van note - harvey
Division of Pennoni

ENGINEERING STORMWATER MANAGEMENT REPORT

Fortuna Park
Block 48, Lot 01
Borough of Ship Bottom,
Ocean County, New Jersey

Prepared For:
Fortuna Park, LLC

Peter D. Chandler, PE
New Jersey Professional Engineer #24GE04439200
PEN #MPAGN23001

March 19, 2025

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SECTION I - EXECUTIVE SUMMARY

Fortuna Park, LLC (Applicant) is proposing a twenty-one (21) single family residence development to replace the Long Beach Island (LBI) Elementary School site. The property is known as Tax Lot 1, Block 48 in the Borough of Ship Bottom, Ocean County, New Jersey. The site has frontage on 19th Street to the north, East Bay Terrace to the west, 20th Street to the south and Central Avenue to the east. The neighboring properties are all single-family residential lots. The property will be subdivided on 15 single family lots of 5,000 sf each and 6 single family lots with an area between 5,720 sf and 7,017 sf. The remaining, easterly side of the property will be subdivided in two (2) lots of 30,000 SF each and will be dedicated to the Borough for recreational space.

The project is proposing demolition of the existing school building, the bus garage, the baseball/basketball fields, and the parking areas and replacing them with 21 single homes and 60,000 sf of recreational space. In addition, a four (4) feet sidewalk is proposed along East Bay Terrace while the remaining of the sidewalk along the frontage will be maintained.

The project is proposing a reduction in impervious coverage and the motor vehicle surface.

The local and state agencies having authority over stormwater management are as follow:

- Borough of Ship Bottom, New Jersey
- Ocean County Planning Board
- Ocean County Soil Conservation District

SECTION II - STORMWATER MANAGEMENT DESCRIPTION AND METHODOLOGY

Under **N.J.A.C. 7:8** a "Major development" means an individual "development," as well as multiple developments that individually or collectively result in:

1. The disturbance of one or more acres of land since February 2, 2004;
2. The creation of one-quarter acre or more of "regulated impervious surface" since February 2, 2004;
3. The creation of one-quarter acre or more of "regulated motor vehicle surface" since March 2, 2021; or
4. A combination of 2 and 3 above that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more.

Major development includes all developments that are part of a common plan of development, or sale (for example, phased residential development) that collectively or individually meet one or more of paragraphs 1, 2, 3, or 4 above. Projects undertaken by any government agency that otherwise meet the definition of "major development", but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

The project is proposing a disturbance over one acre and as such meets the definition for a major development.

Per N.J.A.C. 7:8-1.6, all "major development" shall comply with the requirements of N.J.A.C. 7:8 Stormwater Management Rules.

The site has an area of 3.96 AC. The area analyzed extends beyond the property limits, up to the curb along the frontage of the site.

Table 1 pre- vs. post-developed coverage areas within the area of disturbance (4.585 acre)

	Motor Vehicle Area (acre)	Building Area (acre)	Other Impervious Area (acre)	Pervious Area (acre)
Pre-Developed	0.725	1.261	1.177	1.422
Post-Developed	0.366	0.843	1.279	2.097
Difference	**0.359 (DECREASE)**	**0.418 (DECREASE)**	**0.102 (DECREASE)**	**0.675 (INCREASE)**

The following assumptions we made in the calculation of the coverage areas:

- The proposed building areas was depicted from the site plan layout. No buildings were considered on the recreational lots.
- The proposed motor vehicle area includes a 24' driveway for each residential lot.
- The "other impervious area" includes the existing sidewalk to remain, the proposed 4' sidewalk and the 75% of the recreational lots in accordance with the maximum lot coverage permitted.

Under existing conditions, the runoff from the entire site overflows to the surrounding roads. The runoff captured by the existing inlets located at corners of the property discharges to the ocean though the municipal conveyance system. In proposed condition, the site is maintaining the existing drainage pattern.

The study extends to the existing curb on all sides.

No drainage system is proposed for the site, and as such no Operation and Maintenance Manual was prepared.

Refer to the project site design as shown on Drainage Area Maps entitled, "Fortuna Park," prepared by Van Note-Harvey division of Pennoni (VNHA/Pennoni) provided with this report.

1. WATER QUANTITY CONTROL:

Pursuant to **N.J.A.C. 7:8-5.6(b)** one of the following requirements must be met:

1. Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the current and projected two-, 10-, and 100-year storm events, do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events.

2. Demonstrate that the there is no increase in peak runoff rates of stormwater leaving the site for the 2-, 10- and 100-year storm events and that demonstrate that there is no adverse effect to the discharge waterway as a result of the proposed development; or

3. Design stormwater management measures so that the post-construction peak runoff rates for the current and projected two-, 10-, and 100-year storm events, as defined and determined pursuant to N.J.A.C. 7:8-5.7(c) and (d), respectively, are 50, 75, and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed.

Assuming the allowable lot coverage on the recreational lots, the project is proposing a reduction of 0.102 acres in impervious coverage while maintaining the existing drainage patterns.

Because of the impervious surface reduction, the proposed improvements will result in a decrease of the peak runoff rates for the stormwater leaving the site for the 2-, 10- and 100-year storm events. Due to the proximity of the site to the ocean there will be no adverse effect to the discharge waterway as a result of the proposed development therefore the site is being analyzed in accordance with option 2 above.

2. WATER QUALITY CONTROL:

Per 7:8-5.5 (a) Stormwater runoff quality standards the stormwater runoff quality standards are applicable when the major development results in an increase of one quarter acre or more of regulated motor vehicle surface.

The project is proposing a total of 0.366 ac of motor vehicle surface resulting in a 0.359 ac reduction of the motor vehicle surface for the site.

The water quality standards only apply if there is a net increase of 0.25 acres or more of motor vehicle surfaces. The project will not create a net increase of 0.25 acres of motor vehicle surface. Therefore, water quality measures are not required.

3. GROUNDWATER RECHARGE REQUIREMENT

Per **N.J.A.C. 7:8-5.2(a)** Stormwater management measures for major development shall be designed to provide groundwater recharge. The project is a major development. Therefore, groundwater recharge measures are required.

Per **N.J.A.C. 7:8-5.4 (b)1** and **N.J.A.C. 7:45-8.5 (a)1** The minimum design and performance standards for groundwater recharge are, as follows:

I. Maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site.
II. The increase of stormwater runoff volume from pre-construction to post-construction for the projected two-year storm is infiltrated.

To show compliance with this requirement computation of the average annual groundwater recharge at a land development site under either pre- or post-developed conditions was performed using the New Jersey Groundwater Recharge Spreadsheet (NJGRS).

See Appendix B for Groundwater Recharge Spreadsheet (NJGRS).

5. SOIL EROSION AND SEDIMENT CONTROL:

Because the Project proposes land disturbance in excess of 5,000 square feet, it will require soil erosion and sediment control approval in accordance with the "Standards for Soil Erosion and Sediment Control in New Jersey" (SSESC).

The soil erosion and sediment control measures for the Project are graphically shown on the associated detailed site plans. Soil erosion and sediment control measures that will be implemented on this project will include, but not be limited to the following:

- Construction access pads shall be provided at the construction entrance/access area. All sediment spilled, dropped, washed or tracked onto roadway shall be removed immediately.
- Temporary and permanent ground cover shall be provided for all disturbed areas as soon as possible after grading.
- Silt fence shall be placed along the toe of all disturbed areas, guiding drainage to stable areas.
- Tree protection fencing will be provided to protect all trees on the project site that are to remain.
- The contractor shall take all appropriate soil erosion and sediment control measures to avoid sediment-laden water from leaving the site prior to its stabilization.

6. SOIL TYPES:

1. PstAt – Psammaquents, sulfidic substratum, 0 to 2 percent slopes, frequently flooded soil – Representative of HSG- "A/D"
2. USHOOB – Urban land-Hooksan complex, 2 to 10 percent slopes– HSG group is unclassified.

7. REVIEW AGENCIES:

1. Borough of Ship Bottom, New Jersey.
2. Ocean County Soil Conservation District.
3. Ocean County Planning Board.

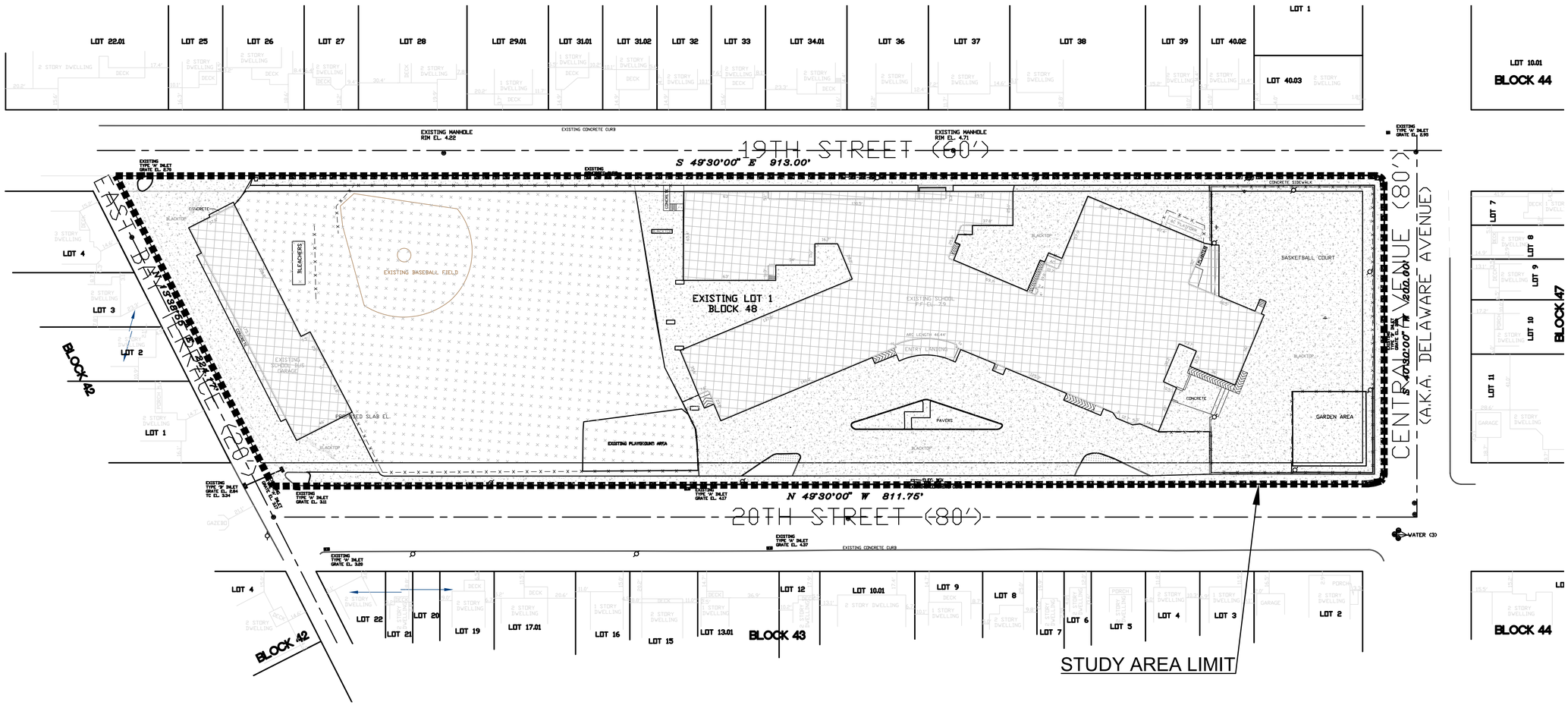
8. REFERENCES:

1. "New Jersey Stormwater Best Management Practices Manual," published by the New Jersey Department of Environmental Protection (NJDEP), March 2021, latest revision.
2. "Soil Survey Geographic (SSURGO) Database for Ocean County, New Jersey," published by the United States Department of Agriculture (USDA), Natural Resources Conservations Service (NRCS), latest revision.
3. Borough of Ship Bottom, New Jersey Land Use Code, latest revision.
4. Storm Water Management Land Development standards of the Ocean County, New Jersey.

Section - III

COVERAGE AREA MAP

MERIDIAN SCALED FROM FILED MAP



LEGEND:

BUILDING AREA

OTHER IMPERVIOUS AREA

GRASS AREA

Existing Condition Coverage Area (AC)	
Total Study Area	**4.585**
Off-site sidewalk	0.295
Motor Vehicle Area	**0.725**
Building Area	1.261
Other Impervious Area	0.882
Total Impervious Area	**3.163**
Pervious Area	1.422

0' 40' 80' 120'

GRAPHIC SCALE

REV.	DESCRIPTION	DATE	DFT.BY	CKD.BY

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103 College Road East • Princeton, NJ 08540 • 609-987-2323
211 Bayberry Drive • Cape May Court House, NJ 08210 • 609-465-2600
www.vannoteharvey.com Certificate of Authorization No. 24GA28271300

FORTUNA PARK
EXISTING IMPERVIOUS AREA MAP
OF
P/O LOT 01, BLOCK 48
PREPARED FOR
FORTUNA PARK LLC.
SITUATED IN
SHIP BOTTOM BOROUGH OCEAN CO., N.J.
SCALE AS SHOWN MARCH 19, 2025

DRAWN BY / DATE	FIELD BK ESSEX CO. 3 PAGE 1–	ORDER No.	FILE No.	SHEET No.
CHECKED BY / DATE				

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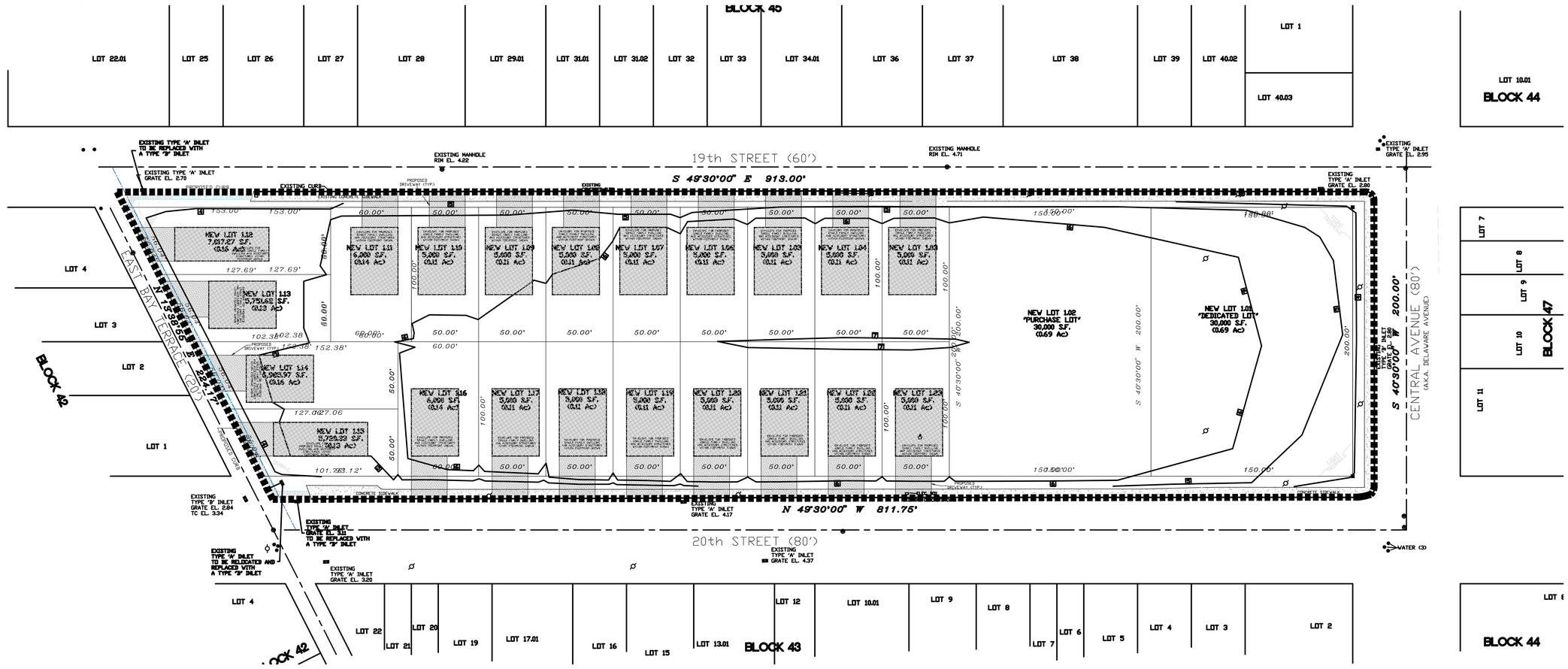
MERIDIAN SCALED FROM FILED MAP

-LEGEND-
■ =MONUMENT TO BE SET



Proposed Condition Coverage Area (SF)	
Total Study Area	**4.585**
Off-site sidewalk	0.223
Motor Vehicle Area	**0.366**
Building Area *	0.843
Proposed sidewalk	0.023
Other Impervious Area**	1.033
Total Impervious Area	**2.488**
Pervious Area	2.097

* Assuming no building on lots 1.02 & 1.01

** Assuming 75% lot coverage for the non-residential lots

LEGEND:

BUILDING AREA

PROPOSED SIDEWALK AREA

OFF-SITE SIDEWALK AREA

MOTOR VEHICLE AREA AREA

0' 40' 80' 120'
GRAPHIC SCALE

REV.	DESCRIPTION	DATE	DFT.BY	CKD.BY

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FORTUNA PARK
PROPOSED IMPERVIOUS AREA MAP
OF
P/O LOT 01, BLOCK 48
PREPARED FOR
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SCALE AS SHOWN MARCH 19, 2025

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CHECKED BY DATE				

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Appendix – A:

SOIL INFORMATION

Appendix – A1:

GEOTECHNICAL INVESTIGATION REPORT

WHITESTONE
An Employee-Owned Company

1515 MARKET STREET
SUITE 920
PHILADELPHIA, PA 19102
215.848.2323
whitestoneassoc.com

March 29, 2024

via email

FORTUNA PARK, LLC/NAUTILUS CUSTOM CONSTRUCTION, LLC
342 West 9th Street
Ship Bottom, New Jersey 08008

Attention: Michael Pagnotta, AIA
Principal

Regarding: PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
201-267 WEST 20TH STREET
BLOCK 48, LOT 1
SHIP BOTTOM, OCEAN COUNTY, NEW JERSEY
WHITESTONE PROJECT NO.: GP2421506.000

Dear Mr. Pagnotta:

Whitestone Associates, Inc. (Whitestone) has completed a preliminary geotechnical investigation at the above-referenced site. The purpose of the investigation was to evaluate the existing subsurface conditions and provide preliminary geotechnical recommendations in support of the proposed development referenced above. The investigation was conducted in general accordance with Whitestone's February 15, 2024 proposal to Fortuna Park, LLC/Nautilus Custom Construction, LLC.

1.0 PROJECT DESCRIPTION

1.1 Site Location & Existing Conditions

The approximately 3.9-acre subject site currently houses the Long Beach Island Grade School with associated athletic fields, pavements, and utilities. The site encompasses the entire block bounded by East Bay Terrace, 19th Street, Central Avenue and 20th Street and is bordered to the west by the Manahawkin Bay.

1.2 Site Geology

The site is situated within the Coastal Plain Geomorphic Province of New Jersey. The Coastal Plain consists mainly of marine sediments that were deposited during successive periods of fluctuating sea level and moving shoreline. Specifically, the project site is located in the Upper Cretaceous-age Wildwood Member of the Kirkwood Formation. The Kirkwood formation generally consists of fine-grained to coarse-grained quartz sand that is somewhat clayey and micaceous, predominately massive bedded with local small-scale cross beddings.

1.3 Proposed Construction

The proposed site redevelopment includes demolition of the existing site improvements and constructing approximately 26 single-family homes with ground-level parking beneath. The proposed single-family homes are anticipated to be two-story to three-story wood-framed structures with a maximum height of 40 feet. The proposed redevelopment also will include public space, new roadways, landscaping, and utilities. New stormwater management areas or below-grade building levels currently are not anticipated.

Based on the November 21, 2023 *Grading Plan* prepared by Horn, Tyson & Yoder, Inc. proposed site grading will require cuts and fills on the order of one foot to attain proposed elevations. Based on experience with similar projects, maximum column, wall, and floor slab loads are anticipated to be less than 75 kips, 4.0 kips per linear foot, and 125 pounds per square foot, respectively.

2.0 SCOPE OF SERVICES

The scope of the investigation and analyses included a limited subsurface exploration, field testing and sampling, and engineering analyses and evaluation of the subsurface materials. The purpose of the preliminary subsurface investigation was to assess anticipated geologic features, shallow groundwater and/or estimated season high groundwater, refusal depths, existing fill, and the potential feasibility of shallow foundations and/or expected earthwork requirements. While the scope of this preliminary investigation will not be sufficient to formulate detailed design recommendations and a more comprehensive geotechnical investigation ultimately will be required, this preliminary investigation may be used to assess potentially development-impactive geotechnical issues to support preliminary studies regarding the feasibility of developing the property.

2.1 Field Exploration

Field exploration at the project site was conducted by means of four borings (identified as B-1 through B-4) conducted with a truck-mounted drill rig utilizing hollow stem augers and split-spoon sampling techniques. The subsurface tests were conducted within an accessible portion of the subject site and extended to a depth of 50 feet below ground surface (fbgs). The test locations subsequently were backfilled to the surface with a mixture of grout and excavated soils from the investigation. The locations of the subsurface tests are shown on the *Boring Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone engineer who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. The locations are presumed to be accurate within a few feet.

The boring and Standard Penetration Tests (SPTs) were conducted in general accordance with American Society for Testing and Materials (ASTM) designation D 1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations were recorded during and immediately after the completion of field operations prior to backfilling the subsurface tests. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels

will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

3.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the explorations consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Cover Materials: The borings were conducted within existing asphalt and lawn-covered areas. The borings conducted in the lawn-covered areas encountered approximately four inches of topsoil. The borings conducted within asphalt areas encountered approximately three inches to six inches of asphalt with up to four inches of underlying granular subbase material.

Existing Fill: Underlying the surface cover materials, the majority of the borings encountered existing fill consisting of silty sand with varying amounts of gravel. The existing fill materials appeared to consist of reworked native materials and extended to depths ranging from 1.5 fbgs and two fbgs.

Organic Deposits: Underlying the existing fill, borings B-1, B-2, and B-3 encountered very soft organic clay (USCS: OH) and organic peat (USCS:PT). Where encountered, the organic deposits extended to depths ranging from six fbgs to eight fbgs.

Coastal Plains Deposits: Underlying the existing fill or organic deposits, the borings encountered coastal plain deposits generally consisting of poorly graded sand with variable amounts of silt (USCS: SP, SM & SP-SM) and lean clay (USCS: CL). The granular coastal plain deposits generally were encountered in a medium dense to dense relative density and the cohesive soils were encountered in a stiff to very stiff consistency. The borings were terminated within the coastal plain deposits at a depth of approximately 50 fbgs.

Groundwater: Static groundwater was encountered within the subsurface tests at a depth of approximately three fbgs. Groundwater levels should be expected to fluctuate seasonally, tidally, and following periods of precipitation.

4.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The following discussion is based on the subsurface conditions encountered during Whitestone's preliminary subsurface investigation for the proposed development and is intended to provide general characteristics of the subsurface conditions for preliminary planning purposes and should not be utilized for final design of structural foundations. These preliminary considerations and site development options should be confirmed or revised upon development of the final project design concept and completion of a site-specific subsurface investigation and engineering analyses.

Foundations: The overburden soft organic soils are not suitable for conventional shallow foundation support without the risk of excessive settlement. Whitestone preliminarily anticipates that the structures may be supported on driven treated timber piles designed to bear within the underlying coastal plain deposits. Whitestone preliminary expects that timber piles driven to a depth of approximately 35 fbgs will achieve allowable axial compression capacities ranging between 10 tons to 15 tons per pile. The final pile length and design capacity should be determined by conducting supplemental subsurface investigation and analysis to address site-specific conditions for the proposed development.

Areal Settlement Considerations: The overburden soft organic soils are highly compressible and will consolidate as a result of new fill being placed to raise existing grades to design elevations. The amount of settlement and time for primary consolidation to occur should be determined by conducting supplemental subsurface investigation and analysis. Depending on the results of the supplemental investigation, a waiting period may be necessary before building and utility construction can begin to allow for primary consolidation to occur.

5.0 CLOSING

Whitestone trusts that the information from this preliminary investigation will be helpful in evaluating the proposed development of this site and appreciates the opportunity to be of service to Fortuna Park, LLC/Nautilus Custom Construction, LLC. Please contact us with any questions regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

James M. Morgan
Senior Associate

Laurence W. Keller, P.E.
Vice President

KRP/JMM/az \\WS-WA-FILE01\ChalfontData\Data\Job Folders\2024\2421506GP\Reports and Submittals\21506_PreGI-1.docx
Enclosures
Copy: Beth Heminghaus, Michael Pagnotta Architects
Kara A. Schultz, Esq., Law Offices of Kara A. Schultz
Banjamin P. Ojserkis, Esq., Cooper Levenson
Nicholas F. Talvacchia, Esq., Cooper Levenson
James Brzozowski, Horn Tyson & Yoder, Inc.

WHITESTONE

FIGURE 1
Boring Location Plan

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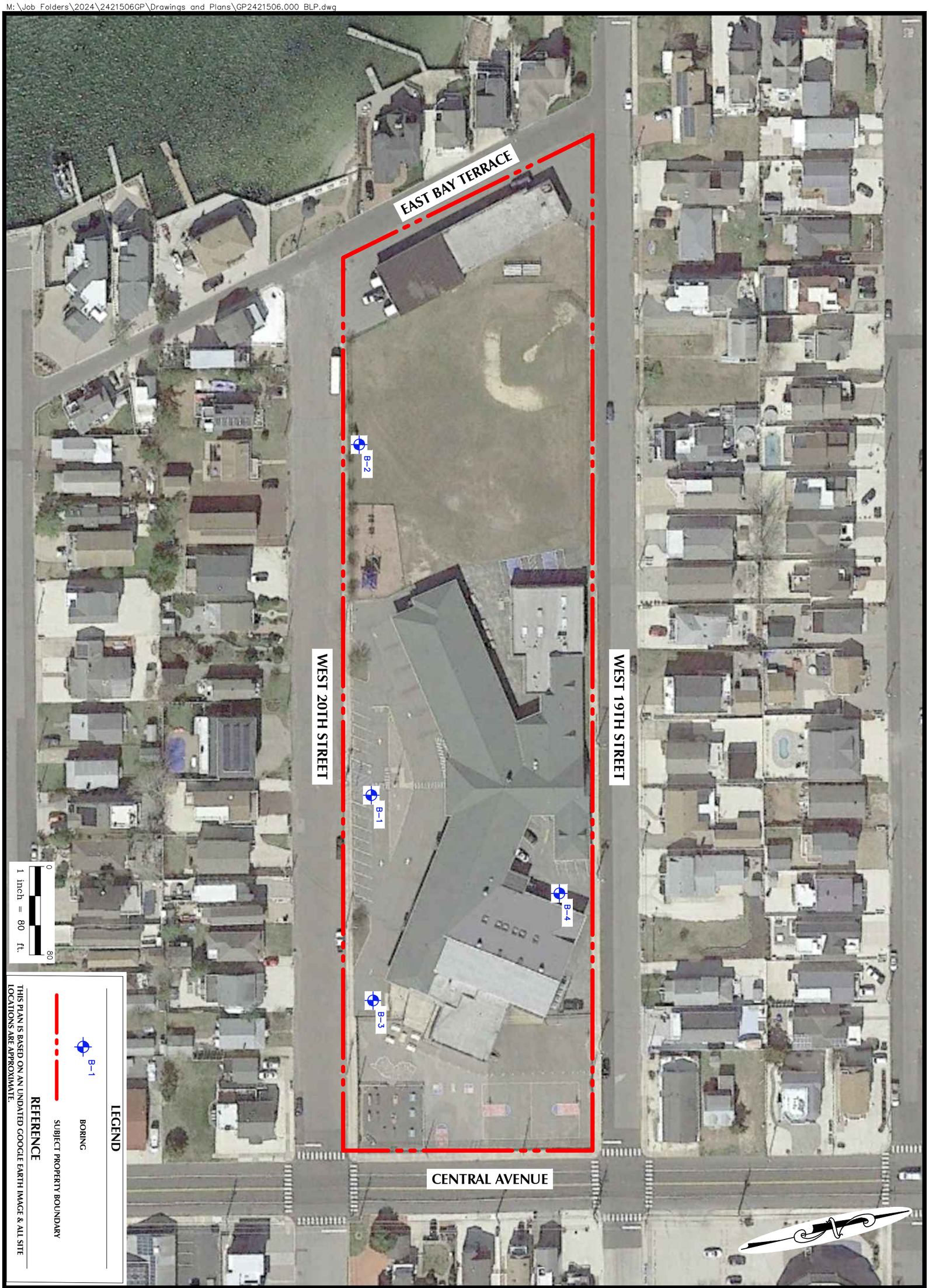

PROJECT #:	GP2421506.000
DESIGNED BY:	GR
DATE:	3/12/24
SCALE:	1" = 80'
PROJ. MGR.:	JMM
FIGURE:	1

DRAWING TITLE:
BORING LOCATION PLAN

CLIENT:
FORTUNA PARK, LLC/
NAUTILUS CUSTOM CONSTRUCTION, LLC

PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT
201-267 WEST 20TH STREET
SHIP BOTTOM, OCEAN COUNTY, Nj

WHITESTONE
An Employee-Owned Company
1600 MANOR DRIVE, SUITE 220, CHALFONT, PA 18914
215.712.2700 WHITESTONEASSOC.COM

WHITESTONE

APPENDIX A
Records of Subsurface Exploration

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/7/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/7/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

Water Depth | Elevation (feet bgs) | (feet)		Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	3.0 | ---		
At Completion:	3.0 | ---	**At Completion:**	NE | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
						0.3	PAVEMENT		4" Asphalt, No Apparent Subbase	
							FILL			
0.5 - 2	S-1	X	7 - 7 - 4	14	14	1.5			Grayish-Brown Silty Sand, Trace Millings, Trace Gravel, Moist, Medium Dense (SM)	Auger Probe to 0.5 fbgs
							CPD		Gray Silty Sand, Moist, Medium Dense (SM)	
2 - 4	S-2	X	3 - 7 - 5 - 4	NR	12	2.5	ORGANIC		No Recovery, Cuttings Reveal Sandy Clay, Wet, Soft	Wet Cuttings @ 3.0 fbgs
4 - 6	S-3	X	2 - 1 - WOH - 1	NR	1	5.0			No Recovery, Cuttings Reveal Sandy Clay, Wet, Soft	Odor @ 6.0 fbgs
6 - 8	S-4	X	1 - 1 - 3 - 5	16	4	8.0			Gray Sandy Organic Clay with Fibers, with Roots, Wet, Very Soft (OH)	Qu = 0.15 tsf
8 - 10	S-5	X	3 - 4 - 17 - 13	18	21		COASTAL PLAIN DEPOSITS		Light Gray Poorly Graded Sand, Wet, Loose (SP) As Above, Wet, Medium Dense (SP)	
						10.0				Mud Rotary Starting @ 10.0 fbgs
13 - 15	S-6	X	10 - 10 - 11 - 15	13	21	15.0			As Above (SP)	
18 - 20	S-7	X	11 - 13 - 13 - 16	11	26	20.0			As Above (SP)	
23 - 25	S-8	X	13 - 11 - 12 - 13	12	23	25.0			As Above (SP)	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/7/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/7/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	3.0	---		
At Completion:	3.0	---	**At Completion:**	NE / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	COASTAL PLAIN DEPOSITS	Light Gray Poorly Graded Sand, Wet, Medium Dense (SP)	
28 - 30	S-9	X	12 - 20 - 32 - 18	14	52	30.0		As Above, Gray Wet, Very Dense (SP)	
						33.0			
33 - 35	S-10	X	13 - 17 - 15 - 19	14	32	35.0		Dark Gray Poorly Graded Sand with Silt, Wet, Dry (SP-SM)	
						38.0			
38 - 40	S-11	X	6 - 9 - 7 - 10	18	16	40.0		Gray Lean Clay with Sand, Wet, Stiff (CL)	Qu = 2.5 tsf
43 - 45	S-12	X	13 - 9 - 14 - 17	18	23	44.5		As Above (CL)	Qu = 2.0 tsf
						45.0		Gray Poorly Graded Fine Sand with Silt, Wet, Medium Dense (SP-SM)	
						48.0			
48 - 50	S-13	X	9 - 11 - 24 - 24	10	35	50.0		Dark Gray Poorly Graded Sand, Wet, Dense (SP)	
								Boring Log B-1 Terminated at a Depth of 50.0 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/7/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/7/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	3.0	---		
At Completion:	3.0	---	**At Completion:**	3.0 / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	4" Topsoil	
0 - 2	s-1	X	1 - 3 - 3 - 3	14	6	0.3	FILL	Light Brown Well-Graded Sand with Gravel, Wet, Loose (SW/FILL)	
2 - 4	S-2	X	2 - 2 - 3 - 3	10	5	2.0	ORGANIC	Gray Organic Sandy Clay, Trace Roots and Fiber, Wet, Very Soft (OH)	
						4.0			Odor @ 4.0 fbgs
4 - 6	S-3	X	1 - 1 - 1 - 1	16	2	5.0		Gray Peat, Majority Roots and Organic Material, Wet, Very Soft (PT)	Qu = 0.16 tsf
						6.0			
6 - 8	S-4	X	1 - 2 - 3 - 10	11	5		COASTAL PLAIN DEPOSITS	Gray Poorly Graded Sand, Wet, Loose (SP)	
8 - 10	S-5	X	7 - 19 - 17 - 15	10	36			As Above, Wet, Dense (SP)	
						10.0			
10 - 12	S-6	X	7 - 7 - 12 - 15	24	19			As Above, Wet, Medium Dense (SP)	
						15.0			
15 - 17	S-7	X	10 - 14 - 14 - 12	17	28			As Above (SP)	
						20.0			
20 - 22	S-8	X	8 - 8 - 10 - 11	11	18			As Above (SP)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/7/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/7/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	3.0	---		
At Completion:	3.0	---	**At Completion:**	3.0 / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	Depth (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	COASTAL PLAIN DEPOSITS		
25 - 27	S-9	X	7 - 9 - 10 - 12	13	19			As Above (SP)	
						30.0			
30 - 32	S-10	X	8 - 5 - 5 - 4	15	10			As Above (SP)	
						35.0			
						35.5		Dark Gray Clay, Wet, Stiff (CL)	Qu = 2.5 tsf
35 - 37	S-11	X	7 - 7 - 12 - 12	14	19			Dark Gray Silty Sand, Wet, Medium Dense (SM)	
						40.0			
40 - 42	S-12	X	6 - 5 - 10 - 12	13	15			Dark Gray Sandy Lean Clay, Wet, Stiff (CL)	Qu = 2.25 tsf High Sand Content
						45.0			
						45.5		As Above, Wet, Medium Stiff (CL)	Qu = 1.75 tsf
45 - 47	S-13	X	5 - 7 - 7 - 6	16	14			Gray Silty Sand, Wet, Medium Dense (SM)	
						48.0			
48 - 50	S-14	X	7 - 9 - 10 - 12	20	19			Gray Sandy Lean Clay, Wet, Stiff (CL)	Qu = 2.0 tsf
						50.0		Boring Log B-2 Terminated at a Depth of 50.0 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/8/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/8/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	2.5	---		
At Completion:	2.5	---	**At Completion:**	NE / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	Depth (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	PAVEMENT	6" Asphalt, 4" Subbase	
0.5 - 2	S-1		8 - 11 - 11	13	19	0.8	COASTAL PLAIN DEPOSITS	Light Brown/Tan Poorly Graded Sand, Moist, Medium Dense (SP)	Auger Probe to 0.5 fbgs
2 - 4	S-2		8 - 6 - 8 - 6	16	14			As Above, Moist to Wet, Medium Dense (SP)	Qu = 0.16 tsf
						4.0			Odor @ 4.0 fbgs
4 - 6	S-3		4 - 2 - 2 - 2	18	4	5.0	ORGANIC	Gray Organic Clay, Trace Roots, Wet, Very Soft (OH)	Qu = 0.17 tsf
						6.5		As Above (OH)	
6 - 8	S-4		1 - 2 - 3 - 5	17	5	8.0	COASTAL PLAIN DEPOSITS	Gray Silty Sand with Roots, Wet, Loose (SM)	
8 - 10	S-5		7 - 2 - 4 - 2	17	6			Gray Poorly Graded Sand, Wet, Loose (SP)	Augers, No Mud Rotary
10 - 12	S-6		2 - 3 - 6 - 6	14	9	10.0		As Above, Light Gray (SP)	
						15.0			
15 - 17	S-7		5 - 9 - 10 - 14	24	19			As Above, Wet, Meidum Dense (SP)	
						20.0			
20 - 22	S-8		8 - 11 - 10 - 10	20	21			As Above (SP)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/8/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/8/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

Water Depth | Elevation (feet bgs) | (feet)		Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	2.5 | ---		
At Completion:	2.5 | ---	**At Completion:**	NE | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						25.0				
25 - 27	S-9	X	4 - 13 - 12 - 14	18	25		COASTAL PLAIN DEPOSITS		As Above, Trace Seashells (SP)	
						30.0				
30 - 32	S-10	X	10 - 10 - 13 - 20	20	23				As Above (SP)	
						35.0				
35 - 37	S-11	X	9 - 5 - 4 - 4	12	9				As Above, with Silt (SP-SM)	
						36.5			Gray Sandy Clay with Shells, Wet, Medium Stiff (CL)	Qu = 1.5 tsf
38 - 40	S-12	X	4 - 8 - 9 - 9	14	17				As Above, No Shells, Wet, Medium Stiff (CL)	Qu = 1.75 tsf
						40.0				
43 - 45	S-13	X	9 - 10 - 21 - 27	16	31	44.0			As Above, Stiff (CL)	Qu = 2.5 tsf
						45.0			Gray Silty Sand, Wet, Dense (SM)	
						48.0				
48 - 50	S-14	X	7 - 7 - 26 - 26		33				Gray Sandy Clay, Wet, Stiff (CL)	Qu = 2.75 tsf
						50.0			Boring Log B-3 Terminated at a Depth of 50.0 Feet Below Ground Surface	

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WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/11/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/11/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

Water Depth | Elevation (feet bgs) | (feet)		Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	3.0 | ---		
At Completion:	3.0 | ---	**At Completion:**	NE | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0	PAVEMENT		3" Asphalt, No Subbase	
						0.3	FILL			
0.5 - 2	S-1		5 - 10 - 7	9	15				Brown Well-Graded Sand with Gravel, Moist, Medium Dense (FILL/SW)	
						2.0	COASTAL PLAIN DEPOSITS			
2 - 4	S-2		4 - 2 - 2 - 1	10	4				Gray Silty Sand, Moist to Wet, Loose (SM)	
						4.0				
4 - 6	S-3		2 - 2 - 2 - 2	8	4	5.0			Gray Clay, Wet, Soft (CL)	Qu = 0.5 tsf
						6.0				
6 - 8	S-4		5 - 5 - 6 - 5	16	11				Gray Poorly Graded Silty Sand, Wet, Medium Dense (SM)	
						8.0				
8 - 10	S-5		4 - 4 - 5 - 8	18	9				Light Gray Poorly Graded Sand, Wet, Loose (SP)	Augers, No Mud Rotary
						10.0				
13 - 15	S-6		14 - 13 - 12 - 12	16	25				As Above, Medium Dense (SP)	
						15.0				
						18.0				
18 - 20	S-7		2 - 2 - 4 - 3	12	6	19.0			Gray Sandy Clay, Wet, Soft (CL)	Qu = 4.0 tsf
									Light Gray Poorly Graded Sand, Wet, Loose (SP)	
						20.0				
23 - 25	S-8		12 - 9 - 14 - 14	4	23				As Above, Medium Dense (SP)	
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Proposed Residential Development	**WAI Project No.:**	GP2421506.000
Location:	201-267 West 20th Street; Ship Bottom, Ocean County, NJ	**Client:**	Fortuna Park, LLC/Nautilus Custom Construction, LLC
Surface Elevation:	± NS feet	**Date Started:**	3/11/2024
Termination Depth:	50.0 feet bgs	**Date Completed:**	3/11/2024
Proposed Location:	Proposed Building	**Logged By:**	JS
Drill / Test Method:	HSA / SPT	**Contractor:**	AD
		Equipment:	Mobile B40

Water Depth (feet bgs) | Elevation (feet)		Cave-In Depth (feet bgs) | Elevation (feet)	
During:	3.0 | ---		
At Completion:	3.0 | ---	**At Completion:**	NE | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0	COASTAL PLAIN DEPOSITS	Light Gray Poorly Graded Sand, Wet, Medium Dense (SP)	
28 - 30	S-9	X	7 - 13 - 20 - 20	17	33			As Above, Dense (SP)	
						30.0			
33 - 35	S-10	X	12 - 21 - 21 - 19	14	42			As Above (SP)	
						35.0			
38 - 40	S-11	X	14 - 24 - 38 - 44	24	62	39.0		As Above, Very Dense (SP)	
						40.0		Dark Gray Sand, Lean Clay, Wet, Hard (CL)	Qu = 4.5+ tsf High Sand Content Fine Sand Slow Augering
43 - 45	S-12	X	9 - 15 - 13 - 15	20	28			As Above, Stiff (CL)	Qu = 2.0 tsf High Sand Content Fine Sand
						45.0			
48 - 50	S-13	X	12 - 10 - 8 - 11	20	18			As Above (CL)	Thin Seams of Light Gray Sand (SP)
						50.0		Boring Log B-4 Terminated at a Depth of 50.0 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

APPENDIX B
Supplemental Information (USCS, Terms & Symbols)

WHITESTONE
An Employee-Owned Company

1515 MARKET STREET
SUITE 920
PHILADELPHIA, PA 19102
215.848.2323
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT	
TRACE	1% TO 10%
LITTLE	10% TO 20%
SOME	20% TO 35%
AND	35% TO 50%

COMPACTNESS*
Sand and/or Gravel

	RELATIVE DENSITY
LOOSE.	0% TO 40%
MEDIUM DENSE	40% TO 70%
DENSE	70% TO 90%
VERY DENSE	90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT	
VERY SOFT	LESS THAN 250
SOFT	250 TO 500
MEDIUM	500 TO 1000
STIFF	1000 TO 2000
VERY STIFF	2000 TO 4000
HARD	GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

L:\Geotechnical Forms and References\Reports\USCSTRMSSYM Philly.docx

WHITESTONE
An Employee-Owned Company

1515 MARKET STREET
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PHILADELPHIA, PA 19102
215.848.2323
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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

Appendix – A2:

OCEAN COUNTY, NEW JERSEY –

NRCS SOIL SURVEY REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Ocean County, New Jersey

March 27, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ocean County, New Jersey
Survey Area Data: Version 21, Aug 29, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 13, 2021—Sep 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
PstAt	Psammaquents, sulfidic substratum, 0 to 2 percent slopes, frequently flooded	5.8	84.3%
USHOOB	Urban land-Hooksan complex, 2 to 10 percent slopes	1.1	15.7%
Totals for Area of Interest		**6.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Ocean County, New Jersey

PstAt—Psammaquents, sulfidic substratum, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2xhp8
Elevation: 0 to 30 feet
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 46 to 58 degrees F
Frost-free period: 190 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Psammaquents, sulfidic substratum, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Psammaquents, Sulfidic Substratum, Frequently Flooded

Setting

Landform: Flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy lateral spread deposits over organic material

Typical profile

^A - 0 to 12 inches: coarse sand
^C - 12 to 36 inches: gravelly sand
2Oese1 - 36 to 43 inches: mucky peat
2Oese2 - 43 to 80 inches: mucky peat

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Pawcatuck, very frequently flooded
Percent of map unit: 5 percent
Landform: Tidal marshes on barrier islands
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Appoquinimink, very frequently flooded
Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Transquaking, very frequently flooded
Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

USHOOB—Urban land-Hooksan complex, 2 to 10 percent slopes

Map Unit Setting
National map unit symbol: 2xhpj
Elevation: 0 to 30 feet
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 46 to 58 degrees F
Frost-free period: 190 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 65 percent
Hooksan and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Landform: Barrier beaches
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Rise
Down-slope shape: Concave
Across-slope shape: Linear

Properties and qualities

Slope: 2 to 10 percent
Runoff class: Very high
Frequency of flooding: Occasional

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Hooksan

Setting

Landform: Dunes on barrier islands
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Eolian sands

Typical profile

A - 0 to 6 inches: sand
C - 6 to 90 inches: sand

Properties and qualities

Slope: 2 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 79 to 90 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R153DY100MD - Foredune
Hydric soil rating: No

Minor Components

Beaches, frequently flooded

Percent of map unit: 5 percent
Landform: Dunes
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: Yes

Transquaking, very frequently flooded

Percent of map unit: 5 percent

Landform: Tidal marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R153DY060MD - Tidal Salt Marsh
Hydric soil rating: Yes

Appoquinimink, very frequently flooded

Percent of map unit: 5 percent
Landform: Tidal marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R153DY060MD - Tidal Salt Marsh
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (LBI School)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group (LBI School)

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ocean County, New Jersey
Survey Area Data: Version 21, Aug 29, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 13, 2021—Sep 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (LBI School)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PstAt	Psammaquents, sulfidic substratum, 0 to 2 percent slopes, frequently flooded	A/D	5.8	84.3%
USHOOB	Urban land-Hooksan complex, 2 to 10 percent slopes		1.1	15.7%
Totals for Area of Interest			**6.9**	**100.0%**

Rating Options—Hydrologic Soil Group (LBI School)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Appendix - B:

NEW JERSEY GROUNDWATER RECHARGE SPREADSHEET

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
OCEAN CO., SHIP BOTTOM BORO	45.8	1.45

Project Name:	MPAGN23001- LBI School
Description:	Study Limit Area
Analysis Date:	04/05/24

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	1.42	Meadow, Pasture, Grassland or range	PSAMMENTS	0.0	-
2	2.59	Impervious areas	PSAMMENTS	0.0	-
3	0.57	Impervious areas	Urban Land Wet	0.0	-
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Total =	4.6			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				0.0	-

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	2.1	adow, Pasture, Grassland or ra	PSAMMENTS	0.0	-
2	2.5	Impervious areas	PSAMMENTS	0.0	-
3	0.57	Impervious areas	Urban Land*	0.0	-
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Total =	5.2	Warning: make total area equal to Pre-Developed Condition		Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				0.0	-

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)	133,729
Post-Development Annual Recharge Deficit=	***0***	(cubic feet)	

Recharge Efficiency Parameters Calculations (area averages)

RWC=	#N/A	(in)	DRWC=	#N/A	(in)
ERWC =	#N/A	(in)	EDRWC=	#N/A	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.