

## Addendum No. 1

Issued: March 3, 2023

Project: South Brunswick Public Library

No. of pages: 46

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To all Bidders:

In accordance with Instructions to Bidders, Bid Forms, etc., the following modifications, deletions, and additions to the Drawings and Specifications shall become a part of the Contract Documents superseding previously issued documents to the extent modified by this Addendum.

Acknowledge receipt of all Addendum in the space provided on the Bid Forms.

### **Modifications**

Item #1: **General** – Include the attached Sub-Surface Soil Investigation and Report by ANS Consultants, Inc. as part of the documents.

Item #2: **General** – Instruction to Bidders and Statutory Requirements, Section V – Insurance and Indemnification, Item A.2 General Liability Insurance – This section is removed and replaced in its entirety by the following:

2. Commercial General Liability insurance coverage, written on an occurrence basis, and must not be altered by any endorsements limiting coverage. Limits of liability shall not be less than the following:

\$2,000,000. General Aggregate per location/per job

\$2,000,000. Products/Completed Operations

\$1,000,000. Personal Injury and Advertising Injury Limit

\$1,000,000. Each Occurrence Combined Single Limit for Bodily Injury and Property Damage

Item #3: **General** – Instruction to Bidders and Statutory Requirements, Section V – Insurance and Indemnification add the following Item D Builder’s Risk Insurance:

D. Builder's Risk Insurance. Where appropriate, the Township may purchase Builder's Risk Insurance and maintain same for the life of the Contract. Such Builder's Risk Insurance shall cover the structures of the partially completed project under construction and be in an amount equal to the Bid Price of the Contract. The insurance shall, at a minimum, insure against the perils of fire, vandalism, malicious mischief and collapse.

Item #4: **Drawing A.221 Exterior Wall Sections** – Install aluminum composite panels at the vertical surfaces of the (3) exterior canopies. Additional canopy specifications were requested, however, the canopies are not a specific product. They are to be constructed on site. Refer to the exterior wall sections and structural drawings for additional information.

Item #5: **Drawing A.221 Exterior Wall Sections** – At Section 4/A.221, disregard the detail reference to 7/A.105 and 8/A.105.

Item #6: **Drawing A.521 Storefront Schedule** – Storefront S4 at Art 177 is a folding glass wall system. Refer to the description in the margin for the Basis of Design product.

Item #7: **Drawing A.602 Partial First Floor Finish Plan** – The Basis of Design product for CLG-1 is Armstrong Cirrus Item No. 584, 15/16”, angled tegular tile.

### **Clarifications**

Item #8: Hazardous materials are not expected to be encountered during the renovation. The GC is to notify the Owner and Architect immediately upon discovery of any suspected hazardous materials. The Owner will then coordinate the investigation and removal as required.

Item #9: A Project Labor Agreement is not required for this project.

Item #10: There are no specific requirements on self-performance of work for this project.

Item #11: The Bid Form is for the entire project. The cost for the building and all other work not listed in the Unit Costs will be included in Item #130 on the Bid Form.

Item #12: There is no irrigation system on this project.

Item #13: Theater seating will be provided and installed by Owner.

Item #14: All permit fees will be paid for by the Owner. Refer to Page ITB-4, Section VI, Pricing Information for Preparation of Bids, Item B.

Item #15: South Brunswick Public Library fire systems are maintained by:

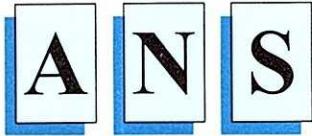
Elite Design & Fire Protection LLC  
305 Kimball St  
Woodbridge, NJ 07095  
732-382-5050

Monitoring of fire alarm systems are through:

Dynamic Protection Systems  
333 Cedar Avenue, Suite 2  
Middlesex, NJ 08846  
732-805-3000

Item #16: Do not scale the drawings for the size of porcelain tiles or other finishes. Refer to the product descriptions for the Basis of Design product sizes.

END OF ADDENDUM



**CONSULTANTS, INC.**  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

Tel: (800) 545-ATUL  
(908) 754-8383  
Fax: (908) 754-8633

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January 11, 2022

Center State Engineering  
481 Spotswood Englishtown Road  
Monroe Township, NJ 08831

Attn.: Mr. Danny DiGiovanni, PE  
Project Manager

Re: **Sub-surface Soil Investigation & Report**  
South Brunswick Public Library  
110 Kingston Lane  
Monmouth Junction, NJ 08852  
Block # 51 & Lot # 11.011, 18, 23, 24, 25 & 26

Dear Mr. DiGiovanni,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Foundation Recommendation Report for the four (4) Soil Borings and four (4) Field Percolation Tests performed on December 28, 2021 and December 29, 2021 at the project referenced above.

Soil samples collected during soil boring program will be discarded after thirty (30) days from the date of this report, if not requested in advance to do otherwise. We thank you very much for providing us an opportunity to service you on this project.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,  
ANS Consultants, Inc.

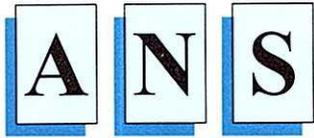
Atulkumar N. Shah, PE, PP, F. ASCE  
President  
NJ PE License #24GE03443900  
ANS / DP

Reported: Center State Engineering - (3); File - (1)

File: ANU-5342\_01.SB

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Dear Mr. DiGiovanni,

Enclosed, please find three (3) copies of the Subsurface Soil Investigation & Foundation Recommendation Report for the four (4) Soil Borings and four (4) Field Percolation Tests performed on December 28, 2021 and December 29, 2021 at the project referenced above. The soil boring work was performed in accordance with our revised signed proposal dated December 22, 2021.

Our **Scope of Services** included the following:

1. Drilling and full-time inspection of total of four (4) test borings down to a maximum of 22'-0" depth or to refusal, whichever comes first, recording of groundwater level or depth to bedrock if encountered in the contracted depth.
2. Perform four (4) field percolation tests.
3. Performance of engineering evaluation to determine the stratification and physical properties of the subsurface materials and to develop and recommend appropriate type of foundation systems.
4. Preparation of a written report summarizing all findings and recommendations.

**PROPOSED CONSTRUCTION:**

The project site is located at 110 Kingston Ln, Monmouth Junction, New Jersey in Middlesex County. At the present time, the property consists of South Brunswick Public Library. We understand that an expansion work is proposed at the library. Since detailed construction drawings were not provided, our recommendations are based upon IBC-2018 and construction material loads for the building construction based upon American National Standards. Please see soil boring location plan in Appendix-A for the exact location and Appendix-C for photographs for the existing conditions.

### **SITE CONDITIONS:**

The subject site is located towards north side of Kingston Ln, and west side of Major Rd. The site was noted to be fairly levelled during the soil boring activities and was primarily surrounded by residential and commercial properties. The subject property is located at an approximate Latitude 40° 23' 00.65" N, and Longitude 74° 31' 51.77" W, on the USGS Digital Elevation Model. It is at an elevation of 89' above mean sea level. See the site location map in Appendix-A for more details.

### **FIELD INVESTIGATION:**

#### **SOIL BORING:**

The soil boring locations were selected and marked by an ANS field representative based upon the equipment access. Surface utility mark-out was performed by New Jersey One-Call System. Once cleared, the soil boring work was initiated on December 28, 2021.

Four (4) Soil Borings, B-1 to B-4 were drilled during the geo-technical investigation at the site on December 28, 2021, and December 29, 2021. The soil boring locations are indicated on the Soil Boring Location Plan which is included in Appendix-A. Soil boring work was performed under the direction and supervision of field engineer Mr. Syed Abbas. The borings were drilled using a 3" diameter hollow stem auger. Soil samples were collected continuously down to 12'-0" depth and then at 5'-0" intervals down to 22'-0" depth in boring B-1 to B-4. Soil samples were extracted using a 2" diameter split spoon sampler as the sampling procedure specified in ASTM 1586-99.

Soil samples were obtained by the Standard Penetration Test (SPT) Method (ASTM D 1586), which consists of driving a 2-inch outside-diameter split-spoon sampler into the soil with a 140-pound weight falling freely from a distance of 30 inches. The samplers were driven in four successive 6-inch increments, with the number of blows per increment being recorded. The number of blows required to advance the sampler in the middle 12 inches is termed as the Standard Penetration Resistance (N-value) and is presented on the Field Test Boring Logs in Appendix-A.

During drilling operations, extracted soil samples were visually examined and classified by our Field Engineer. The soil sample description, Standard penetration test (SPT) blow counts and locations, strata changes, groundwater depth and other pertinent information were recorded on a detailed field log. Soil samples obtained from the split spoon sampler were visually classified according to the Unified Soil Classification System (USCS). Samples were later returned to our laboratory for further review and testing.

#### **FIELD PERCOLATION TEST:**

Four (4) field percolation tests were performed near soil boring locations as shown on attached location plan. Tests were performed by drilling a hole using auger and then installing a 2" diameter PVC pipe at test depth. Bottom of PVC pipe was secured, and water was filled to the top of the pipe, and the ground around the PVC pipe was saturated for one hour. After saturation time, drops in water level were recorded at a constant time interval and, percolation rate was calculated by taking average of all drops per hour. Detailed field percolation test report is enclosed in appendix-A.

**LABORATORY TESTING:**

Four (4) soil samples, one from each boring were laboratory tested to determine in-place moisture content and to classify the soil as per Unified Soil Classification System, ASTM-D2487-93. The findings are summarized below. Laboratory test reports are enclosed in Appendix -B.

Soil Boring Number	Soil Sample Number	Depth Sample collected	% Moisture Content	Fines thru #200 Sieve	USCS Classification Symbol
B-1	S-1	4' – 6'	15.8	19.4	SM
B-2	S-2	6' – 8'	13.0	11.4	SP-SM
B-3	S-3	8' – 10'	19.6	12.0	SP-SM
B-4	S-4	10' – 12'	10.6	11.7	SP-SM

SP-SM: A mixture of poorly graded sand and silty sands    SM: Silty sands

**SUBSURFACE CONDITIONS:**

Detailed description of the soil encountered in the test boring is documented in the boring log which is presented in Appendix-A. The following gives a general description of the subsurface conditions encountered at the borings. While the borings may indicate that the subsurface conditions appear to be relatively uniform across the site, it should be recognized that the size of borings was small compared to the size of the site, and that the existence of anomalies cannot be precluded.

According to NJ Geoweb website, the geological formation is Pensauken formation, and the geologic age is Pliocene. The soil contains sand, clayey sand, pebble gravel, minor silt, clay, and cobble gravel; yellow, reddish yellow, white. Sand typically includes weathered feldspar. Locally iron-cemented. As much as 140 feet thick.

Based on the results of soil borings and our geo-technical laboratory testing, we estimate the general stratigraphy of the site to consist of the following major units, in an increasing order of depth.

**Stratum-1:** Fill material containing green, orange, brown, gray, silt, clay, f/c sand, f/c gravel, fragments of wood, trace roots, and fragments of cinder block were noted under this stratum down to 6' depth in boring B-1, and down to 2' depth in boring B-3, and B-4. The relative density of this material was noted to be in dense condition. The relative stiffness of this material varied between very soft and medium stiff.

**Stratum-2:** Green, orange, brown, silt, clay, f/c sand, gravel, and roots were noted under this stratum between 6' and 10' depth in boring B-1, down to 4' depth in boring B-2, between 2' and 8' depth in boring B-4. The relative density of this material was noted to be in medium dense condition. The relative stiffness of this material varied between very soft and medium stiff.

**Stratum-3:** Orange, tan, green, gray, red, black, brown, f/c sand, silt, f/c gravel, and clayey silt were noted under this stratum between 10' and 22' depth in boring B-1, between 4' and 22' depth in boring B-2, between 2' and 22' depth in boring B-3, and between 8' and 22' depth in boring B-4. The relative density of this material varied between very loose and dense. The relative stiffness of this material varied between soft and medium stiff.

**SUMMARY OF FINDINGS:**

Boring number	Depth	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity	Recommended Safe Soil Bearing Capacity
B-1	0' – 2'	4	FILL	800	800
B-1	2' – 4'	44	FILL	+5000	2000
B-1	4' – 6'	11	FILL	2200	2000
B-1	6' – 8'	17	SM/GM	3400	2000
B-1	8' – 10'	10	SM/GM	2000	2000
B-1	10' – 12'	10	SM/GM	2000	2000
B-1	15' – 17'	9	SM/GM	1800	2000
B-1	20' – 22'	7	SM/GM	1400	1500

Boring number	Depth	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity	Recommended Safe Soil Bearing Capacity
B-2	0' – 2'	7	SM/GM	1400	500
B-2	2' – 4'	2	SM/GM	400	500
B-2	4' – 6'	4	SM/GM	800	800
B-2	6' – 8'	15	SM/GM	3000	2000
B-2	8' – 10'	18	SM/GM	3600	2000
B-2	10' – 12'	6	SM/GM	1200	1500
B-2	15' – 17'	10	SM/GM	2000	2000
B-2	20' – 22'	13	SM/GM	2600	2500

Boring number	Depth	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity	Recommended Safe Soil Bearing Capacity
B-3	0' – 2'	3	FILL	600	600
B-3	2' – 4'	16	SM/GM	3200	2000
B-3	4' – 6'	31	SM/GM	+5000	2000
B-3	6' – 8'	16	SM/GM	3200	2000
B-3	8' – 10'	12	SM	2400	2000
B-3	10' – 12'	4	SM	800	1000
B-3	15' – 17'	9	SM/GM	1800	2000
B-3	20' – 22'	5	SM/GM	1000	1500

Boring number	Depth	Penetration Resistance N-Value	Soil Type	In-Place Soil Bearing Capacity	Recommended Safe Soil Bearing Capacity
B-4	0' – 2'	4	FILL	800	800
B-4	2' – 4'	12	CL-ML	2400	2000
B-4	4' – 6'	7	SC-SM	1400	1500
B-4	6' – 8'	11	SC-SM	2200	2000
B-4	8' – 10'	9	SM/GM	1800	2000
B-4	10' – 12'	5	SM/GM	1000	1000
B-4	15' – 17'	13	SM/GM	2600	2000
B-4	20' – 22'	11	SM/GM	2200	2000

**GROUNDWATER:**

Ground water was encountered at 6'-8" depth in boring B-1, at 7'-10" depth in boring B-2, at 6'-2" depth in boring B-3, and at 6'-4" depth in boring B-4 below existing grade. It should be noted that groundwater level will fluctuate due to variations in rainfall or other factors not evident at the time of our investigation.

**CONCLUSIONS:**

1. Groundwater level varied between 6'-2" and 7'-10" depth in borings B-1 to B-4 below existing grade surface. Consequently, we anticipate that groundwater management during construction will be critical.
2. Fill was noted down to 6' depth in boring B-1, and down to 2' depth in boing B-3, and B-4. Except fill, the majority of the on-site soil in borings B-1 to B-4 was noted to be clay, silt, sand, and gravel down to 4' to 10' depth, followed by silt, sand, and gravel down to 22' depth. The on-site soil will be suitable as structural fill. Depending upon the time of the year when the actual construction takes place, drying of excavated sandy soil and aeration may be required to reduce the moisture content. In-situ moisture content of soil varied between 10.6% and 19.6%, which is generally considered moist to wet.
3. The following parameters should be used for seismic design of the building in accordance with IBC-2018:

Description	Parameter	Recommended value
Mapped Spectral Acceleration for short periods:	S <sub>s</sub>	0.243
Mapped Spectral Acceleration for 1-sec period:	S <sub>1</sub>	0.054
Site Class:	D	Stiff Soil
Site Coefficient:	F <sub>a</sub>	1.6
Site Coefficient:	F <sub>v</sub>	2.4
5 percent damped Design spectral response acceleration at short periods:	SD <sub>s</sub>	0.259
5 percent damped Design spectral response acceleration at 1-sec periods:	SD <sub>1</sub>	0.087

4. Any fill used as backfill material within the building and pavement areas should consist of approved portions of the on-site granular soils, which have been maintained at moisture contents suitable for compaction or select fill should be imported. All fill should be placed in lift in the order of twelve (12) inches in loose thickness and be uniformly compacted to at least 95% of its maximum dry density as determined by the modified proctor density values derived based upon ASTM D-1557-98 test procedure.

In addition, we recommend that backfill soil placed in confined areas, such as foundation or utility excavations, should be spread in lifts in the order of six (6) to eight (8) inches in loose thickness and it should be compacted to the same degree using manually operated vibratory compaction equipment. We recommend that temporary construction slopes be established at one vertical to two horizontal or flatter, or as required by the governing safety codes.

#### **FOUNDATION DESIGN CRITERIA:**

Noted 2' to 6' of loose fill. We recommend that the foundation for the proposed expansion work of existing library shall be supported by conventional shallow foundations established on undisturbed/virgin soil noted 4' to 6' below grade. Foundation should be designed to impose maximum allowable net bearing pressure of up to 2,000 pounds per square foot.

Over excavation and backfilling using ¾" clean crushed stones will be required if any soft areas are encountered. Any pockets of localized unsuitable soil encountered during foundation excavation should be completely removed. The over excavated area should be backfilled utilizing either controlled compacted fill or ¾" size clean gravels. Any footing or slab placed in this area will require over excavation, removal of unsuitable material and backfilling with ¾" size stones or controlled compacted fill. Placing additional reinforcing steel to strength the footing over soft soil may be required.

We recommend that exterior foundations be established at least three feet six inches below the adjacent exterior grade, or as required by local ordinance, to provide protection from frost penetration. The maximum post-construction settlements of foundations designed and constructed in accordance with our recommendations will be in the order of ¾" or less.

#### **FLOOR SLAB DESIGN CRITERIA:**

A complete removal of loose fill from the top 2' to 6' depth will be required. The floor slab shall be supported directly on the compacted sub-grade of onsite material or controlled compacted structural fill. Compaction of the sand below the floor slab sub-grade to 95% of its optimum density will be required. We recommend performing compaction test at the rate of one test per 200-sq.ft. area. Recommended Modulus of Sub-Grade reaction is 100 pci.

To minimize dampness, we recommend that the floor should be underlain by a six (6) mil polyethylene moisture barrier and six (6) inch thick layer of clean ¾ inch crushed stone to provide a stable working area during construction and serve as a capillary break between the base of the slab and the underlying silty sub-grade soils. It may be desirable to install footing drains so that any water which accumulates in the stone drainage layer could be removed by pumping.

Any back fill required for the structural area to be off site or 3/4" clean crushed stones may be utilized to minimize the influence of moisture on the first fill layer. All off-site fill should be composed of relatively well graded sand and gravel containing less than 15% by weight passing U.S. Standard #200 sieve and having a maximum particle size of six inches.

Acceptable soil materials for backfill and fill should be free of clay, rock or gravel larger than six (6) inches in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter and it should comply with ASTM D-2487-91 soil classification groups GW, GP, SM, SW and SP.

All fill should be placed in lifts in the order of twelve (12) inches in loose thickness and it should be uniformly compacted to at least 95% of its maximum dry density as determined by the modified proctor density values derived based upon ASTM D-1557-93 test procedure. In addition, we recommend that backfill soils placed in confined areas, such as foundation or utility excavations, should be spread in lifts in the order of six to eight inches in loose thickness and be compacted to the same degree using manually operated vibratory compaction equipment.

#### **BELOW GRADE WALLS:**

We recommend that the exterior building walls should be constructed with a continuous perimeter foundation drain to convey localized groundwater seepage away from the building and prevent the hydrostatic pressures built-up against the walls. The drain could consist of a 6 to 8 inch diameter PVC pipe surrounded on all sides by a minimum of six (6) inches of clean 3/8" crushed gravel. The pipe should drain by gravity to the site storm water system, if feasible, or should be connected to a sump pit where any water could be removed by pumping.

Soil Unit weight (total):	120 pcf
Angle of Internal Friction:	27 degrees
Coefficient of sliding friction:	0.4
Coefficient of active earth pressure:	0.28
Coefficient of passive earth pressure:	3.57

#### **RECOMMENDATIONS FOR THE EARTHWORK FOUNDATION CONSTRUCTION:**

**Clearing and Stripping:** Clearing and stripping would include removing vegetation and any boulders or any loose or unsuitable soil at the distance of 5 feet beyond the limits of the proposed building excavation, structure, and paved areas. Limits of stripping should conform to construction permit limitations.

**Soil Erosion and Sediment Control:** Clearing and stripping should be performed in accordance with the requirements of the soil erosion and sediment control plan and environment permits.

**Drainage and Dewatering:** Site runoff during construction should be controlled in accordance with the soil erosion and sediment control plan. Interim grading during earthwork should be planned to prevent ponding of water in the prepared subgrade.

**Protection of Utilities:** Existing utilities, in the area of construction should be marked to protect from damage during excavation and foundation construction. Excavations should be stopped if they could potentially undermine existing utilities.

**Excavation & side slope:** An unbraced excavation slope of 2.0 horizontal to 1 vertical or flatter may be considered in the planning for construction. Sheeting and bracing, and or slope stabilization systems should be used wherever the unbraced slope pass beneath utilities or structures, the active roadway arrears and/or where it is found to be necessary or more cost effective to use sheeting in order to limit the size of the excavations and maintain traffic. Sheeting and bracing systems and excavation slopes may be designed using the soil properties presented in summary table provided earlier.

**Proof rolling and compaction of Pavement and Fill Subgrades:** Following stripping or excavation to plan elevations, all subgrades for placement of new foundation or parking lot pavement should be proof rolled using a vibratory roller with minimum 1 ton static weight in confined areas along side walls and 10 tons static weight in the footprint of the building and general roadway paved areas. Footing subgrades should be compacted with small area vibratory plate compactors. Proof rolling should be observed and evaluated by a qualified Geotechnical engineer or technician familiar with site conditions.

#### **MINIMUM PAVEMENT DESIGN SECTIONS:**

##### **ACCESS ROAD AND TRUCK TRAFFIC AREAS**

Bituminous Concrete Surface Course (NJDOT I-5)	2 inches
Bituminous Concrete Base Course (NJDOT I-2)	4 inches
Quarry Process Sub-Base Course (NJ DOT DGA)	<u>6 inches</u>
<b>TOTAL SECTION THICKNESS</b>	<b>12 inches</b>

##### **AUTOMOBILE PARKING AREAS**

Bituminous Concrete Surface Course (NJDOT I-5)	2 inches
Bituminous Concrete Base Course (NJDOT I-2)	3 inches
Quarry Process Sub-Base Course (NJ DOT DGA)	<u>4 inches</u>
<b>TOTAL SECTION THICKNESS</b>	<b>9 inches</b>

As previously discussed, it is recommended that the loose soils at the surface should be proof rolled and densified with a heavy vibratory compactor. With this recommended compaction, a CBR value of six (6) would be appropriate for use in the design of flexible pavements over site soils with imported granular fill, the CBR could be about eight (8).

#### **RECOMMENDED SERVICES:**

It is recommended that we should be retained to provide continuous observation and Soil engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations, and to allow design charges in the event that subsurface conditions differ from those anticipated prior to start of construction.

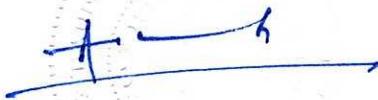
**LIMITATIONS:**

The recommendations contained in this report are our best professional judgment as to be followed in the design and construction of the proposed project. There may be subsurface conditions not disclosed by the explorations adequately identify subsurface conditions for the purpose of this study. If during construction any differences are found between the report of the explorations and the actual subsurface conditions, they should be brought to our attention immediately so that the effect in our recommendations can be evaluated.

This report has been prepared in accordance with generally accepted Geo-technical Engineering practices for the exclusive use of our client, Center State Engineering, and their designated representative(s). No other warranty, express or implied is made. Contractor's wishes to use the soil boring information may do at their own risk. Unless specifically indicated to the contrary in this report, this report does not address environmental considerations, which may affect the site development. The conclusions and recommendations of this report are not intended to supersede or overlook any N.J.D.E.P. Environmental conditions, which should be reflected in the site planning.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (908)754-8383.

Sincerely,  
ANS Consultants, Inc.

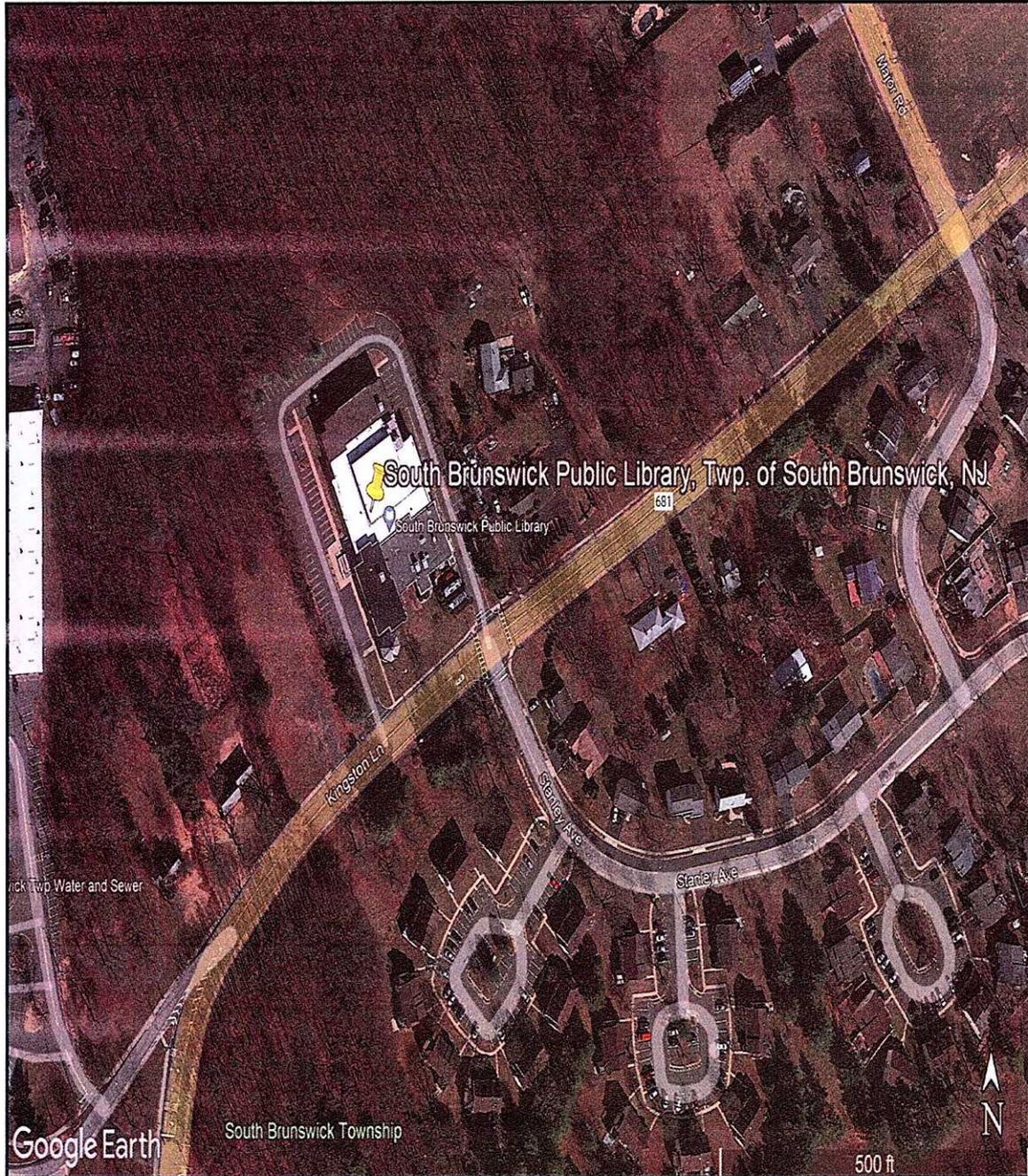
A handwritten signature in blue ink, appearing to read 'Atukumar N. Shah', is written over a horizontal line. The signature is stylized and includes a vertical stroke on the left side.

Atukumar N. Shah, PE, PP, F. ASCE  
President  
NJ PE License #24GE03443900  
ANS / DP

Reported: Center State Engineering - (3); File - (1)

# Appendix-A

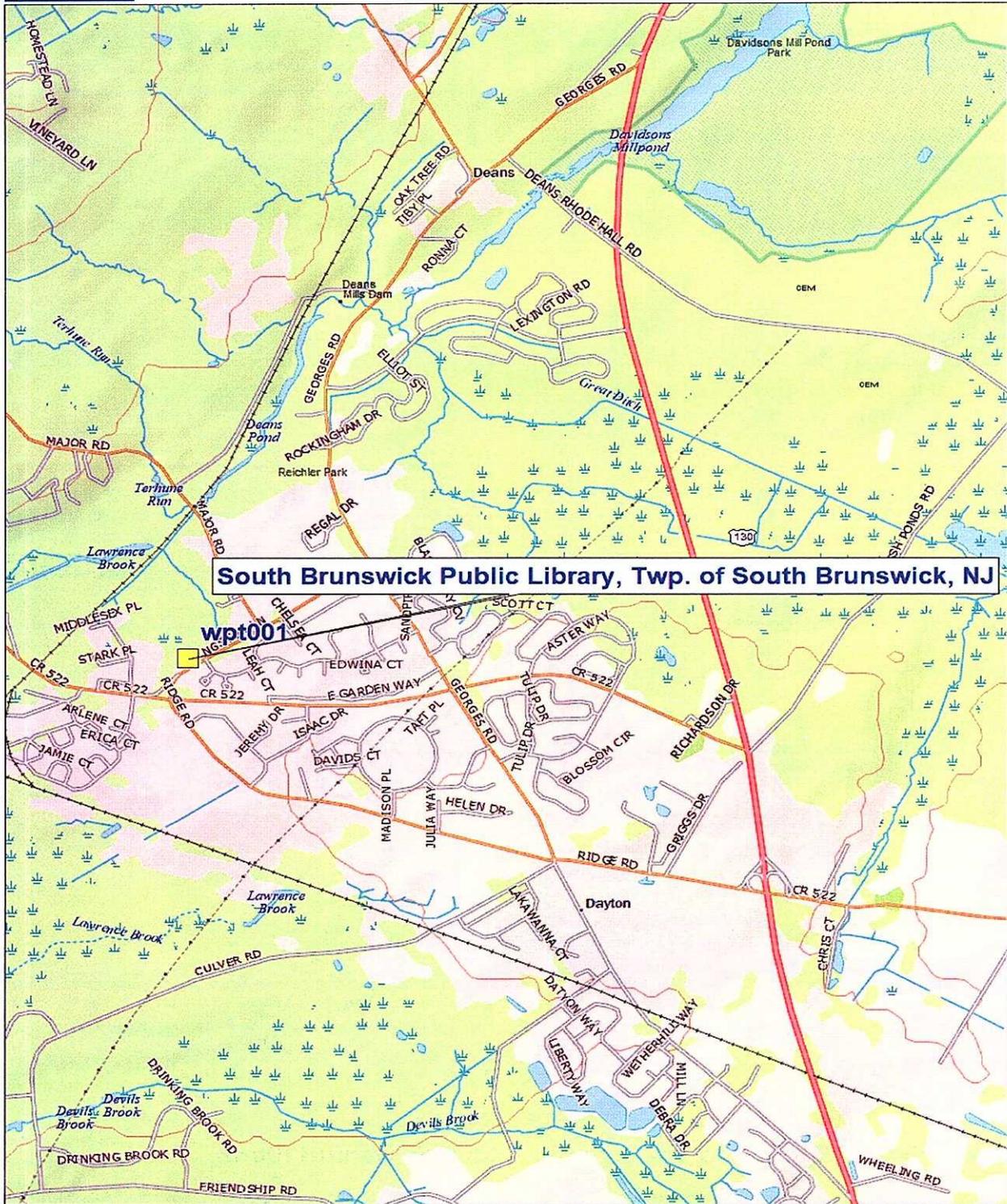
**GOOGLE MAP**



**Client: Center State Engineering**  
**Project: South Brunswick Public Library**  
**South Brunswick Twp., NJ**



**CONSULTANTS, INC.**  
4405 South Clinton Avenue  
South Plainfield, NJ 07080



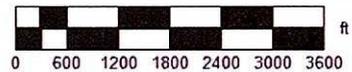
Data use subject to license.

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www.delorme.com



MN (12.6° W)

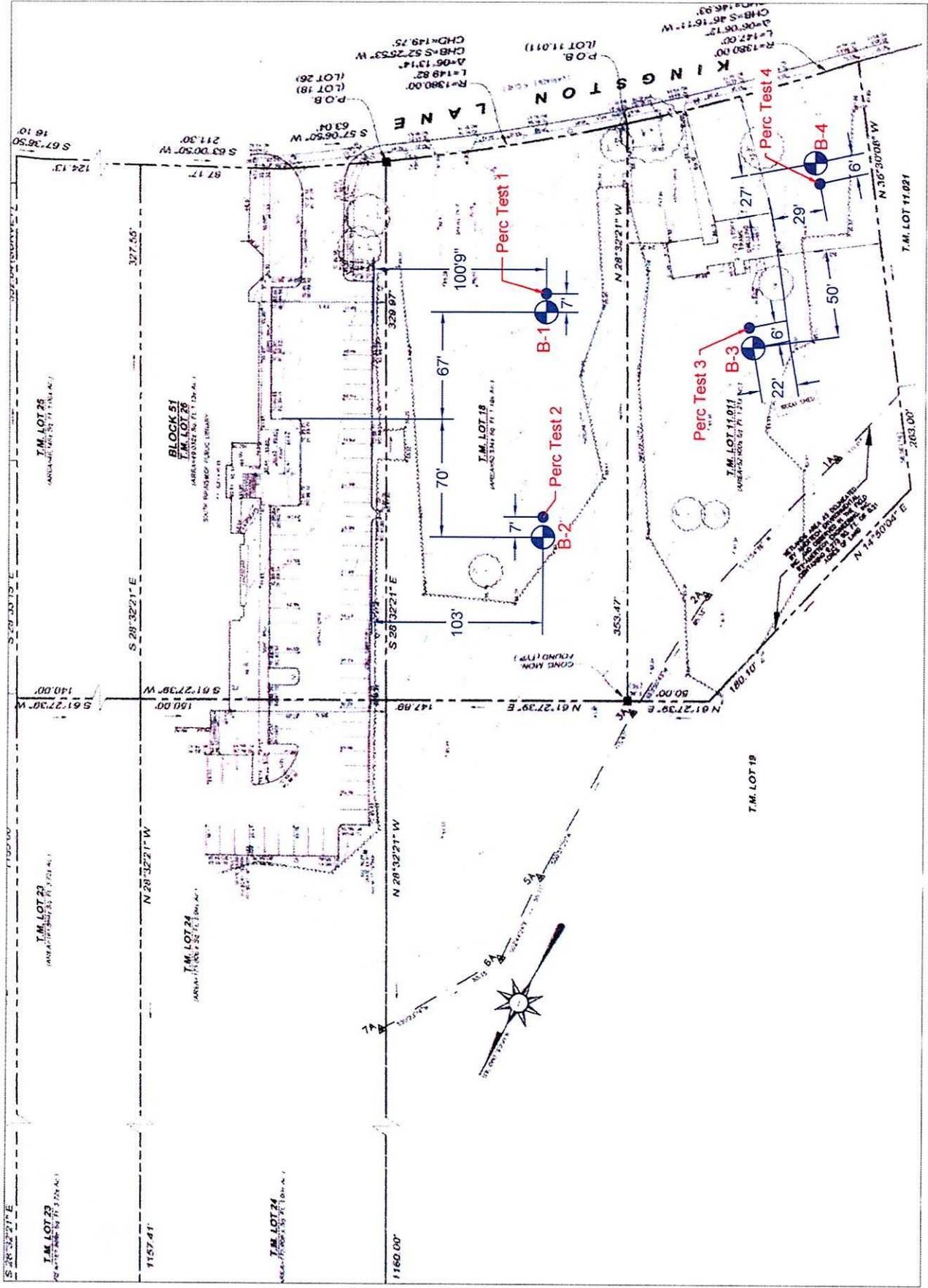


Data Zoom 13-0

### SITE LOCATION MAP

South Brunswick Public Library, South Brunswick, NJ

	CONSULTANTS, INC.
	4405 South Clinton Avenue
	South Plainfield, NJ 07080



CLIENT: Center State Engineering  
 PROJECT: 110 Kingston Ln, Monmouth Junction, NJ  
 ANS CONSULTANTS INC.  
 4405 SOUTH CLINTON AVE.  
 SO. PLAINFIELD, NJ, 07080  
 PHONE: (908) 754 8383 FAX: (908) 754 8633  
 BY: Dharmin Parekh DATE: 1/10/2022  
 Project No: ANU-5342

**SOIL BORING LOCATION PLAN**

SCALE: N.T.S

**LEGEND:**  
 Soil boring location

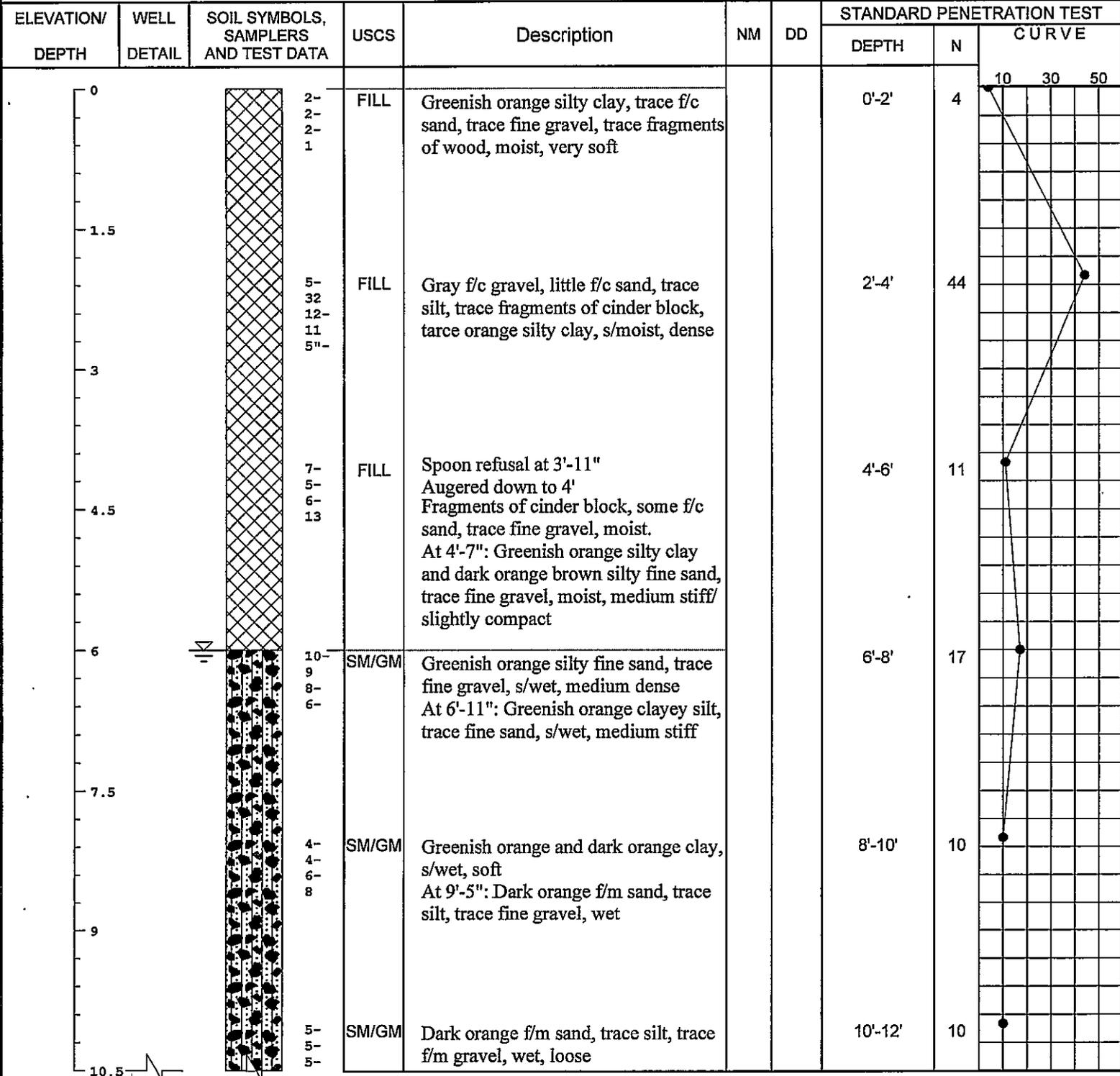
# DRILL HOLE LOG

## BORING NO.: B-1

**PROJECT:** South Bunswick Public Library  
**CLIENT:** Center State Engineering  
**LOCATION:** 110 Kingston Ln, Monmouth Junction, NJ 08852  
**DRILLER:** Jesus, Frank, A. Shah  
**DRILL RIG:** Acker XLS  
**DEPTH TO WATER > INITIAL**  $\nabla$  : 6'-8"

**PROJECT NO.:** ANU-5342  
**DATE:** 12/28/2021  
**ELEVATION:** N/A  
**LOGGED BY:** Syed Abbas

**AT COMPLETION**  $\nabla$  :



This information pertains only to this boring and should not be interpreted as being indicative of the site.

# DRILL HOLE LOG

BORING NO.: B-1

PROJECT: South Bunswick Public Library

PROJECT NO.: ANU-5342

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST				
							DEPTH	N	CURVE		
10.5			5					10	30	50	
12					Augered down to 15'						
13.5											
15			4- 4- 5- 5	SM/GM	Dark orange brown f/m sand, trace silt, trace fine gravel, wet, loose			15'-17'	9		
16.5					Augered down to 20'						
18											
19.5			2- 3- 4- 6	SM/GM	Brown fine sand, trace silt, trace coarse gravel, wet, loose			20'-22'	7		
21											
22.5					Boring ended at 22'						

# DRILL HOLE LOG

## BORING NO.: B-2

**PROJECT:** South Bunswick Public Library  
**CLIENT:** Center State Engineering  
**LOCATION:** 110 Kingston Ln, Monmouth Junction, NJ 08852  
**DRILLER:** Jesus, Frank, A. Shah  
**DRILL RIG:** Acker XLS  
**DEPTH TO WATER > INITIAL**  $\nabla$  : 7'-10"

**PROJECT NO.:** ANU-5342  
**DATE:** 12/28/2021  
**ELEVATION:** N/A  
**LOGGED BY:** Syed Abbas

**AT COMPLETION**  $\nabla$  :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST		
							DEPTH	N	CURVE
									10    30    50
0  1.5  3  4.5  6  7.5  9  10.5		3- 4- 3- 1	SM/GM	Surface: 2" thick top soil Greenish orange silty clay, little f/c sand, little f/c gravel, moist, soft			0'-2'	7	
		2- 1- 1- 2	SM/GM	Orange brown clayey silt, trace fine sand, trace fine gravel, moist, very soft			2'-4'	2	
		1- 1- 3- 4	SM/GM	Orange brown silty fine sand, trace fine gravel, moist, very loose At 5': Tan orange fine sand, trace silt, trace fine gravel, moist, loose			4'-6'	4	
		3- 5- 10 - 16	SM/GM	Orange and greenish brown silty fine sand, trace f/m gravel, s/wet, s/compact			6'-8'	15	
		13- 10- 8- 5	SM/GM	Greenish orange silty fine sand, little f/c gravel, s/wet/ medium dense			8'-10'	18	
		3- 2- 4-	SM/GM	Greenish orange clayey silt, trace f/c sand, trace f/m gravel, wet, soft			10'-12'	6	

This information pertains only to this boring and should not be interpreted as being indicative of the site.



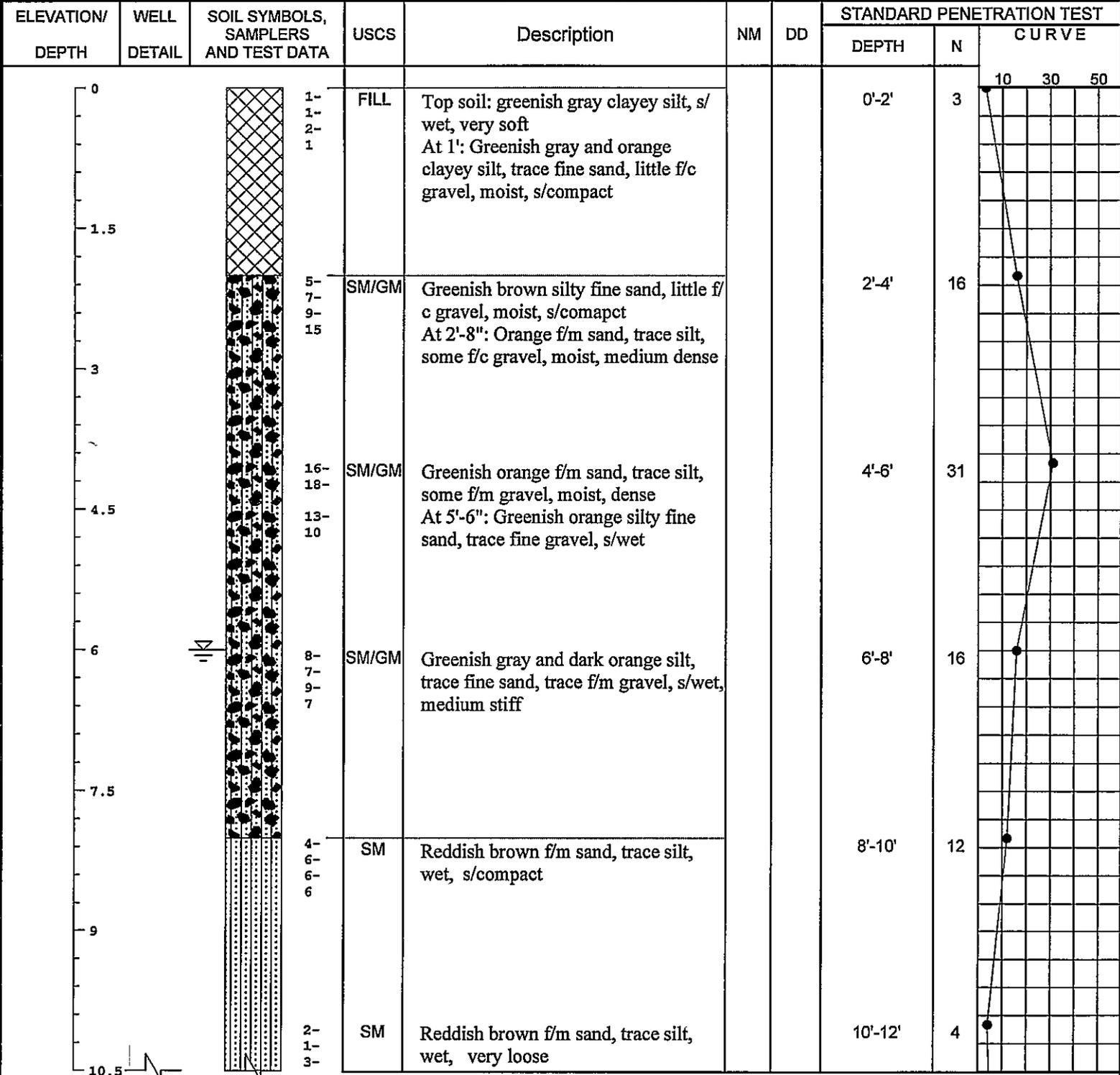
# DRILL HOLE LOG

## BORING NO.: B-3

**PROJECT:** South Bunswick Public Library  
**CLIENT:** Center State Engineering  
**LOCATION:** 110 Kingston Ln, Monmouth Junction, NJ 08852  
**DRILLER:** Jesus, Frank, A. Shah  
**DRILL RIG:** Acker XLS  
**DEPTH TO WATER >** INITIAL  $\nabla$  : 6'-2"

**PROJECT NO.:** ANU-5342  
**DATE:** 12/28/2021 & 12/29/2021  
**ELEVATION:** N/A  
**LOGGED BY:** Syed Abbas

**AT COMPLETION  $\nabla$  :**



This information pertains only to this boring and should not be interpreted as being indicative of the site.



# DRILL HOLE LOG

## BORING NO.: B-4

**PROJECT:** South Bunswick Public Library  
**CLIENT:** Center State Engineering  
**LOCATION:** 110 Kingston Ln, Monmouth Junction, NJ 08852  
**DRILLER:** Jesus, Frank, A. Shah  
**DRILL RIG:** Acker XLS  
**DEPTH TO WATER > INITIAL**  $\nabla$  : 6'-4"

**PROJECT NO.:** ANU-5342  
**DATE:** 12/29/2021  
**ELEVATION:** N/A  
**LOGGED BY:** Syed Abbas

**AT COMPLETION**  $\nabla$  :

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST		
							DEPTH	N	CURVE
0		1- 2- 2- 3	FILL	Top soil: Dark greenish gray silt, trace fine gravel, trace roots, s/wet, very soft At 1': Orange brown clayey silt, trace roots, s/wet, very soft			0'-2'	4	10 30 50
1.5		5- 5- 7- 8	CL-ML	Orange brown silty clay, trace roots, moist, medium stiff			2'-4'	12	
3		3- 3- 4- 5	SC-SM	Orange brown clayey silt, trace roots, moist, soft At 5'-6": Dark orange silty fine sand, s/wet			4'-6'	7	
4.5		6- 6- 5- 3	SC-SM	Orange brown f/m sand, little silt, trace fragments of clay, wet, s/compact			6'-8'	11	
6	$\nabla$	3- 4- 5- 4	SM/GM	Reddish brown f/m sand, trace silt, trace fine gravel, wet, loose			8'-10'	9	
7.5		2- 2- 3-	SM/GM	Reddish brown f/m sand, trace silt, trace fine gravel, wet, very loose			10'-12'	5	
9									
10.5									

This information pertains only to this boring and should not be interpreted as being indicative of the site.

# DRILL HOLE LOG

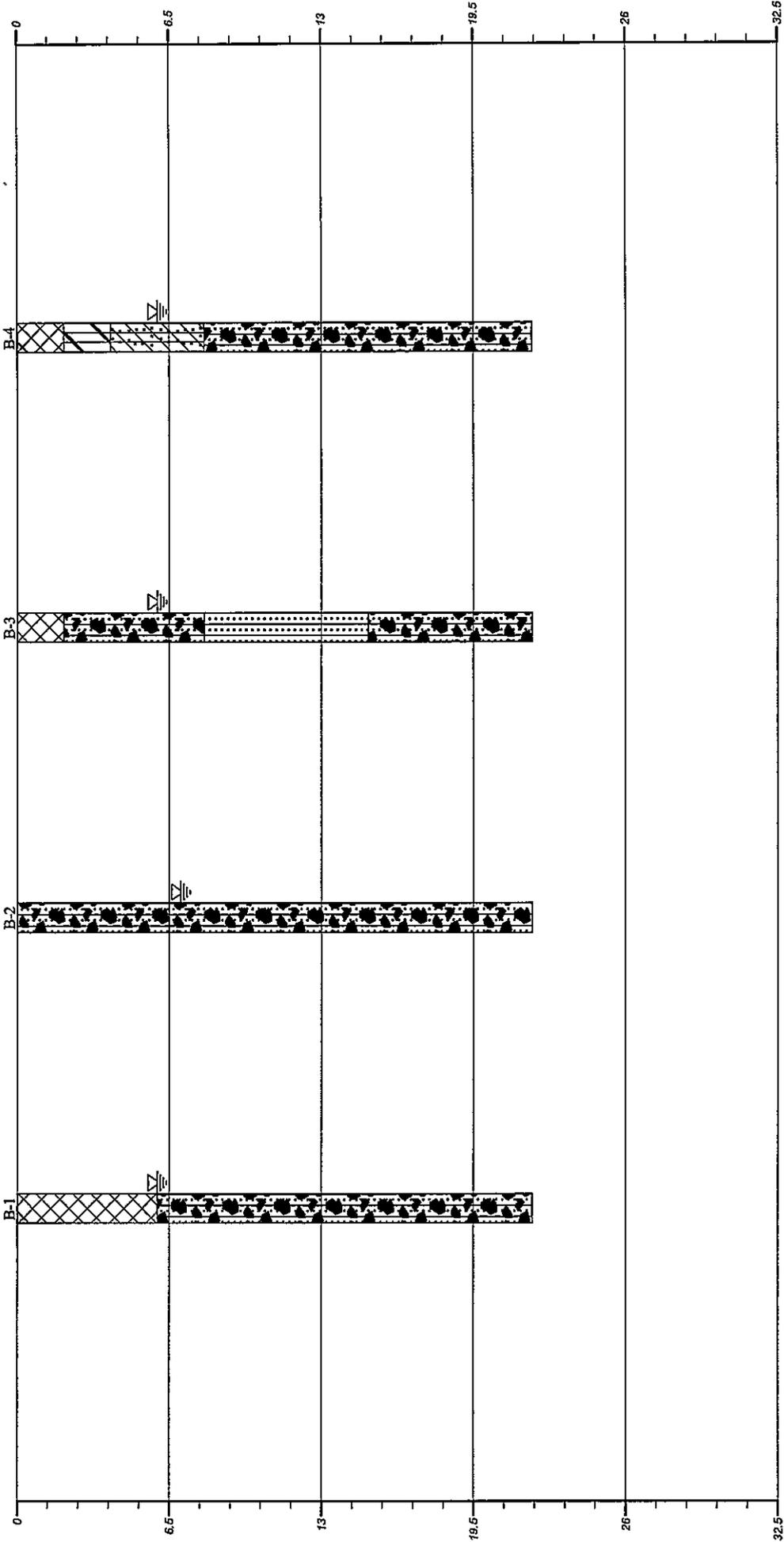
BORING NO.: B-4

PROJECT: South Bunswick Public Library

PROJECT NO.: ANU-5342

ELEVATION/ DEPTH	WELL DETAIL	SOIL SYMBOLS, SAMPLERS AND TEST DATA	USCS	Description	NM	DD	STANDARD PENETRATION TEST		
							DEPTH	N	CURVE
10.5									10 30 50
12					Augered down to 15'				
13.5									
15		3- 5- 8- 9	SM/GM	Orange brown fine sand, trace silt, trace fine gravel, wet, s/compact			15'-17'	13	●
16.5									
18				Augered down to 20'					
19.5									
21		3- 6- 5- 8	SM/GM	Brown and black f/c sand, trace silt, some f/m gravel, wet, s/compact			20'-22'	11	●
22.5				Boring ended at 22'.					

Depth in Feet



Strata symbols

- Fill
- Silty sand and gravel
- Blank
- Silty sand

- Silty low plasticity clay
- Poorly graded clayey silty sand

Plan View

**ANS CONSULTANTS, INC.**  
**GENERALIZED SOIL PROFILE**

<small>HORIZONTAL SCALE:</small>	<small>DRAWN BY/APPROVED BY</small>
<small>VERTICAL SCALE: 1"=6.5'</small>	<small>DATE DRAWN</small>
<b>South Brunswick Public Library</b>	

**PROJECT NO. ANU-5342**      **FIGURE NUMBER**

# KEY TO SYMBOLS

Symbol Description

## Strata symbols

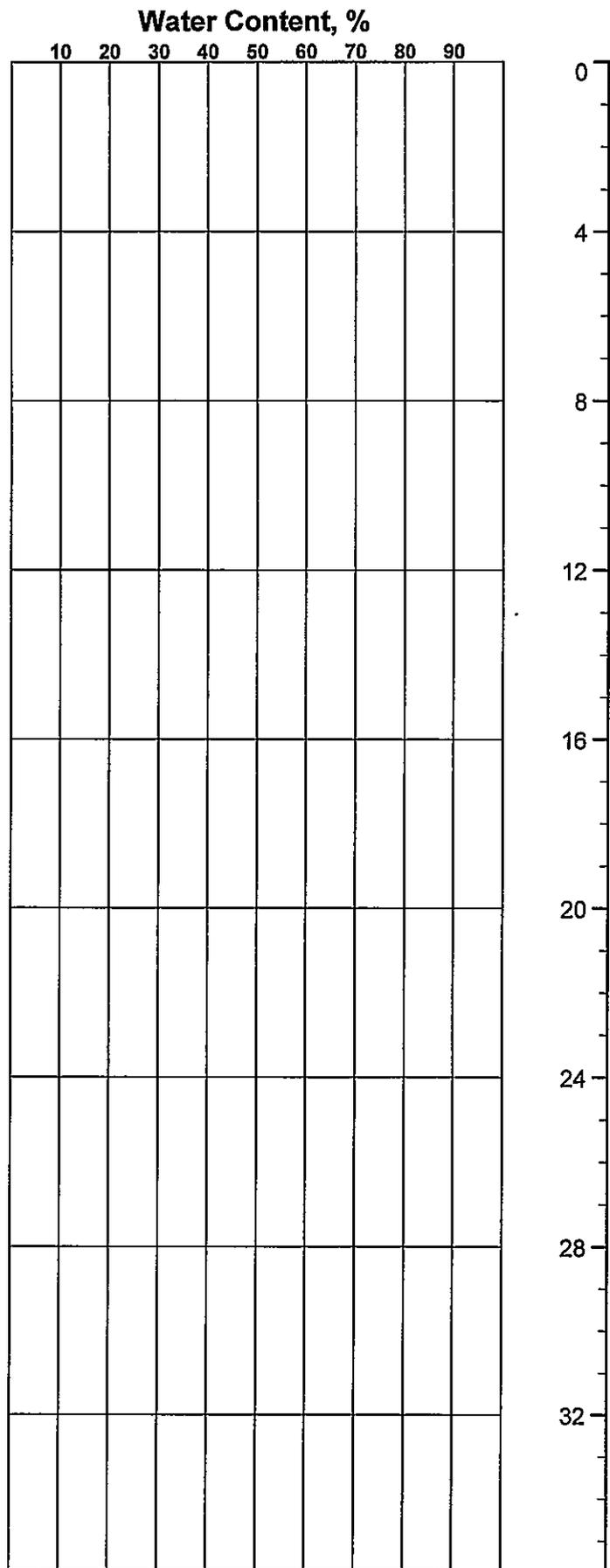
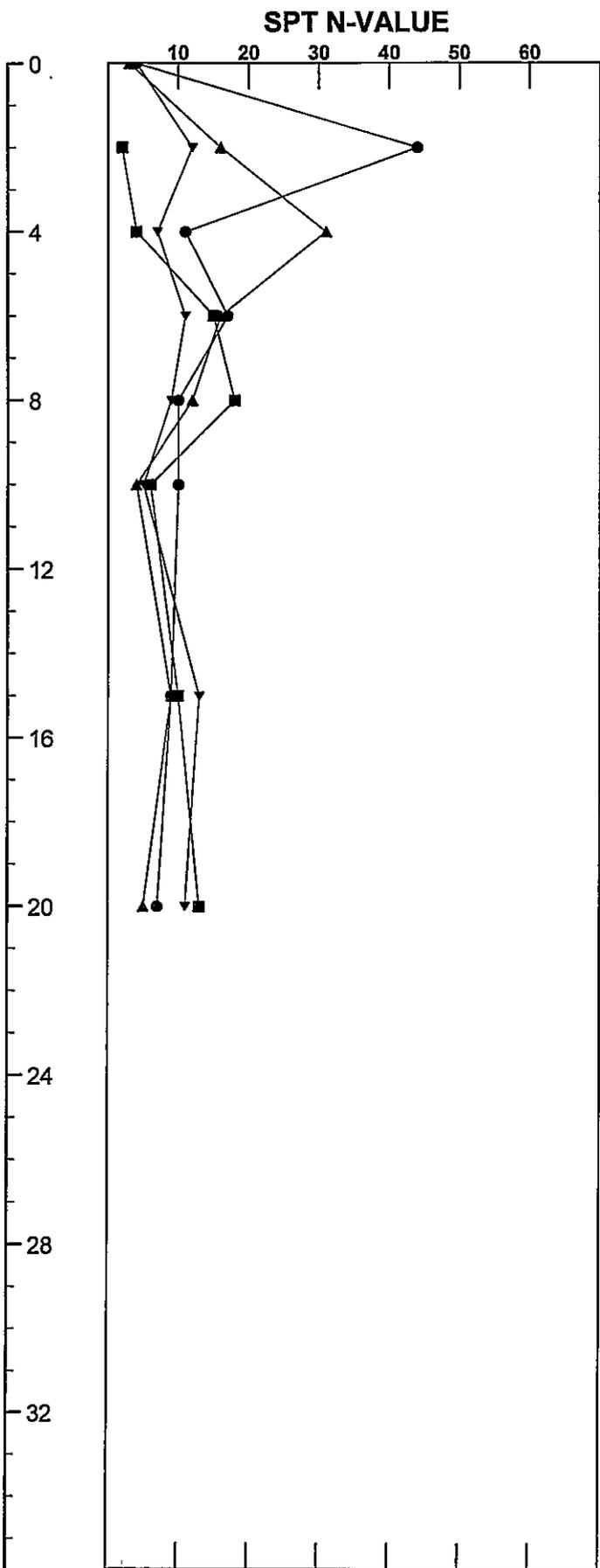
	Fill
	Silty sand and gravel
	Blank
	Silty sand
	Silty low plasticity clay
	Poorly graded clayey silty sand

## Misc. Symbols

	Water table during drilling
--	-----------------------------

## Notes:

1. Exploratory borings were drilled on 12/29/2021 using a 4-inch diameter continuous flight power auger.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.



**Key to Borings**

- B-1      ▲ B-3
- B-2      ▼ B-4

<b>ANS CONSULTANTS, INC.</b>	
<b>South Bunswick Public Library</b>	
Vertical Scale: 1 to 4	Figure:

**Client: Center State Engineering**

**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**

**Field Percolation Test**

Four (4) field percolation tests were performed near soil boring locations as shown on attached location plan. Tests were performed by drilling a hole at location using an augur and then installing a 2" diameter PVC pipe at test depth. Bottom of PVC pipe was secured, and water was filled to the top of the PVC pipe and the ground around the bottom of the PVC pipe was saturated for one hour. After saturation time, drop in water level were recorded at a constant time interval and, Percolation rate was calculated by taking average of all drops per hour.

**Percolation test # 1:**

1. Depth of test: 5'-3".
2. Water was filled to top of PVC pipe at 2:38 PM.
3. One hour saturation time ended at 3:38 PM.
4. Water was levelled off to top of PVC pipe and drops in water level were recorded at 15-minute interval.

<b>S. No.</b>	<b>Time</b>	<b>Drop in Water Level (inch)</b>	<b>Remarks</b>	<b>Percolation Rate per HR</b>
1.	3:38 pm	Water was levelled off to top of pipe		
2.	3:53 pm	5/8	Refilled	2 ½
3.	4:08 pm	5/8	Refilled	2 ½
4.	4:23 pm	9/16	Refilled	2 ¼
5.	4:38 pm	9/16	Refilled	2 ¼
6.	4:53 pm	9/16	Refilled	2 ¼
7.	5:08 pm	½	Refilled	2
8.	5:23 pm	½	Refilled	2
9.	5:38 pm	½	Refilled	2
10.	5:53 pm	½	Refilled	2

**Client: Center State Engineering**

**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**

$$\begin{aligned} \text{Average Percolation Rate Per Hour} &= \frac{2 \times 2\frac{1}{2}'' + 3 \times 2\frac{1}{4}'' + 4 \times 2''}{9} \\ &= \frac{19\frac{3}{4}''}{9} \\ &= 2.19'' \end{aligned}$$

**Percolation test # 2:**

5. Depth of test: 4'-6".
6. Water was filled to top of PVC pipe at 12:07 PM.
7. One hour saturation time ended at 1:07 PM.
8. Water was levelled off to top of PVC pipe and drops in water level were recorded at 5-minute interval.

<b>S. No.</b>	<b>Time</b>	<b>Drop in Water Level (inch)</b>	<b>Remarks</b>	<b>Percolation Rate per HR</b>
1.	1:07 pm	Water was levelled off to top of pipe		
2.	1:12 pm	7/16	Refilled	5 ¼
3.	1:17 pm	7/16	Refilled	5 ¼
4.	1:22 pm	7/16	Refilled	5 ¼
5.	1:27 pm	3/8	Refilled	4 ½
6.	1:32 pm	3/8	Refilled	4 ½
7.	1:37 pm	5/16	Refilled	3 ¾
8.	1:42 pm	5/16	Refilled	3 ¾
9.	1:47 pm	5/16	Refilled	3 ¾
10.	1:52 pm	5/16	Refilled	3 ¾
11.	1:57 pm	5/16	Refilled	3 ¾

**Client: Center State Engineering**

**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**

$$\begin{aligned} \text{Average Percolation Rate Per Hour} &= \frac{3 \times 5 \frac{1}{4} + 2 \times 4 \frac{1}{2} + 5 \times 3 \frac{3}{4}}{10} \\ &= \frac{43 \frac{1}{2}}{10} \\ &= 4.35" \end{aligned}$$

**Percolation test # 3:**

- 9. Depth of test: 4'-2".
- 10. Water was filled to top of PVC pipe at 10:49 AM.
- 11. One hour saturation time ended at 11:49 AM.
- 12. Water was levelled off to top of PVC pipe and drops in water level were recorded at 10-minute interval.

<b>S. No.</b>	<b>Time</b>	<b>Drop in Water Level (inch)</b>	<b>Remarks</b>	<b>Percolation Rate per HR</b>
1.	11:49 am	Water was levelled off to top of pipe		
2.	11:59 am	1 ¼	Refilled	7 ½
3.	12:09 pm	1 3/16	Refilled	7 1/8
4.	12:19 pm	1 3/16	Refilled	7 1/8
5.	12:29 pm	1 1/8	Refilled	6 ¾
6.	12:39 pm	1 1/8	Refilled	6 ¾
7.	12:49 pm	1 1/8	Refilled	6 ¾
8.	12:59 pm	1 1/16	Refilled	6 3/8
9.	1:09 pm	1 1/16	Refilled	6 3/8
10.	1:19 pm	1 1/16	Refilled	6 3/8
11.	1:29 pm	1 1/16	Refilled	6 3/8
12.	1:39 pm	1 1/16	Refilled	6 3/8

**Client: Center State Engineering**

**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**

$$\begin{aligned} \text{Average Percolation Rate Per Hour} &= \frac{7\frac{1}{2}'' + 2 \times 7\frac{1}{8}'' + 3 \times 6\frac{3}{4}'' + 5 \times 6\frac{3}{8}''}{11} \\ &= \frac{73.875''}{11} \\ &= 6.72'' \end{aligned}$$

**Percolation test # 4:**

1. Depth of test: 5'-0".
2. Water was filled to top of PVC pipe at 12:47 AM.
3. One hour saturation time ended at 1:47 AM.
4. Water was levelled off to top of PVC pipe and drops in water level were recorded at 30-minute interval.

<b>S. No.</b>	<b>Time</b>	<b>Drop in Water Level (inch)</b>	<b>Remarks</b>	<b>Percolation Rate per HR</b>
1.	1:47 pm	Water was levelled off to top of pipe		
2.	2:17 pm	1/8	Refilled	1/4
3.	2:47 pm	1/8	Refilled	1/4
4.	3:17 pm	1/8	Refilled	1/4
5.	3:47 pm	1/16	Refilled	1/8
6.	4:17 pm	1/16	Refilled	1/8
7.	4:47 pm	1/16	Refilled	1/8
8.	5:17 pm	1/16	Refilled	1/8

$$\begin{aligned} \text{Average Percolation Rate Per Hour} &= \frac{3 \times \frac{1}{4}'' + 4 \times \frac{1}{8}''}{7} \\ &= \frac{11/4''}{7} \\ &= 0.18'' \end{aligned}$$

**Search Information**

**Address:** 110 Kingston Ln, Monmouth Junction, NJ 08852, USA

**Coordinates:** 40.3838573, -74.530399

**Elevation:** 93 ft

**Timestamp:** 2022-01-11T17:56:41.235Z

**Hazard Type:** Seismic

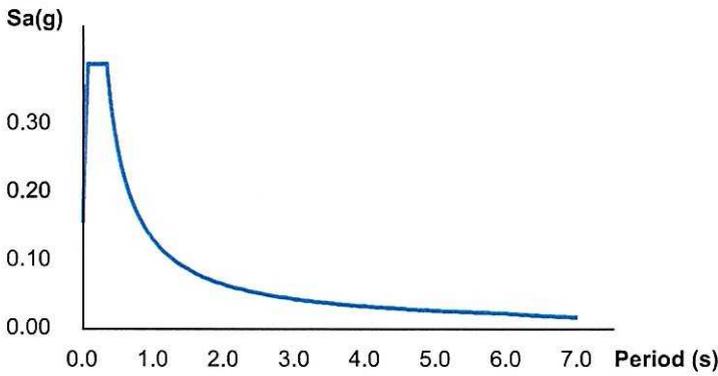
**Reference Document:** ASCE7-16

**Risk Category:** II

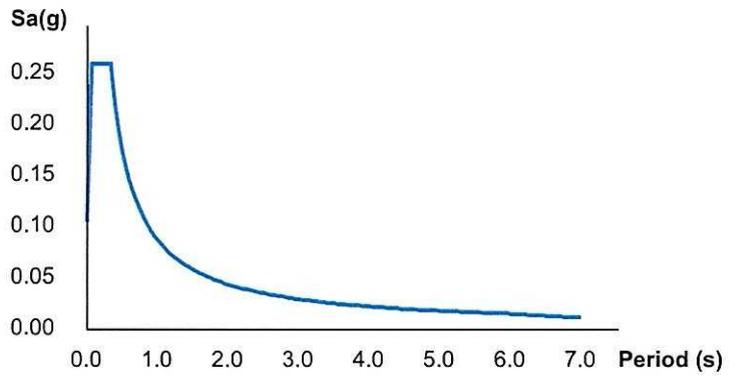
**Site Class:** D



**MCE<sub>R</sub> Horizontal Response Spectrum**



**Design Horizontal Response Spectrum**



**Basic Parameters**

Name	Value	Description
$S_S$	0.243	MCE <sub>R</sub> ground motion (period=0.2s)
$S_1$	0.054	MCE <sub>R</sub> ground motion (period=1.0s)
$S_{MS}$	0.388	Site-modified spectral acceleration value
$S_{M1}$	0.13	Site-modified spectral acceleration value
$S_{DS}$	0.259	Numeric seismic design value at 0.2s SA
$S_{D1}$	0.087	Numeric seismic design value at 1.0s SA

**Additional Information**

Name	Value	Description
SDC	B	Seismic design category
$F_a$	1.6	Site amplification factor at 0.2s
$F_v$	2.4	Site amplification factor at 1.0s

CR <sub>S</sub>	0.943	Coefficient of risk (0.2s)
CR <sub>1</sub>	0.943	Coefficient of risk (1.0s)
PGA	0.144	MCE <sub>G</sub> peak ground acceleration
F <sub>PGA</sub>	1.511	Site amplification factor at PGA
PGA <sub>M</sub>	0.218	Site modified peak ground acceleration
T <sub>L</sub>	6	Long-period transition period (s)
SsRT	0.243	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.257	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.054	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.057	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

*The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.*

## **Disclaimer**

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](#).

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# FIELD SOIL CLASSIFICATION SYSTEM

## PARTICLE SIZE IDENTIFICATION

Boulders..... 8 inch diameter or greater  
Cobbles..... 3 to 8 inch diameter  
Gravel ..... Coarse -- 1 to 3 inch  
Medium -- 1/2 to 1 inch  
Fine -- 4.75 mm to 1/2 inch  
Sand..... Coarse -- 2.0 mm to 4.75 mm  
(dia. of pencil lead)  
Medium -- 0.425 mm to 2.0 mm  
(dia. of broom straw)  
Fine -- 0.075 mm to 0.425 mm  
(dia. of human hair)  
Silt & Clay. . . Smaller than 0.075 mm

### RELATIVE PORTIONS

Descriptive Term	Percent
Trace - tr .....	1 - 10
Some - sm .....	11 - 20
Adjective - ly .....	21 - 35
And - & .....	36 - 50

### ABBREVIATIONS

Bn - Brown	
Gy - Gray	
Blk - Black	
Rd - Red	
Or - Orange	
Bl - Blue	
Lt - Light	Coarse grained - c
Dk - Dark	Medium grained - m
Multi - Multi colored	Fine grained- f

## COHESIONLESS SOIL

(Gravel, Sand, Silt and Combinations)

### DENSITY

Very Loose ..... 05 blows / ft or less  
Loose ..... 06 to 10 blows / ft  
Medium Dense ..... 11 to 30 blows / ft  
Dense ..... 31 to 50 blows / ft  
Very Dense ..... 51 blows / ft or more

### COHESIVE SOIL

(Clay Silt and Combinations)

### CONSISTENCY

Very Soft ..... 01 blow / ft or less  
Soft..... 02 to 4 blows / ft  
Medium Stiff ..... 05 to 8 blows / ft  
Stiff..... 09 to 15 blows / ft  
Very Stiff ..... 16 to 30 blows / ft  
Hard ..... 31 blows / ft or greater

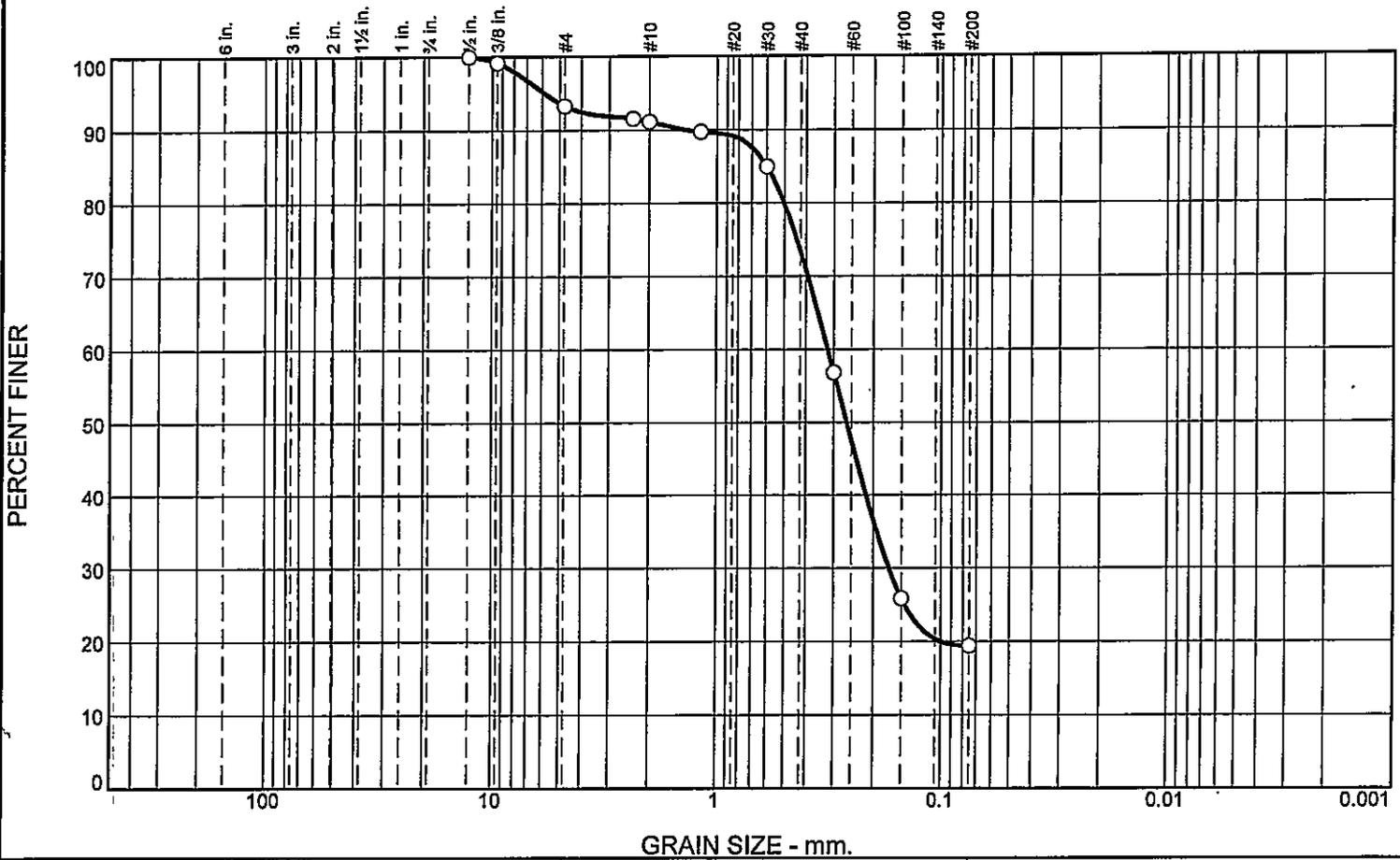
### ROCK

R.Q.D.	Rock Quality
00 - 25 .....	Very Poor
25 - 50% .....	Poor
50 - 75% .....	Fair
75 - 90% .....	Good
90 - 100%.....	Excellent

HSA - Hollow Stem Auger  
SS- Split Spoon Sampler  
WOR - Weight of Rods  
WOH - Weight of Hammer  
NR - No Recovery of Sample

# Appendix-B

# Particle Size Distribution Report As per ASTM D-422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.7	2.2	17.6	54.1	19.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.2		
#4	93.3		
#8	91.5		
#10	91.1		
#16	89.7		
#30	85.0		
#50	56.8		
#100	25.9		
#200	19.4		

\* (no specification provided)

**Material Description**

Brown in color, silty sand

**Atterberg Limits**

PL= NP      LL= NV      PI= NP

**Coefficients**

D<sub>90</sub>= 1.3790      D<sub>85</sub>= 0.6010      D<sub>60</sub>= 0.3191  
D<sub>50</sub>= 0.2628      D<sub>30</sub>= 0.1705      D<sub>15</sub>=  
D<sub>10</sub>=                      C<sub>u</sub>=                      C<sub>c</sub>=

**Classification**

USCS= SM                      AASHTO= A-2-4(0)

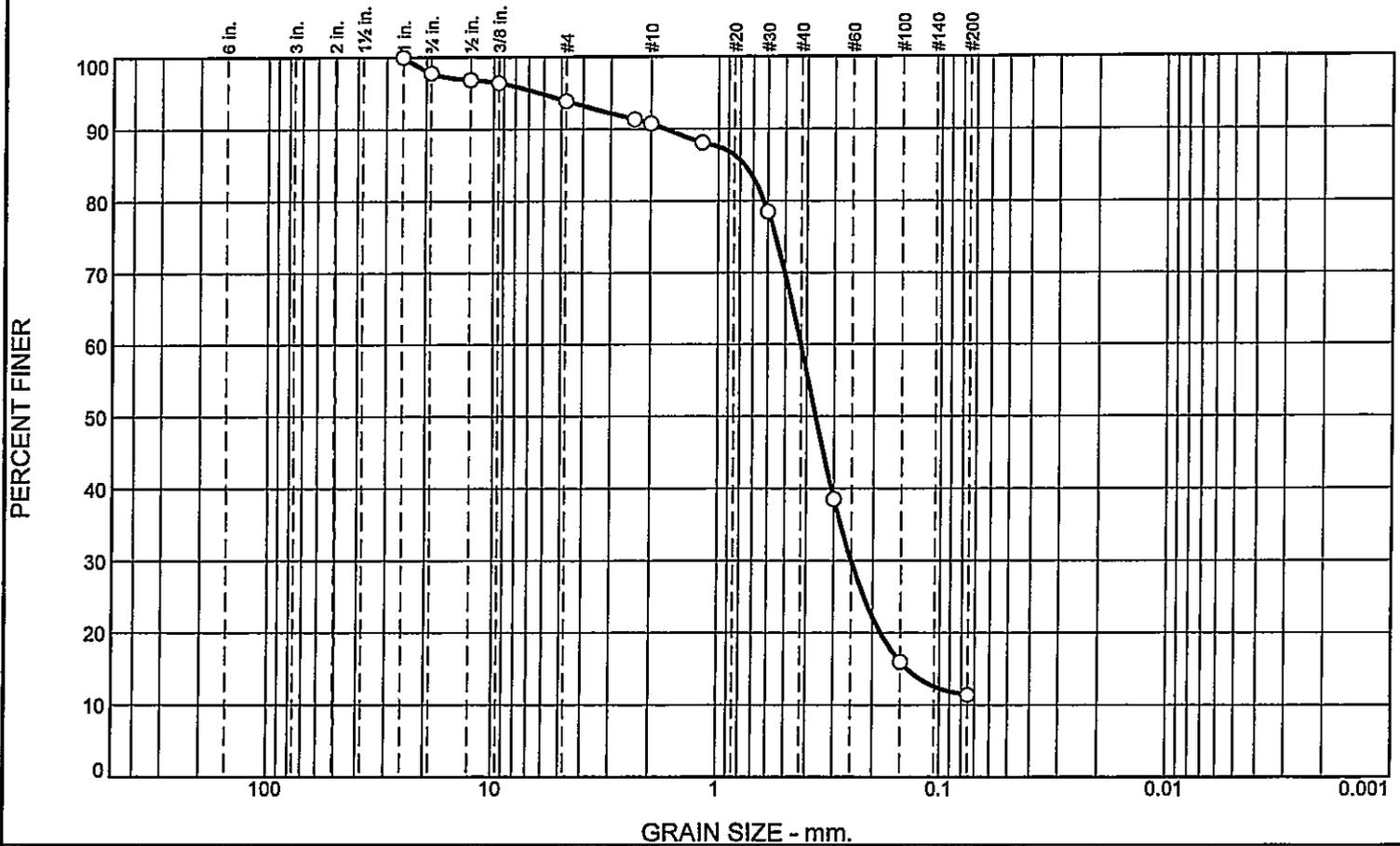
**Remarks**

Sample was collected on 12/28/21 and tested on 01/10/22. In-Situ  
%MC=15.8  
F.M.=1.59

Location: B-1      Sample Number: S-1      Depth: 4'-6'      Date: 01/11/2022

<b>ANS CONSULTANTS, INC.</b> South Plainfield, New Jersey	Client: Center Statre Engineering Project: South Brunswick Public Library, Library Expansion, Twp. of South Brunswick, Nj Block # 51, Lot # 11.011,18,23,24,25 & 26 Project No: ANU5342	Figure 1 F 1
--	---	--------------

# Particle Size Distribution Report As per ASTM D-422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.2	3.9	3.2	30.8	48.5	11.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	97.8		
1/2	96.9		
3/8	96.4		
#4	93.9		
#8	91.3		
#10	90.7		
#16	88.1		
#30	78.5		
#50	38.5		
#100	16.0		
#200	11.4		

\* (no specification provided)

**Material Description**

Brown in color. poorly graded sand with silt

**Atterberg Limits**

PL= NP      LL= NV      PI= NP

**Coefficients**

D<sub>90</sub>= 1.7293      D<sub>85</sub>= 0.7626      D<sub>60</sub>= 0.4254  
D<sub>50</sub>= 0.3637      D<sub>30</sub>= 0.2508      D<sub>15</sub>= 0.1397  
D<sub>10</sub>=                  C<sub>u</sub>=                  C<sub>c</sub>=

**Classification**

USCS= SP-SM      AASHTO= A-2-4(0)

**Remarks**

Sample was collected on 12/28/21 and tested on 01/10/22. In-Situ  
%MC=13.0  
F.M.=1.99

Location: B-2      Sample Number: S-2      Depth: 6'-8'      Date: 01/11/2022

<b>ANS CONSULTANTS, INC.</b> South Plainfield, New Jersey	Client: Center Statre Engineering Project: South Brunswick Public Library, Library Expansion, Twp. of South Brunswick, Nj Block # 51, Lot # 11.011,18,23,24,25 & 26 Project No: ANU5342      Figure 2 F 1
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# Appendix-C



CONSULTANTS, INC.  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Client: Center State Engineering**

**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**



**Sample procurement using split spoon samplers and augurs**



**Sample recovery from split spoon samplers**



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4405 South Clinton Avenue  
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**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**



Sample procurement using split spoon samplers and augurs



Field Percolation Test



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4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Client: Center State Engineering**

**Project: South Brunswick Public Library, Twp of South Brunswick, NJ**



**Sample procurement using split spoon samplers and augurs**



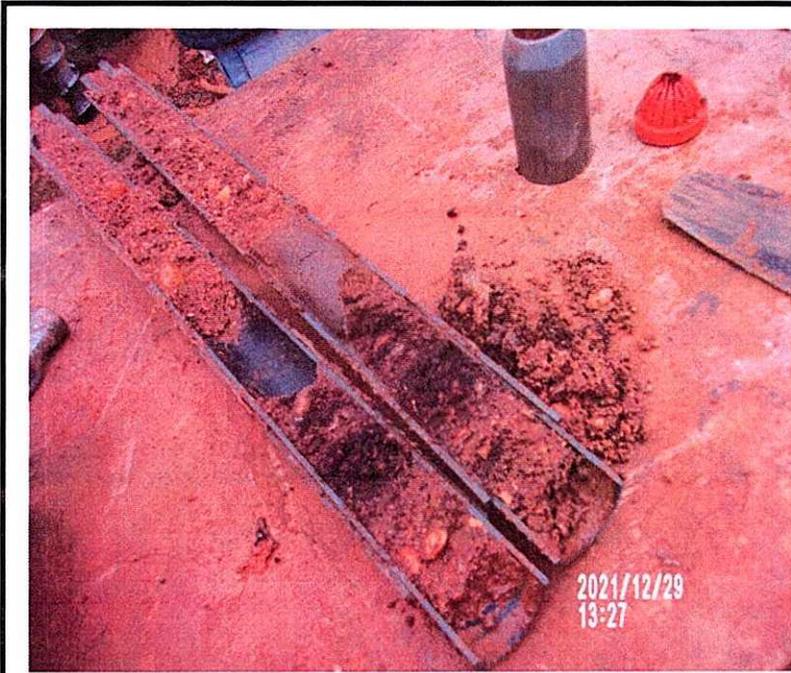
**Field Percolation Test**



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Sample recovery from split spoon samplers



Field Percolation Test