PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

Proposed Beachway Avenue Waterfront Development

Monmouth County, New Jersey

June 20, 2023

Prepared for:
Beachway Avenue Realty, LLC
7 Heyward Hills Drive
Holmdel, New Jersey, 07733

Attn: Tom Critelli

Prepared by:
Geo-Technology Associates, Inc.
Geotechnical and Environmental Consultants

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GTA Project No: 31230924

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

June 20, 2023

Beachway Avenue Realty, LLC
7 Heyward Hills Drive
Holmdel, New Jersey 07733

Attn: Tom Critelli

Re: Preliminary Geotechnical Engineering Report
Proposed Beachway Avenue Waterfront Development
Monmouth County, New Jersey

Dear Mr. Critelli:

In accordance with our April 27, 2023 agreement, Geo-Technology Associates, Inc. (GTA) has conducted a preliminary geotechnical engineering study in support of the Proposed Beachway Avenue Waterfront Development, to be constructed in the Borough of Keansburg, Monmouth County, New Jersey. GTA has prepared this report to convey our findings, conclusions, and recommendations about subsurface conditions that could affect foundation support and related geotechnical considerations for the proposed construction.

Please note that, unless you make other arrangements, GTA will discard all soil samples obtained from the explorations 60 days after the date of this report. If you have any questions or concerns about this report, or if you want additional information, please contact Kyle Plaza at (609) 577-2724 or KPlaza@gtaeng.com.

Sincerely,

GEO-TECHNOLOGY ASSOCIATES, INC.

Kyle T. Plaza, P.E.
Associate

Dennis C. Loh, P.E.
Vice President

TABLE OF CONTENTS

1.0 SUMMARY OF FINDINGS AND PRELIMINARY RECOMMENDATIONS

We have prepared this summary for the user's convenience only. Do not rely on it exclusively for any decision-making purpose. Please review the full text of the report which addresses each topic in further detail.

TOPIC	DESCRIPTION
Site Attributes	
Existing Conditions	The site was a vacant lot at the time of GTA's preliminary investigation. Paved areas surrounded by curbs were located in the western portion of the site and grass areas were present in the eastern portion of the site.
Proposed Construction	(3) 5-story condominium buildings with approximate footprint areas of about 10,000 square feet each.
Conditions Encountered	
Topsoil	Encountered in all test pit explorations. 3 to 5 in. thick.
Existing Fills	Encountered in all explorations throughout the project site to depths ranging from about 3½ to 9½ feet beneath existing ground surface.
Native Soils	Sands and clays.
Groundwater	Observed at about 6 to 9 feet bgs in all explorations.
Recommendations	
Existing Fill	• Existing fills are undocumented. If possible, client should obtain fill placement documentation for fill placed during land development. • Existing fills should not be relied upon for direct support of building foundation loads. Consideration can be given by the client to leaving fills in place beneath slabs, pavements, and utilities if limited risk is acceptable. • A ground improvement program should be considered to improve the existing fill materials in-place and mitigate potential associated risks.
Groundwater	• Widespread groundwater impacts not anticipated. • Perched water may be encountered in localized excavations. • Commonly used temporary dewatering techniques (e.g., sumps, gravity flow trenches) will likely be sufficient to control perched water seepage.
Foundations	• Preliminary net allowable soil-bearing pressure: 2,000 to 4,000 psf. • Preliminary net allowable soil-bearing pressure on ground improvement: 4,000 to 6,000 psf. • Minimum widths: 24 inches (wall footings); 30 inches (column footings). • Maximum anticipated post-construction settlements: 1 inch total; ½ inch differential between columns. • Frost Depth Embedment – 36 inches • IBC Seismic Site Class of D
Slabs	Place slab on min. 4-inch-thick gravel covered with a min. 6-mil vapor barrier.

*bgs = below existing ground surface

2.0 INTRODUCTION

This report presents the results of a preliminary geotechnical engineering exploration performed by Geo-Technology Associates, Inc. (GTA) for the planning and design of the proposed Beachway Avenue Waterfront Development located in the Borough of Keansburg, Monmouth County, New Jersey. GTA has performed a preliminary geotechnical engineering study and prepared this report for Beachway Avenue Realty, LLC in accordance with our proposal dated April 27, 2023.

2.1 Study Purpose

GTA conducted this study to develop preliminary geotechnical engineering recommendations for the proposed Beachway Avenue Waterfront Development. A supplemental geotechnical exploration will need to be performed to confirm these preliminary opinions and recommendations when the project design plans are more fully developed and prior to construction.

2.2 Referenced Documents

GTA was provided with a set of plans titles "NJDEP Permitting Plan – Beachway Avenue Waterfront Redevelopment" by MidAtlantic Engineering Partners, LLC (MidAtlantic) dated February 15, 2018. The plans indicate the site boundaries and the layout and grading of the proposed development. GTA has based its understanding of the project on its review of the provided plans. If the referenced documents are modified after the date of GTA's initial review, Client should provide the updated versions to GTA. Modifications may make it necessary for GTA to revise its geotechnical engineering recommendations.

3.0 PROJECT DESCRIPTION

3.1 Site Location

The project site is located in the Borough of Keansburg, Monmouth County, New Jersey. The *Site Location Map*, in Appendix A, Figure No. 1, indicates the general site location.

3.2 Existing Site Conditions

At the time of GTA's exploration, the site was a vacant lot with grass and asphalt paved surfaces surrounded by curbs. The existing ground surface was relatively level across the site. The existing ground surface topography was not shown on the provided plans. However, Google Earth indicates the existing topography across the site generally ranges from about Elevation (EL) 9 feet to EL 12 feet. The elevations obtained from Google Earth should be considered *very* approximate.

3.3 Proposed Construction

3.3.1 Site Grading

Based on our discussions with MidAtlantic and the provided "Grading & Utility Plan," we understand that fills of about 2 to 4 feet will generally be required to achieve the proposed surface grades across the site. It is our understanding that this fill placement will allow for the development to be constructed above the flood plain elevation of the locale.

3.3.2 Proposed Buildings

Three 5-story condominium buildings are planned for construction on the site. All three buildings are planned to have 4-stories of residential condominium units above a ground floor parking level and will have footprint areas of approximately 10,000 square feet. We anticipate the proposed structures will be constructed using cast-in-place concrete and steel- or wood-frame construction. Actual building loads were not available at the time of our exploration. In our analyses for this preliminary report, we have assumed maximum column, wall, and floor slab loads of 400 kips, 15 kips per linear foot (klf), and 125 pounds per square foot (psf), respectively.

3.3.3 Stormwater Management (SWM)

An underground SWM system is planned for the development and will be located beneath the pavement in the southeastern portion of the site. The system will generally consist of perforated 36-inch diameter HDPE pipes approximately 360 feet long. The system is designed to infiltrate water at approximately EL 4.75 feet, which is about 2 to 4 feet below existing grades in that area of the site.

3.3.4 Pavements

Ingress and egress to the development will be provided from two locations along Beachway Avenue. Parking and drive aisles throughout the site are planned to be constructed of porous pavement systems and will be located between and adjacently southeast of the proposed buildings. Recommendations pertaining to the pavement design were not included in the scope of this preliminary study.

3.3.5 Retaining Walls

A segmental block retaining wall is planned to surround the development to the southwest, west, and northeast. The maximum height of the retaining wall is expected to be about 8 feet. Evaluations and recommendations pertaining to the retaining wall was not included in the scope of this preliminary investigation.

4.0 PRELIMINARY GEOTECHNICAL ENGINEERING STUDY

4.1 Historical Review

Based on our review of historic aerial photography on historicaerials.com dating back to 1931, the site has been previously developed in some capacity since at least that year. The original development appears to have been razed sometime between 1984 and 1995. The site appeared as a vacant lot until about 2007 when redevelopment activities appear to begin, and a structure can be seen in the northern portion of the site. That structure was then razed sometime between 2010 and 2012 and the site became a vacant lot once again, appearing as it does today.

4.2 Geologic Review

The subject site is situated within the Coastal Plain physiographic province of New Jersey, which is characterized by unconsolidated deposits dipping gently to the southeast. According to the Surficial Geology of the Keyport Quadrangle, Middlesex and Monmouth Counties, New Jersey (OFM 46, 2002) published by the New Jersey Geological Survey, the surficial soils at the site are considered part of the "Lower Terrace Deposits." The unit is described as yellow, yellowish-brown, reddish yellow sand and minor silt, with pebble gravel. The unit can be as much as 50 feet thick but is generally less than 30 feet thick.

According to the Bedrock Geologic Map of the Keyport Quadrangle, Middlesex and Monmouth Counties, New Jersey (GMS 14-2, 2014) the site is situated within the Woodbury Formation. The unit is described as dark gray to olive black clayey silt and very fine quartz sand, with occasional lenses of finely disseminated pyrite, lignite, and siderite.

Please refer to the referenced publications for more detailed descriptions of the geologic members.

4.3 Subsurface Exploration Scope

GTA performed a preliminary subsurface exploration of the site in May 2023, consisting of soil borings and test pits. Details of the exploration program are outlined below. The *Exploration Location Plan* (Appendix A, Figure No. 2) indicates the approximate exploration locations.

Number & Type of Explorations	Exploration Nos.
2 SPT borings	B-1 and B-2
7 backhoe-excavated test pits	TP-1 through TP-7

GTA selected the exploration locations and field-located them using a hand-held GPS and existing site features. GTA estimated ground surface elevations at the exploration locations using Google Earth, and therefore all elevations should be considered *very* approximate.

GTA was on site on May 5, 2023 to supervise and document 2 Standard Penetration Test (SPT) borings extending to depths of about 49 feet below the existing ground surface. The borings were performed by Environmental Technical Drilling, Inc. using a CME45 truck-mounted drill rig and mud-rotary drilling methods. The explorations were selected by GTA and located in the field using the existing site features as reference.

Standard Penetration Testing (SPT) was performed in the borings in general accordance with procedures of ASTM D1586. Soil samples were obtained every 2 to 5 feet throughout the depth of the boring. The SPT involves driving a 2-inch O.D., 1⅜-inch I.D. split-spoon sampler with a 140-pound hammer free-falling from a height of 30 inches. The number of blows required to drive the sampler was recorded in six-inch intervals. The SPT N-value, given as blows per foot (bpf), is defined as the total number of blows required to drive the sampler from the 6- to 18-inch interval.

GTA was on site on May 11, 2023 to supervise and document 7 test pit excavations generally located across the southern portion of the project site. The test pits were performed by JA Neary Excavating using a Case 580 backhoe and extended to depths of about 6½ to 9½ feet below existing grades. A staff geo-professional from GTA observed and logged the test pits, collected soil samples, and performed in-situ infiltration testing in 4 of the test pits located within the proposed underground SWM basin area. The operator backfilled the test pits with excavated materials upon completion.

The soil samples obtained from the explorations were delivered to GTA's laboratory for visual classification and laboratory testing. The classifications shown on the logs are based on the Unified Soil Classification System (USCS) visual/manual methods, supplemented by laboratory testing.

4.4 Subsurface Conditions

The results of the subsurface exploration were, for the most part, consistent with the known site history and geologic mapping of the project site. For more information about the specific subsurface conditions at each exploration location, please refer to the individual exploration logs within Appendix B. GTA has summarized the encountered subsurface conditions in the following sections.

4.4.1 Surficial Materials

The soil borings were performed within the existing paved area of the site, and both encountered approximately 4 inches of asphalt at the surface. The test pits were located within existing grass landscaped areas and encountered between 3 to 5 inches of topsoil at the surface. The reported topsoil thicknesses generally represent the upper layer of dark and organic soil.

4.4.2 Existing Fills

All of the explorations performed for our exploration encountered existing fill materials beneath the surficial materials at the site. Fill depths generally ranged from about 3½ to 8½ feet below the existing ground surface. The existing fill materials were generally granular in nature and contained varying amounts of gravel and fines. Debris and deleterious materials such as plastics, wood, concrete and brick fragments, and abandoned pipes were encountered within the existing fill materials. SPT N-values within the fill ranged from 8 to 62 bpf, indicative of loose to very dense soil conditions.

4.4.3 Native Soils

Beneath the topsoil and existing fill, the explorations encountered native soils consistent with the geologic mapping of the site. The native granular soils were classified as poorly-graded sands with minor amounts of silt (SP, SP-SM) and the native fine-grained soils were classified as lean clays with varying amounts of sand (CL). SPT N-values typically ranged from 4 to 40 bpf, indicative of very loose to medium dense granular soils and to medium stiff to hard fine-grained soils.

4.4.5 Groundwater

Groundwater was encountered in all of the explorations performed for this study at depths ranging from 6 to 9 feet below the ground surface. Note that groundwater levels can fluctuate with seasonal variations in precipitation and as a result of development activity. Due to the site's proximity to the ocean, tidal variations of the groundwater level can also be expected. Also, perched water conditions may develop in localized areas where granular soils are underlain by less permeable, fine-grained soils, especially after precipitation events.

4.5 Laboratory Testing

GTA performed laboratory testing on selected soil samples obtained from the explorations, including natural moisture content determinations and grain size analyses for classification of the soils in accordance with the Unified Soil Classification System (USCS). Classification of the soils in accordance with the USCS provides information regarding the engineering properties of the on-site soils that will likely support the proposed foundations, slabs, and pavements, and be used as controlled compacted

fill and backfill. Detailed results of the laboratory testing performed for this study are included in Appendix C. The results of the laboratory tests are summarized in the following table:

SUMMARY OF CLASSIFICATION TESTING

Boring No.	Depth (ft.)	USCS Classification	Natural Moisture (%)	Liquid Limit (%)	Plasticity Index (%)
B-1	20 to 22	Poorly-graded SAND with gravel (SP)	20.4	NP	NP
B-2	2 to 4	FILL: Silty SAND with gravel	11.3	NP	NP
B-2	10 to 12	Poorly-graded SAND with silt (SP-SM)	24.6	NP	NP

*Note: NP = Non-plastic

5.0 PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our preliminary geotechnical engineering study, it is GTA's professional opinion that the subsurface conditions at the project site are generally suitable for construction of the proposed development, provided the following geotechnical engineering recommendations are followed, and that applicable standard of care is maintained during construction. GTA's preliminary recommendations for foundations, stormwater management, and other geotechnical considerations are presented in the following paragraphs. A supplemental geotechnical exploration with additional soil borings and/or other exploration methods will need to be performed to confirm these preliminary recommendations prior to final design and construction.

5.1 Earthwork Considerations

5.1.1 Groundwater

The presence of groundwater will not likely affect mass grading activities on a widespread basis. Nonetheless, seepage of perched water may occur where water becomes trapped in granular soils underlain by less-permeable soils, particularly after periods of precipitation. Also, groundwater levels may fluctuate with the tides and with seasonal variations in precipitation and as a result of development activity. Accordingly, the contractor should be prepared to dewater and shore excavations during construction. Excavations extending below the groundwater level will require shoring.

5.1.2 Existing Fills

Existing fill materials were encountered in all of our explorations and extended to depths ranging from about 3½ to 8½ feet below the existing ground surface. We assume that placement and testing documentation for the existing fills is not available, and the presence of debris and some deleterious materials indicate it was not likely placed in a controlled, compacted manner.

GTA believes that the existing fill materials should not be considered suitable for direct support of building foundation loads. However, considering the fill encountered in the proposed building areas does not appear to contain or be underlain by significant thicknesses of compressible materials, consideration can be given to allowing the existing fill to remain in place below the parking level floor slabs provided the risk of potentially minor slab settlements is accepted by the Owner. **If this risk cannot be accepted, the existing fill will need to be treated via a ground improvement program or will need to be entirely removed from within and 5 feet beyond the proposed building areas and replaced with controlled compacted fill.** If the risk is tolerable, it will be necessary to excavate through the fill to expose competent natural soils for the footings. The resultant excavations should be backfilled with stone or lean concrete and the footings would bear directly on the lean concrete or stone backfill. Alternatively, as discussed in Section 5.2.2, a ground improvement program can be used to improve the existing fill beneath the footings to render them suitable for foundational support.

Consideration should be given to allowing the existing fill to remain in place below proposed paved areas with the risk of potential future pavement settlement, which could manifest as “bird baths” in the pavement. Even in this scenario, however, some undercutting should be expected to remove soft or deleterious materials in isolated areas.

Where excavation is necessary, the existing fills should be replaced with controlled, compacted fill. Portions of the existing fill will likely be suitable for reuse as new fill, provided deleterious materials and organics are removed prior to placement. More detailed recommendations pertaining to fill placement and fill material criteria will be provided in the supplemental geotechnical report.

We suggest that a budget contingency allowance be included in the contract documents, based on an assumed volume of undercut material measured in cubic yards, with add and deduct unit prices to adjust from the assumed volume. All volumes should be calculated from the measured dimensions of the excavation.

5.2 Preliminary Building Recommendations

5.2.1 Foundation Design

It is GTA's opinion that shallow spread footings will be able to support the proposed condominium buildings, providing the footings are constructed on firm, native materials, or on controlled compacted fill, compacted AASHTO No. 57 stone, or lean concrete placed directly atop the suitable natural soils. Based on the preliminary SPT borings, bearing pressures on the order of 2,000 to 4,000 pounds per square foot (psf) appear feasible. A final design allowable bearing pressure can be confirmed following the supplemental geotechnical exploration. Exterior footings should be founded at least 36 inches below final exterior grades to protect against the effects of frost, or deeper if required by local ordinance.

5.2.2 Foundation Design on Ground Improvement

To eliminate potential risks associated with leaving the existing fill materials in place and/or encountering soft/loose soils that can lead to excessive settlements, consideration should be given by the project team to implement a ground improvement program prior to construction. Based on our discussions with the client and ground improvement installers, we understand that a ground improvement program consisting of aggregate piers/stone columns is feasible and is the preferred option to allow the use of conventional shallow foundations for building support while limiting settlements to within tolerable limits.

Aggregate pier or stone column installation is a type of ground improvement that consists of highly densified inclusions of aggregate that improve the overall modulus of the in-place soils. Aggregate piers are individual elements, typically 24 to 30 inches in diameter, and are constructed using a probe or tamper by displacing or replacing the in-place soils with stone placed in 1-to-3-foot lifts from the bottom design elevation to the surface. Using this method, ground improvement elements are not structurally connected to the building foundations.

Ground improvement is a design-build service offered by a variety of installers using their own proprietary techniques. After preliminary discussions with a ground improvement installer, we believe the implementation of aggregate piers could result in allowable bearing pressures of up to 4,000 to 6,000 psf while limiting settlements beneath the structures to 1 inch total and ½ inch differential. The selected ground improvement installer will confirm the allowable post-installation bearing capacity based on their review of the final building loads, construction drawings, and performance criteria specifications.

5.2.3 Seismic Site Class Designation

The soil conditions within the upper 100 feet at this site can be categorized as Site Class D per the 2018 International Building Code, New Jersey Edition (IBC). This categorization is based on the boring data, general geologic information for the region, and the information contained in the applicable code. Subsurface explorations at this site were extended to a maximum depth of 49 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of the geologic conditions of the general area. A site-specific seismic study could be performed to confirm the conditions below the current maximum boring depth.

5.2.4 Preliminary Slab Design

For preliminary design purposes, the lowest-level slabs can be designed as concrete slabs-on-grade using a design modulus of subgrade reaction (k) of 200 pounds per cubic inch (pci). To prevent or retard the rise of capillary moisture through the slab, GTA recommends that the slabs should be founded on a minimum 4-inch-thick layer of open-graded stone, covered with a polyethylene vapor barrier beneath the slab. The open-graded stone layer should comprise imported washed gravel or crushed stone materials with less than 5 percent fines.

5.3 Stormwater Management Considerations

5.3.1 Infiltration Test Results

SUMMARY OF INFILTRATION TEST RESULTS

Test Pit	Approximate Test Depth* (ft)	USCS Classification	Measured Infiltration Rate (in/hr)
TP-1	7	Poorly-graded SAND with silt (SP-SM)	72
TP-2	6	FILL: Silty sand with gravel	½
TP-3	5	FILL: Silty sand with gravel	24
TP-4	5	FILL: Silty sand	18

*Beneath existing ground surface. No factor of safety has been applied to the measured infiltration rates.

5.3.2 SWM Construction Considerations

The primary conditions that affect the capacity to infiltrate water are the soil gradation and density properties and the presence of hydraulically restrictive layers such as silt or clay (fines), rock, or groundwater, each of which would restrict the flow of water into the underlying aquifer. The subsurface profile in the proposed SWM basin areas generally consisted of existing silty sand fill material and natural sands that extended to the full depths of our excavations. Groundwater was observed at depths ranging to about 6 to 9 feet below existing grades.

The infiltration tests performed in the natural sand soils indicated they are receptive to infiltration, with measured infiltration rates ranging from about 24 to 72 inches per hour. The infiltration tests performed within the existing fill materials ranged from about ½ inch to 18 inches per hour. The large variance in the rates performed within the fill materials is indicative of variable soil gradation and density properties.

We believe the results indicate that infiltration of collected stormwater generally appears feasible at the proposed basin location within the native granular soils. However, undercutting and replacement of the some of the existing fill materials should be anticipated if these soils are found to contain high amounts of fines following the excavation to achieve the proposed basin bottom elevations. The overexcavations should then be backfilled to the proposed basin bottom elevations using granular soils, washed gravel, or sand meeting the design infiltration rate. Scarifying or replacement of the silty sand soils may also be necessary during construction to facilitate infiltration depending on the design rate.

6.0 LIMITATIONS

This report, including all supporting boring and test pit logs, field data, field notes, laboratory test data, calculations, estimates and other documents prepared by GTA in connection with this project have been prepared for the exclusive use of Beachway Avenue Realty, LLC pursuant to agreement between GTA and Beachway Avenue Realty, LLC in accordance with generally accepted engineering practice. Additionally, these recommendations are preliminary in nature and will need to be confirmed or altered accordingly following a supplemental geotechnical investigation and report. All terms and conditions set forth in the Agreement and the General Provisions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and Beachway Avenue Realty, LLC is unauthorized and such use is at the sole risk of the user.

The analysis and recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Test borings and test pits indicate soil

conditions only at specific locations and times and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between the exploration locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be reevaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of Geo-Technology Associates, Inc.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our client.

This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

Important Information about This

Geotechnical-Engineering Report

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

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

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

Understand the Geotechnical-Engineering Services Provided for this Report

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

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

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

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

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

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

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

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

Read this Report in Full

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

You Need to Inform Your Geotechnical Engineer About Change

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

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

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

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

Most of the "Findings" Related in This Report Are Professional Opinions

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

This Report's Recommendations Are Confirmation-Dependent

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

This Report Could Be Misinterpreted

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

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

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

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

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

Geoenvironmental Concerns Are Not Covered

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

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

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

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX A

Figures

Note: Site boundary is approximate.

SITE LOCATION MAP

14 Worlds Fair Drive, Suite A
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

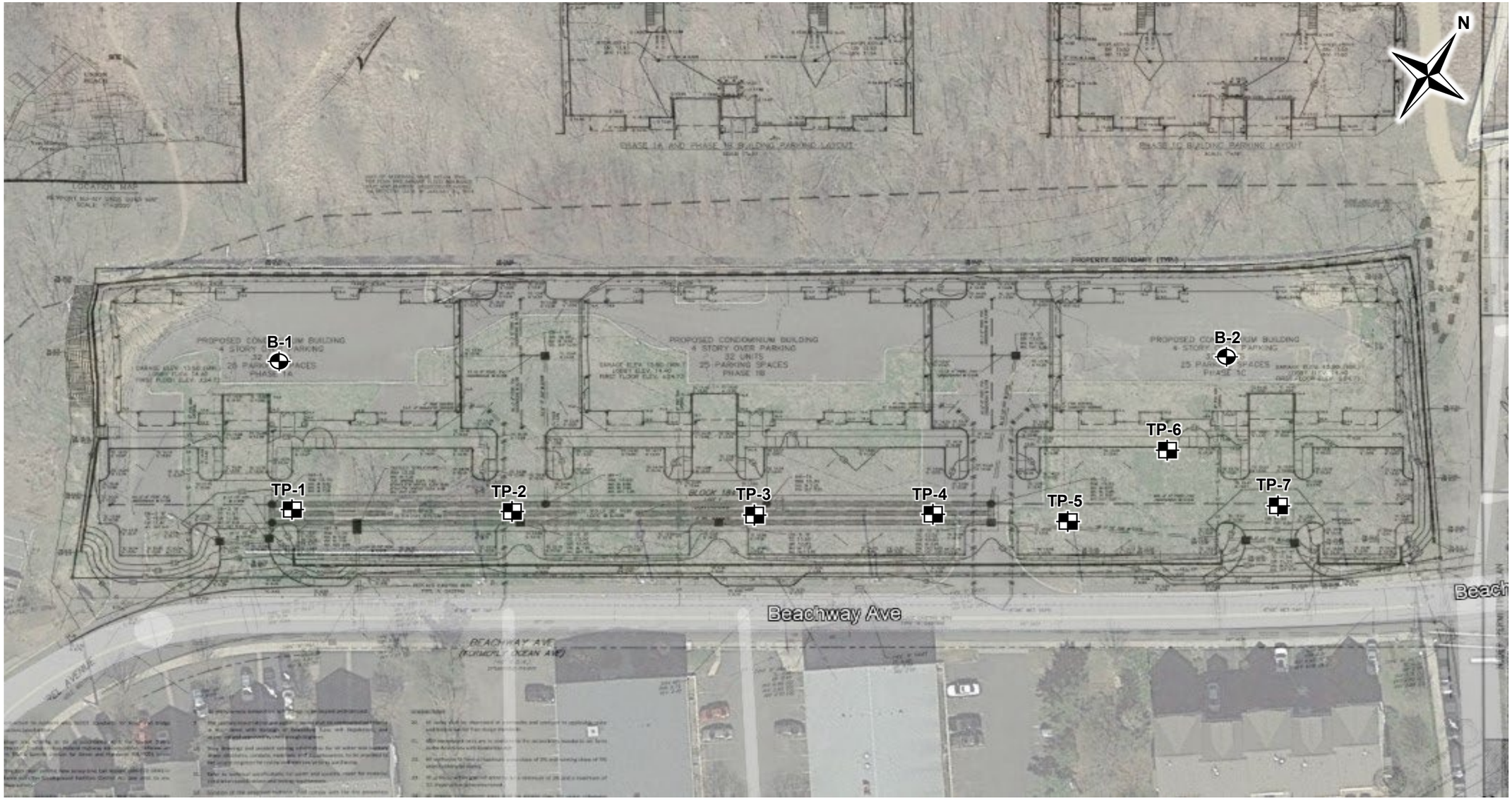
PROPOSED BEACHWAY AVENUE WATERFRONT DEVELOPMENT

Borough of Keansburg,
Monmouth County, New Jersey

Prepared For: Beachway Avenue Realty, LLC

SOURCE: Google Maps		
SCALE: NTS	DATE: JUNE 2023	PROJECT #: 31230924

Figure 1



*Base plan prepared by MidAtlantic Engineering Partners, LLC titled "Grading & Utility Plan" dated February 15, 2018 with a latest revision date of July 19, 2018.

LEGEND:

B-X Indicates the numbers and approximate locations of borings performed by GTA for this study.

TP-X Indicates the numbers and approximate locations of test pits performed by GTA for this study.

EXPLORATION LOCATION PLAN

14 Worlds Fair Drive, Suite A
Somerset, New Jersey 08873
(732) 271-9301
fax (732) 271-9306

GEO-TECHNOLOGY ASSOCIATES, INC.

PROPOSED BEACHWAY AVENUE WATERFRONT DEVELOPMENT

Borough of Keansburg,
Monmouth County, New Jersey

Prepared For: Beachway Avenue Realty, LLC

DESIGN BY: *	DRAWN BY: AFS	REVIEWED BY: KTP
SCALE: NTS	DATE: MAY 2023	PROJECT #: 31230924

Figure 2

APPENDIX B

Exploration Logs

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)	SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50			ML
					CL
					OL
		ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50			MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	▽
UPON COMPLETION OF DRILLING	▼
24 HOURS AFTER COMPLETION	▼

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF BORING NO. B-1

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT NO.: **31230924**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, NJ**
DATE STARTED: **5/5/2023**
DATE COMPLETED: **5/5/2023**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **Mud Rotary**
SAMPLING METHOD: **Split-Spoon**

WATER LEVEL (ft):	6 Ft.	N/A	N/A
DATE:	5/5/2023	5/5/2023	-
CAVED (ft):	In casing	8 Ft.	BOC

GROUND SURFACE ELEVATION: **11 Ft.**
DATUM: **Google Earth**
EQUIPMENT: **CME 45**
HAMMER TYPE: **Automatic**
LOGGED BY: **AFS**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	21	11-23-39-24	62	11.0	0			4 In. of Pavement	
2	2.0	10	10-23-15-15	38	10.7				FILL - Dark brown, moist, very dense, silty sand with gravel and with wood, concrete fragments	
3	4.0	20	8-8-7-6	15					- dense at 2 Ft.	
4	6.0	13	4-4-4-4	8	5.0				- medium dense, gravel grades out at 4 Ft.	
5	8.0	24	3-3-3-3	6			SP-SM		Dark yellow-brown, wet, loose, Poorly-graded SAND with silt	
6	10.0	24	7-11-11-9	22		10			- medium dense at 10 Ft.	
7	15.0	10	4-5-6-7	11					- Gray brown at 15 Ft.	
8	20.0	8	2-2-2-2	4	-9.0	20	SP		Gray brown, wet, very loose, Poorly-graded SAND with gravel	- NMC = 20.4%
9	25.0	10	2-3-3-4	6	-14.0		CL		Gray-brown, moist, medium stiff, Lean CLAY with sand	
10	30.0	24	3-6-7-10	13		30			- stiff, with gravel at 30 Ft.	
11	35.0	18	3-5-8-12	13					- dark gray to black, gravel grades out at 35 Ft.	
12	40.0	24	4-7-10-13	17		40			- very stiff at 40 Ft.	
13	45.0	18	5-10-12-16	22						
14	47.0	24	15-22-18-29	40					- hard at 47 Ft.	
					-38.0	50			Boring complete at 49 Ft.	
						60				

NOTES: **Location and elevation are approximate.**
BOC: Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-1

LOG OF BORING NO. B-2

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT NO.: **31230924**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, NJ**
DATE STARTED: **5/5/2023**
DATE COMPLETED: **5/5/2023**
DRILLING CONTRACTOR: **Environmental Technical Drilling, Inc.**
DRILLER: **Scott P.**
DRILLING METHOD: **Mud Rotary**
SAMPLING METHOD: **Split-Spoon**

WATER LEVEL (ft):	7 Ft.	N/A	N/A
DATE:	5/5/2023	5/5/2023	-
CAVED (ft):	In casing	10 Ft.	BOC

GROUND SURFACE ELEVATION: **11 Ft.**
DATUM: **Google Earth**
EQUIPMENT: **CME 45**
HAMMER TYPE: **Automatic**
LOGGED BY: **AFS**
CHECKED BY: **KTP**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	19	8-11-18-21	29	11.0	0			4 In. of Asphalt	
2	2.0	9	12-5-3-3	8	10.7				FILL - Dark yellow-brown, moist, medium dense, silty sand with gravel and with brick, concrete fragments	- NMC = 11.3%
3	4.0	15	3-3-6-5	9					- loose at 2 Ft.	
4	6.0	12	3-11-8-8	19	5.0		SP-SM		- Dark yellow-brown and dark brown, moist, loose, poorly-graded sand with silt and roots	
5	8.0	20	5-5-6-5	11		10			Dark yellow-brown, moist, medium dense, Poorly-graded SAND with silt	
6	10.0	18	3-3-3-5	6					- wet at 7 Ft.	- NMC = 24.6%
									- loose at 10 Ft.	
7	15.0	16	5-8-9-9	17					- medium dense at 15 Ft.	
8	20.0	10	4-4-6-10	10		20			- loose at 20 Ft.	
9	25.0	12	11-15-10-4	25	-16.5		CL		Gray-brown, moist, medium stiff, Lean CLAY with sand	
10	30.0	24	3-5-10-11	15		30			- dark gray to black, stiff at 30 Ft.	
11	35.0	18	2-5-7-8	12						
12	40.0	24	4-8-11-14	19		40			- very stiff at 40 Ft.	
13	45.0	24	4-8-11-18	19						
14	47.0	24	7-11-13-13	24	-38.0	50			Boring complete at 49 Ft.	
						60				

NOTES: **Location and elevation are approximate.**
BOC: Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF BORING NO. B-2

LOG OF TEST PIT NO. TP-1

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

PROJECT NO.: **31230924**

DATE STARTED: **5/11/2023**
DATE COMPLETED: **5/11/2023**
CONTRACTOR: **J.A. Neary Excavating**
EQUIPMENT: **Case 580 Super N**

GROUNDWATER ENCOUNTERED: **9 Ft.**
GROUND SURFACE ELEVATION: **12 Ft.**
DATUM: **Google Earth**
LOGGED BY: **SR**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0				
				5 In. of Topsoil	
11.6				FILL - Brown (10YR 4/3) and gray (10YR 6/1), moist, silty sand with gravel and brick fragments [Sandy Loam per USDA]	
	2				
				- Dark yellow-brown (10YR 4/6) and gray (10YR 6/1), gravel grades out at 3-1/2 Ft.	
	4				
				- Dark brown (10YR 3/3) at 5 Ft.	
	6				
5.0		SP-SM		Yellow-brown (10YR 5/6), moist, Poorly-graded SAND with silt [Sand per USDA]	- Infiltration rate = 72 in/hr at 7 Ft.
	8				
				- wet at 9 Ft.	▼
2.5				Test pit complete at 9-1/2 Ft.	
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-1

LOG OF TEST PIT NO. TP-2

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

PROJECT NO.: **31230924**

DATE STARTED: **5/11/2023**
DATE COMPLETED: **5/11/2023**
CONTRACTOR: **J.A. Neary Excavating**
EQUIPMENT: **Case 580 Super N**

GROUNDWATER ENCOUNTERED: **8 Ft.**
GROUND SURFACE ELEVATION: **12 Ft.**
DATUM: **Google Earth**
LOGGED BY: **SR**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0				
11.7				4 In. of Topsoil	
				FILL - Dark brown (10YR 3/3) and gray (10YR 6/1), moist, silty sand with gravel [Sandy Loam per USDA]	
	2				
	4				- Hard excavating at 3-1/2 Ft.
				- Dark brown (10YR 3/3) at 5-1/2 Ft.	
	6				- Infiltration rate = 0.5 in/hr at 6 Ft.
				- with pipe and concrete slab, gravel grades out at 7 Ft.	
				- Very dark gray (10YR 3/1) at 7-1/2 Ft.	
	8				▼ Rapid water seepage at 8 Ft.
3.5				Test pit complete at 8-1/2 Ft. due to rapid water water seepage.	
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-2

LOG OF TEST PIT NO. TP-3

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT NO.: **31230924**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

GROUNDWATER ENCOUNTERED: **7 Ft.**
DATE STARTED: **5/11/2023**
GROUND SURFACE ELEVATION: **12 Ft.**
DATE COMPLETED: **5/11/2023**
DATUM: **Google Earth**
CONTRACTOR: **J.A. Neary Excavating**
LOGGED BY: **SR**
EQUIPMENT: **Case 580 Super N**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
11.8	0			3 In. of Topsoil	
				FILL - Dark brown (10YR 3/3) and gray (10YR 6/1), moist, silty sand with gravel [Sandy Loam per USDA]	
	2				
	4			- Dark yellow-brown (10YR 4/6) at 4-1/2 Ft.	
				- with wood and concrete at 5-1/2 Ft.	- Infiltration rate = 24 in/hr at 5 Ft.
	6				
5.0					▼ - Rapid water seepage at 7 Ft.
4.5		SP-SM		Yellow-brown (10YR 5/6) and gray-brown (10YR 5/2), wet, Poorly-graded SAND with silt [Sand per USDA]	
	8			Test pit complete at 7-1/2 Ft. due to rapid water seepage.	
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-3

LOG OF TEST PIT NO. TP-4

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

PROJECT NO.: **31230924**

DATE STARTED: **5/11/2023**
DATE COMPLETED: **5/11/2023**
CONTRACTOR: **J.A. Neary Excavating**
EQUIPMENT: **Case 580 Super N**

GROUNDWATER ENCOUNTERED: **7 Ft.**
GROUND SURFACE ELEVATION: **10 Ft.**
DATUM: **Google Earth**
LOGGED BY: **SR**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
9.7	0			4 In. of Topsoil	
				FILL - Dark brown (10YR 3/3) and gray (10YR 6/1), moist, silty sand with concrete and brick fragments [Sandy Loam per USDA]	
	2				
				- Dark brown (10YR 3/3) and yellow (10YR 7/6) at 3-1/2 Ft.	
	4				
				- Yellow-brown (10YR 5/6) and gray (10YR 6/1), with roots at 5 Ft.	- Infiltration rate = 18 in/hr at 5 Ft.
	6				
					▼ - Sidewall collapse at 7 Ft.
2.5				Test pit complete at 7-1/2 Ft. due to rapid water seepage and sidewall collapse.	- Rapid water seepage at 7 Ft.
	8				
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-4

LOG OF TEST PIT NO. TP-5

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

DATE STARTED: **5/11/2023**
DATE COMPLETED: **5/11/2023**
CONTRACTOR: **J.A. Neary Excavating**
EQUIPMENT: **Case 580 Super N**

PROJECT NO.: **31230924**
GROUNDWATER ENCOUNTERED: **6 Ft.**
GROUND SURFACE ELEVATION: **11 Ft.**
DATUM: **Google Earth**
LOGGED BY: **SR**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
10.8	0			3 In. of Topsoil	
				FILL - Dark brown, moist, silty sand with gravel and plastic fragments	
	2			- Dark orange brown at 3 Ft.	
7.5		SP-SM		Yellow and gray, moist, Poorly-graded SAND with silt	
	4				
	6				Rapid water seepage at 6 Ft.
4.5				Test pit complete at 6-1/2 Ft. due to rapid water seepage.	
	8				
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-5

LOG OF TEST PIT NO. TP-6

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

PROJECT NO.: **31230924**

DATE STARTED: **5/11/2023**
DATE COMPLETED: **5/11/2023**
CONTRACTOR: **J.A. Neary Excavating**
EQUIPMENT: **Case 580 Super N**

GROUNDWATER ENCOUNTERED: **9 Ft.**
GROUND SURFACE ELEVATION: **12 Ft.**
DATUM: **Google Earth**
LOGGED BY: **SR**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
11.8	0			3 In. of Topsoil	
				FILL - Dark brown, moist, silty sand with gravel	
	2				
				- Dark orange-brown at 3-1/2 Ft.	
8.0	4	SP-SM		Yellow-brown and gray, moist, Poorly-graded SAND with silt	
	6				
	8				Rapid water seepage at 9 Ft.
2.5				Test pit complete at 9-1/2 Ft. due to rapid water seepage and sidewall collapse.	
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-6

LOG OF TEST PIT NO. TP-7

PROJECT: **Proposed Beachway Avenue Waterfront Development**
PROJECT LOCATION: **Borough of Keansburg, Monmouth County, New Jersey**
CLIENT: **Beachway Avenue Realty, LLC**

PROJECT NO.: **31230924**

DATE STARTED: **5/11/2023**
DATE COMPLETED: **5/11/2023**
CONTRACTOR: **J.A. Neary Excavating**
EQUIPMENT: **Case 580 Super N**

GROUNDWATER ENCOUNTERED: **8 Ft.**
GROUND SURFACE ELEVATION: **12 Ft.**
DATUM: **Google Earth**
LOGGED BY: **SR**
CHECKED BY: **KTP**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
	0				
11.7				4 In. of Topsoil	
				FILL - Dark brown, moist, silty sand with gravel	
	2			- Dark orange-brown at 3 Ft.	
8.5		SP-SM		Yellow-brown and gray, moist, Poorly-graded SAND with silt	
	4				
	6				
4.0	8			Test pit complete at 8 Ft. due to sidewall collapse.	▼ Rapid water seepage at 8 Ft.
	10				
	12				

NOTES: **Location and elevation are approximate.**
Backfilled on completion.

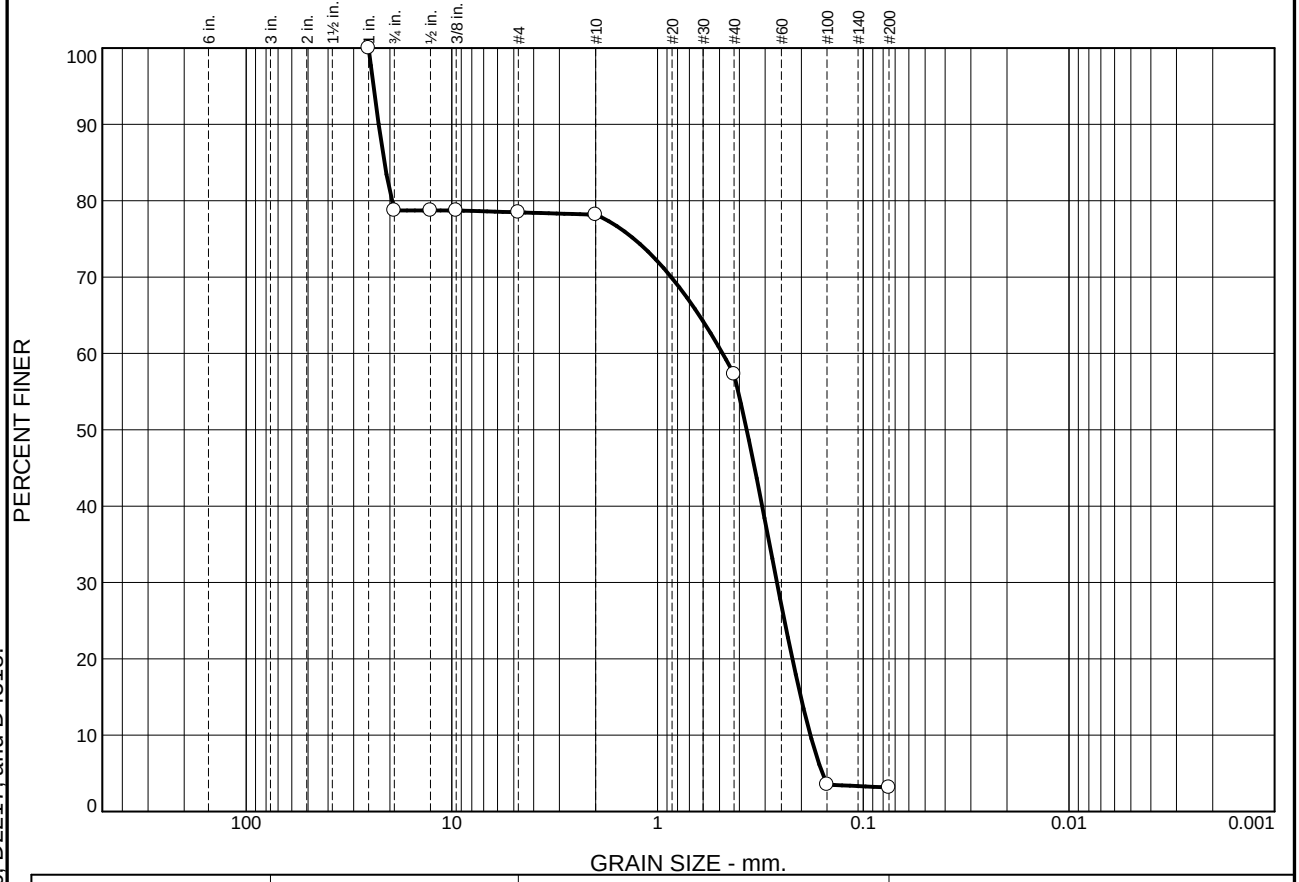
GEO-TECHNOLOGY ASSOCIATES, INC.
14 Worlds Fair Drive, Suite A
Somerset, NJ 08873

LOG OF TEST PIT NO. TP-7

APPENDIX C

Laboratory Data

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	21.3	0.2	0.3	20.9	54.2	3.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	21.2613	0.4830	0.3686	0.2627	0.2011	0.1807	0.79	2.67

Material Description	USCS	AASHTO
○ Poorly-graded SAND with gravel	SP	A-3

Project No. 31230924 **Client:** Beachway Avenue Realty, LLC

Project: Proposed Beachway Avenue Waterfront Development

○ **Source of Sample:** B-1 **Depth:** 20 **Sample Number:** 8

Remarks:

○NMC = 20.4%

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Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR **Checked By:** AFS

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	11.6	18.8	8.8	20.7	22.9	17.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	12.3371	1.8362	0.7832	0.2485				

	Material Description	USCS	AASHTO
○	Silty SAND with gravel	SM	A-1-b

Project No. 31230924 **Client:** Beachway Avenue Realty, LLC

Project: Proposed Beachway Avenue Waterfront Development

○ **Source of Sample:** B-2 **Depth:** 2 **Sample Number:** 2

Remarks:

○NMC = 11.3%

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Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR **Checked By:** AFS

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	7.2	85.9	6.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.3746	0.2706	0.2396	0.1842	0.1392	0.1161	1.08	2.33

Material Description	USCS	AASHTO
○ Poorly-graded SAND with silt	SP-SM	A-3

Project No. 31230924 **Client:** Beachway Avenue Realty, LLC

Project: Proposed Beachway Avenue Waterfront Development

○ **Source of Sample:** B-2 **Depth:** 10 **Sample Number:** 6

Remarks:

○NMC = 24.6%

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Somerset, NJ 08873

Figure

ASTM Specifications performed my include: D421, D422, D2216, D2217, and D4318.

Tested By: RR **Checked By:** AFS