THE AUTHORITY
Improving your Tomorrow.
745 Lebanon Road • Millville, NJ 08332 • 856-825-3700
theauthoritynj.com

August 16, 2024

SOLID WASTE COMPLEX ADMIN BUILDING ADDITION & RENOVATION

ADDENDUM #2

Includes included in this addendum are:

1. Bid due date change
2. Changing flooring type in specified rooms from VCT to LVT
3. Adding Geotechnical Report

1. Bid Due Date

Bids due date is changed to Wednesday, September 4, 2024, at 1:00 p.m. in the Board Room at the Cumberland County Improvement Authority, 745 Lebanon Road, Millville, NJ 08332.

2. Flooring Selection Update

The floor finish of the following rooms will be changed from V.C.T. to L.V.T. Color to be determined. Refer to the specification for additional information. 12 Gun Storage, 14 Stair, 17 Storage, 22 General Storage, 23 General Storage, 24 Stair, and 26 Janitor.

3. Geotechnical Report

See included report.

Colliers
Engineering & Design

Report of Geotechnical Evaluation

August 16, 2024

Proposed Building Additions

Solid Waste & Recycling Facility
169 Jesse Bridge Road (Block 76, Lot 14)
Deerfield Township, Cumberland County, New Jersey

Prepared for:

Fralinger Engineering, PA
ATTN: Charles Fralinger
629 Shiloh Pike
Bridgeton, NJ 08302

Prepared by:

Eduardo Freire, PE
NJ Professional Engineer
License No. GE24GE04339100

Rose Recchia
Staff Geologist

Colliers Engineering & Design
5439 Harding Highway
Mays Landing, New Jersey 08330
Main: 877 627 3772
Colliersengineering.com

Project No. 24006994A

Accelerating success.

Table of Contents

Figures

Appendices

Introduction

This report presents the results of the geotechnical exploration performed to provide geotechnical design criteria and foundation support recommendations for the proposed building additions located at the Solid Waste & Recycling Facility at 169 Jesse Bridge Road, Deerfield Township, Cumberland County, New Jersey (Block 76, Lot 14). Colliers Engineering & Design (CED) understands that the proposed development consists of two single-story building additions and typical site improvements.

The subsurface exploration was conducted in accordance with our proposal 24006994P (dated June 27, 2024), and your subsequent written authorization. The purposes of this exploration were to evaluate the existing subsurface conditions at the project site, and to provide geotechnical related design and construction recommendations for the proposed building additions.

Our scope of services for this exploration included the completion of three test borings, one hand excavated existing foundation test pit, laboratory testing of representative soil samples, engineering analyses of the subsurface data obtained from this field exploration, and the preparation of this report.

Site Description and Proposed Development

The site is located at 169 Jesse Bridge Road in Deerfield Township, as shown on the Site Location Map, Figure 1. The site is currently developed with the existing Solid Waste & Recycling Facility containing multiple single-story buildings and structures, and surrounding asphalt paved parking areas and drive lanes.

The subject project site is bounded to the north by a paved parking area followed by a single-story building and wooded cover; to the south by a single-story building and a paved parking area; to the east by a paved parking area, followed by a natural gas station, and followed by Jesse Bridge Road; and to the west by a paved parking area.

Based on the Site Plan package, titled “Solid Waste Recycling Administration Building Expansion Plan”, prepared by Fralinger Engineering, PA, dated June 20, 2024, we understand that the proposed development includes two - single-story building additions with slabs-on-grade to be constructed on the south and west portions of the existing administration building. The southern addition will have a footprint area of approximately 2,096 square feet (sf) and the western addition will have a footprint of 560 sf.

Site grades are generally level across the site, ranging between approximately EL. 72 feet to EL. 73 feet. We understand that the finished floor elevations (FFE) of the proposed building additions will generally match the FFE of the existing building, requiring minimal grade cuts/fills to achieve the final site grades (i.e. less than 2 feet). Building loading information was not available during the preparation of this report, but we anticipate that maximum column and wall loads will be typical for this type of building.

Colliers Engineering & Design

Subsurface Exploration and Laboratory Testing Program

The subsurface conditions at the site were explored on July 23, 2024, through the advancement of three test borings, identified herein as TB-1 through TB-3. The test borings were field located by CED personnel based on offsets from existing site features. The test borings were performed in the existing asphalt pavement and grass covered areas, generally within the footprint of the proposed building additions. The approximate test boring locations are shown on the attached Exploration Location Plan, Figure 2.

The test borings were advanced to a termination depth of approximately 25 feet below ground surface (bgs) by Soil Borings Drilling, LLC of Haddonfield, New Jersey, using standard hollow-stem auger drilling techniques. Split spoon sampling was performed in accordance with ASTM D1586 (Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils). The number of blows required to drive the split spoon every 6 inches into the soil was recorded and is shown on the test boring logs. The sum of blows for the interval from 6 inches to 18 inches is the N-value. The N-value indicates the soil resistance encountered within each sampling interval. Upon completion, the test borings were backfilled with soil cuttings, and capped with asphalt cold patch (where appropriate).

The test borings were performed under the full-time technical observation of CED. Representative soil samples were collected and visually identified in accordance with the Burmister Soil Classification System. Details pertaining to the subsurface conditions encountered are presented on the Test Boring Logs in Appendix A.

One hand excavated test pit was performed along the eastern wall of the existing building, adjacent to the proposed southern addition, to explore the existing foundations. The test pit was located in the field by CED personnel and performed as close as possible to an apparent column location. The approximate test pit location is shown on the Exploration Location Plan, Figure 2. Upon completion, the test pit was backfilled with soil cuttings. The existing building foundation information obtained during the test pit exploration is presented in the *Foundation Test Pit* section of this report.

The laboratory testing was assigned to determine the physical properties of the subsoils, as well as to augment the field exploration. The stratigraphic continuity and physical characteristics of the subsoils were evaluated by the determinations of grain size distribution by mechanical sieve, plasticity limits, moisture content, and organic content. The laboratory testing results are presented in Appendix B.

Subsurface Conditions

Regional Geology

The site is located within the Atlantic Coastal Plain Physiographic Province of New Jersey. The USDA – Natural Resources Conservation Service (NRCS) Web soil mapping and the Rutgers Engineering Soil Survey of New Jersey (No. 21) for Cumberland County were reviewed for soil properties. Review of the published information revealed the site to be underlain by *Downer Loamy Sand, 0 to 5 percent slopes (DocB)* and *AM-24 (ge)* soils. The underlying natural soils are derived from unconsolidated, stratified alluvial deposits consisting of clayey silt and sand with intermixed or irregular layers of gravel. Soil colors range from yellow-brown or red-brown to dull red.

According to the *Bedrock Geologic Map of Central and Southern New Jersey* (Dalton, R.F., 2014), the surficial soils are underlain at depth by the *Cohansey Formation (Tch)*, consisting of gravelly, fine to coarse quartz sand with discrete lenses of clay and silt, with zones of woody clay. The formation tends to be white to yellow with some local red to orange-brown iron oxide staining in sand layers, while clay beds are dark gray or white to red when weathered.

Subsurface Description

Based on the results of the test borings, the generalized subsurface conditions at the site may be described below, in order of depth:

- **Surface Cover:** The test borings were advanced in the existing asphalt pavement and grass covered areas outboard of the existing building. The surface cover in the test borings consisted of either asphalt approximately 6 inches thick with subbase approximately 2 inches thick or topsoil approximately 4 to 6 inches thick.

- **Stratum F (Granular Fill):** Underlying the surface cover in each of the test borings is an apparent fill stratum extending to a depth of approximately 2 feet bgs. The granular fill consists of brown coarse to fine sand with moderate amounts of clay and silt (little to some) and minor amounts of medium to fine gravel (trace to little). The Standard Penetration Test (SPT) or N-values in Strata F soils range from 6 blows per foot (bpf) to 21 bpf, averaging approximately 13 bpf. The relative density was generally encountered to be loose to medium dense.

- **Stratum S (Granular Soils):** Underlying the Stratum F soils is a stratum consisting of predominantly orange, tan, and brown coarse to fine sand with variable amounts gravel (none to and) and variable amounts of clay and silt (trace to and). The Stratum S soils extend to the maximum test boring depths of 25 feet bgs. The SPT N-values within the Stratum S soils range from 7 bpf to 50 bpf, averaging approximately 22 bpf. The higher values are likely due to the increased gravel content. The relative density was generally encountered to be loose to dense.

These subgrade findings are generally consistent with the mapped Regional Geology; however, the upper granular deposit appears to be man-placed fill, likely from existing site development. The depth of any in-place fill is difficult to discern without historical grading plans due to similarities in appearance between the near surface soils and the natural soils of the area; however, the top 2 feet of the soil profile appears to be granular fill.

Groundwater Conditions

Groundwater was first encountered in each the test borings at depths ranging from approximately 6 feet to 8 feet bgs. It should be noted that fluctuation in groundwater levels can occur due to several factors, including variations in precipitation, seasonal changes, and site development activities, which can alter surface water drainage paths.

Existing Foundation Test Pit

Test pit TP-1 was performed along the perimeter footings of the existing building adjacent to the proposed southern building addition, as shown on Figure 2, to explore the existing foundation system. The existing building appears to be founded on a shallow foundation system (spread and strip footings) from the test pit investigation.

The information obtained on the existing foundation system at the test pit location is as follows:

Table 1: Existing Foundation

Test Pit No.	Foundation Location	Depth To Bottom of Foundation (in)*	Foundation Thickness (in)	Distance From Wall To Outside Foundation Edge (in)	Estimated Foundation Width (in)+
TP-1	Perimeter Strip Footing	45	11	49	65

*Below existing grade
+Assuming 8" wide block and 8" from wall to inside foundation edge (49" + 8" + 8" = 65")

Note that the existing foundation on the outside of the existing building extends a considerable distance outboard of the existing building at 49" where typically it would be expected to 8". It is our opinion that the existing footings may have been overpoured. As such this should be considered by the designer and the contractor as possibly additional work may be needed to excavate this area and install new foundations for the proposed additions, if the existing overpoured foundations cannot be used.

Discussion and Recommendations

Based on our geotechnical exploration, the site is favorable for the use of traditional shallow foundations and slab-on-grade construction to support the proposed building additions, provided routine site preparation, limited stabilization program, and load bearing fill procedures outlined herein are implemented. The following sections summarize our recommendations with respect to site and subgrade preparation, as well as the construction of foundations, floor slabs, and site utilities.

Site Preparation

The purpose of these recommended site preparation procedures is to provide stable, uniform, and level bearing conditions for the proposed building addition foundations and slab-on-grade. Contractors should be prepared to perform routine subgrade maintenance (e.g. grading, seal-rolling, etc.) of exposed surfaces throughout construction. The following procedures should be performed under the technical supervision of the Geotechnical Engineer.

- Install soil erosion and sedimentation control devices, as well as temporary stormwater management facilities, as specified by Site/Civil Engineer.

- Site preparation and earthwork should be performed during dry and favorable weather conditions.

- Maintain positive drainage conditions throughout construction, avoiding unnecessary ponding of stormwater in excavations or low areas of the site. Seal-roll exposed soil or subgrade surfaces prior to rain or snow events, and promptly remove any standing water immediately afterwards.

- Any existing utility locations should be verified in the field and relocated or abandoned as necessary, prior to construction. If the option to abandon underground utilities in-place is chosen, we recommend that a lean cement grout (250 psi) be used to fill the underground utility lines.

- Remove and dispose of vegetation, trees, stumps, and root balls at an appropriate off-site facility. Strip topsoil in its entirety and stockpile onsite for later use within landscaped areas.

- Complete demolition of existing site structures/site features as necessary in accordance with the demolition plan and the following guidelines.

    - Demolish and remove structural elements (pavement, foundations, slabs, vaults, etc.) in their entirety from within the footprint areas of the proposed building additions extending a minimum of 5 feet outboard of the proposed perimeters (where possible). Any backfilling should be performed with compacted load bearing fill in accordance with the *Load Bearing Fill* Section of this report.

    - If feasible, implement a recycling program consisting of the processing of inert building materials (concrete, block, brick, stone, etc.) to a gradation similar to a NJDOT 901.10 dense graded aggregate (DGA), if intended for reuse as load bearing fill. Alternatively, remove demolition debris from the site in accordance with local and state regulations.

- Complete excavations as necessary to achieve the proposed subgrade elevations. The existing in-situ soils may be excavated with conventional equipment (excavators, dozers, etc.).

- If any unsuitable (deleterious) fill, buried debris, or obstructions are encountered, they should be removed in their entirety and backfilled with compacted load bearing fill. Selective removal/ replacement of the Strata F soils may be required, as directed by the onsite representative of the Geotechnical Engineer.

- **Perform a limited stabilization program within structural areas of the site** (foundation footprints and slabs), plus a 5-foot perimeter (see the *High Energy Vibratory Proof-Rolling* section below). Specifically, after the final subgrades have been reached (within cut areas) and prior to load bearing fill placement (within fill areas), compact the exposed subgrades with a minimum 5-ton roller with a minimum of six passes applied in a crisscrossing pattern, where available. Any remaining unstable zones should be removed as directed by the onsite representative of the Geotechnical Engineer.

- Following satisfactory subgrade preparation, place and compact load bearing fill, as needed, in thin, controlled, compacted lifts to achieve the final subgrade elevations in accordance with the recommendations presented in the *Load Bearing Fill* section of this report.

- Load bearing fill, foundations and slabs should not be constructed on frozen ground. Any frozen subgrade should be removed in its entirety and backfilled with compacted load bearing fill or be permitted to thaw and recompacted prior to the placement of additional material, reinforcement, concrete, and pavement.

- Trench excavations should be performed in accordance with the recommendations presented in *Temporary Excavations* and *Surface Water and Groundwater Control sections* of this report. Trench instability should be anticipated in open excavations.

- In accordance with the Occupational Safety and Health Administration (OSHA) requirements, all excavations should be properly sloped or otherwise structurally retained to provide stable and safe working conditions.

High Energy Vibratory Proof-Rolling

Following site clearing, stripping of surface cover, and excavating to proposed subgrade bearing levels (in cut areas), the exposed subgrade soils should be improved by utilizing high energy (5-ton minimum static weight) vibratory rollers with a minimum of six passes applied in a crisscrossing pattern, where available, prior to the placement of any load bearing fills. A smooth drum roller is recommended to be utilized on the predominantly granular soil and a sheepsfoot roller is recommended for predominantly fine-grained soils. The resulting energy will improve densities ranging from approximately 2 feet to 4 feet below the exposed site grades, depending upon the nature of the soils and groundwater levels at the time. The vibratory or static modes should be used as directed by the onsite representative of the Geotechnical Engineer, depending on the moisture content of the subgrade material and possible interference from groundwater conditions. The compactor should be used in static mode within 5 feet of any nearby existing structures.

We recommend that high energy vibratory proof-rolling be utilized within the footprints of the proposed structural areas (foundations and slabs) and to prepare subgrades within structural areas receiving site fills, including a minimum of 5 feet outboard of the proposed perimeters, where possible. Specific attention should be made during proof-rolling operations to any newly demolished features, to confirm suitable subgrade support for the proposed development, as well as all areas containing variable fill of Strata F. Areas that do not respond favorably to high energy proof-rolling may require the use of over-excavation and replacement methods. See the *Over-Excavation/Stabilization* and *Load Bearing Fill* sections of this report for further details.

Over-Excavation / Stabilization

The near surface subgrade contains fill, pockets of loose granular fills, and unconsolidated deposits that require stabilization. During subgrade preparations, these strata should be carefully observed and evaluated by the onsite representative of the Geotechnical Engineer to confirm suitability prior to placement of load bearing fill and foundation construction. Any remaining unstable zones should be removed as directed by the onsite representative of the Geotechnical Engineer.

Any loose, soft, or wet soil and soil containing organic material or significant debris, are not considered suitable support for foundations or floor slabs and, if encountered, should be excavated and replaced with load bearing fill compacted in-place. Over-excavations on the order of several feet should be anticipated during subgrade preparation. If any buried debris or obstructions are encountered, they should be removed in their entirety and backfilled with compacted load bearing fill.

Construction during extended wet weather periods could create the need to over-excavate exposed soils if they become disturbed and cannot be recompacted due to elevated moisture content and/or weather conditions. The need for over-excavation should be confirmed through continuous observation and testing by the onsite representative of the Geotechnical Engineer. Selective drying and recompaction of unsuitable subgrades may be accomplished by scarifying or windrowing surficial material during extended periods of dry and warm weather. Otherwise, use of imported material or chemical subgrade stabilization methods, such as cement, could become necessary at additional cost. The need for subgrade over excavation and/or stabilization will be dependent, in part, on the subgrade protection effort exercised by the Contractor.

Load Bearing Fill

All fill/backfill proposed to support building, slabs, pavement, and site features that would be adversely affected by settlement is considered load bearing fill. Materials used as load bearing fill should consist of inorganic, readily compactable, predominantly well-graded granular soils with no more than 15 percent fines (material passing the No. 200 sieve) that are free of trash, debris, organic inclusions, and other deleterious material, frozen material, or excess moisture. We recommend that fragments having a maximum dimension greater than 3 inches be broken down or excluded from the fill. Alternate imported fill materials such as dense graded aggregate (NJDOT 901.10), including recycled concrete aggregate, may also be considered, where approved for use by the Geotechnical Engineer.

We anticipate that the soil excavated during site development activities will generally consist of the Stratum F material. The predominantly granular materials can be reused as load bearing fill, provided they meet the requirements above, are sufficiently moisture conditioned, and any organic material, debris, and fragments larger than 3 inches, are removed. **Should excavated soils contain elevated silt and clay content, they should be stockpiled separately for re-use in landscaped and non-structural areas, as they will be subject to moisture-related compaction problems and should be avoided for reuse as load bearing fill**.

Load bearing fill should be placed in essentially horizontal lifts, with a maximum loose thickness of 8 inches. Each lift should be compacted to at least 95 percent of the maximum dry density, as determined by the modified Proctor test (ASTM D1557). In addition to meeting the compaction criteria, the compacted material should maintain visual stability beneath the compaction equipment and be observed and documented by the onsite representative of the Geotechnical Engineer.

Moisture contents should be maintained near the optimum moisture content during compaction procedures to facilitate proper compaction.

It is unknown if the site earthworks will result in a balanced site. If onsite materials resulting from the proposed earthworks are to be removed from the site, a Clean Fill evaluation may be required to satisfy NJDEP, as well as the receptor of the material. Conversely, if materials are to be imported to the site, Clean Fill documentation should be provided to the property owner by the Contractor.

Foundation Recommendations

The test borings indicate that the proposed building additions can be adequately supported using a conventional shallow foundation system, provided that the site-specific stabilization and load bearing fill procedures outlined above are implemented. Conventional spread and strip footings may be designed and proportioned assuming a maximum allowable soil bearing pressure of 3,000 pounds per square foot (psf). The allowable bearing capacity may be increased by 30% for transient loadings.

Footings may be supported on compacted soils of Stratum F or S, or on newly placed compacted load bearing fill. Footing bearing subgrades should be compacted using a “jumping jack” or other trench compaction equipment upon completion of footing excavation and prior to reinforcing steel installation (plate tamper is not suitable). The foundation bearing surface preparation should be observed by the onsite representative of the Geotechnical Engineer prior to foundation construction (i.e. reinforcing steel installation and concrete placement) for consistency with the recommended design allowable soil bearing pressure. Any loose, soft, or wet soil and soil containing organic material or significant debris are not considered suitable foundation support, and if encountered, should be excavated in their entirety and replaced with load bearing fill compacted in place. See the *Over-Excavation / Stabilization* and *Load Bearing Fill* sections of this report for further details.

The length of time that the excavated subgrade remains exposed to weather conditions should be kept to a minimum so as to not generate more unsuitable material removal. Onsite soils and fill exposed to weather conditions may soften, requiring removal and replacement prior to foundation installation, due to their sensitivity to moisture. Water that accumulates in the bottom of excavations should be removed promptly.

The minimum width of all wall footings should be 24 inches, and the minimum horizontal dimension of all isolated spread footings should be 36 inches, regardless of the bearing pressure developed. All exterior footings subject to frost action should be based at least 30 inches below the adjacent exterior grade for frost protection and bearing considerations, or deeper as required to bear new foundations at or below the existing foundation bearing level. Interior footings should be based at least 24 inches below the finished floor elevation. In addition, we recommend that the shallow foundations bear below a zone bounded by a plane that extends outward and upward on a 1:1 slope from any underground utility excavation, or other underground features.

It is not anticipated that underpinning of the existing building foundations will be required for construction of the proposed building additions but if the proposed spread footings are deeper than the existing foundation bearing levels, underpinning will be needed. A licensed professional engineer should design the underpinning system. Where underpinning is required, the final excavation and pouring of spread footings should be staggered so that no more than four linear feet of the existing spread footing bottom is exposed at any one time.

Following proper site preparation techniques, the foundations should be capable of supporting the anticipated loads with the potential for post-construction total settlement estimated at less than 1 inch, and 0.5 inch of post-construction differential settlement between adjacent columns. These values are generally within tolerable limits for this type of structure.

Floor Slab

Providing the subgrades for the proposed building additions are prepared, compacted, and proof-rolled under the observation of the onsite representative of the Geotechnical Engineer as described herein, the floor slabs may be supported on-grade in accordance with the following criteria.

The floor slab subgrade should be compacted with a smooth drum vibratory roller immediately prior to installation of the aggregate base to re-compact any materials disturbed by previous construction activities or adverse weather conditions. Any unstable zones detected that cannot be stabilized by additional compaction efforts should be removed, and the excavated area backfilled with load bearing fill.

Immediately prior to slab construction, we recommend that a minimum 4-inch layer of an aggregate base course consisting of a dense-graded aggregate (DGA) conforming to NJDOT (901.10) be placed and compacted over the prepared subgrade. All structural fill supporting the floor slab, including the DGA base course, should be compacted to a minimum of 95 percent of the maximum dry density, as determined by the modified Proctor test (ASTM D1557). The aggregate should be dampened just prior to concrete placement to allow for proper curing of the concrete. These procedures are intended to interrupt the rise of capillary moisture through the slab and to provide uniform concrete curing conditions.

Based on the existing predominantly granular subgrade soil at the site, a coefficient of sliding friction of 0.35 may be used for design of a floor slab without a vapor retarder. However, a minimum 10-mil vapor retarder should be placed over the subgrade, below the aggregate base course, in interior portions of the building to receive floor coverings such as carpeting, floor tile, or epoxy-based finishes. Where vapor retarders are used, a reduced coefficient of sliding friction of 0.20 should be used for design.

We anticipate that, following proper site preparation, the onsite subgrade soils of Stratum F can achieve a Modulus of Subgrade Reaction on the order of 150 pounds per cubic inch (pci). Reinforced concrete floor slabs should be simply supported at wall and column junctures to allow unrestricted rotation of the slab edges. Control joints should be provided at the slab and wall/column interfaces to reduce the potential for slab cracking, should the building settle differentially from the floor slab. Alternatively, the slabs should be free to undergo vertical deflections at the edges.

Seismic Considerations

In accordance with the provisions of the current International Building Code (New Jersey Edition), the site generally has a Site Class Definition of “D” for the existing subsurface soil and groundwater conditions. This classification was determined by utilizing the Standard Penetration Test (SPT) blow count data through the upper 25 feet of the subsurface profile. Medium compact conditions were assumed throughout the remainder of the soil profile to a depth of 100 feet. The following design parameters are provided utilizing tables in the IBC Code and United States Geological Survey (USGS) design tools:

From the USGS and using ASCE 7-16 information (See Appendix C):

Short Period Spectral Acceleration (S_S)	0.144g
Spectral Acceleration at 1 Second (S_1)	0.043g
Peak Ground Acceleration (PGA)	0.076g

Lateral Earth Pressures and Soil Parameters

Lateral earth pressures acting on foundations and foundation walls that are restrained from lateral movement should be designed considering the following:

- Compute lateral earth pressures using a total unit weight for soils of 115 pounds per cubic foot and an internal friction angle of 30 degrees. Consider the buoyant unit weight for zones below the groundwater table.
- Consider hydrostatic pressures for zones below the groundwater table. Where infiltration of surface water may occur behind a wall, an appropriate drainage system shall be incorporated into the design.
- Surcharge loads from surface loads (vehicle or pedestrian traffic, temporary construction loads and equipment, pavement loads, or other structures) should be added to the lateral earth pressures. We recommend using a coefficient of 0.5 times the vertical surcharge loads to determine the horizontal surcharge load.

The parameters presented above consider that backfill within 5 feet of the structure walls will consist of compacted in-place soils or load bearing fill in accordance with the recommendations within this report.

Surface Water and Groundwater Control

Surface grading should be maintained on a continual basis during construction to direct surface water runoff away from open excavations and prevent water from pooling on subgrade soils. The contract documents should require the contractor to provide whatever means and methods are necessary to maintain stable, relatively dry excavations and subgrade conditions at all times during construction.

Based on the anticipated final site grades and below grade excavations, groundwater or perched water are not anticipated to be encountered within the shallow excavations. Should groundwater, perched water, or seepage be encountered during installation of below grade structures or utilities, pumping using standard sump pit and pump techniques may be sufficient to control such water conditions. If needed, sump pits should be installed outboard of the proposed building additions footprint areas and should be filled with minimum ¾-inch clean stone and lined with geotextile filter fabric to prevent excessive particle migration, particularly if heavy pumping is required. Pumped water should be discharged away from the building pad, structural areas, and open excavations, and filtered as per soil erosion / sediment control requirements and any applicable environmental regulations. Groundwater discharge permits will need to meet local requirements.

The dewatering specifications should be of the performance type requiring that the successful contractor provide an adequate dewatering system capable of maintaining the water table a minimum of 2 feet below the prevailing excavation bottom during each stage of construction to maintain stable excavations, provide appropriate subgrade preparation, and allow placement of backfill and/or load bearing fill. A dewatering plan should be submitted for review by the Geotechnical Engineer of Record prior to construction. The dewatering plan should consider the impact of the cone of depression on adjacent features and properties. The contractor should monitor existing nearby structures, as needed during the dewatering period. If applicable, dewatering should continue until adequate structural dead weight is available to resist uplift pressures. The dewatering operation could be continuous for an extended period of time. Therefore, standby systems should be considered to assure the continuity of the dewatering operation.

Temporary Excavations

Temporary excavation stability is a function of many factors including the presence and abundance of groundwater, the type and density of the various soil strata, the depth of excavation, surcharge loadings adjacent to the excavation, and the length of time and weather conditions while the excavation remains open. The loose sandy (e.g. cohesionless) soils near the ground surface and any imported load bearing fill are likely to result in excavation bank stability problems for foundation and utility construction. Temporary bracing or "stay-forms" should be anticipated for shallow foundation and/or utility excavations.

For deeper excavations, the use of relatively flat slopes, benching, or temporary bracing and trench shields may be needed. It is the responsibility of the Contractor to maintain safe excavations in conformance with all applicable federal, state, and local regulations such as OSHA. All excavations should conform to applicable sloping or shoring standards for worker access.

Our opinion is that the existing site soils and new load bearing fill will generally be classified as "Type C" soils under OSHA excavation regulations. Temporary sheeting and shoring should be designed and sealed by a Professional Engineer registered in the State of New Jersey. Soil parameters presented herein should be used only as a guideline by the contractor and does not in any way obviate the requirement for the contractor to submit proposed sheeting design certified by a licensed Professional Engineer prior to construction. These designs should be submitted for review by CED prior to construction.

Below Grade Utilities

The majority of site soils will be suitable for support of subsurface utilities. We offer the following recommendations specific to utility construction:

- Prior to installation, the bearing surface for utility structures (manholes, vaults, etc.) should be evaluated by the onsite representative of the Geotechnical Engineer. Should debris or unsuitable soils be encountered at the utility invert levels, the subgrade should be over-excavated a minimum depth of 6 inches and backfilled with load-bearing fill material to provide uniform support.
- The utility structures should receive a bedding of at least 4 inches of dense-graded aggregate (DGA), as defined by current NJDOT construction standards.
- Any excavated utility trenches beneath the proposed finished floor or pavement subgrades should have the subgrade soils compacted and evaluated by the onsite representative of the Geotechnical Engineer, then backfilled with compacted load bearing fill in accordance with the recommendations outlined in the *Load Bearing Fill* section of this report. If loose or otherwise unstable material is present at the subgrade level, this material should be removed and replaced with load bearing fill.

The proposed underground utility installation is not anticipated to be impacted by groundwater concerns, provided they are installed at typical depths of 4 feet to 6 feet or less below existing site grades. Utility excavations may encounter perched water conditions in the near surface due to the presence of silts and clays, especially if construction starts during or after rainy seasons.

Existing Utilities

Any existing underground utilities should be located, and those utilities which are not reused should be removed and capped. The utility trenches that are in the influence zone of new construction are recommended to be backfilled with load bearing fill or grouted, as needed. Underground utilities, which are to be reused, should be evaluated by the Structural Engineer and utility backfill should be evaluated by the Geotechnical Engineer to determine their suitability for support of the planned construction. If any existing utilities are to be preserved, grading operations must be carefully performed to not disturb or damage the existing utility.

Construction Observation

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions between the test borings and below the depths explored may be different from those encountered in the test borings, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the supervision of a Geotechnical Engineer from CED who is familiar with the intent of the recommendations presented herein. This observation is recommended to evaluate whether the conditions anticipated in the design actually exist or whether the recommendations presented herein should be modified where necessary. CED should also provide onsite observation and testing on a full-time basis during excavation operations, subgrade preparation, foundation installation, and all critical earthwork operations. CED recommends that a representative from CED be on-site on a full-time basis during the earthwork construction. CED has the capability of providing these services and can provide a proposal to perform the onsite quality assurance observation and materials testing.

Closing

The conclusions and recommendations presented in this report are based, in part, on the explorations accomplished for this evaluation. The number, location, and depth of the explorations were completed within the constraints of budget and site access to yield the information to formulate the recommendations. We recommend that we be provided the opportunity for general review of the project plans and specifications when they become available, to confirm that the recommendations and design considerations presented in this report have been properly interpreted and implemented into the project design package.

We recommend that the test boring logs be a part of the specifications for the project along with a reference to the plan sheets that contain the test boring locations for informational purposes. Should the data not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, his own explorations, tests, and analyses.

Clarification

This report has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project Architect, Structural Engineer, and/or Civil Engineer. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available. The conclusions, projections, and recommendations presented in this report cannot be applied to other building configurations or loads. The project plans and specifications should be submitted to us for review so that the geotechnical-related conclusions and recommendations provided herein have been correctly interpreted and are incorporated into the design.

We emphasize that this report should be made available to prospective bidders for informational purposes. We would recommend that the project specifications contain the following statement:

"A geotechnical engineering report has been prepared for this project by Colliers Engineering & Design. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent their interpretation of the subsurface conditions, field and laboratory testing, and the results of analyses which they have conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, his own investigation, tests, and analyses."

Limitations

This geotechnical exploration program has been performed in accordance with generally accepted engineering practice and applicable design standards as referenced herein. This report and its supporting documentation have been prepared exclusively for the use of our Client pursuant to the Agreement between CED and the Client. All provisions set forth in the Agreement and the Business Terms and Conditions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein.

The findings, conclusions, and recommendations contained in this report are based on data revealed by limited exploration and testing of the subsurface at the referenced project site. The explorations indicate subsurface conditions at the specific locations and times explored, and only within the depths penetrated. Should deviations from the described subsurface conditions be encountered at any time prior to or during construction, CED should be notified immediately so that modifications to our recommendations can be made, if necessary.

This report is applicable only to the contemplated project design described herein, and any changes in the design should be brought to our attention so that we may evaluate whether our recommendations will be affected. CED 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 CED. As such, the conclusions and recommendations contained in this report are pending our review of final plans and specifications, and verification of subsurface conditions by our direct observation at the time of construction.

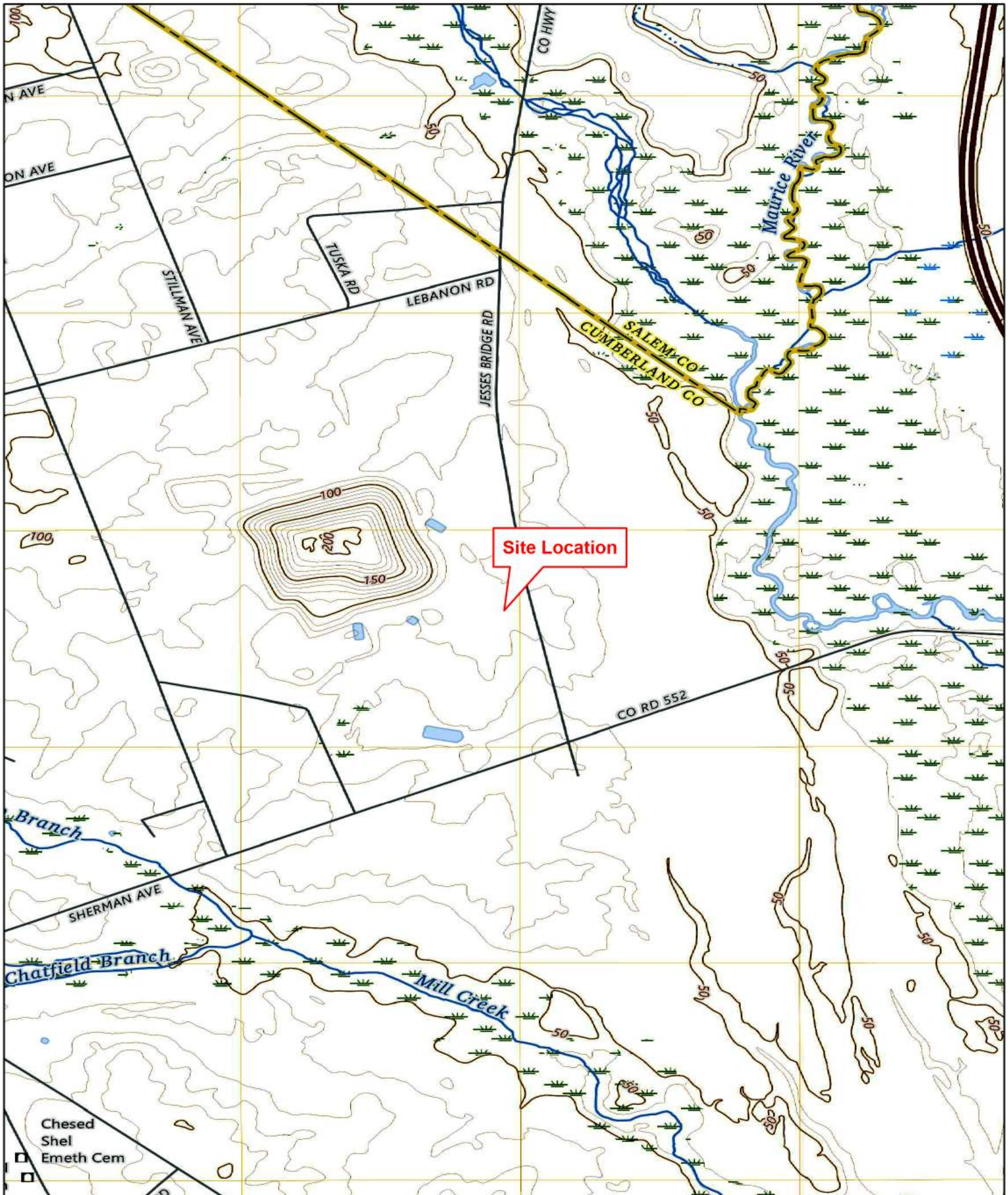
This report and supporting documentation are instruments of service. The subject matter of this report is limited to the facts and matters stated herein.

Our recommendations are based upon the assumption that the services of a qualified Geotechnical Engineer will be retained for the observation of excavation operations, foundation installation, and all critical earthwork operations. CED has the capability of providing these services and can provide a proposal to perform the on-site quality assurance observation and materials testing.

The scope of this geotechnical program did not include investigation or evaluation of any environmental issues, such as wetlands, or hazardous or toxic materials on, below, or in the vicinity of the subject site. Any statements in this report or supporting documentation regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client.

\\corp.collierseng.com\corp\Mays Landing, NJ\Projects\2024\24006994A\Reports\Geotechnical\01-Exploration\GeoRpt-FND\Report Docs\240815_RR_GeoRpt-Bldg Additions_Solid Waste&Recycling Facility.docx

Figures



Source: Esri, NASA, NGA, USGS, FEMA. Millville Quadrangle NJ USGS (2023).

Prepared For:

We Set Our Sights on Excellence
Fralinger Engineering PA

Prepared By:

Mays Landing Office
5439 Harding Highway
Mays Landing, NJ 08330
T: 800.258.3787
www.colliersengineering.com

Colliers Engineering & Design

SITE LOCATION MAP

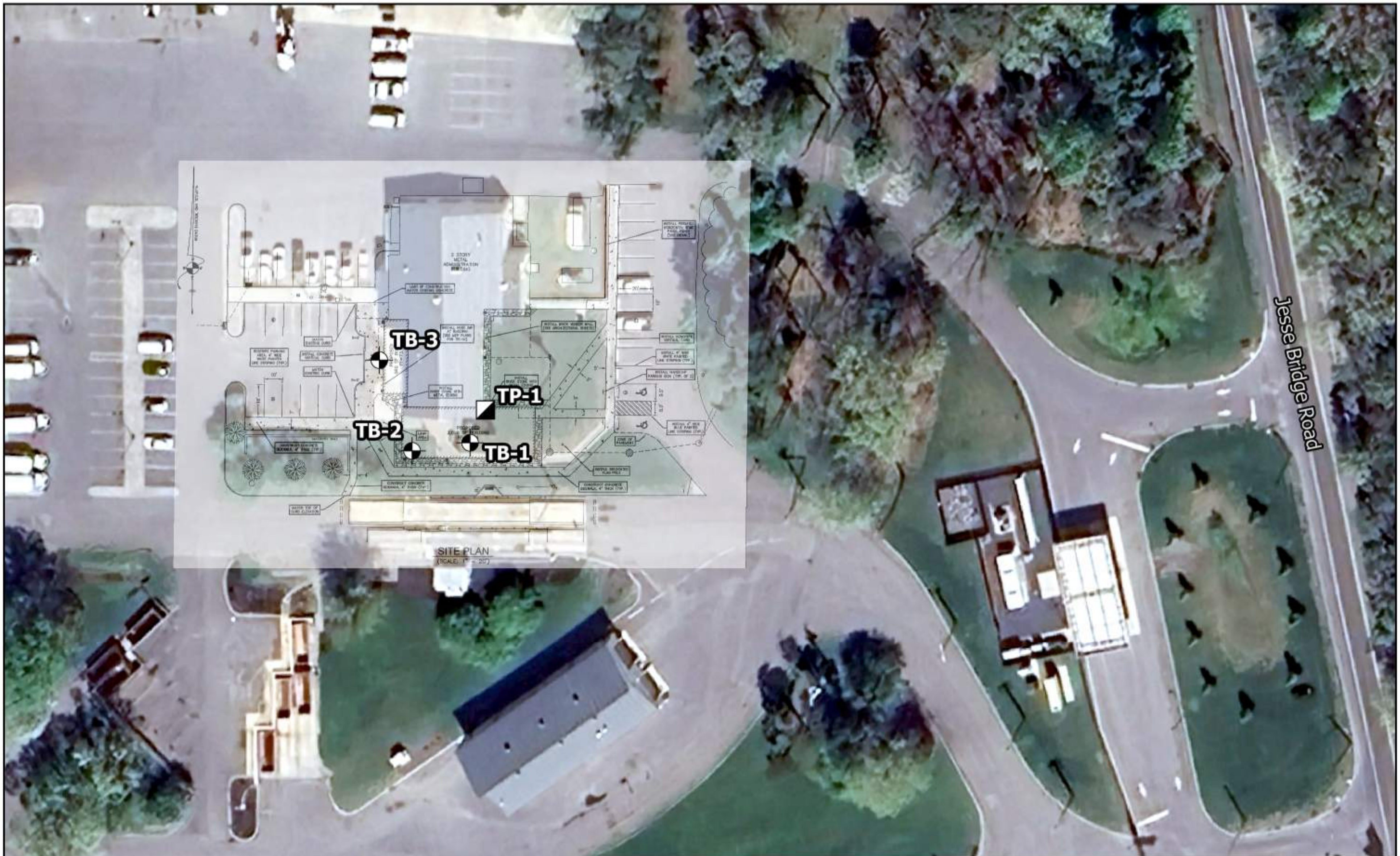
Proposed Building Additions
Solid Waste & Recycling Facility

DEERFIELD TOWNSHIP
CUMBERLAND COUNTY, NJ 08332

Drawn By: RR	Checked By: EF	Proj. No.: 24006994A
Scale: 1 IN = 2,000 FT	Date: 08/13/2024	Figure No.: 1

N W E S

0 1,000 2,000 4,000 Feet



Source: Maxar, Microsoft. Site Plan (SP-2), prepared by Fralinger Engineering, PA, dated 6/21/24. Google Aerial Imagery dated 4/22/23, retrieved 8/7/24.

LEGEND

INDICATES THE NUMBERS AND APPROXIMATE LOCATIONS OF TEST BORINGS PERFORMED FOR THIS EXPLORATION PROGRAM.

HAND EXCAVATED TEST PIT

0 50 100 200 Feet

N

Prepared For:

Fralinger Engineering PA — We Set Our Sights on Excellence

Prepared By:

Mays Landing Office
5439 Harding Highway
Mays Landing, NJ 08330
T: 800.258.3787
www.colliersengineering.com

Colliers Engineering & Design

TITLE:

EXPLORATION LOCATION PLAN

PROJECT:

Proposed Building Additions
Solid Waste & Recycling Facility

DEERFIELD TOWNSHIP
CUMBERLAND COUNTY, NJ 08332

Drawn By: RR	Checked By: EF	Project No.: 24006994A
Scale: 1 IN = 100 FT	Date: 08/13/2024	Figure No.: 2

Engineering
& Design

Appendix A

Test Boring Logs

Burmister Soil Classification System

I - Soil and Fraction/Plasticity Definitions

Material	Symbol	Fraction	Sieve Size	Definition
Boulders	Bldr	-----	9” +	Material retained on 9” sieve.
Cobbles	Cbl	-----	3” to 9”	Material passing 9” sieve and retained on the 3” sieve.
Gravel	G	Coarse (c) Medium (m) Fine (f)	1” to 3” 3/8” to 1” No. 10 to 3/8”	Material passing the 3” sieve and retained on the No. 10 sieve.
Sand	S	Coarse (c) Medium (m) Fine (f)	No. 30 to No. 10 No. 60 to No. 30 No. 200 to No. 60	Material passing No. 10 sieve and retained on the No. 200 sieve.
Material	**Symbol**	**Plasticity**	**Plasticity Index**	**Definition**
Silt	$	Non-Plastic	Passing No. 200 (0.075 mm) PI<1	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air-dried.
Clayey Silt	cy$	Slight (SL)	1 to 5	Clay – Soil. Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.
Silt & Clay	$ & C	Low (L)	5 to 10	
Clay & Silt	C & $	Medium (M)	10 to 20	
Silty Clay	$C	High (H)	20 to 40	
Clay	C	Very High (VH)	40 Plus	
Organic Silt	(O$)	-----	-----	Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content and exhibits fine granular and organic characteristics.

II - Proportion Definitions

Component	Written	Proportions	Symbol	Percentage Range by Weight*
Principal	CAPITALS	---	---	50 or more
Minor	Lower Case	And	a.	35 to 50
		Some	s.	20 to 35
		Little	l.	10 to 20
		Trace	t.	0 to 10

* Minus sign (-) lower limit, plus sign (+) upper limit, no sign middle range.

III – Terminology for Stratified Soils

Terminology	Definition
Parting	0 to 1/16” thickness
Seam	1/16” to ½” thickness
Layer	½” to 12” thickness
Occasional	One or less per foot of thickness
Frequent	More than one per foot of thickness
Alternating	Stratification descriptor (non-varved)

Colliers Engineering & Design

5439 Harding Highway, Mays Landing, NJ 08330

PROJECT: Prop. Building Additions - Solid Waste & Recycling Facility - Deerfield, NJ

LOCATION: (See Plan).

PROJECT NO. 24006994A

TEST BORING: TB-1

GROUND ELEVATION (ft): -
ELEV. FROM: Exist. Grade
- -

CONTRACTOR: Soil Borings Drilling, LLC
DRILLER: N. Campbell
DRILLING EQUIPMENT: Mobile Drill B-29
METHOD: HSA X Mud Rotary ____ Other ____
HAMMER: CH ____ Safety ____ Automatic X
RODS: AW X NW ____ Other ____

GROUNDWATER:	DEPTH (ft)	DATE
FIRST ENCOUNTERED	6	7/23/24
END OF DRILLING (0 hrs.)	-	-

ASTM D-1586

DATE STARTED 7/23/24
DATE FINISHED 7/23/24
FIELD OBSERVER: R. Macchia
CHECKED BY: E. Freire

DEPTH BELOW SURFACE (ft.)	SAMPLE NUMBER / DEPTH (ft.)	BLOWS PER 6 INCHES 0-6"	6-12"	12-18"	18-24"	RECOVERY (in)	POCKET PENETROM. (tsf)	MOISTURE (%)	WATER SYMBOL	PROFILE DEPTH / ELEV.	IDENTIFICATION OF SOILS / REMARKS
	S-1	2	5	8	8	24				Stratum F	S-1: ±4" Topsoil
	0.0'-2.0'									2.0	Brown cmf SAND, little mf Gravel, little Clay & Silt. (FILL; Moist).
	S-2	9	14	10	17	24					S-2: Orange cmf SAND, little mf Gravel, little Clay & Silt. (Moist).
	2.0'-4.0'										
5	S-3	6	19	14	19	24					S-3: Orange cmf SAND, some(+) mf Gravel, some Clay & Silt. (Moist).
	4.0'-6.0'								▽		
	S-4	10	16	12	13	24					S-4: Orange, Brown cmf SAND, little Clay & Silt, little mf Gravel. (Wet).
	6.0'-8.0'										
	S-5	8	10	8	8	24					S-5: Orange, Brown cmf SAND, and mf Gravel, little(+) Clay & Silt. (Wet).
10	8.0'-10.0'										
	S-6	6	5	6	7	24					S-6: Orange, Brown cmf SAND, little mf Gravel, trace Clay & Silt. (Wet).
	10.0'-12.0'										
	S-7	5	4	4	4	24				Stratum S	S-7: Orange cmf SAND, trace Clay & Silt, trace f Gravel. (Wet).
15	13.0'-15.0'										
	S-8	4	8	6	10	16	2.0				S-8: Orange cmf SAND, little Clay & Silt. (Wet). 2" Seam of CLAY & SILT. (Wet)
20	18.0'-20.0'										
	S-9	16	13	13	12	12	2.25				S-9: Orange cmf SAND, and Clay & Silt. (Wet).
25	23.0'-25.0'									25.0 / -25.0	END OF TEST BORING AT 25.0 FEET
30											
35											
40											

NOTES:

TEST BORING: TB-1

Colliers Engineering & Design

5439 Harding Highway, Mays Landing, NJ 08330

PROJECT: Prop. Building Additions - Solid Waste & Recycling Facility - Deerfield, NJ

LOCATION: (See Plan).

PROJECT NO. 24006994A

TEST BORING: TB-2

PAGE 1 OF 1

GROUND ELEVATION (ft): -
ELEV. FROM: Exist. Grade

CONTRACTOR: Soil Borings Drilling, LLC
DRILLER: N. Campbell
DRILLING EQUIPMENT: Mobile Drill B-29
METHOD: HSA X Mud Rotary ___ Other ___
HAMMER: CH ___ Safety ___ Automatic X
RODS: AW X NW ___ Other ___

GROUNDWATER:	DEPTH (ft)	DATE
FIRST ENCOUNTERED	8	7/23/24
END OF DRILLING (0 hrs.)	-	-

ASTM D-1586

DATE STARTED 7/23/24
DATE FINISHED 7/23/24
FIELD OBSERVER: R. Macchia
CHECKED BY: E. Freire

DEPTH BELOW SURFACE (ft.)	SAMPLE NUMBER / DEPTH (ft.)	BLOWS PER 6 INCHES 0-6"	6-12"	12-18"	18-24"	RECOVERY (in)	POCKET PENETROM. (tsf)	MOISTURE (%)	WATER SYMBOL	PROFILE DEPTH / ELEV.	IDENTIFICATION OF SOILS / REMARKS
	S-1	2	11	10	9	12				Stratum F	S-1: ±6" Topsoil Brown cmf SAND, little Clay & Silt, trace mf Gravel. (FILL; Moist).
	0.0'-2.0'									2.0	
	S-2	7	10	8	16	24					S-2: Orange cmf SAND, some(+) mf Gravel, some Clay & Silt. (Moist).
	2.0'-4.0'										
5	S-3	11	15	14	17	24					S-3: Tan, Orange cmf SAND, little Clay & Silt, trace mf Gravel. (Moist).
	4.0'-6.0'										
	S-4	7	12	11	9	24					S-4: Tan, Orange cm SAND, some mf Gravel, little Clay & Silt. (Moist).
	6.0'-8.0'								▽		
	S-5	6	7	9	7	24					S-5: Tan, Orange cmf SAND, some mf Gravel, little Clay & Silt. (Wet).
10	8.0'-10.0'										
	S-6	7	8	8	7	24					S-6: Tan, Brown cmf SAND, trace Clay & Silt. (Wet).
	10.0'-12.0'										
	S-7	10	12	10	11	24				Stratum S	S-7: Same as S-6. (Wet).
15	13.0'-15.0'										
	S-8	6	6	5	7	24					S-8: Tan, Brown cmf SAND, little Clay & Silt. (Wet).
20	18.0'-20.0'										
	S-9	22	50/5"	-	-	11				23.9	S-9: Brown, Orange mf SAND, trace Clay & Silt. (Wet).
25	23.0'-23.9'									-23.9	END OF TEST BORING AT 23.9 FEET
30											
35											
40											

NOTES:

TEST BORING: TB-2
PAGE 1 OF 1

Colliers Engineering & Design

5439 Harding Highway, Mays Landing, NJ 08330

PROJECT: Prop. Building Additions - Solid Waste & Recycling Facility - Deerfield, NJ

LOCATION: (See Plan).

PROJECT NO. 24006994A

TEST BORING: TB-3

PAGE 1 OF 1

GROUND ELEVATION (ft): -
ELEV. FROM: Exist. Grade
- -

CONTRACTOR: Soil Borings Drilling, LLC
DRILLER: N. Campbell
DRILLING EQUIPMENT: Mobile Drill B-29
METHOD: HSA X Mud Rotary ____ Other ____
HAMMER: CH ____ Safety ____ Automatic X
RODS: AW X NW ____ Other ____

GROUNDWATER:	DEPTH (ft)	DATE
FIRST ENCOUNTERED	8	7/23/24
END OF DRILLING (0 hrs.)	-	-

ASTM D-1586

DATE STARTED 7/23/24
DATE FINISHED 7/23/24
FIELD OBSERVER: R. Macchia
CHECKED BY: E. Freire

DEPTH BELOW SURFACE (ft.)	SAMPLE NUMBER / DEPTH (ft.)	BLOWS PER 6 INCHES 0-6"	6-12"	12-18"	18-24"	RECOVERY (in)	POCKET PENETROM. (tsf)	MOISTURE (%)	WATER SYMBOL	PROFILE (DEPTH / ELEV.)	IDENTIFICATION OF SOILS / REMARKS
	S-1	-	3	3	9	24				Stratum F	S-1: ±6" Asphalt; ±2" Subbase Brown cm SAND, some Clay & Silt, little mf Gravel. (FILL; Moist).
	0.0'-2.0'									2.0	
	S-2	13	13	16	15	24					S-2: Brown, Orange cmf SAND, some mf gravel, little Clay & Silt. (Moist).
	2.0'-4.0'										
5	S-3	21	19	20	19	24					S-3: Brown, Orange cm SAND, some f Gravel, little(+) Clay & Silt. (Moist).
	4.0'-6.0'										
	S-4	14	15	13	10	24					S-4: Brown, Orange cmf SAND, some mf Gravel, little Clay & Silt. (Moist).
	6.0'-8.0'								▽		
	S-5	9	9	9	11	24					S-5: Same as S-4. (Wet).
10	8.0'-10.0'										
	S-6	7	10	7	9	24					S-6: Brown, orange cmf SAND, some mf Gravel, little Clay & Silt. (Wet).
	10.0'-12.0'										
	S-7	4	9	10	17	18				Stratum S	S-7: Brown, Orange cmf SAND, little Clay & Silt. (Wet).
15	13.0'-15.0'										
	S-8	3	3	4	3	22					S-8: Orange, Tan cmf SAND, little Clay & Silt. (Wet)
20	18.0'-20.0'										
	S-9	5	7	7	6	18					S-9: Orange, Tan mf SAND, trace Clay & Silt. (Wet)
25	23.0'-25.0'									25.0 / -25.0	END OF TEST BORING AT 25.0 FEET
30											
35											
40											

NOTES:

TEST BORING: TB-3
PAGE 1 OF 1

Colliers Engineering & Design

Appendix B

Laboratory Test Results

5439 Harding Highway
Mays Landing, New Jersey 08330
Main: 877 627 3772
colliersengineering.com

AASHTO ACCREDITED

Colliers Engineering & Design

US Army Corps of Engineers
VALIDATED LABORATORY

GEOTECHNICAL LABORATORY TESTING RESULTS

CLIENT: Fralinger Engineering, PA
629 Shiloh Pike
Bridgeton, NJ 08302

ATTN: Mr. Charles Fralinger

PROJECT: Proposed Building Additions
Solid Waste & Recycling Facility
169 Jesse Bridge Road
Deerfield Township, NJ

Project # 24006994A

DATE: August 5, 2024

PAGE: 1 of 1

CHECKED BY: Eduardo M. Freire, P.E.

TITLE: Laboratory Manager

SAMPLES RECEIVED: July 24, 2024

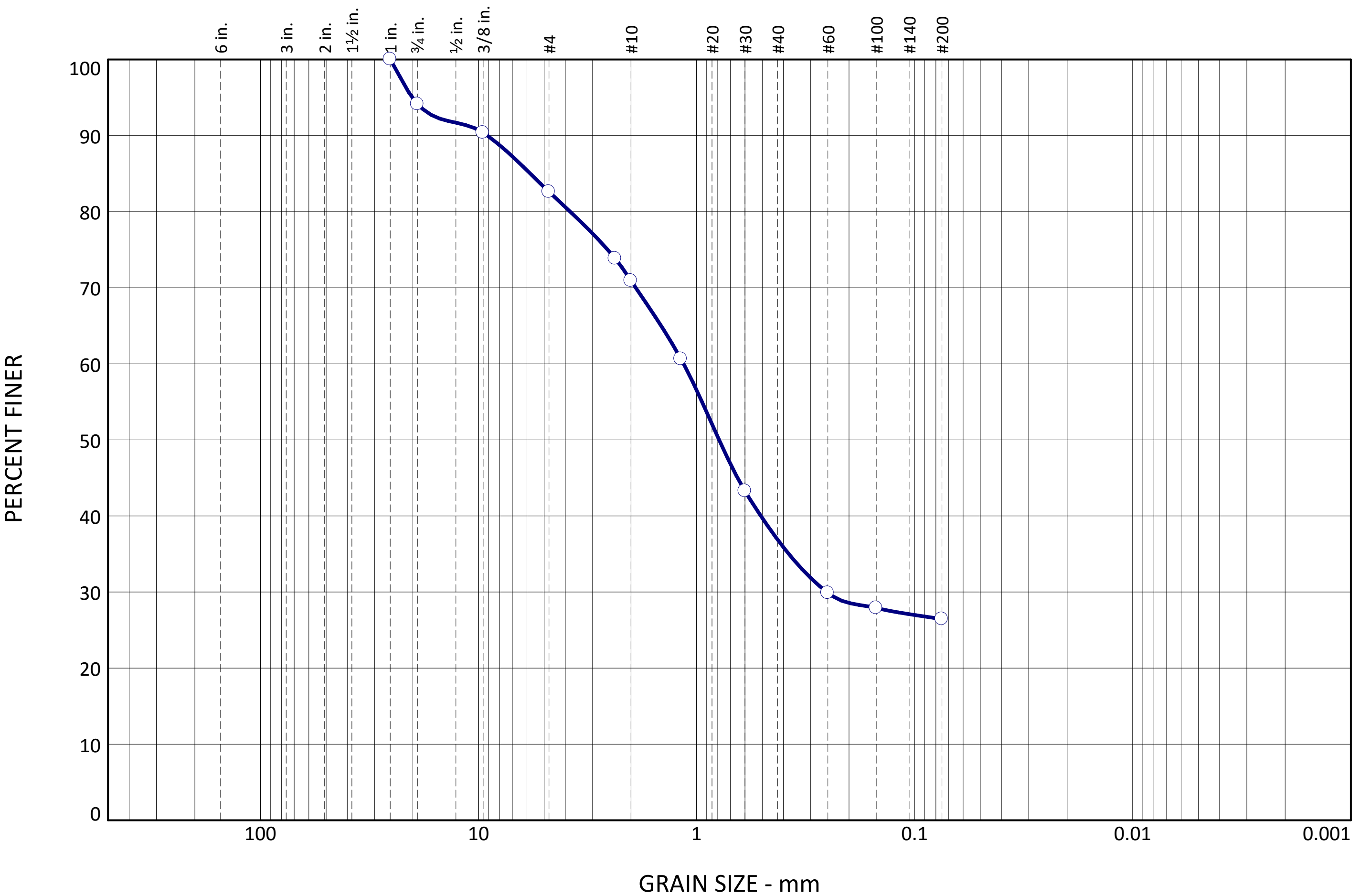
SAMPLES TESTED: 7/24/24 - 8/5/24

LAB TECHNICIAN(S): K. Perry

Test Boring No.	Sample No.	Depth (ft)	Water Content (%) (ASTM D2216)	Atterberg Limits (ASTM D4318)			Particle Size Analysis (Sieve Only)* (ASTM D6913)	%Passing #200 Sieve (ASTM D1140)	Organic Content (%) (ASTM D2974)
				Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)			
TB-1	S-3	4-6					PSA-1		
	S-5	8-10					PSA-2		
TB-2	S-2	2-4					PSA-3		0.7
	S-4	6-8					PSA-4		
TB-3	S-1	0-2					PSA-5		0.9
	S-3	4-6					PSA-6		
		Testing Total:					**6**		**2**

Comments/Remarks: * See attached Plate(s)

Particle Size Distribution Report



% Cobbles	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	9.6	19.5	27.6	13.4	3.5	26.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	94.1		
.375	90.4		
#4	82.6		
#8	73.8		
#10	70.9		
#16	60.6		
#30	43.3		
#60	29.9		
#100	27.9		
#200	26.4		

* (no specification provided)

Material Description

Orange coarse to fine Sand, some medium to fine Gravel, some [Fines: (Silt/Clay)]

Atterberg Limits

LL= PL= PI=

Coefficients

D_{85}= 5.7880 D_{60}= 1.1479 D_{50}= 0.7888
D_{30}= 0.2530 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

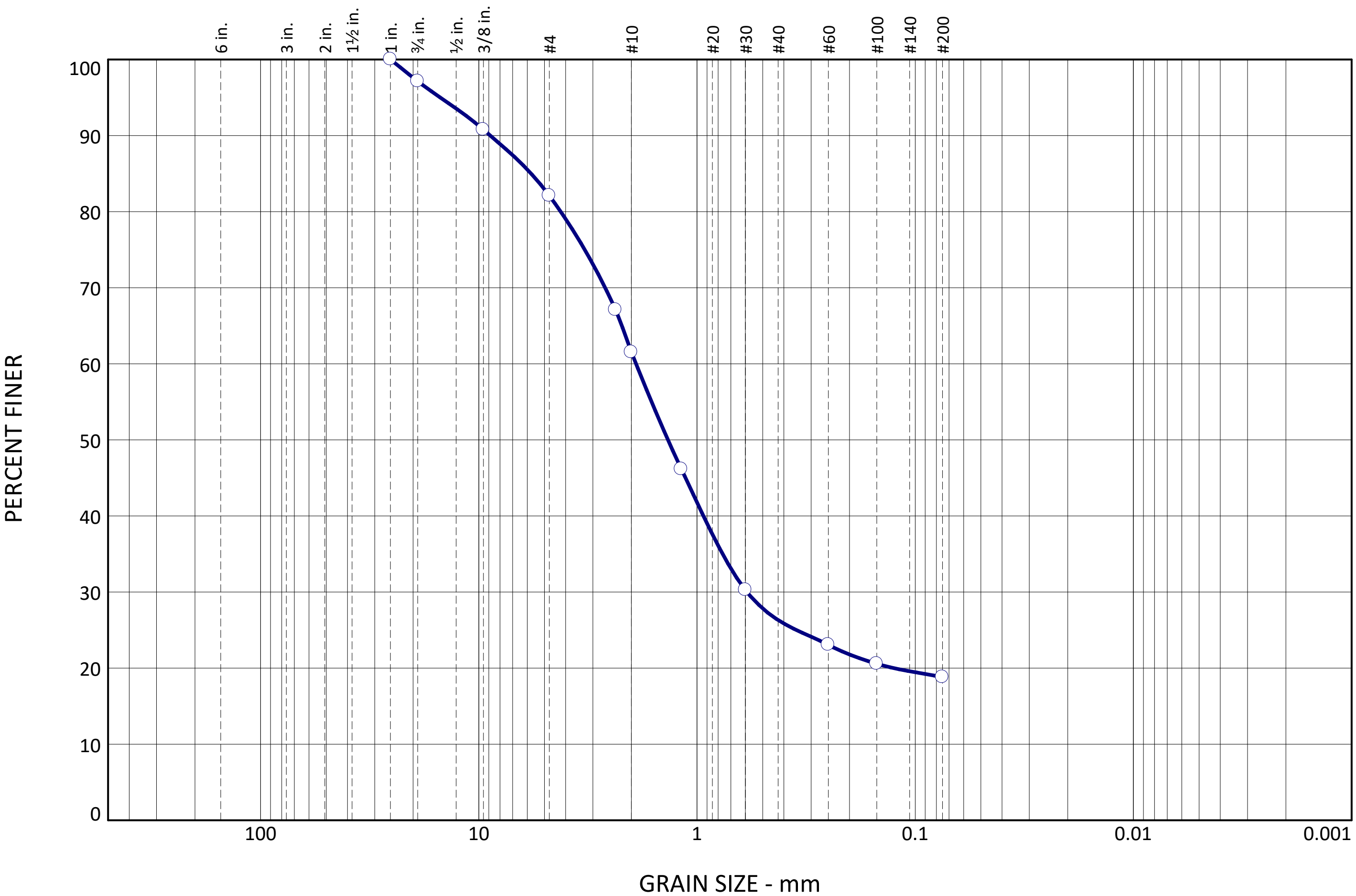
Source of Sample: TB-1 **Depth:** 4'-6'
Sample Number: S-3

Date: 8/5/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772
Geotechnical Laboratory
Colliers Engineering & Design

Client: Fralinger Engineering, PA
Project: Proposed Building Additions - Solid Waste & Recycling Facility
169 Jesse Bridge Road - Deerfield Township, NJ
Project No: 24006994A **Plate** PSA-1

Particle Size Distribution Report



% Cobbles	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	9.2	29.3	31.2	7.2	4.3	18.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	97.1		
.375	90.8		
#4	82.1		
#8	67.1		
#10	61.5		
#16	46.2		
#30	30.3		
#60	23.1		
#100	20.6		
#200	18.8		

* (no specification provided)

Material Description

Orange coarse to fine Sand, and medium to fine Gravel, little [Fines: (Silt/Clay)]

Atterberg Limits

LL= PL= PI=

Coefficients

D_{85}= 5.7544 D_{60}= 1.9040 D_{50}= 1.3588
D_{30}= 0.5897 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

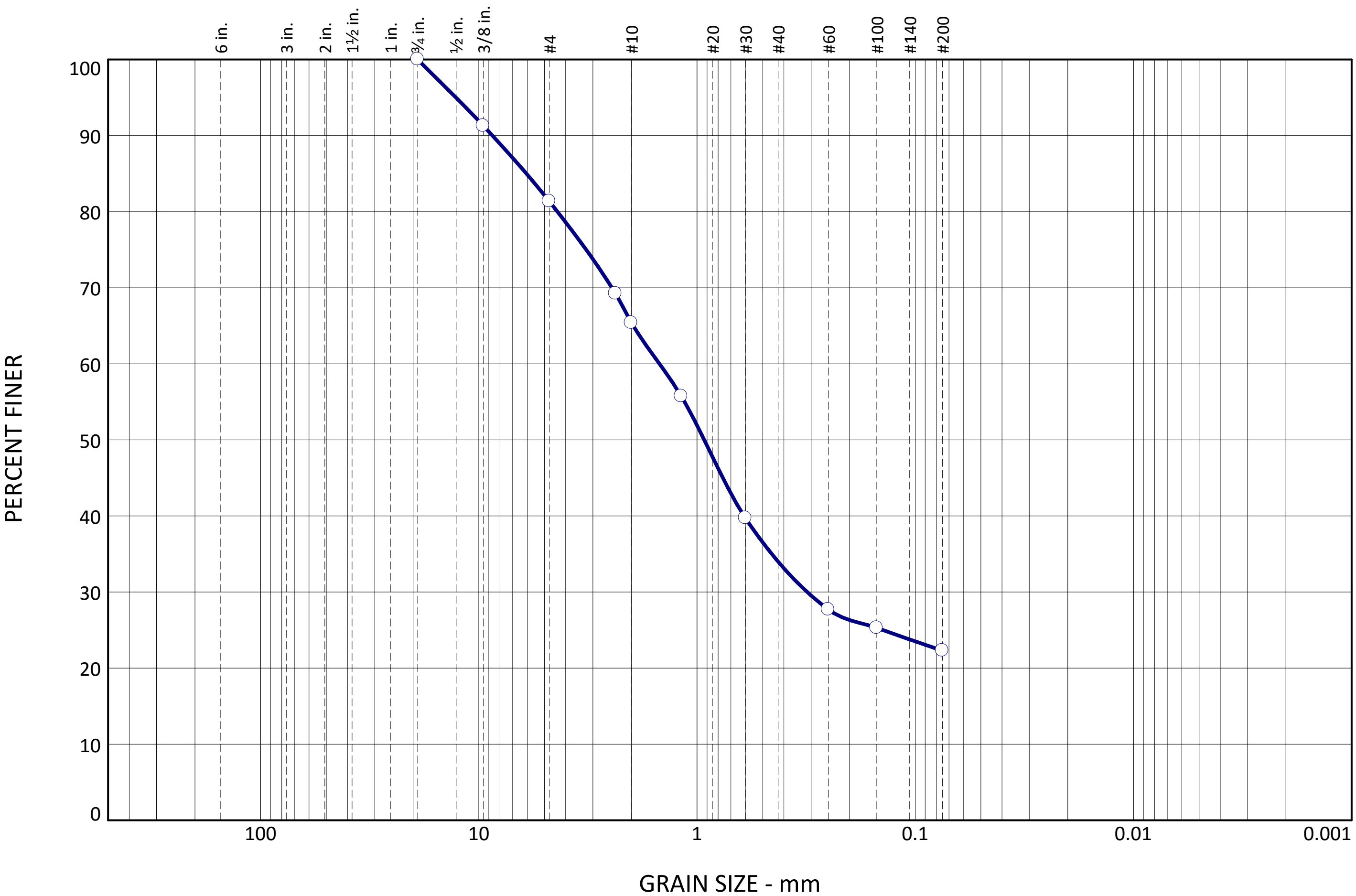
Source of Sample: TB-1 **Depth:** 8'-10'
Sample Number: S-5

Date: 8/5/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772
Geotechnical Laboratory
Colliers Engineering & Design

Client: Fralinger Engineering, PA
Project: Proposed Building Additions - Solid Waste & Recycling Facility
169 Jesse Bridge Road - Deerfield Township, NJ
Project No: 24006994A **Plate** PSA-2

Particle Size Distribution Report



% Cobbles	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	8.7	25.9	25.7	12.0	5.4	22.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	91.3		
#4	81.3		
#8	69.2		
#10	65.4		
#16	55.7		
#30	39.7		
#60	27.7		
#100	25.3		
#200	22.3		

* (no specification provided)

Material Description

Orange coarse to fine Sand, some medium to fine Gravel, some [Fines: (Silt/Clay)]

Atterberg Limits

LL= PL= PI=

Coefficients

D_{85}= 6.0493 D_{60}= 1.4859 D_{50}= 0.9269
D_{30}= 0.3125 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

Organic Content (OC): 0.7%

Source of Sample: TB-2 **Depth:** 2'-4'
Sample Number: S-2

Date: 8/5/24

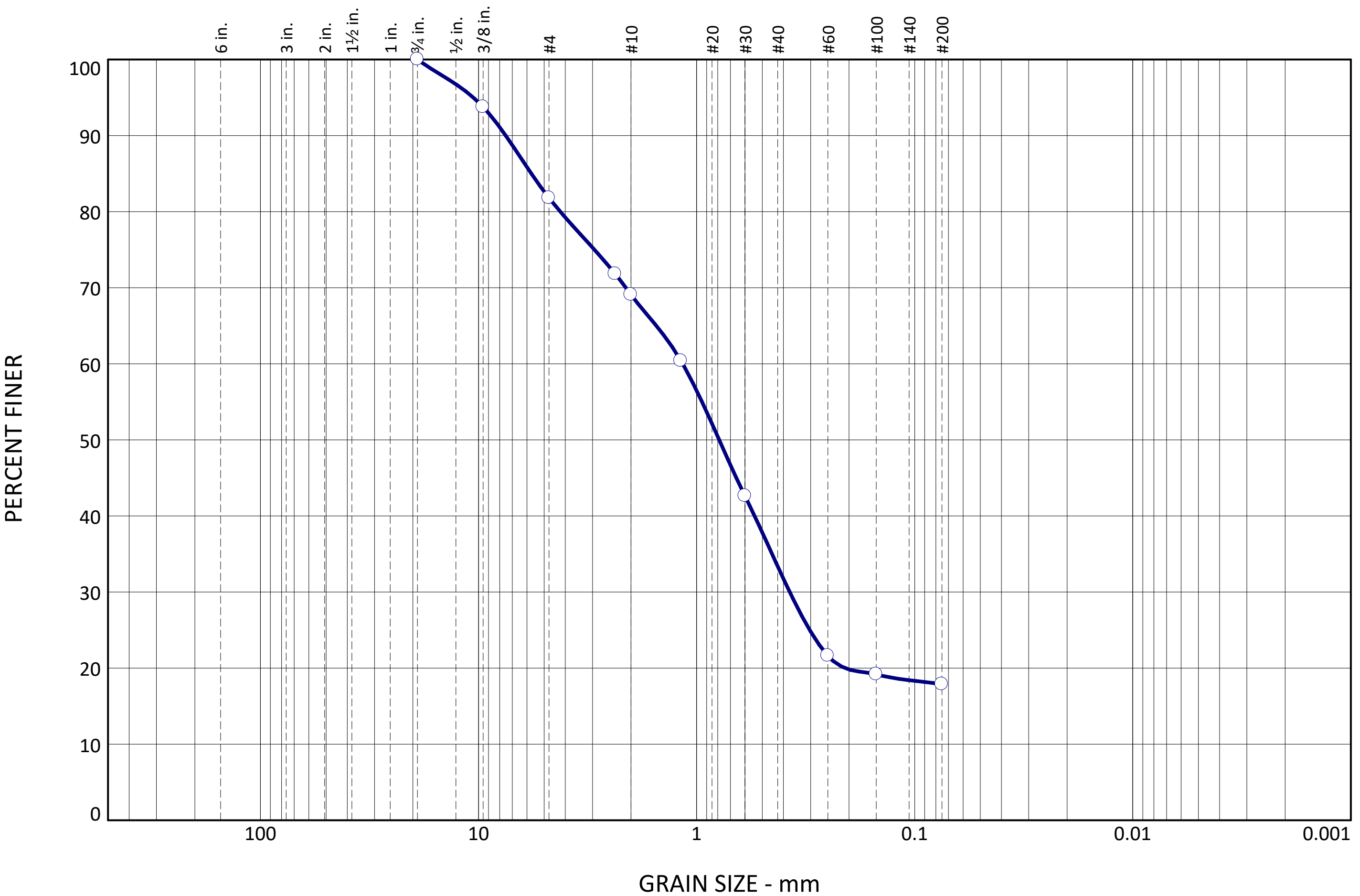
5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical Laboratory

Colliers Engineering & Design

Client: Fralinger Engineering, PA
Project: Proposed Building Additions - Solid Waste & Recycling Facility
169 Jesse Bridge Road - Deerfield Township, NJ
Project No: 24006994A **Plate** PSA-3

Particle Size Distribution Report



% Cobbles	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	6.3	24.6	26.5	21.0	3.7	17.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	93.7		
#4	81.8		
#8	71.8		
#10	69.1		
#16	60.4		
#30	42.6		
#60	21.6		
#100	19.2		
#200	17.9		

* (no specification provided)

Material Description

Orange coarse to medium SAND, some medium to fine Gravel, little [Fines: (Silt/clay)]

Atterberg Limits

LL= PL= PI=

Coefficients

D_{85}= 5.7218 D_{60}= 1.1587 D_{50}= 0.7879
D_{30}= 0.3741 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

Source of Sample: TB-2 **Depth:** 6'-8'
Sample Number: S-4

Date: 8/5/24

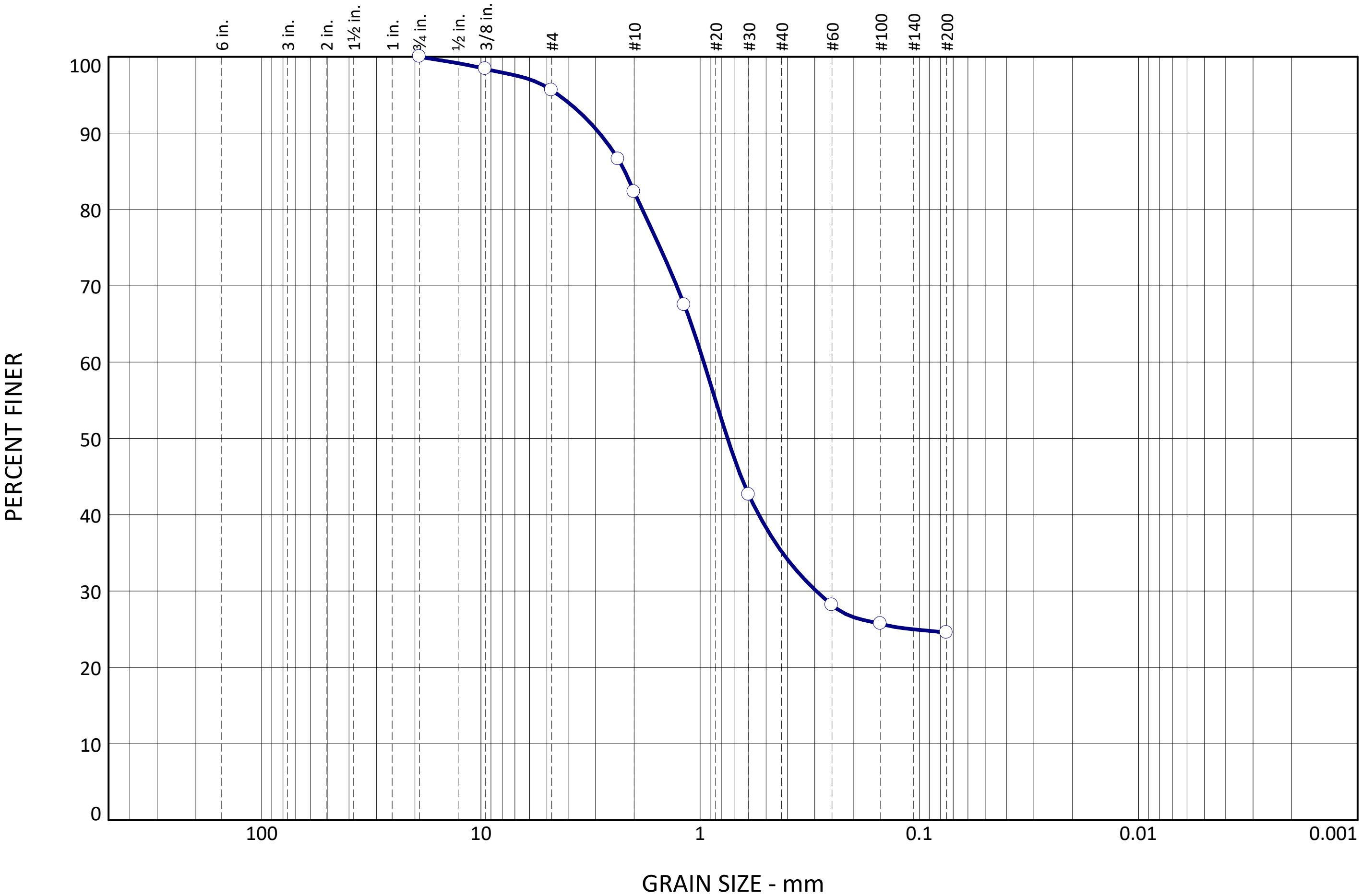
5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical Laboratory

Colliers Engineering & Design

Client: Fralinger Engineering, PA
Project: Proposed Building Additions - Solid Waste & Recycling Facility
169 Jesse Bridge Road - Deerfield Township, NJ
Project No: 24006994A **Plate** PSA-4

Particle Size Distribution Report



% Cobbles	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	1.6	16.1	39.7	14.4	3.7	24.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	98.4		
#4	95.6		
#8	86.6		
#10	82.3		
#16	67.5		
#30	42.6		
#60	28.2		
#100	25.7		
#200	24.5		

* (no specification provided)

Material Description

Brown coarse to medium SAND, some [Fines: (Silt/Clay)], little medium to fine Gravel

Atterberg Limits

LL= PL= PI=

Coefficients

D_{85}= 2.2049 D_{60}= 0.9628 D_{50}= 0.7494
D_{30}= 0.2946 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

OC: 0.9%

Source of Sample: TB-3 **Depth:** 0'-2'
Sample Number: S-1

Date: 8/5/24

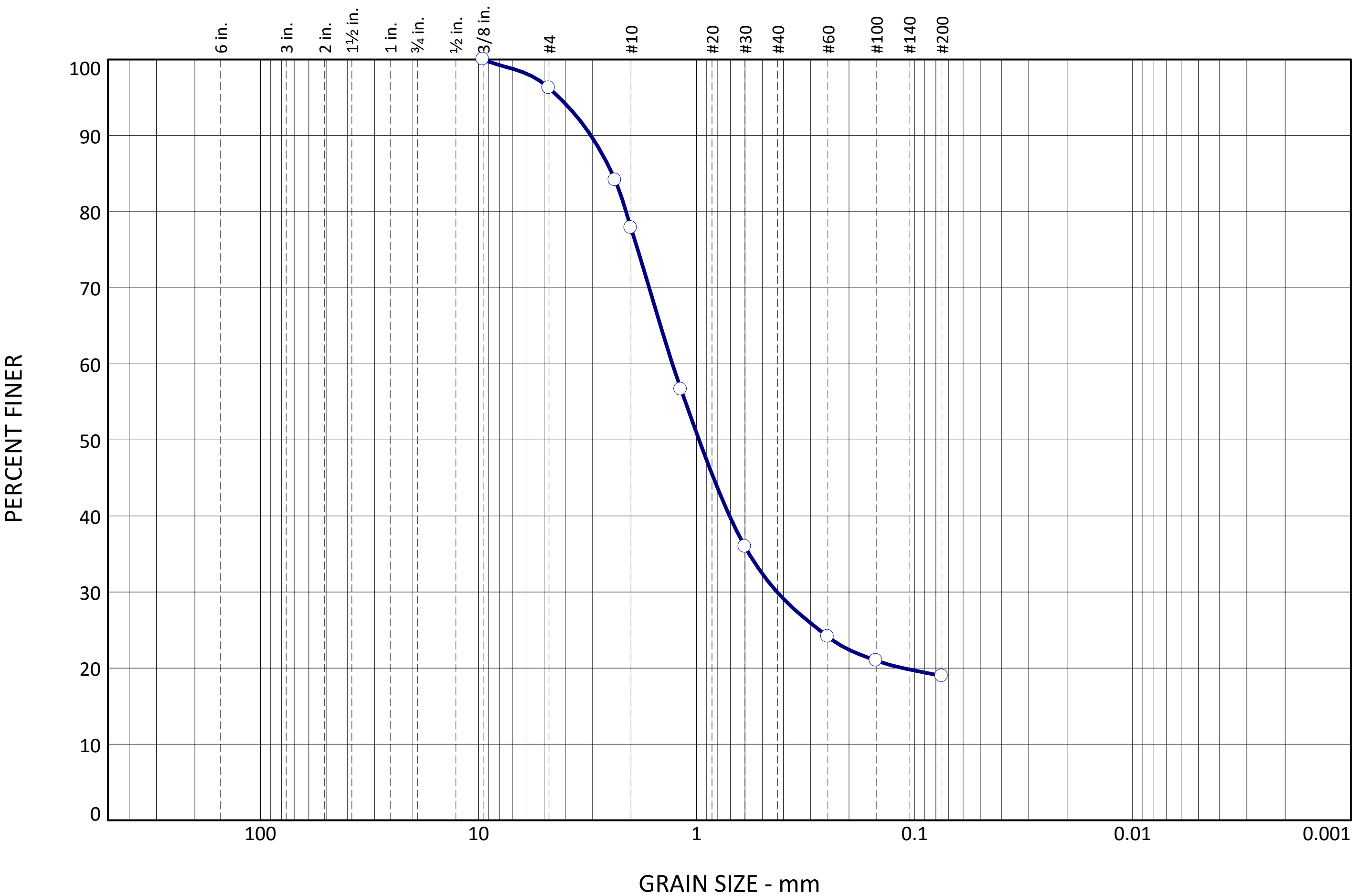
5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical Laboratory

Colliers Engineering & Design

Client: Fralinger Engineering, PA
Project: Proposed Building Additions - Solid Waste & Recycling Facility
169 Jesse Bridge Road - Deerfield Township, NJ
Project No: 24006994A **Plate** PSA-5

Particle Size Distribution Report



% Cobbles	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.0	0.0	22.1	41.9	11.9	5.2	18.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	96.2		
#8	84.2		
#10	77.9		
#16	56.6		
#30	36.0		
#60	24.1		
#100	21.0		
#200	18.9		

* (no specification provided)

Material Description

Brown coarse to medium SAND, some fine Gravel, little [Fines: (Silt/Clay)]

Atterberg Limits

LL= PL= PI=

Coefficients

D_{85}= 2.4355 D_{60}= 1.2918 D_{50}= 0.9748
D_{30}= 0.4275 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

Source of Sample: TB-3 **Depth:** 4'-6'
Sample Number: S-3

Date: 8/5/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical Laboratory

Colliers Engineering & Design

Client: Fralinger Engineering, PA
Project: Proposed Building Additions - Solid Waste & Recycling Facility
169 Jesse Bridge Road - Deerfield Township, NJ
Project No: 24006994A **Plate** PSA-6

Engineering & Design

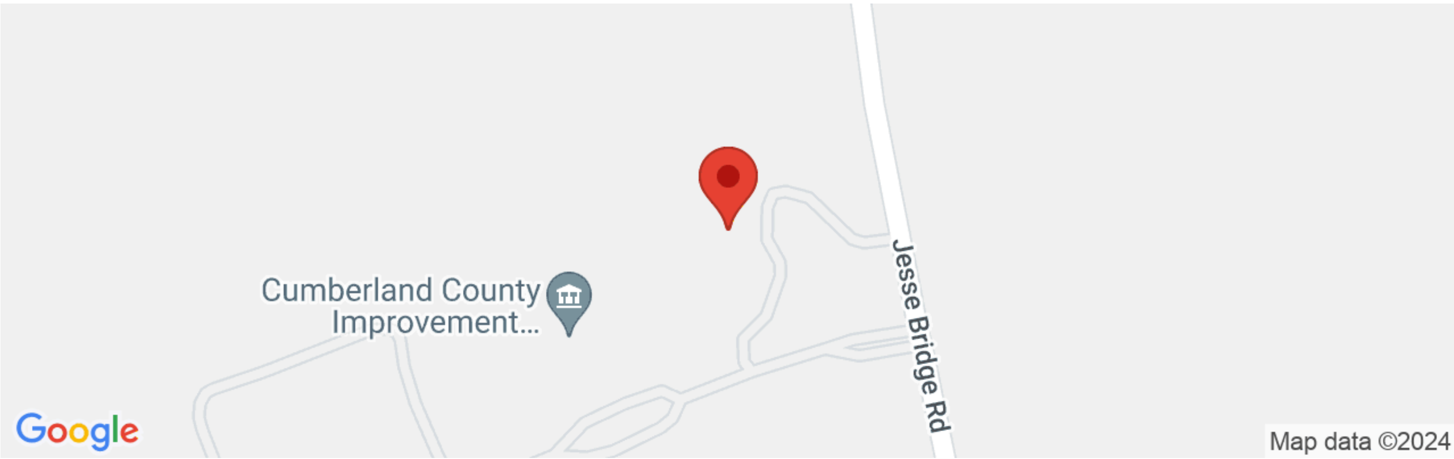
Appendix C

Seismic Information

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

Proposed Building Additions - Solid Waste & Recycling Facility - 169 Jesse Bridge Road - Upper Deerfield Twp, NJ

Latitude, Longitude: 39.45017844, -75.09429654



Date	8/13/2024, 12:42:33 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	0.144	MCE_R ground motion. (for 0.2 second period)
S_1	0.043	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.231	Site-modified spectral acceleration value
S_{M1}	0.102	Site-modified spectral acceleration value
S_{DS}	0.154	Numeric seismic design value at 0.2 second SA
S_{D1}	0.068	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2 second
F_v	2.4	Site amplification factor at 1.0 second
PGA	0.076	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.122	Site modified peak ground acceleration
T_L	6	Long-period transition period in seconds
SsRT	0.144	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.153	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.043	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.046	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.076	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.943	Mapped value of the risk coefficient at short periods
C_{R1}	0.931	Mapped value of the risk coefficient at a period of 1 s
C_V	0.7	Vertical coefficient

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

Colliers Engineering & Design

Colliers Engineering & Design is a trusted provider of multi-discipline engineering, design and consulting services providing customized solutions for public and private clients through a network of offices nationwide.

For a full listing of our office locations, please visit colliersengineering.com

1 877 627 3772