fill in any structural areas, all existing organic materials, frozen or wet, excessively soft or loose soils, tree stumps, and other deleterious materials should be



removed and wasted. If perched surface water is encountered during any grading or excavation process, Hynes & Associates should be consulted for additional recommendations regarding the stabilization of the bases of the excavations and backfilling.

After the stripping operations have been completed, the exposed subgrade soils should be inspected. The inspector should verify that organic matter, debris, and organic matter have been removed from structural subgrade areas. The inspector should require the exposed subgrade materials be proofrolled utilizing a heavily-loaded dump truck or other pneumatic tired vehicle of similar size and weight. The purpose of proofrolling would be to provide surficial densification and to locate any isolated areas of soft or loose soils requiring undercutting. Proofrolling is not advised in wet areas which may deteriorate under repeated vehicular loading. Wet areas should be drained and allowed to dry prior to proofrolling. Precipitation may result in standing water (perched water) at low areas. If the water is allowed to pond, the natural soils may deteriorate and overexcavation or subgrade improvements may be necessary at those areas. The Geotechnical Engineer should be consulted to evaluate poor subgrade conditions during construction.

Care should be exercised during the grading operations at the site. Shallow SP-SM, SM, ML, and CL materials were identified at the boring locations. These materials are slightly (SP-SM) to moderately (SM) to highly (ML, CL) sensitive to changes in moisture conditions and should therefore be protected. If earthwork is performed in the presence of moisture, the traffic of heavy equipment, including heavy compaction equipment, may create pumping and a general deterioration of the subgrade soils. Construction traffic should be minimized at structural subgrade areas. If subgrade problems arise, the Geotechnical Engineer should be consulted for an evaluation of the conditions. Overexcavated areas resulting from the removal of organic matter, debris, or otherwise unacceptable materials should be backfilled with properly compacted materials in accordance with the procedures discussed in the following section.

B. Fill Selection, Placement and Compaction

It is recommended that all materials to be used as structural fill be inspected, tested and approved by the Geotechnical Engineer prior to use. The existing native SP, SP-SM, and SM soils that are of the correct moisture content and do not contain organics may be re-used for structural fill. Acceptable borrow material should include USCS classifications GW, SP and SM. Furthermore, the material to be utilized as structural fill should have a Plasticity Index (PI) less than 20. Hynes & Associates does not recommend using the native SM-ML, ML, OL, CL, CH, or CL-ML as structural fill.

The importation of high quality, granular material should be allowed, and acceptable unit rates for importation and placement should be established. Sand, gravel or sand/gravel mixtures would be appropriate for wet weather placement. Otherwise, the materials noted above will be acceptable for use as structural fill. Native or imported SM soils will be sensitive to alteration in moisture content and will become unworkable during and following periods of precipitation. For this reason, if earthwork is attempted in late autumn, winter or early spring, the above mentioned high quality imported granular material should be limited to those soils better than SM. SM materials become unworkable at moisture contents greater than 3 percentage points above optimum. The contractor would have to dry these SM materials or set them aside for use in landscaping areas.

Structural fill should be placed in lifts which are 8 inches or less in loose thickness and should be compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557). The existing fill material should, also, be tested for compaction. Adjustments to the natural moisture content of the soils may be required in order to obtain specified compaction levels. Should utility construction be performed after earthwork, the



Contractor should be responsible for achieving 95 percent compaction in all trench backfill. These guidelines should be set for all structural fill at the site including, but not limited to ground slab and pavement fills.

For the proofrolling and fill compaction operations, fill limits should be extended at least 5 feet beyond the pavement and slab edges. A sufficient number of in-place density tests should be performed by an engineering technician to verify that the proper degree of compaction is being obtained in all fill soils.

C. Revetment Improvements

The revetment is to extend from a 12 inch timber curb along the roadway, over the existing revetment to 28.5 feet from the noted curb. The new revetment rip-rap will be placed over repaired washouts, exposed soil, rubble, concrete rubble, and the existing revetment. Low areas and washout along the east side of the existing revetment shall be filled, backfilled and repaired using the high quality structural fill prepared and installed in accordance with Sections A and B above. The Geotechnical Engineer should be consulted to provide location specific repairs for large washouts, and settled areas. Fills should be covered with a high strength non-woven geotextile fabric such as (Mirafi 1120N or S1200), and stone layers.

The project sketch indicates that all new stone work shall be lined with a filter cloth. The "filter cloth" should be the above noted high strength non-woven fabric. Prior to the placement of the fabric over existing stone rock, concrete, voids and uneven areas along the revetment shall be filled in with stone/rock of various sizes to make the existing revetment top and side slopes "smooth" to accept the fabric and new stone. Chink stone between existing stone to lock in stones. Then install the fabric and the new stone. In addition to the geotextile fabric, install geogrid, such as tensile BX1200 or TriAx TX160 on top of the non-woven fabric from approximate 12 inches above the mean high water level, down the slope and below all new stone, up to the outside edge of the toe of the revetments. The bottom should be relatively smooth prior to the placement of the geotextile fabric and the cloth should be laid loosely, i.e., not in stretched condition, but free of wrinkles, folds and creases. The large size sheets that are available should be used to reduce the number of laps required. Lap dimensions should follow manufacturer's recommendations. Riprap should be placed on the subgrade fabrics in such manner as to produce reasonably well-graded mass of rock with a minimum percentage of voids. Riprap should, also, be placed to its full course thickness in one operation and in a way that will avoid displacing the geogrid and geotextile fabric.

Note that we encountered SANDs, (SM, SP-SM and CL) in Boring B-2 to a depth of 17 feet. We encountered a very loose sand layer between 4 and 6 feet. In boring B-3, we encountered SM, SP and CL-ML soils to depths of 22 feet. We encountered very loose and very soft soils from 4 to 8 feet. We only drilled 2 borings along the west side of Beach Drive. We may encounter very poor soils or organic soils at subgrade levels. The subgrade should be inspected and very poor soils shall be removed. The width of the overexcavation should be the width of the base of the proposed stone structures plus two times the depth of the overexcavated area. The replacement stone should be a clean stone such as AASHTO No. 2 or 3 stone and should be placed on a geogrid and underlying geotextile. The outside surfaces (slopes) of the stone backfill should have a 1:1 slope. Following the backfill stone placement, the geogrid or geotextile fabric at the overexcavation subgrade should be continued up the outside of the stone backfill slopes and continued across the breakwater subgrade. The balance of the overexcavation, outside of the stone backfill and geotextile may be backfilled with common fill material.

We estimated settlement of the structure considering the boring data in test borings B-2 and B-3. We estimated 6 to 8 inches of settlement. This would be expected outside (west of) the existing revetment. A few inches of settlement is expected along the existing revetment. We recommend overbuilding the structure to account for the post construction settlement.



D. Pavement Subgrade Preparation and Design

Borings B-1, and B-4 through B-8 were drilled along Beach Road. Below the surficial organic bearing soil, borings identified SAND, (SP, SP-SM), Silty SAND (SM), Clayey SILT (ML), Silty CLAY (CL, CH), and Organic SILT (OL) in the upper 5 to 6 feet of the subgrade.

After the stripping operations, all pavement subgrade areas should be inspected and proofrolled in accordance with Section A and B of this report. The pavement subgrade soils will consist of materials having the classifications of SP-SM, SM, ML, and CL in accordance with the USCS. The top 12 inches of the natural subgrades at pavement areas should be compacted to 95 percent of the Modified Proctor maximum dry density (ASTM D-1557) prior to fill or stone placement. Refer to Sections A and B for recommendations for subgrade preparation and fill construction.

During the exploration phase of this project, bulk soil samples were collected at pavement boring locations B-4, B-6 and B-8 for California Bearing Ratio (CBR) testing. The CBR values were 6, 24, 14, for B-4, B-6, and B-8, respectively. The CBR and Modified Proctor test results are included in the Appendix. The design CBR is 2/3 of the average or 10. The CBR and Modified Proctor test procedures are described in the "Investigative Procedures" section of this report.

The following recommendations are provided for pavements assuming an improved subgrade (top 12 inches compacted to 95 percent of the Modified Proctor maximum dry density) and organic soils have been removed from pavement subgrade areas (see Section A recommendations) approved subgrade soil types.

STREET PAVEMENTS:

Asphalt Surface Course (Maryland Superpave 9.5 mm)	1.5 inches
Asphalt Concrete Base Course (Maryland Superpave 19 mm)	3 inches
Graded Aggregate Subbase (Maryland Type CR-6)	6 inches

The pavement materials and construction should be in general accordance with the Queen Anne's County Construction Standards, the Maryland State Highway Administration (SHA), and this report. The pavement subgrade and pavement layers should be graded such that surface water is carried off of the pavement areas. The surface water should not be allowed to pond. Runoff onto adjacent properties should be controlled property.

E. Groundwater and Drainage

As noted under "SUBSURFACE CONDITIONS" above, groundwater was encountered at depths ranging from 3 to 7 feet below existing grade during at the test boring locations. Groundwater elevations will vary at other times during the day and year with tidal fluctuations in the nearby Chesapeake Bay. Relative to the anticipated pavement subgrade elevation, the Contractor may experience construction and excavation problems relating to groundwater at periods of very high tides. The Contractor will likely experience construction problems relating to the groundwater during the revetment improvements. The Contractor should be prepared to dewater as necessary, and work on the beach subgrade. Some work will need to be scheduled in consideration of the bay tide.



Efforts should be made to keep exposed subgrade areas dry during construction, primarily because the soils will be susceptible to deterioration and loss of strength in the presence of moisture. Adequate drainage should be provided at the site to minimize any increase in moisture content of the pavement subgrade soils. The final site drainage should also be designed such that run-off onto adjacent properties is controlled properly.

ADDITIONAL SERVICES RECOMMENDED

Additional engineering, testing and consulting services recommended for this project are summarized below.

A. Site Preparation and Proofrolling Monitoring

The Geotechnical Engineer or experienced soils inspector should inspect the site after it has been stripped and excavated. The inspector should determine if any undercutting or in-place densification is necessary to prepare a subgrade for fill placement, or slab and pavement support. The inspector should look closely for buried rubble and debris, and explore where suspected, and remove where encountered.

B. Fill Placement and Compaction Monitoring

The Geotechnical Engineer or experienced soils inspector should witness all fill operations and take sufficient in-place density tests to verify that the specified degree of fill compaction is achieved. The inspector should observe and approve borrow materials used and should determine if their existing moisture contents are acceptable.

C. Pavement System Inspection

Pavement subgrade soils should be inspected prior to the placement of pavement materials to verify that proper compaction has been achieved and that project specifications are being followed. A sufficient number of in place density tests should be performed to assure that the specified degree of compaction is achieved in the subbase stone layer and asphalt layers.

D. Revetment Installation Inspection

The Geotechnical Engineer should inspect the revetment subgrades. He should verify that an acceptable subgrade is available and that no very loose, soft, or organic soils areas exist beneath the revetment bearing surfaces. The Geotechnical Engineer should, also, verify that the type and specifications of the geotextile fabric used under the breakwater, and see that the fabric is properly installed, seamed and anchored.

REMARKS

This report has been prepared solely and exclusively for Davis, Moore, Shearon & Associates, Inc. to provide guidance to design professionals in developing facilities plans for the Kent Island Estates Beach Road Rehabilitation project located in Kent Island, Maryland. It has not been developed to meet the needs of others, and application of this report for other than its intended purpose could result in substantial difficulties. The Consulting Engineer cannot be held accountable for any problems which occur due to the application of this report to other than its intended purpose. This report in its entirety should be attached to the project specifications.



These analyses and recommendations are, of necessity, based on the concepts made available to us at the time of the writing of this report, and on-site conditions, surface and subsurface that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the areal extent of the site and to depth, are representative of conditions across the site. It is also recommended that we be given the opportunity to review all plans for the project in order to comment on the interaction of soil conditions as described herein and the design requirements.

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices.



APPENDIX

1. Investigative Procedures
2. Project Location Map
3. Boring Location Plans
4. Existing Site Plan
5. Revetment Cross Section Drawing
6. Boring Logs
7. California Bearing Test (CBR) Results
8. Modified Proctor Test Results
9. Unified Soil Classification Sheet
10. Field Classification Sheet
11. Important Information Sheet



INVESTIGATIVE PROCEDURES

SOIL TEST BORINGS

Soil drilling and sampling operations were performed in accordance with ASTM Specification D-1586. The borings were advanced by mechanically turning continuous hollow stem auger flights into the ground. At regular intervals, samples were obtained with a standard 1.4 inch I.D., 2.0 inch O.D. splitspoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the "Standard Penetration Resistance". The penetration resistance, when properly evaluated, is an index to the soil's strength, density and behavior under applied loads. The soil descriptions and penetration resistances for each boring are presented on the Test Boring Records in the Appendix.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigation, jar samples obtained during drilling operations are examined in our laboratory and visually classified by the geotechnical engineer in accordance with ASTM Specification D-2488. The soils are classified according to the Unified Classification System (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior.

ATTERBERG LIMITS TEST

Portions from representative soil samples obtained during drilling operations were selected for Atterberg Limits tests. The Atterberg Limits are indicative of the soil's plasticity characteristics. The liquid limit is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in accordance with ASTM Specification D-4318. The plastic limit is the moisture content at which the soil begins to lose its plasticity and is determined in accordance with ASTM Specification D-4318.

NATURAL MOISTURE TEST

Portions from representative soil samples obtained during drilling operations were selected for Natural Moisture Content testing. The Natural Moisture Content Test determines the moisture content of soils by drying the sample in an oven with a standard drying temperature of 110 °C. The loss of mass drying the sample, is used to determine the moisture content into the soil. The natural moisture content of the sample is calculated in percentage as the weight of water divided by the weight of dry soil times 100. The natural moisture content of soils is determined in accordance with ASTM Specification D-2216.



INVESTIGATIVE PROCEDURES (CONTINUED)

CALIFORNIA BEARING RATIO

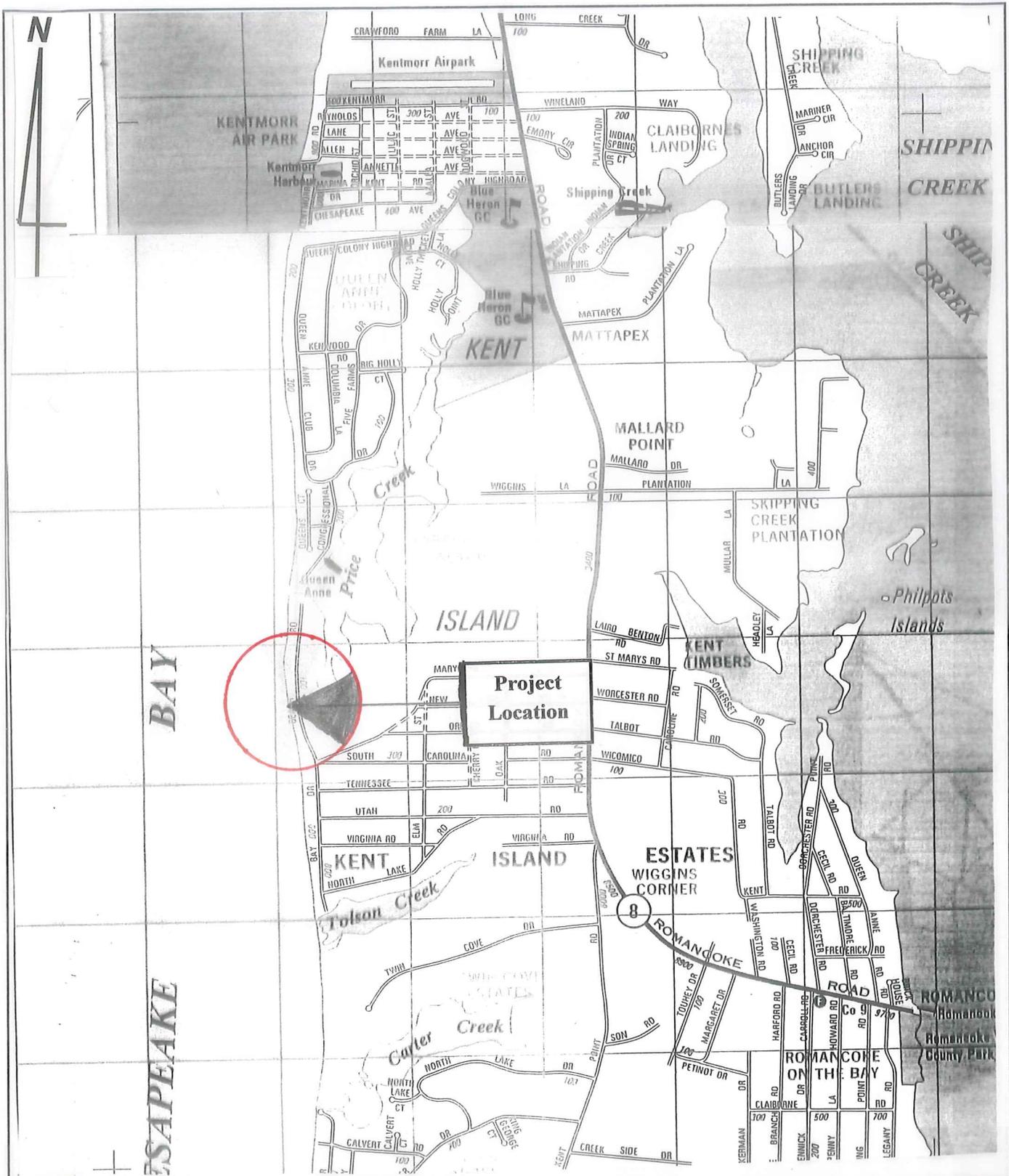
The results of the compaction testing described above were utilized in compacting samples for the laboratory California Bearing Ratio tests. The California Bearing Ratio, abbreviated as CBR, is a punching shear test. It provides data that are a semi-empirical index of the strength and deflection characteristics of a soil that has been correlated with pavement performance. This correlation has resulted in the establishment of design curves for pavement thickness.

The test is performed on a 6-inch diameter, 5-inch thick, disc of compacted soil which is confined in a steel cylinder. The specimens are first tested immediately after compaction and then soaked for four (4) days to simulate a saturated pavement subgrade.

A 1.95-inch diameter piston is forced into the soil at a standard rate and the resistance of the piston penetration is measured. The CBR is the ratio expressed as a percentage of the load at 1.0-inch piston penetration compared to the load required to produce the same penetration in a standard crushed stone.

MODIFIED PROCTOR

A Bulk sample was obtained from the pavement area test borings. A Modified Proctor compaction test (ASTM D 1557) was performed on this soil to determine its compaction characteristics, including its maximum dry density and optimum moisture content.



JOHN D. HYNES & ASSOCIATES, INC.

32185 Beaver Run Drive • Salisbury, Maryland 21804
410-546-6462 / Fax: 410-548-5346

Date: December 8, 2023

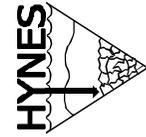
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Drawn: ADC Maps

Project Location Map
Kent Island Estates Beach Road Rehabilitation
Kent Island, Maryland

DWG. No.

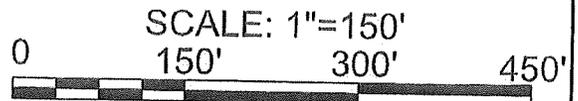
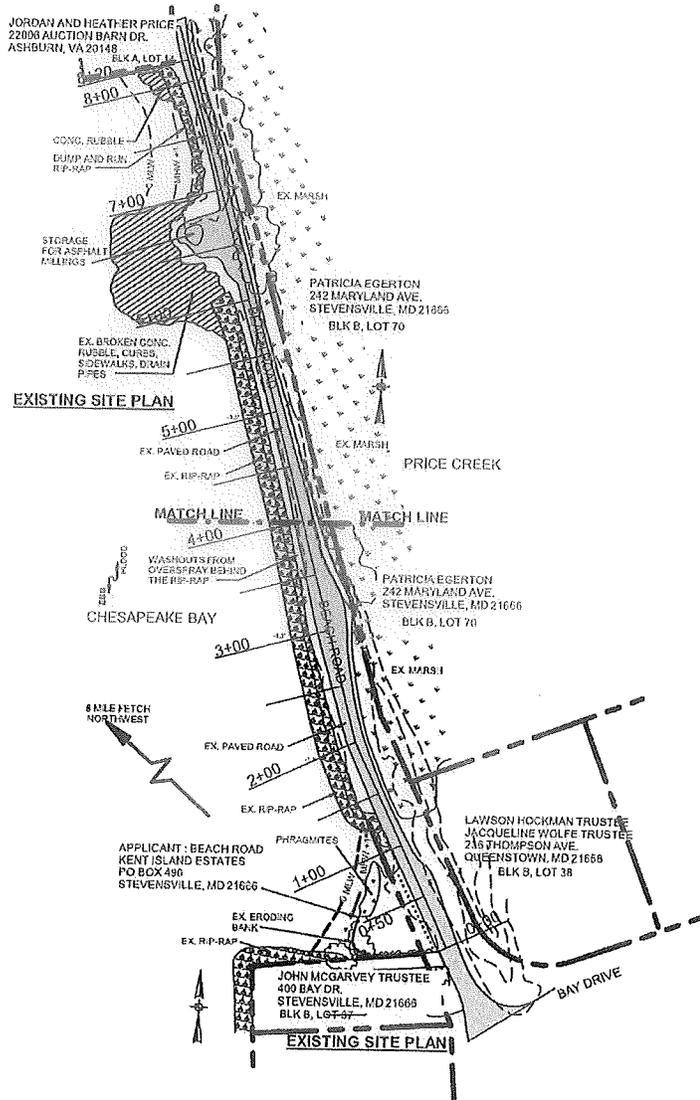
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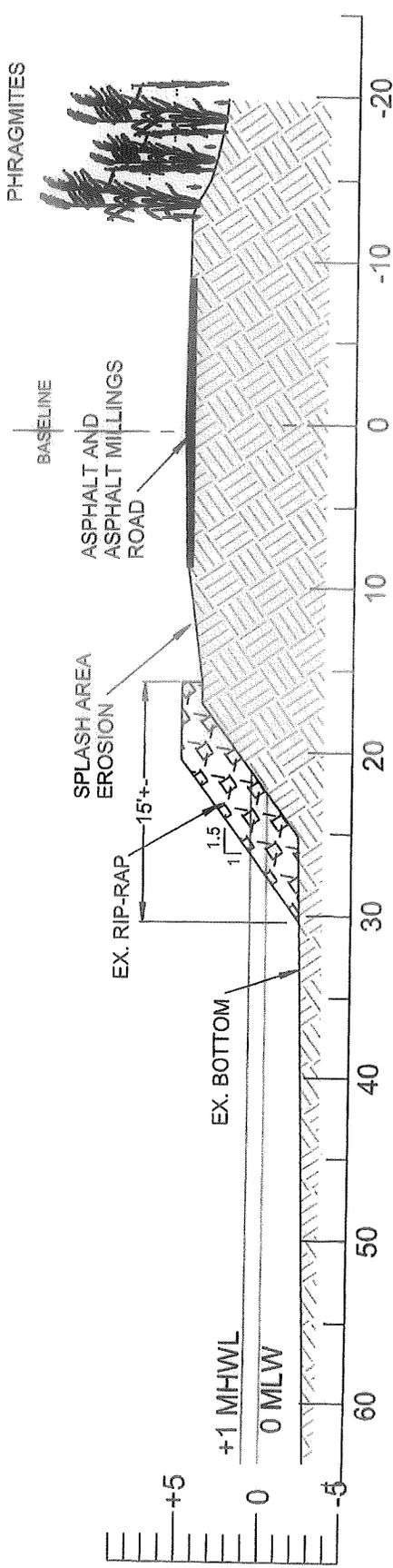
HYNES JOHN D. HYNES & ASSOCIATES, INC.
 32185 Beaver Run Drive • Salisbury, Maryland 21804
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Boring Location Plan
 Kent Island Estates Beach Road Rehabilitation
 Kent Island, Maryland

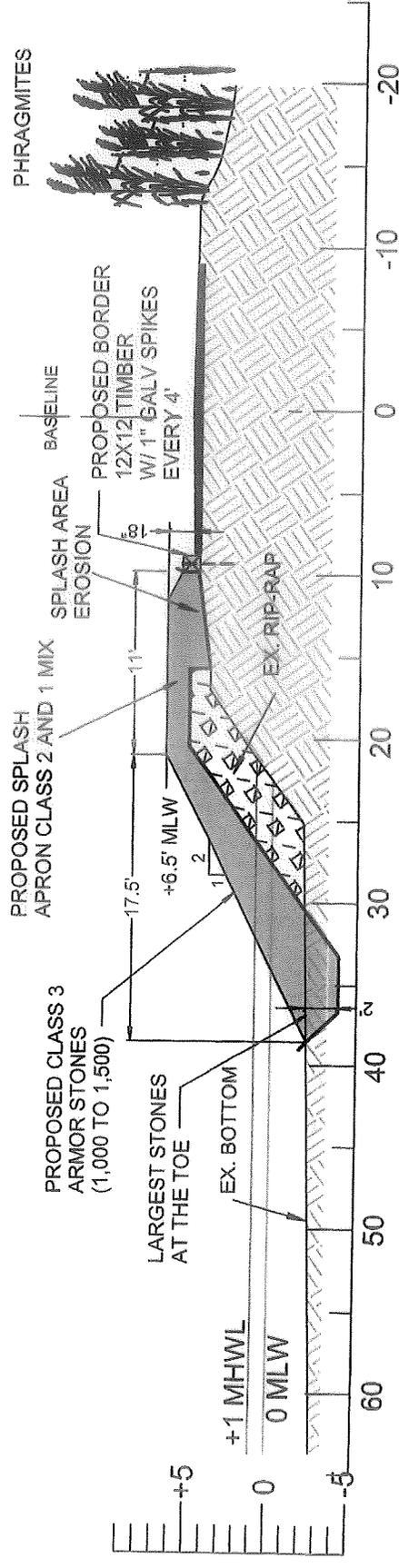
Date: December 8, 2023
 Scale: As Shown
 Drawn: Google Earth
 DWG. No. JDH-10-23-358-B



<p>OWNER : KENT ISLAND ESTATES MAILING ADDRESS: P.O. BOX 490 STEVENSVILLE, MD 21666 SITE ADDRESS: BEACH ROAD STEVENSVILLE, MD 21666</p>	<p>MAP: 70 GRID: 0 PARCEL: 114 SEC. 3 BLK. 1 LOTS 1A THRU 7 DEED REFERENCE: 00106 / 00291 DISTRICT - 04 ACCOUNT NUMBER - 074459 ZONING: NC-20 CRITICAL AREA - LDA</p>	<p>EXISTING SITE PLAN</p>
<p>Doldon W. Moore & Associates, LLC Cell: 443-771-2374 Tidal Wetlands Consultant and Facilltor P.O. Box 1 Owings, MD 20736 Email: dwmoorej@verizon.net Consulting Services, Permit Facilitation, Procc Management, Aquaculture, Habitat Restoration, Expert Testimony</p>	<p>NOTES:</p>	



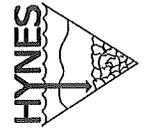
SECTION 4+00



SECTION 4+00

NOTE: ALL NEW STONE WORK IS LINED WITH FILTER CLOTH

SCALE: 1"=10'



JOHN D. HYNES & ASSOCIATES, INC.
 32185 Beaver Run Drive • Salisbury, Maryland 21804
 410-546-6462 / Fax: 410-548-5346

Revetment Cross Section Drawing
 Kent Island Estates Beach Road Rehabilitation
 Kent Island, Maryland

Date: February 19, 2024
Scale: As Shown
Drawn:
DWG. No. JDH-10-23-358



**HYNES
&
ASSOCIATES**

LOG OF BORING B-1

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21

Date Completed: : November 30, 2023
 Logged By: : E. Cross
 Drilled By: : B. Walters
 Drilling Method: : HSA (Geoprobe 3230)
 Total Depth: : 15.5 feet

Kent Island Estates Beach Road Rehab.

Project No.: JDH-10/23/358

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	Blow Count	REMARKS
0	Brown, wet, medium dense, fine to coarse SAND, with trace to little silt		ML	1	2-2-3-4	Scale 1" ~ 6.2 feet
2	Brown, wet to saturated, very soft, silty CLAY		CL	2	1-1-2	Approximately 2 inches of organic bearing soil was encountered at the ground surface.
4						Groundwater was encountered at 6 feet during drilling operations.
6	Brownish gray, saturated, medium dense, fine to medium SAND, with little silt, trace clay		SM	3	4-10-11	Boring caved in at 4.5 feet.
8				4	4-11-11	Latitude 38.891794 Longitude -76.364470
10						Laboratory Test Results
12	Brown, saturated, medium dense, fine to medium SAND, with trace to little silt		SP-SM	5	5-8-9	Sample No. 2 From 3 to 4.5 feet
14				6	4-6-7	Atterberg Limits
16	Boring terminated at 15.5 feet.					Liquid Limit = 26 Plasticity Index = 10 Natural Moisture = 23.0%
18						Sample No. 3 From 6 to 7.5 feet
20						Natural Moisture = 13.9%
22						
24						
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**HYNES
&
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LOG OF BORING B-2

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21
Kent Island Estates Beach Road Rehabilitation
Project No.: JDH-10/23/358

Date Completed: : November 30, 2023
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 3230)
Total Depth: : 40.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	Blow Count	REMARKS
0	Brownish gray, wet, medium dense, fine to coarse SAND, with little silt		SM	1	2-4-11-17	Scale 1" ~ 6.2 feet
2	Brownish gray, wet, medium dense, fine to coarse SAND, with trace to little silt, trace gravel		SP-SM	2	4-5-5-6	Groundwater was encountered at 6 feet during drilling operations.
4	Brown, saturated, very loose, fine to medium SAND, with little silt, little clay		SM	3	4-1-1-1	Boring caved in at 5 feet.
6	Brown, saturated, medium stiff, silty CLAY		CL	4	1-1-2-4	Latitude 38.892143 Longitude -76.364777
8	Brown, saturated, medium dense, fine to medium SAND, with little silt, trace clay		SM	5	6-7-7-9	Laboratory Test Results
10						Sample No. 4 From 6 to 8 feet
12	Brown, saturated, loose, fine to medium SAND, with trace to little silt		SP-SM	6	2-4-5	Atterberg Limits
14						Liquid Limit = 36 Plasticity Index = 16 Natural Moisture = 29.3%
16						
18	Brown to gray, saturated, very loose to medium dense, fine to medium SAND, with trace silt			7	2-3-4	
20						
22						
24			SP	8	3-3-2	
26						
28						
30				9	3-7-9	
32	Dark gray, saturated, medium dense, fine to medium SAND and clayey SILT		SM-ML	10	4-6-9	
34						
36						
38	Gray, saturated, dense, fine to medium SAND, with little silt, trace clay (shell fragments)		SM	11	8-16-21	
40						
42	Boring terminated at 40.5 feet.					



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LOG OF BORING B-3

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21
Kent Island Estates Beach Road Rehabilitation
Project No.: JDH-10/23/358

Date Completed: : November 30, 2023
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : HSA (Geoprobe 3230)
Total Depth: : 40.5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	Blow Count	REMARKS
0	Brown, wet, medium dense, fine to coarse SAND, with little silt, little clay, trace gravel		SM	1	2-3-4-7	Scale 1" ~ 6.2 feet Groundwater was encountered at 5.5 feet during drilling operations.
2				2	3-4-5-7	
4	Brown to black, wet to saturated, very loose, fine to coarse SAND, with trace silt		SP	3	3-3-1-1	Boring caved in at 4 feet.
6	Grayish brown, saturated, very soft, silty CLAY, with trace sand		CL-ML	4	1-1-1-1	Latitude 38.892847 Longitude -76.365010
8	Grayish brown, saturated, medium dense, fine to medium SAND, with little silt		SM	5	2-3-7-5	Laboratory Test Results Sample No. 4 From 6 to 8 feet Atterberg Limits Liquid Limit = 20 Plasticity Index = 5 Natural Moisture = 15.2%
10				6	6-8-9	
12	Dark gray to dark brown, saturated, very soft to very stiff, clayey organic SILT, with trace sand		OL	7	6-13-16	
14				8	1-1-2	
16				9	3-7-13	
18	Dark gray, saturated, medium dense, fine to medium SAND and clayey SILT		SM-ML	10	5-6-11	
20				11	6-8-12	
22	Boring terminated at 40.5 feet.					
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**HYNES
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LOG OF BORING B-4

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21
Kent Island Estates Beach Road Rehabilitation
Project No.: JDH-10/23/358

Date Completed: : November 30, 2023
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	Brown, wet, fine to medium SAND, with trace silt		SP	1	Scale 1" ~ 6.2 feet
2	Gray, wet, silty CLAY, with little sand, trace gravel		CL	2	Approximately 10 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 5 feet during drilling operations. Latitude 38.89254 Longitude -76.36480 Laboratory Test Results Sample No. 3 From 3 to 4 feet Natural Moisture = 22.6%
4	Gray, wet, silty CLAY		CH	3	
4	Dark gray, wet to saturated, silty CLAY, with little sand		CL	4	
6	Boring terminated at 5 feet.				
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LOG OF BORING B-5

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21

Date Completed: : November 30, 2023
 Logged By: : E. Cross
 Drilled By: : B. Walters
 Drilling Method: : HSA (Geoprobe 3230)
 Total Depth: : 15.5 feet

Kent Island Estates Beach Road Rehab.

Project No.: JDH-10/23/358

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	Blow Count	REMARKS
0	Brown, wet, very loose, fine to medium SAND, with little silt, trace clay		SM	1	1-2-2-3	Scale 1" ~ 6.2 feet
2	Gray to brown, wet to saturated, loose, fine to coarse SAND, with trace silt		SP	2	1-2-4	Approximately 12 inches of organic bearing soil was encountered at the ground surface.
4				3	2-4-4	Groundwater was encountered at 7 feet during drilling operations.
6				4	1-1-1	Boring caved in at 4.5 feet.
8	Dark gray, saturated, very soft, CLAY and SILT		CL-ML	4		Latitude 38.893788 Longitude -76.365248
10	Gray, saturated, very soft, silty CLAY, with little sand		CL	5	1-1-2	
12	Gray, saturated, medium dense, fine to medium SAND, with trace silt		SP	6	2-5-6	
14	Boring terminated at 15.5 feet.					
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LOG OF BORING B-6

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21
Kent Island Estates Beach Road Rehabilitation
Project No.: JDH-10/23/358

Date Completed: : November 30, 2023
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	Brown, wet, fine to medium SAND, with little silt, little clay		SM	1	Scale 1" ~ 6.2 feet
2	Grayish brown, wet to saturated, fine to medium SAND, with trace silt		SP	2	Approximately 14 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 3 feet during drilling operations. Latitude 38.894422 Longitude -76.365264
4	Very dark brown, saturated, clayey organic SILT, with trace sand		OL	3	
6				4	
8	Boring terminated at 5 feet.				
10					
12					
14					
16					
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LOG OF BORING B-7

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21
Kent Island Estates Beach Road Rehabilitation
Project No.: JDH-10/23/358

Date Completed: : November 30, 2023
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	Brownish gray, wet, fine to medium SAND, with trace to little silt		SP-SM	1	Scale 1" ~ 6.2 feet Approximately 14 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 3 feet during drilling operations. Latitude 38.895211 Longitude -76.365222 Sample No. 2 From 2 to 3 feet Natural Moisture = 20.8%
2				2	
4	Brown to gray, saturated, fine to coarse SAND, with trace silt		SP	3	
4				4	
6	Boring terminated at 5 feet.				
8					
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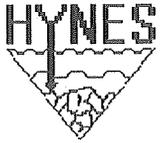
LOG OF BORING B-8

(Page 1 of 1)

Davis, Moore, Shearon & Associates, Inc.
P.O. Box 80
Centreville, Maryland 21
Kent Island Estates Beach Road Rehabilitation
Project No.: JDH-10/23/358

Date Completed: : November 30, 2023
Logged By: : E. Cross
Drilled By: : B. Walters
Drilling Method: : Hand Auger
Total Depth: : 5 feet

Depth in Feet	DESCRIPTION	GRAPHIC	USCS	Sample	REMARKS
0	Brown, fine to medium SAND, with trace to little gravel, trace silt (shell fragments)		SP	1	Scale 1" ~ 6.2 feet Approximately 14 inches of organic bearing soil was encountered at the ground surface. Groundwater was encountered at 4 feet during drilling operations. Latitude 38.89328 Longitude -76.36509
2	Grayish brown, wet, silty CLAY, with trace sand		CL	2	
4	Grayish brown, wet to saturated, fine to coarse SAND, with trace silt		SP	3	
4				4	
6	Boring terminated at 5 feet.				
8					
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JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants

Monitoring Well Installation

Construction Inspection and Materials Testing

RECORD NO: 16391

TEST TYPE: 3 point Mod CBR/15 lb.

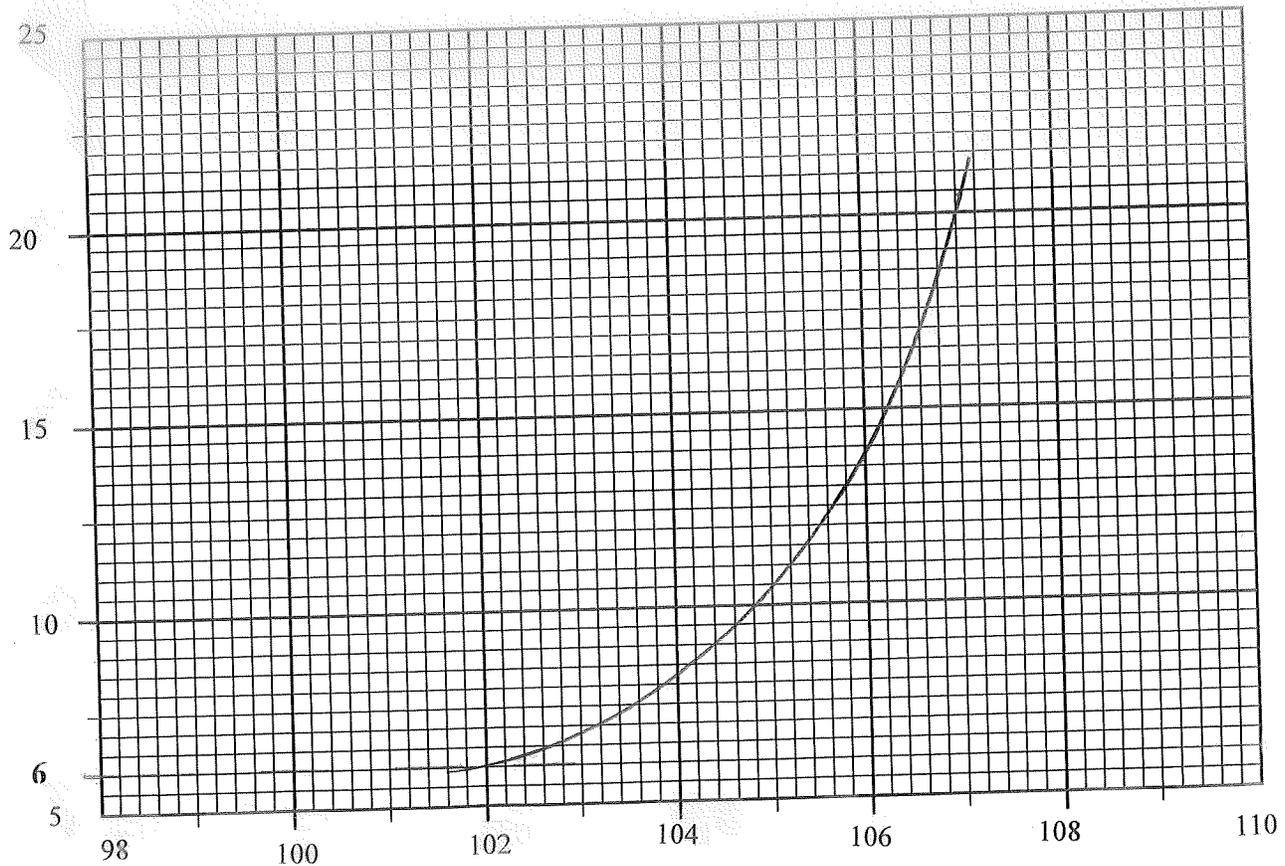
MADE FOR: Davis, Moore, Shearon & Associates

TEST DATE: December 11, 2023

PROJECT: Kent Island Estates Beach Road Rehabilitation

LOCATION: B-4

TEST METHOD: ASTM D-1883

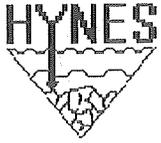


Data: Brown, fine to medium SAND, with trace silt (SP)

CBR = 6 at 102.0 pcf

JOHN D. HYNES & ASSOCIATES, INC.

By: R. Culbertson



JOHN D. HYNES & ASSOCIATES, INC.

*Geotechnical and Environmental Consultants
Monitoring Well Installation
Construction Inspection and Materials Testing*

RECORD NO: 16390

TEST TYPE: 3 point Mod CBR/15 lb.

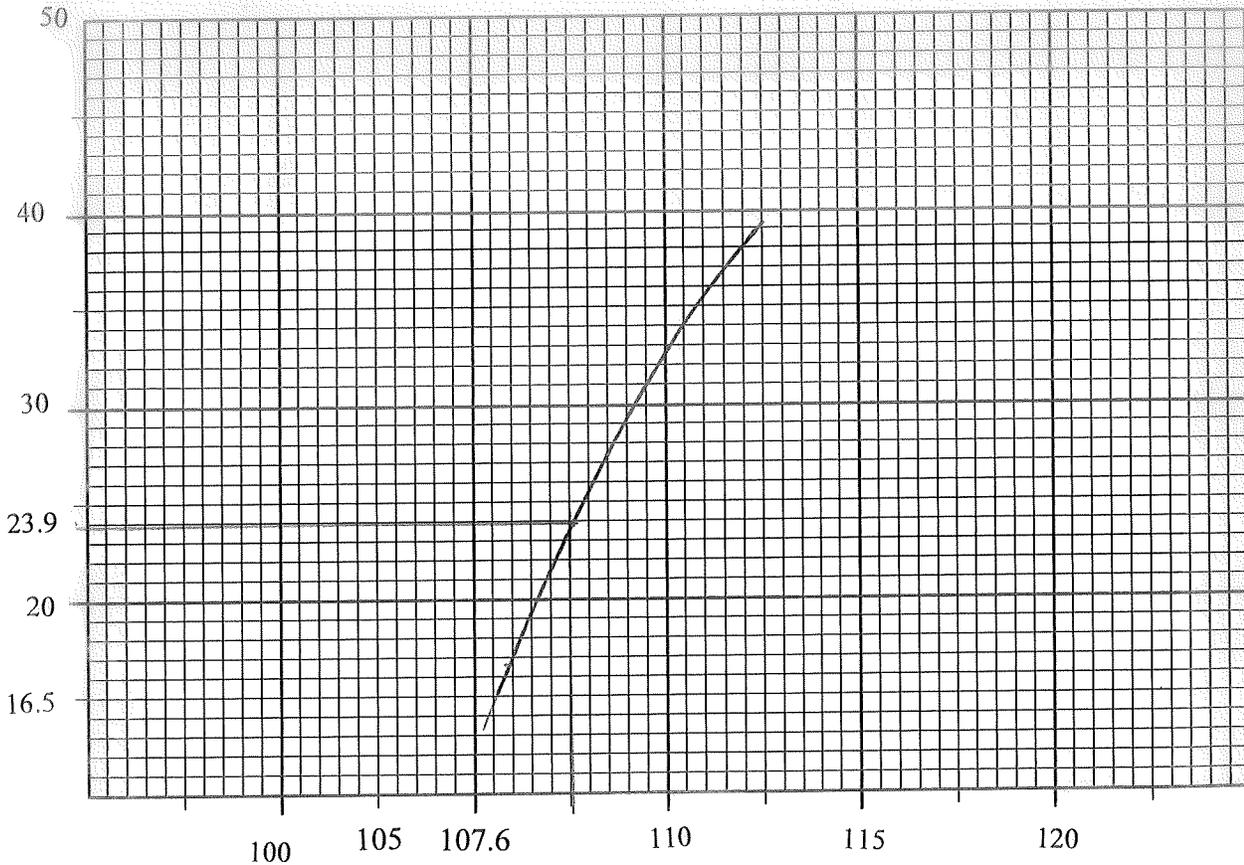
MADE FOR: Davis, Moore, Shearon & Associates

TEST DATE: December 23, 2023

PROJECT: Kent Island Estates Beach Road Rehabilitation

LOCATION: B-6

TEST METHOD: ASTM D-1883

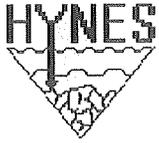


Data: Brown, fine to medium SAND, with little silt, trace clay (SM)

CBR = 24 at 107.6 pcf

JOHN D. HYNES & ASSOCIATES, INC.

By: R. Culbertson



JOHN D. HYNES & ASSOCIATES, INC.

Geotechnical and Environmental Consultants

Monitoring Well Installation

Construction Inspection and Materials Testing

RECORD NO: 16389

TEST TYPE: 3 point Mod CBR/15 lb.

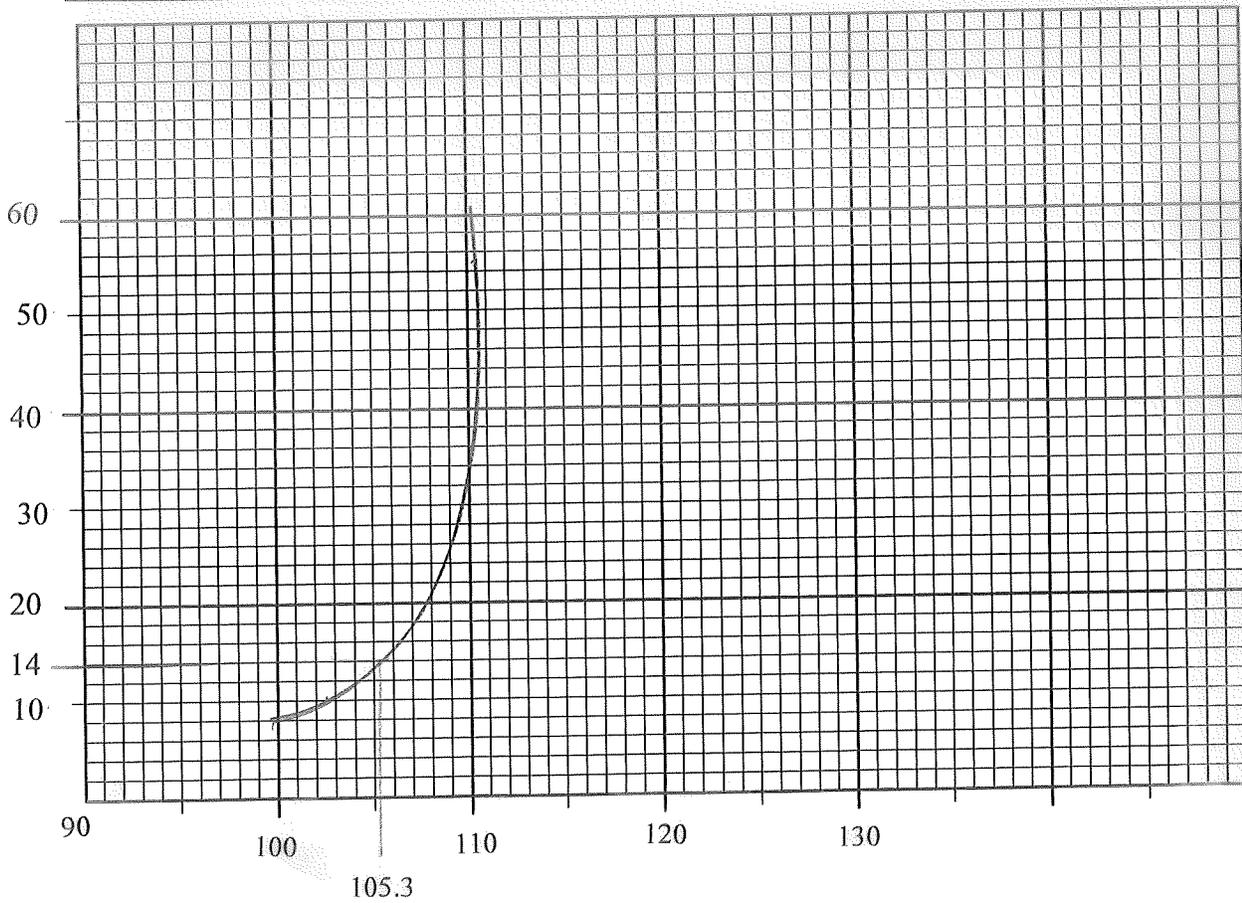
MADE FOR: Davis, Moore, Shearon & Associates

TEST DATE: December 11, 2023

PROJECT: Kent Island Estates Beach Road Rehabilitation

LOCATION: B-8

TEST METHOD: ASTM D-1883



Data: Light brown, fine to medium SAND, with trace to little shells, trace silt (SP)

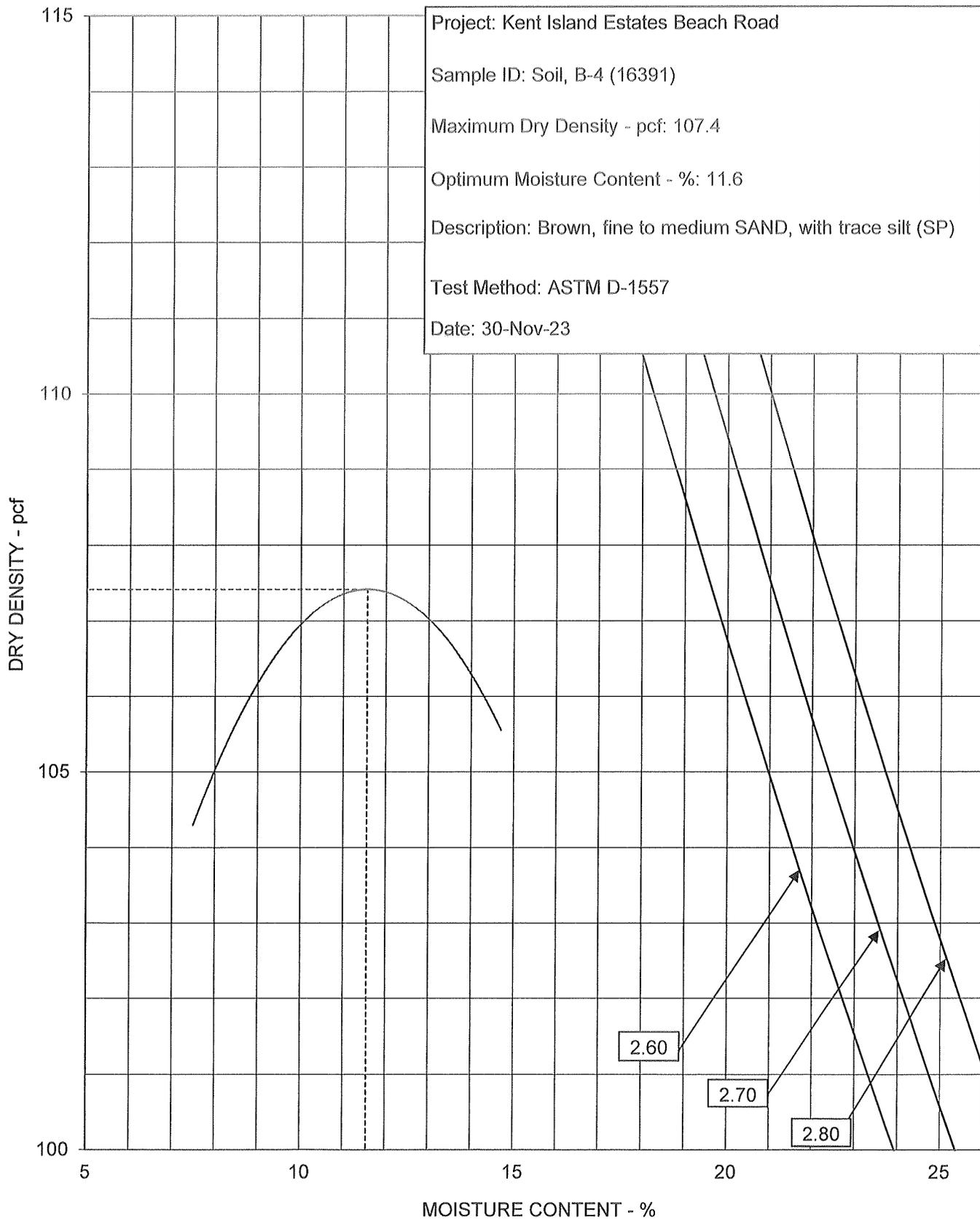
CBR = 14 at 105.3 pcf

JOHN D. HYNES & ASSOCIATES, INC.

By: R. Culbertson

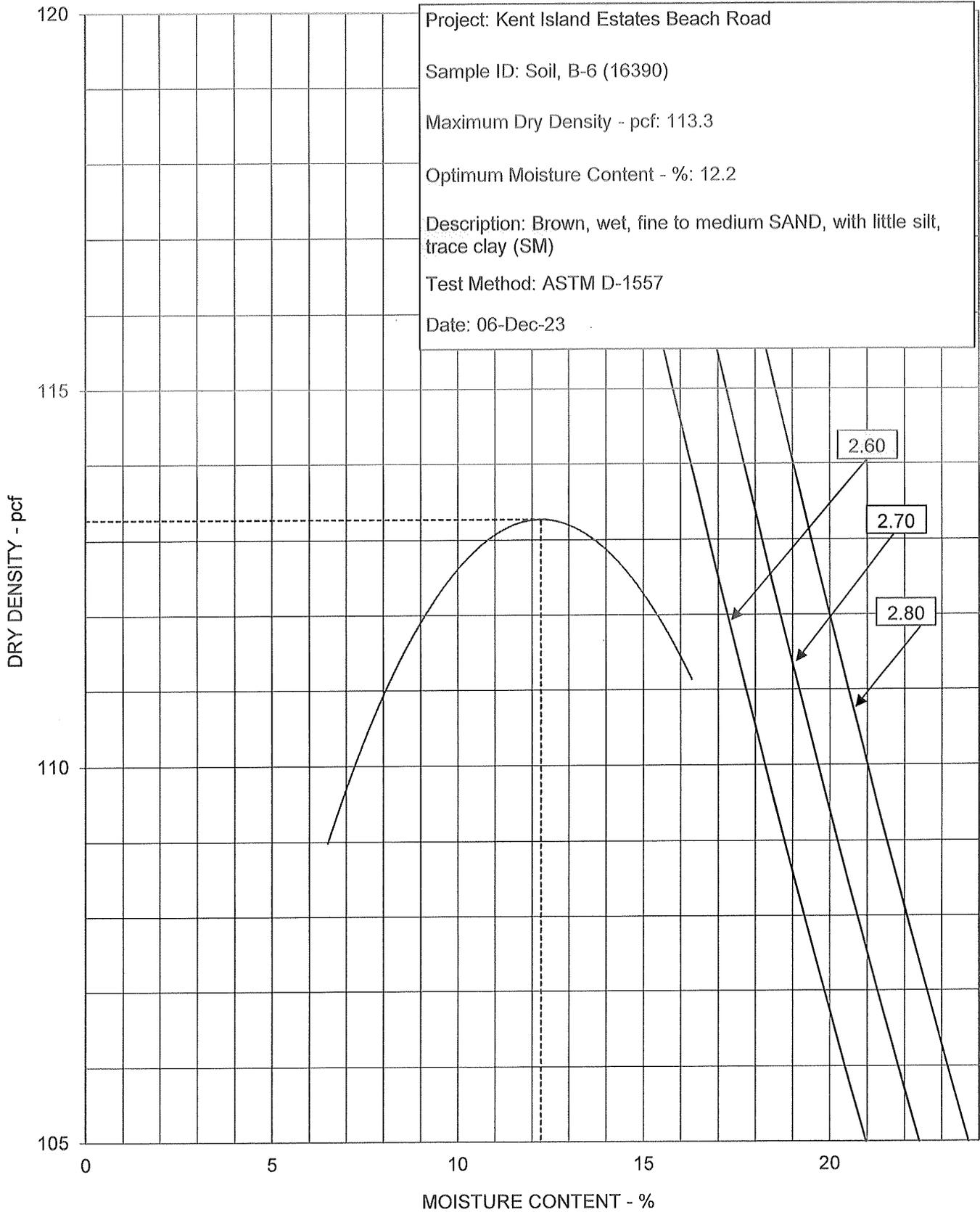


John D. Hynes & Associates



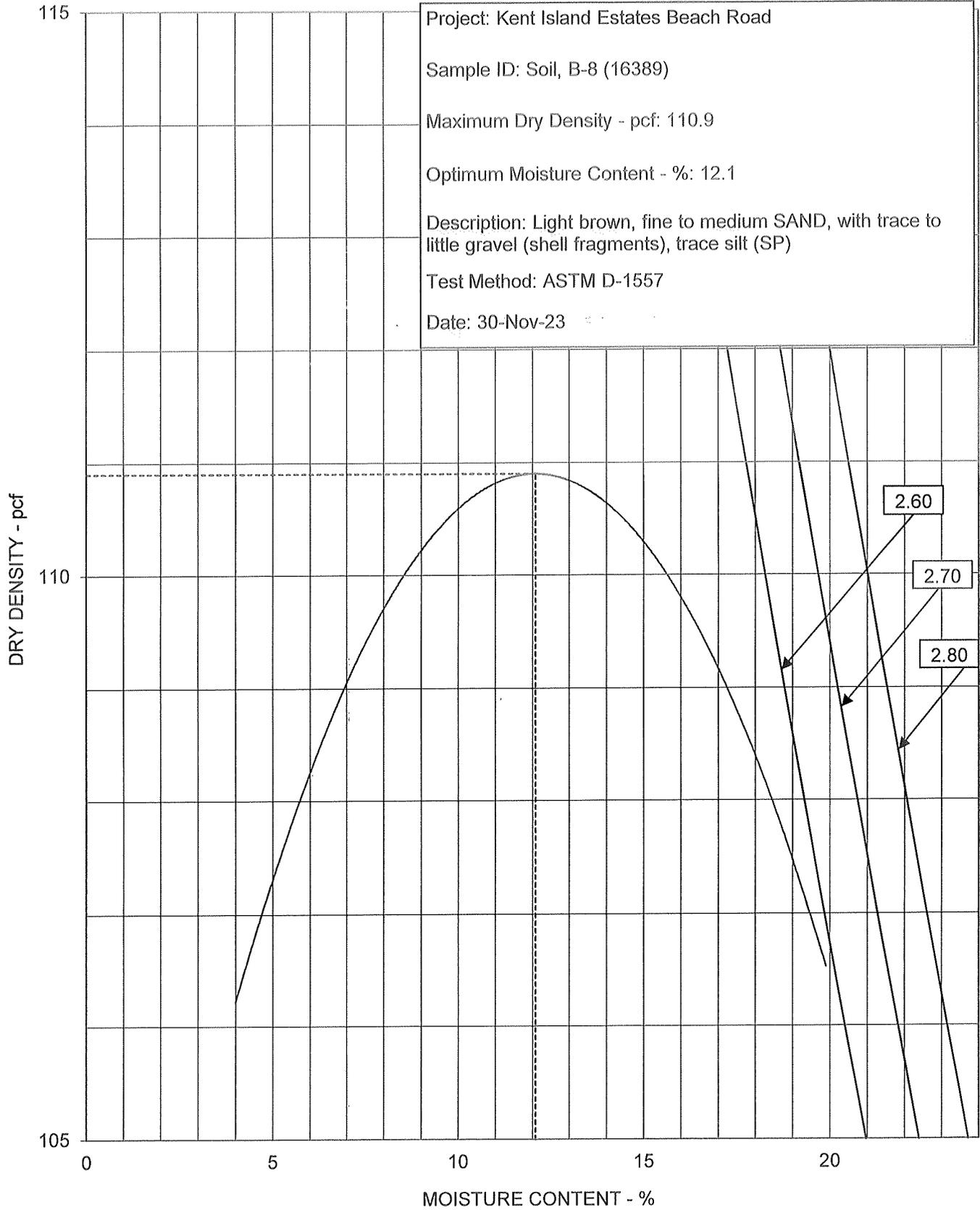


John D. Hynes & Associates





John D. Hynes & Associates



Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. Contact the geotechnical engineer before applying this report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.*

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists.*



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