Geotechnical Engineering Report

Proposed Marmen Manufacturing Facility
Port of Albany, New York
February 4, 2022
Terracon Project No. JB215020

Prepared for:
McFarland-Johnson, Inc.
Saratoga Springs, New York

Prepared by:
Terracon Consultants - NY, Inc.
Albany, New York

February 4, 2022

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Attn: Mr. Steven Boisvert, P.E.
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Re: Geotechnical Engineering Report
Proposed Marmen Manufacturing Facility
Port of Albany, New York
Terracon Project No. JB215020

Dear Mr. Boisvert:

We have completed the Geotechnical Engineering services for the referenced project. This study was performed in general accordance with Terracon proposal no. PJB215020 and the agreement for subconsultant professional services between McFarland-Johnson and Terracon entered into on or about June 1, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs and pavements for the project.

Terracon submitted a draft geotechnical report for this project in October 2021, and we understand the design team has completed their review of the draft report. This final report has been prepared cognizant of comments made through the review and evaluation process and has been updated and/or revised accordingly.

We appreciate the opportunity to be of service to you. If you have any questions concerning this report or if we may be of further service, please contact us at your convenience.

Sincerely,
Terracon Consultants-NY, Inc.

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Senior Engineer

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REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents

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INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Marmen manufacturing facility on Beacon Island at the Port of Albany, New York. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Seismic site classification
- Slope stability
- Foundation design and construction
- Floor slab design and construction
- Pavement design and construction
- Retaining wall design and construction
- Frost considerations

The geotechnical engineering scope of services for this project included the advancement of 18 conventional test borings to depths ranging from 30.1 to 165.0 feet below existing site grades, completion of 12 test pits to depths between 11.5 and 16 feet, site reconnaissance by a geotechnical engineer, laboratory testing of selected soil samples, and preparation of this summary report.

Previous subsurface and/or geotechnical investigations have been completed by Dente/Terracon and others on the Beacon Island site. These include:

- Environmental Subsurface Investigation and Soil Sampling – ATL, October 2020
- Subsurface Exploration Data Report (for Wharf) – CME Associates, October 2020
- Subsurface Investigation (at Bridge Site) – ATL, May 2020
- Supplemental Geotechnical Report – Dente/Terracon, July 2017
- Preliminary Geotechnical Evaluation – CME Associates, April 2017
- Phase II Environmental Site Assessment – Bergmann Associates, April 2017

Information from these previous studies has been considered in the preparation of this report and is included herein where referenced and as applicable.

Note that an additional six boreholes were included in a contingency work scope which was ultimately not carried out, as the information from the base scope boreholes coupled with that from the previous investigations at the site was ultimately judged sufficient for the purposes of this study.

Maps indicating the site and test boring locations are included as the attached **Site Location** and **Exploration Plan**, respectively.

SITE CONDITIONS

Existing conditions at the site are summarized in the following table:

Item	Description
Parcel Information	The project site is located in the town of Bethlehem, New York along the west side of the Hudson River, south of the currently developed portion of the Port of Albany and the point at which the Normanskill Creek empties into the river. The site is about 80 acres in size, with geographic coordinates at the approximate center of the parcel at 42.6038° N, 73.7656° W.
Existing Improvements	None, other than an abandoned railroad spur.
Current Ground Cover	Woods and heavy vegetation currently comprise the ground cover across much of the site, although some trails and traveled ways have been established in places. A clearing exists at the south end of the site.
Existing Topography	Topographic mapping provided for our use indicates that existing landside grades currently range between elevations of about 7 and 21 feet, and slope down accordingly along the banks of the tidally influenced river and creek where mean high water level is reportedly elevation 3.8 feet.
Geology	NYS geologic mapping indicates alluvial deposits in the site locale. Previous subsurface investigations in the area indicate the site is mantled with fill materials and river sediments, followed in sequence with depth by alluvial deposits, glaciolacustrine silt and clay, glacial till and ultimately shale bedrock.

The site is situated in an area once occupied by Beacon Island and a portion of Cabbage Island in the Hudson River, along with side channels of the river that separated the islands from both the mainland and from one another. Review of available historical topographic and aerial imaging reveals that previously submerged portions of the site have been filled over the last 100 years or so, in effect joining the site with the mainland.

As has been described in the previously referenced reports, much of this filling occurred through the placement of waste coal ash from the power generating station just south of the site. The plant was coal fired upon its construction in the early 1950s until about 1970, when its boilers were converted to use fuel oil and later natural gas. Waste coal ash during the plant's coal burning years was disposed of on the project site, primarily on the site's west side and at its south end. The method of placement of the coal ash is unknown with certainty, but is believed to have been transported in bulk and pushed/tracked into place as opposed to hydraulically placed.

PROJECT DESCRIPTION

General

As we understand it, the project entails construction of a new industrial facility where off-shore wind turbine supports will be manufactured. In general, this will involve the fabrication of large cylindrical tower sections and transition pieces from flat steel stock. Raw material will arrive at the existing Port of Albany north of the site and will be transported to the site via a new bridge which is to be built across the Normanskill Creek (we have addressed the bridge in a separate geotechnical report). Finished product will be shipped out from a wharf to be constructed near the site's northeast corner (note that the wharf is being designed by others and is not addressed herein).

The facility will be comprised of four separate buildings (Buildings A thru D), along with a gravel surfaced yard area for the storage/staging of finished tower sections and transition pieces prior to shipment from the wharf. The function and relative size of each proposed building are outlined as follows:

- Building A – Plate Preparation and Welding (291,617 sq.ft.)
- Building B – Welding Finishing (89,074 sq.ft.)
- Building C – Blast-Metallization-Paint (142,371 sq.ft.)
- Building D – Internal Assembly/Finishing (67,217 sq.ft.)

Plans call for these to be single-story, high-bay, slab-on-grade buildings with pre-fabricated metal superstructures. No below grade levels are planned, although one or more service pits up to 8 feet in depth will be included in Buildings A and C. The buildings and some areas about their exterior will include rails embedded in the slabs to facilitate production flow and material transport with tower rotators and transfer cars on the rails. The buildings will also feature overhead cranes for picking and moving materials and equipment about their interiors.

In the gravel surfaced yard area, the tower sections will be staged/stored horizontally, and the transition pieces will be staged/stored vertically. The fabricated product will be moved about using large reach stackers and self-propelled modular transporters (SPMTs) as described below. Curbs will in general define the limits of the yard area, beyond which grades will slope down to the river or creek.

Anticipated Loads

Generally speaking, the products to be manufactured at the facility, the materials from which they will be fabricated, and the equipment required to move these items about are all rather large and heavy. Marmen has furnished a load case document outlining a number of anticipated loading conditions associated with the anticipated material handling and plant operations. These include:

Load Case	Description
A	Tower rotator on rails
B	Transfer car on rails
C	Steel shells on slab
D	Metallization transfer car
E	Plate trailer, 130,000 lb. tandem axle
F	36,000 lb. capacity forklift
G	70,000 lb. capacity forklift
H	HLM 3500 reach stacker (loaded)
J	HLM 3500 reach stacker (unladen)
K	Tower section and transition piece storage

As we understand it, load cases A thru D in the table above represent those which will act on rails embedded in the building or exterior slabs, or those which will be imparted on the slabs themselves, whereas load cases E thru J may act on either the slabs or on the gravel surfaced yard area. Load case K represents storage of the manufactured product which will take place only in the yard area east of the buildings.

For the purposes of this evaluation, we understand that combined live and dead loads within the building and exterior slab areas will not exceed 600 pounds per square foot (psf) when aggregated across a given building (or slab) footprint. Individual building column loads, when coupled with crane loads, are not expected to exceed 256 kips at Buildings B thru D. At Building A this load combination is anticipated to be upwards of 899 kips, or in the most extreme case 1365 kips assuming maximum snow, crane and operational loads all coinciding which, in the event this were to occur, would be transient. The design team has informed us that there are no substantial reciprocating loads.

Among the transport vehicles which will traverse the gravel surfaced yard, it appears the loaded reach stacker represents the most severe case. The reach stacker laden front axle design load is 449 metric tons (495 tons imperial) which will ride on five large tires inflated to 8.0 bar (117.6 psi) each. Total area under the front axle is about 156 sq.ft., resulting in an overall unit ground pressure of about 6,300 psf beneath the axle.

Although not listed among the load cases, self-propelled modular transporters (SPMTs) will also traverse the yard. Each SPMT has a design laden gross weight of 240 metric tons (265 tons imperial) which will ride on 16 polyfilled tires. Total area under the carriage is about 146 sq.ft., resulting in an overall unit ground pressure of about 3,600 psf beneath the carriage. It is understood that both the reach stackers and SPMTs will be restricted from areas west of Buildings A, B and C, and north of Buildings C and D.

We understand that fabricated tower sections will be upwards of 10 meters (32.8 feet) in diameter, 50 meters (164 feet) in length and will weigh up to 800 metric tons (1,760,000 pounds), while the transition pieces will be upwards of 10 meters (32.8 feet) in diameter, 35 meters (115 feet) in length and will weigh up to 800 metric tons (1,760,000 pounds).

As detailed in load case K, plans call for the tower sections to be staged horizontally on moveable storage fixtures, one on each end. Each fixture is to have two bearing plates which will bear on the gravel yard surface, each plate 20 sq.ft. in plan area, this resulting in a unit contact pressure upwards of 22,000 psf as currently planned.

The transition pieces are to be staged in a vertical position, on modular jersey barrier-like units 1.25 meters (4.1 feet) wide at their base and 10 to 14 meters (32.8 to 45.9 feet) in length. Each transition piece is to be supported on three units, with resulting contact pressures at the base of the units bearing on the gravel yard surface between 3,300 psf and 4,700 psf.

Tolerable Settlements

The Marmen load case document outlines tolerances for relative rail displacements and accommodating these will largely be a function of slab stiffness, as we understand it.

The document lists maximum allowable settlement at exterior man door and garage door slabs as 1 inch relative to the building, and maximum allowable settlement at interior and exterior slabs with rails as ½ inch relative to the rails and/or building.

While we have not been provided with allowable settlement for the buildings as a whole, it is our understanding that steel framed, metal clad structures of this type are relatively settlement tolerant, and displacements of two to three inches can usually be accommodated without causing a structural concern.

In the yard area, we understand the end user acknowledges rutting, aggregate kick-out and/or settlement of the aggregate surface will occur with use over time, and that they will re-dress and re-level the yard area surface as needed. It is further understood that settlement beneath the tower section storage fixtures need only be limited such that the tower sections remain off the ground, while allowable differential settlement beneath the transition piece modular units is reportedly 3 inches.

Proposed Grades

Finish floor elevation at each of the proposed buildings is 21.0 feet, which in general is several feet or more above existing site grades within the proposed building footprints. The approximate difference in elevation between existing site grades and proposed finished floor level at each building is summarized as follows:

Building	Approx. Existing Grade Elev. (ft)	Finished Floor Elev. (ft)	Difference Between Exist. Grade and Finished Floor (ft)
A	13 to 19	21.0	2 to 8 overall (but generally in the range of 6 to 8)
B	11 to 17	21.0	4 to 10 overall (but generally in the range of 8 to 10)
C	7 to 13	21.0	8 to 14 overall (but generally in the range of 10 to 12)
D	7 to 19	21.0	2 to 14 overall (but generally in the range of 2 to 4)

From the buildings and progressing eastward across the yard area, proposed grades slope gently toward the river at an inclination of about 3 percent or flatter, to elevations between about 13 and 16 feet. Both cuts and fills will be required in the yard area to establish finish grades, which are as much as 6 feet lower than existing grade in places, and in general up to about 8 feet higher than existing grade. New fill approaching 14 feet in thickness will be required in a limited area about Building D.

As previously noted, curbs will in general define the limits of the yard area, beyond which grades will slope down to the river (or creek as applicable), at inclinations typically between 1V:3H and 1V:4H. Additionally, a retaining wall is planned on the west side of Building C. The wall will be approximately 780 feet in total length, with retained height upwards of about 13 feet.

It is also our understanding that disturbance to the existing shoreline(s) is to be minimized so as to preserve existing trees and whatever visual screening from the waterways they provide.

Retaining Walls

Plans call for a retaining wall on the west side of Building C. The wall will be approximately 780 feet in total length, with retained height upwards of about 13 feet. As currently envisioned this will be a mechanically stabilized earth (MSE) type wall.

Exclusions

Finally, we note that incoming raw materials will initially be received at another site, this located at 700 Smith Boulevard in the currently developed portion of the Port. Plans at that location call for a 20,000 sq.ft. receiving and pre-assembly building (Building E), along with temporary storage of steel plates, flanges and miscellaneous items in an accompanying yard area. We have addressed Building E and the proposed bridge at the north end of Beacon Island in separate reports issued in January 2022.

This report does not address the proposed access road linking the subject site to River Road/NYS Route 144 or the proposed automobile parking areas west of the buildings at the subject site. We are currently awaiting authorization from National Grid to complete test borings in their right-of-way as a basis for evaluating the potential impacts of these features from a geotechnical standpoint and providing earthwork recommendations as appropriate.

If any of the above information is incorrect, please let us know so we can review the conclusions and recommendations provided in this report for applicability to the actual design and update the report as appropriate.

As the design of the project progresses and site grading plans and structural loads are fully developed, we should be retained to assess such additional information relative to the recommendations contained herein.

SUBSURFACE CHARACTERIZATION

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration results (from this and previous studies), geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical analysis and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual subsurface logs. The logs can be found in the **Exploration Results** and the GeoModel in the **Figures** sections of this report.

Subsurface Profile

The following model layers were identified within the subsurface profile. For a more detailed view of the model layers with depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Fill	In general coal ash on the west side and south end of the site. Elsewhere sand, silt, gravel and/or clay in varying proportion, along with occasional organics and/or foreign material such as cinders, slag, brick, metal, wood.

2	**Alluvium**	Sand with lesser amounts of gravel, frequently intermixed or interbedded with silts and/or clays. Relatively minor amounts of organics common.
3	**Silt and Clay**	Glaciolacustrine silt and clay deposit.
4	**Glacial Till**	Fine sand and silt with embedded coarser sands, gravel, rock fragments. Some cobbles and boulders. Sometimes clayey.
5	**Bedrock**	Shale bedrock. Upper few feet relatively weathered.

Surface Materials and Fill Soils

Although generally somewhat brushy and/or wooded, topsoil was generally scarce in the coal ash disposal areas. Elsewhere, topsoil or forest mat was present at the ground surface at thicknesses between about 0.3 and 1.0 feet as indicated on the test pit logs. We note the indicated topsoil thicknesses should be regarded as a rough approximation only and should not be relied upon for construction quantity estimates; contractors are advised to make their own estimates or determination of topsoil thickness and quality for bidding purposes.

Beneath whatever surface organic materials were present, fill and/or suspected fill soils were found at most locations, extending to depths between about 3 to as much as 29 feet below existing grade. Coal ash was the most prevalent fill material as outlined below. Otherwise, the fills generally consisted of sand, silt, gravel and/or clay in varying proportion, along with occasional organics and/or foreign material such as cinders, slag, brick, metal and wood. Some of these materials likely represent river sediments, reworked native soils or dredge spoil. The relative density of the non-coal ash fill as indicated by measured SPT N-values was most often in the loose to medium dense range.

As has been described in the previously referenced reports, much of the filling on the site has occurred through the bulk placement of waste coal ash from the south adjoining power generating station. The plant was coal fired upon its construction in the early 1950s until about 1970, when its boilers were converted to use other fuels. Waste coal ash during the plant's coal burning years was disposed of on the project site, primarily along the site's west side and at its south end. The method of placement of the coal ash is unknown but is believed to have been transported in bulk and pushed/tracked into place as opposed to hydraulically placed. Relative density of the coal ash indicated by measured SPT N-values was typically very loose, and it was noted that some vibration of the ground was evident underfoot as a large tracked excavator traversed the ground surface in the coal ash area while moving from location to location in the course of excavating the test pits.

Laboratory testing of coal ash samples recovered from the site indicates it is comprised primarily of silt (66 to 76 percent by weight) and fine sand (19 to 27 percent) sized particles and classifies among the ML group using the Unified Soil Classification System (USCS). Coarser sand and clay size particles are present in trace amounts. Maximum dry density of the coal ash as determined by ASTM D1557 (modified Proctor) was between 61.8 and 64.2 pounds per cubic foot (pcf) with

optimum moisture content between 38.2 and 42.1 percent. These results are in keeping with what would be expected based on published accounts concerning the engineering properties of coal ash. Relatively minor amounts of organics were commonly noted in the ash fill as well, but overall the material was found to be rather consistent in composition.

It should be noted here that beneficial reuse of coal ash as a building material is not uncommon in the construction industry. In addition to its use as an additive in concrete, coal ash is generally regarded as suitable for construction of engineered structural fills for building sites, foundations and embankments, among other applications. Its usefulness as such is outlined in ASTM E2277, which cites low unit weight and relatively high shear strength, along with ease of handling and compaction as positive attributes of coal ash.

That said, the uncontrolled manner in which the material was placed is a concern as it relates to site development, and what follows herein should be viewed in this context. We regard the other miscellaneous fills and river sediments similarly (in the absence of gross debris, organics, or whatever otherwise unsuitable materials may be found). And despite the overall potential usefulness of coal ash as a fill material, the Ductile Iron Pipe Research Association (DIPRA) considers coal ash a known corrosive environment. Accordingly, the ash should be considered potentially aggressive to ductile iron piping systems and possibly other buried metallic pipes/elements placed within it.

Finally, while not found to be prevalent across the site, it should be understood that localized pockets of coarse, unsuitable debris may be present in places, as evidenced by buried railroad ties identified by Bergmann in the course of their 2017 study. The railroad ties were found at test pit TP-8 (located along the access road in southeast portion of site) between the depths of 8 and 12 feet below grade. Also note that fill materials and native soils were found to be similar in composition in places, rendering distinction between them difficult; the depth of fill as indicated on the logs should be considered approximate.

Alluvial Soils

Native soils beneath the existing fill materials were found to consist of alluvium, typically composed of sands with lesser amounts of gravel, frequently intermixed or interbedded with silt and/or clay. Relatively minor amounts of organics were commonly noted in these soils also. The alluvial soils extended to depths of about 25 to 55 feet (or as little as 20 feet at B-21-11) and exhibited a typically loose relative density. In the instances where the recovered soils were primarily fine-grained, their relative consistency was most often very soft.

Silt and Clay

Underlying the alluvium was a lacustrine silt and clay deposit which extended to depths of about 40 to 155 feet, generally increasing in depth to the east and more markedly to the south across the site. The silts and clays in this deposit were characteristically gray in color and very soft in relative consistency. Layers consisting primarily of silt were occasionally found therein. An

exception to this is noted at borehole B-21-11, where no lacustrine soils were found between the alluvium and an unusually shallow glacial till deposit at a depth of 20 feet.

Laboratory testing performed on selected soil samples indicates that the gray silt and clay soils at this site are typically low to medium plasticity silts/clays categorized as CL or CL-ML in the USCS. A tabular summary of the most recent laboratory test results on these cohesive soils is provided below.

Boring/Test Pit ID	Depth (ft)	Natural Water Content (%)	Liquid Limit	Plasticity Index
B-21-7	60-62	26.4	NP	NP
B-21-17	40-42	30.5	31	12
B-21-18	35-37	35.5	33	11
B-21-20	40-42	33.2	31	11
B-21-23	110-112	20.6	23	6
TP-21-3	6-6.5	19.6	33	14
TP-21-7	3-3.5	18.9	33	12

As indicated in the table above, measured liquid limits ranged from 23 to 33 percent, and corresponding plasticity indices ranged from 6 to 14 percent. The natural moisture content of these soils ranged from 20.6 to 35.5 percent and was typically nearer the liquid limit in the deeper deposits. Laboratory testing results on the silt and clay deposit from previous studies have been similar. UU triaxial shear testing from previous studies also indicates its undrained shear strength is between about 580 and 640 psf.

Previous consolidation testing on the silt and clay deposit at the Beacon Island site and our experience with these Glacial Lake Albany lacustrine soils in the region indicate these deposits have been preconsolidated; that is, they have been subjected to stresses greater than current overburden pressures and have consolidated under these excess pressures. The preconsolidation is believed to be the result of a combination of stresses induced through desiccation, or drying, caused by the regional lowering of the water table during the geologic past and by loading from overburden soils which existed previously in the area but have since been eroded.

The available information indicates a net preconsolidation pressure of 4,000 psf or greater in the upper silt and clay; the net preconsolidation pressure and over-consolidation ratio (OCR) typically diminish with increasing depth. Previous cone penetrometer testing performed across the Beacon Island site indicates the OCR ranges from upwards of about 6 in the upper overburden soils to about 1.2 or less at depths greater than 100 feet. Undrained shear strengths of 500 to 750 psf are

typical for the gray Glacial Lake Albany silts and clays in the region, this consistent with the results of UU triaxial testing previously completed at the site as noted above.

Glacial Till

Glacial till soils were found beneath the lacustrine silts and clays at most locations, although no till was encountered atop the underlying bedrock at boreholes B-21-10 and B-21-15. The till typically consisted of fine sand and silt (occasionally clayey) with embedded coarser sands, gravel and rock fragments, and was generally between about 3 and 12 feet in thickness (or as much as 22 feet thick at borehole B-21-17). Its relative density was most often in the dense to very dense range.

Cobbles and boulders are common in glacial till soils in the region and were frequently encountered in the till at this site as well. Note that the split spoon sampler employed in the SPT testing has an inside diameter of 1.375 inches which thereby limits recovery of coarser material and the extent to which coarser materials are represented in laboratory gradation testing. We also note that granular seams or layers within the till soils and at the till/bedrock interface may be more permeable than the surrounding soils and rock and may be under a slight artesian pressure.

Bedrock

Bedrock was encountered at depths between 45 and 159 feet below the existing ground surface, generally increasing in depth to the east and more markedly to the south across the site. This correlates with a bedrock surface elevation in the range of about –34 to –143 feet (below MSL). Note that rock may also have been encountered (or nearly so) upon refusal of the drill tooling at a depth of 30.1 feet (approx. elevation –19 feet) in borehole B-21-11, although this was not confirmed through rock coring at this location.

The upper few feet of rock were typically relatively weathered. Confirmatory rock core sampling of the less weathered underlying rock in general revealed weak shale with very close to moderate joint, fracture and/or bedding spacing at a relatively high angle. Bands or layers of medium strong sandstone or graywacke were occasionally encountered, as were occasional siltstone seams and quartz veins. Rock quality designation (RQD) ranged from 8 (very poor) to 58 (fair) and averaged about 38 percent overall.

For information purposes, the Geologic Map of New York (New York State Education Department, 1970) maps bedrock underlying the project area as Normanskill shale with minor constituents of mudstone and sandstone, along with shale and graywacke of the Austin Glen Formation.

Groundwater Conditions

Based on the recovery of wet soil samples and groundwater level measurements from this and previous investigations, groundwater in general appears to about 3 to 14 feet below the existing ground surface, this corresponding to groundwater elevations in the range of approximately 3 to 14 feet.

Mean high water in the Hudson River/Normanskill Creek is at an elevation of about 4 feet, and groundwater is in general expected at or near this level. A number of observation wells from previous investigations were observed on the site, and water level readings taken in these wells during this investigation tend to support this conclusion. Note however that these waters are tidal, normally within a range of about four to five feet, and tides are therefore expected to routinely affect water levels in and around the site. Information provided for our use indicates that extreme floodwaters may rise to about elevation 18 feet or more.

Additionally, as evidenced by some of the shallower observed water levels, locally perched or trapped groundwater may be present at times within the upper soils, particularly during seasonally wet periods and following heavy or extended periods of precipitation.

Groundwater elevations at the site should be expected to vary with seasonal fluctuations in precipitation and runoff, and with rising and falling water levels in the Hudson River. Tidal changes in the Hudson River are also expected to influence groundwater levels within a few hundred feet of shore to some degree daily. Additionally, grade adjustments on and around the site, surrounding drainage improvements and/or periodic flooding may also affect the water table.

GEOTECHNICAL OVERVIEW

General Discussion

In our opinion, the investigation completed at the project site revealed subsurface conditions that, with the exception of the coal ash fill, are typical along the Hudson River in the Albany area. The conditions are also generally consistent with those revealed through previous investigations at the site. The upper soils are composed of coal ash, miscellaneous fill and river sediments which are underlain by, in sequence with depth, alluvium, soft silt and clay, glacial till and ultimately shale bedrock. Groundwater is expected at or near the level of the river, or roughly 3 to 14 feet below existing site grades.

From a geotechnical standpoint, the site presents some challenges in the context of the proposed construction and planned heavy industrial loading. There are a number of factors which will impact on site development including:

- The bulk uncontrolled coal ash fill, along with other miscellaneous fills and river sediments
- Extensive cut and fill requirements
- Soft clays at depth which are subject to time-dependent consolidation settlement
- Weak subgrades relative to vehicular and material loading in yard area

Some key points for each of these factors are discussed in the following paragraphs, together with our recommended development approach.

It should be understood that the performance of the planned buildings and site features will ultimately be dependent upon successful implementation of the earthworks recommended herein. Retaining Terracon for construction period geotechnical observation, testing and consulting services will maintain continuity between the design and construction phases which can minimize risks and provide cost saving benefits to the Owner.

In general, the footprints of Buildings A, B and C are situated over the coal ash fill in their entirety, while miscellaneous fills consisting of sand, silt and clay with lesser amounts of foreign matter are present in the area of Building D. The uncontrolled coal ash fill, together with the other miscellaneous fills and river sediments, are not considered suitable for direct support of conventional shallow spread foundations and slab-on-grade construction. These materials offer marginal or unreliable bearing capacity and are subject to excessive post-construction settlement in the absence of some means to improve them.

To this end, we have evaluated a number of ground improvement methods in terms of their potential to enhance the bearing capacity and settlement characteristics of the existing fills and native deposits in-place, considering likely cost, impact to schedule and so on. These include deep dynamic compaction (DDC), rammed aggregate piers and soil mixing, along with full or partial undercuts and replacement. Each of these options was ultimately dismissed, either on the basis of technical feasibility or perceived benefit relative to time and expense. Additionally, note that none of these options would relieve the necessity to preload the building pads and allow time sufficient for consolidation settlement of the deep soft clays to occur, as outlined subsequently herein.

Taking into account that several feet of new fill is required to raise site grades beneath the buildings, and to the extent the proposed buildings and rail embedded slabs are not highly sensitive to settlement, consideration may be given to their support on unit mat type foundations, provided the mats are made sufficiently stiff to resist discrete concentrated loads beneath columns, rails, etc. and distribute these over broader areas of the mat. While all fills required to raise site grades should consist of suitable soils, we recommend the mats rest on no less than three feet of imported select structural fill to ensure the quality, uniformity and integrity of materials directly beneath the foundations.

The use of mat foundations will require preloading the building pads and exterior rail areas with the subgrade fill required to establish proposed grades, together with a surcharge approximating the average building live and dead loads the foundation subgrades will support. Doing so as a means of improvement will allow the underlying fills, river sediments and deep clays to consolidate under the weight of these loads and limit post-construction settlement. Plans should include a sufficient waiting period for the time-dependent settlement to occur, estimated at upwards of three to four months. To the extent possible, whatever filling is required in the yard area should also occur early in the construction schedule so as to limit post-construction settlements there.

It should be understood the mat foundation option is offered as a relatively cost-effective and expedient means of developing the site considering the rather poor soil conditions and proposed

usage. Assuming the recommendations herein are adhered to, we expect that post-construction settlements will remain within tolerable levels and overall performance of the foundations and buildings will be satisfactory. That said, a good deal of uncertainty remains concerning what is or may be buried in the bulk uncontrolled fills across the site, and the owner and/or end user must be willing to accept some accompanying risk of excessive settlement in exchange for the benefit to cost and schedule represented by the mat option. If this uncertainty cannot be accepted, the buildings and slabs should be supported on end bearing steel piles driven to refusal on bedrock.

Similarly, to the extent existing fills are left in place beneath new pavements in the storage/staging yard area, the owner and/or end user must accept some degree of risk that excessive long-term settlements may occur. As previously indicated, buried railroad ties were disclosed in a test pit during a previous investigation, and this test pit was located in the currently proposed yard area. Heavy proof rolling of exposed subgrades as described herein will help to identify unsuitable subgrades and mitigate, but not eliminate, the risk of long-term settlement. An exceptionally heavy reinforced aggregate pavement section has been developed in consideration of the appreciable reach stacker, SPMT and material storage area loads, together with the marginal subgrade conditions which now exist.

Selective reuse of suitable onsite cut materials will be possible beneath building pads and yard areas, with some limitations as discussed in the **Earthwork** section herein. Whatever environmental considerations are involved with the handling and/or reuse of coal ash and/or other materials on the site are beyond the scope of this report and have been addressed in the Soil Management Plan by ATL (October 2020). Additionally, as previously indicated, the Ductile Iron Pipe Research Association (DIPRA) considers coal ash a known corrosive environment, and the ash should therefore be considered potentially aggressive to ductile iron piping systems and possibly other buried metallic pipes/elements placed within it.

Finally, limited vibration resulting from heavy equipment tracking across the ground surface was felt underfoot in the coal ash areas during the course of the investigation. It is possible a tendency for this to occur in association with heavy or reciprocating equipment will remain post-construction, in spite of the additional filling required to establish proposed grades. If the potential for such nuisance vibrations is perceived as a problem, this should be further studied by the end user and design team.

The following sections of this report provide more detailed recommendations to assist in planning for the geotechnical aspects of the project. We should be provided with the opportunity to review plans and specifications prior to their release for bidding to confirm that our recommendations were properly understood and implemented, and to allow us to refine our recommendations, if warranted, based upon the final design. The **General Comments** section provides an understanding of the report limitations.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Assignment of seismic Site Class is required to determine the Seismic Design Category for a structure. The Site Class is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance or undrained shear strength pursuant to Section 20.4 of ASCE 7 and the International Building Code (IBC).

Seismic Site Classification

In our estimation, assignment of seismic Site Class D (stiff soil profile) for the project is justifiable. This determination is made based upon the results of shear wave velocity testing in seismic cone penetrometer tests previously completed at the site. Additional cone tests or geophysical testing may be performed to confirm this determination if desired.

Liquefaction

An evaluation of the potential for soil liquefaction to occur was made using the computer software program Liquefy Pro by CivilTech Corporation. An earthquake magnitude of 6.0 was assumed, and a peak ground acceleration (PGA) of 0.09g for the project area was used, this representing a two percent probability of exceedance in 50 years (2,500 year return period, as obtained from USGS earthquake hazards mapping). Based on these parameters and site specific conditions determined through the subsurface investigation, the calculated factor of safety against liquefaction is greater than 1.2. As such, liquefaction potential at the project site is considered low. However, seismically induced ground surface settlements may occur over the general area, with those at the project site estimated to not exceed 0.5 inch.

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, stabilization of subgrade surfaces as necessary, bulk cuts and fills, preloading/surcharging the buildings pads, excavation for foundation construction and associated backfill. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria as necessary to render the site in the state considered suitable in our geotechnical engineering evaluation for new foundations and aggregate-surfaced pavement sections.

Construction site safety is the sole responsibility of the contractor, who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility is neither implied nor shall it be inferred.

Site Preparation

Site preparation should begin with stripping of existing topsoil and surficial organic matter as applicable from the new building and yard areas. Any remains of former structures or obviously unsuitable materials that may be found should also be removed.

Prior to placing fills to raise grades and/or after cuts are made to the plan subgrade elevations, the exposed grades should be heavily and thoroughly proof-rolled using a steel drum roller with a static weight of at least 10 tons. The roller should operate in its vibratory mode, unless requested otherwise by the Geotechnical Engineer observing the work, and travel at a speed not exceeding three feet per second (two miles per hour). The roller should complete at least eight passes over all subgrade surfaces (four each in opposing directions). The method of proof-rolling may be modified by the Geotechnical Engineer based upon the conditions revealed at the time of construction.

Soft areas identified by the proof-rolling should be investigated to determine the cause and stabilized accordingly. These investigations may include the excavation of test pits. If existing fills are found and determined by to be unsuitable by the Geotechnical Engineer, they should be removed and replaced as deemed necessary.

Settlement and Preloading

Plans indicate about 2 to 14 feet of new fills are required to raise site grades in the building areas, this representing a net increase in load intensity of roughly 200 to 1800 psf on the underlying subgrades. Added to this will be the building and operational loads which we understand will be no greater than 600 psf when aggregated across a given building (or slab) footprint. In our estimation, new loads of this magnitude will result in stresses at depth which approach but do not exceed preconsolidation pressures in the deep clay deposit, limiting settlements in the clay deposit to those in the recompression range.

Settlements will occur throughout the existing fills and overburden soils in response these loads. In general, the degree of settlement is expected to vary with the height of fill required to establish proposed grades, but we estimate that maximum settlements will be between roughly 4 and 6 inches beneath the building pads. As these estimated settlements are beyond that which are considered typical and tolerable, a preloading and settlement monitoring plan targeted at limiting post-construction settlements should be implemented.

Development of a detailed preloading and settlement monitoring program is beyond the scope of this report. However, the basic elements of preloading include placement of new fill material to proposed grade levels, together with a surcharge fill which approximates (or exceeds, within limits) anticipated overall post construction loading. Instrumentation is installed to track the settlement that occurs over time. The plan should be implemented early in the construction schedule and sufficient time allowed such that these settlements are essentially complete prior to building construction and final grading.

In doing so, it is important the preload/surcharge load intensity matches or exceeds total post-construction grading, building and operational loads without exceeding preconsolidation pressures in the clay deposit. We expect this can be accomplished by placing a surcharge fill 6 to 7 feet in height across the building pads once the site is filled to the proposed finish floor elevation of 21.0 feet (i.e., top of surcharge elevation 27 to 28 feet). The surcharge should extend to this height, but no higher; if the preconsolidation pressure in the clays is exceeded (either through surcharging or operationally post-construction) both the magnitude of overall settlement and the time required for consolidation to occur will be greater than that estimated herein.

For preliminary planning purposes, we recommend that the full height of the temporary surcharge extend at least 10 feet outside the planned building footprints; the embankment side slopes of the temporary surcharge should be inclined no steeper than 1V:2H.

Material composition and compaction of fills placed to nominal finish floor elevation should be as described elsewhere herein. The temporary surcharge fill above finished floor level may consist of whatever material is most expedient, and may be simply tracked into place provided its in-place density is 100 pounds per cubic foot (pcf) or greater.

The required waiting period for settlement to occur will depend on the consolidation rate of the soils but we estimate the process will be substantially complete within a period between say 6 weeks and 3 to 4 months once the full height of fill and surcharge is in place. This should be understood and accommodated in developing the project schedule. Settlement in the fills and upper soils is expected to occur relatively quickly and in a semi-elastic manner as new loads are applied, whereas recompression settlement of the deep clays is expected to occur more slowly over the course of weeks and months.

Instrumentation in the form of conventional settlement plates and settlement systems with pressure transducers should be provided as part of the preloading and settlement monitoring program to allow the rate and total amount of settlement that occurs to be measured. Other instruments such as piezometers and inclinometers may be included in the preloading program as determined appropriate during its design.

For preliminary planning purposes, it should be assumed that a combination of at least 12 settlement plate and pressure transducer type settlement systems will be required across the building pads, their locations to be selected by this Geotechnical Engineer. The preloading and settlement monitoring program should be reviewed with the contractor and the settlement plates installed prior to any fill placement (but after the site has been stripped and proof-rolled).

Immediately upon installation of each settlement system, the top of plate elevation and any readout device panels should be determined and recorded as the starting grade or initial reference point, along with the elevation at the top of the first extension pipe for conventional systems. Following this, approximately 12 inches of fill should be placed and compacted over the plate to properly seat and secure the platform, and the instruments resurveyed. The instruments and panels should be clearly

marked and/or protected as necessary to prevent any disturbance or damage during construction activities.

When adding any subsequent extensions, the top of pipe elevation of the existing extension should first be obtained and recorded, and the top of pipe elevation of the new extension should be recorded immediately after being installed. Elevation data should be recorded and maintained such that the actual plate elevation can be referenced and determined at all times. Elevations should be obtained at each device at least twice weekly as the fill is being placed, and on a weekly basis thereafter during the hold period.

All survey monitoring should be performed under the supervision of a professional land surveyor, with elevations obtained to the nearest 0.01 foot and referenced to a consistent offsite benchmark(s) that is not susceptible to movement or damage over the monitoring period. Additionally, the elevation of the subgrade fill immediately adjacent to the instrument should also be obtained to the nearest 0.1 foot with each set of measurements.

The settlement system elevation should be determined for each measurement interval based on the survey data. The elevation of the subgrade fill at each monitoring interval should also be collected. Terracon should prepare a plot of relative movement (i.e., settlement) of the plate/system vs. time on an ongoing basis in order to allow interim evaluation of settlement conditions.

Careful monitoring of the instruments and whatever data is collected over the preload period will be necessary to determine the point at which recompression/consolidation settlement has essentially ended and building construction can begin. There is uncertainty in predicting both the magnitude of anticipated settlement and the time required for recompression settlement to occur, and this should be understood by all parties, thus the range in time planned for the holding period should be flexible. The preload and settlement monitoring program should be designed and monitored by this Geotechnical Engineer, who will determine the required duration and make interim evaluations of the results obtained therefrom.

Bulk Cut and Fill Considerations

As a considerable amount of cut and fill will be required to establish proposed grades, economic site development will likely be dependent on the reuse of cut soils as new subgrade fill to raise site grades as necessary. Accordingly, the challenges and limitations associated with their reuse should be understood.

The onsite soils, in some cases, contain appreciable quantities of fine-grained silt and/or clay and will therefore require control of their as-compacted moisture content within narrow limits to achieve requisite in-place density as the material is placed. It may be necessary to either dry the soil in windrows or add water prior to placement and compaction depending on the prevailing weather conditions at the time of construction or the in-situ moisture content of the soils as they are excavated. Should site development proceed during seasonally wet or cold periods, it will likely be difficult to

adequately dry the siltier cut soils and it may be necessary to stabilize these soils with lime, fly ash or kiln dust, or to use an imported granular fill.

Topsoil, vegetation and other surface materials should be stripped from all cut/fill areas prior to earth moving operations. The subgrade fill should be firm and stable after it is placed and compacted, and should not “pump”, “weave” or otherwise exhibit instability during construction; soils should be undercut and replaced where unsatisfactory. The fill subgrades should also be properly graded, drained, sealed and/or protected from moisture and frost as necessary. Placement of fill over wet, soft, snow covered, or frozen subgrades should not be permitted. All bulk fill placement and compaction should be monitored and tested by a representative of the Geotechnical Engineer on a full-time basis.

Where new fills are required to raise site grades, some difficulty may be experienced in achieving proper compaction of the fill soils considering the existing unimproved subgrades. This may be of particular difficulty in lower, wetter portions of the site, or where the filling is attempted with cut soils of lesser quality. It may therefore be necessary to begin the new fills using better quality imported granular material for the initial one or two lifts. Consideration may also be given to placing an initial layer of oversize stone (e.g., surge stone or shot rock, with a maximum 8 inch particle size) to displace excessively loose or wet soils and establish a firm base from which to continue. Other methods of subgrade improvement which may be considered include the use of reinforcement with dry granular material and geogrids or soil modification with admixtures as noted above.

Based on the findings of the subsurface investigation, bulk cuts across the site are not expected to encounter a generalized groundwater condition. However, perched groundwater may be intercepted in places, possibly necessitating the construction of fabric lined and stone filled drainage trenches to relieve, collect and dispose of such waters.

Fill Material Types

As indicated above, it may be assumed that excavated onsite soils will in general be suitable for reuse in fill areas once cleansed of any oversized particles, unsuitable debris or organics, subject to the approval of the Geotechnical Engineer and based upon the conditions encountered at the time of construction. Cut soils essentially free of organics, debris or particles >6 inches in size may be considered suitable fill and placed in common fill areas throughout the site, but no closer than three feet from the bottom of any mat foundation. Excessively silty or clayey materials should not be used as a source of fill within yard areas, though may be considered for placement under mat foundation areas if spread in thin (say less than 8 inch) lifts. Unsuitable materials should be wasted offsite or in landscaped areas.

Material imported for general use should consist of well-graded sand or sand and gravel which meets the requirements stipulated for Select Granular Fill in section 733-11 of the NYSDOT Standard Specifications for Construction and Materials.

We recommend that mat foundations be supported on no less than three feet of imported select structural fill to ensure the quality, uniformity and integrity of materials directly beneath the buildings and exterior rails. Designated select structural fill should consist of an imported processed sand and gravel or crusher-run stone which meets the requirements stipulated for Type 2 or 4 Subbase material in section 304 of the NYSDOT Standard Specifications.

Fill Compaction Requirements

Fills beneath the building pads and pavements should be placed in uniform loose layers no more than about one-foot thick where heavy vibratory compaction equipment is used. Thinner lifts should be used as necessary where hand operated equipment is required for compaction. Each lift should be compacted to no less than 95 percent of its maximum dry density as determined by the Modified Proctor Compaction Test – ASTM D1557, and moisture content of the material being placed should be maintained within +/- 3 percent of its optimum moisture content. In landscape areas, the compaction requirement may be relaxed to 90 percent of maximum dry density.

Grading and Drainage

All grades should provide effective drainage away from the buildings during and after construction, with such drainage maintained throughout the life of the structures. Water retained next to buildings can result in soil movements greater than those outlined in this report, which may in turn lead to unsatisfactory differential floor slab and/or foundation displacements, cracked slabs and walls, or roof leaks.

Temporary Excavations

Excavations must be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P and its appendices, along with any state and local codes, as applicable. The contractor should be aware that slope height, slope inclination, and excavation depth should in no instance exceed OSHA regulations. Flatter slopes than those stipulated by the regulations or temporary shoring may be required depending upon the soil/groundwater conditions encountered and other external factors. OSHA regulations are strictly enforced and if they are not followed, the owner, contractor, and/or earthwork and utility subcontractor could be liable and subject to substantial penalties.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of this Geotechnical Engineer. Monitoring should include documentation of adequate removal of topsoil and unsuitable fills, proof-rolling, and evaluation of foundation and yard area subgrades. If unanticipated conditions are encountered, this Geotechnical Engineer should prescribe mitigation options. Each lift of new compacted fill should be tested, evaluated, and reworked, as necessary, until approved by this Geotechnical Engineer prior to placement of additional lifts.

Foundation bearing grades and subgrades for floor slabs, pavements and concrete pads should also be evaluated under the direction of this Geotechnical Engineer. If unanticipated conditions are encountered, this Geotechnical Engineer should prescribe mitigation options.

It should be understood that subsurface conditions will be more fully known when the site is excavated. The continuation of this Geotechnical Engineer's services into the construction phase of the project and their continuous observations during earthwork and foundation construction will allow for validation of the subsurface conditions assumed to exist for this study and in the development of the design recommendations in this report, along with assessing any variations, providing interim recommendations as necessary and reviewing any associated design changes.

MAT FOUNDATIONS

Foundation Design Parameters

Over the course of this study, we were furnished with load distribution diagrams quantifying contact pressure beneath the mat foundations at selected column locations considering both building and operational loads. These diagrams indicate that load intensity may range upwards of about 2,500 to 3,500 psf over limited areas no greater than about 10 x 20 feet with the mat configured as currently planned. The diagrams further indicate that load intensity dissipates from the loaded areas such that contact pressure at the limits of a mat area measuring about 40 x 80 feet in plan dimension does not exceed about 1,500 psf. As previously noted, we understand that gross loading on the mats aggregated across the total floor area does not exceed 600 psf.

In view of the above, we expect the limiting pre-consolidation pressure within the deep lacustrine soils will not be exceeded and thus settlements will be controlled by recompression. Under these parameters, we estimate that post-construction mat settlements across the site will not exceed 1 to 2 inches. As mat design progresses, and other load cases are developed, they should be provided to us for review to determine whether these other loadings cause imposed stresses to exceed the pre-consolidation stress within the deep lacustrine soils.

The mat foundations should be constructed on a minimum three feet of select structural fill, over subgrades which have been prepared, preloaded and surcharged as described herein. Provided this is so, an effective modulus of subgrade reaction of 50 pounds per cubic inch (pci or psi/in) may be assumed at the top of the select structural fill layer.

Differential settlement across the mats will depend, in part, on their rigidity. We caution that differential settlements may occur due to non-uniform loading conditions both during and after the completion of construction. The mats must be designed, as needed, to accommodate the varying loading conditions and settlements. Preferably, construction should proceed such that differential loading is not created across the mats. When available, we should review the construction sequence

and actual load distributions expected across the mats to refine the settlement estimates and evaluate differential settlement concerns.

Utilities, where they connect with the buildings, should be designed to accommodate the expected settlements. Within the buildings, the utilities should be placed within chaseways built into the mats for access. The utilities should not be planned or constructed either within or below the mats.

Frost protection at the perimeter of buildings or in unheated portions thereof should be provided by seating foundations four feet or greater below surrounding grades, or through the use of an appropriate frost protected shallow foundation (FPSF) detail.

Mat Foundation Construction Considerations

The foundations should be seated directly on at least three feet of imported select structural fill, which is itself placed over subgrades prepared as described herein. All final bearing grades should be firm, stable, and free of loose soil, mud, water and frost. This Geotechnical Engineer should approve the condition of the foundation bearing grades immediately prior to placement of reinforcing steel and concrete.

SERVICE PITS

As previously indicated, one or more service pits up to 8 feet in depth (this corresponding with approximately elevation 13 feet) will be included in Buildings A and C. With floodwaters expected to rise upwards of elevation 18 feet, elevated groundwater may subject the pits to uplift pressures (buoyancy). Some means should therefore be incorporated to resist uplift, whether this be through self-weight of the pits, base extensions or some other method. Adequate waterproofing measures should also be provided.

Otherwise, the pits should be equipped with an open sump and pump system, with the pumps designed to dewater a specified volume that would be dependent upon the flood elevation, soil medium surrounding the pits, and the actual plan dimensions and depths of the pits.

Note that the pit walls should be designed to resist lateral earth pressures as outlined below.

RETAINING WALLS

The parameters given below are provided to analyze internal and external stability of the wall system and should be suitable for preliminary design purposes. We note however that the MSE retaining wall planned west of Building C will apparently be situated on the loose coal ash fills and will therefore be subject to settlement concerns similar to the buildings. While we expect the wall foundation subgrades can be improved through preloading as described elsewhere herein, it should be understood that the full height of the preload must in this case extend laterally to at

least 5 feet beyond the planned wall face, with the preload embankment side slope temporarily extending beyond the wall. The preload materials would then need to be removed from the retaining wall area and the wall system and its reinforcing constructed following the preload program. If this is not feasible or possible, consideration should be given to a different type of wall system more tolerant to settlement that can be built in conjunction with the site fills (as noted below).

The wall reinforcement system should also be considered in conjunction with overall site design. Based on the anticipated coal ash subgrades upon which the wall will be situated, we expect that satisfying global stability concerns will ultimately be a controlling factor in design. Reinforcement geogrid lengths upwards of 20 to 30 feet or more may be necessary depending on the wall system chosen, and the sequencing of geogrid installation with fills required to raise site grades should be coordinated as appropriate. In our estimation, a Geosynthetic Reinforced Soil System (GRSS) type wall is better suited to the expected site conditions as compared with the MSE type wall currently under consideration. GRSS walls are more tolerant to settlement and thus could be built in conjunction with the fills to raise site grades. Wall design would be a subsequent service that we should provide.

All earth-retaining walls should be designed to resist the lateral pressures generated by earth backfill and any temporary or permanent surcharge loads. The following design parameters are provided to assist in calculating lateral earth pressures and analyze wall stability as applicable:

- Soil angle of internal friction - 30 degrees
- Coefficient of At-Rest earth pressure (k_o) - 0.50
- Coefficient of Active earth pressure (k_a) - 0.33
- Coefficient of Passive earth pressure (k_p) - 3.00
- Total unit weight of compacted soil - 130 pcf

The recommended design parameters assume that the backfill consists of imported select granular or structural fill as outlined in the **Earthwork** section herein and that the backfill remains permanently well-drained. Water must not be allowed to collect against the wall unless the wall is designed to accommodate the added hydrostatic pressure. Use of excavated site soils for wall backfill should be avoided. The parameters are also based on idealized non-sloping conditions on each side of the wall and should be considered preliminary subject to review when grades are finalized. Where slopes are present either in front of or behind the walls, the coefficients of lateral earth pressure must be adjusted accordingly.

SHORELINE AND SLOPE STABILITY

An evaluation of global shoreline stability was made at several selected sections along the banks of the Hudson River and Normanskill in consideration of the proposed grading and loading

conditions, including the heavy transport vehicles. A total of five sections were evaluated, three along the river and two along the creek.

In developing each section, existing and proposed topography was taken from the site plans furnished to us, and the subsurface profile was compiled from information as revealed by the test borings and test pits. A uniform surcharge load for the material staging and/or equipment loadings was assumed based on the loading information provided, and was applied on the inside of the curb line indicated on the plans.

The slope and foundation geometries were analyzed by inputting data from the inferred subsurface profiles into the global stability evaluation software, SLOPE/W by Geo-Slope International, Ltd. Typical engineering properties for the soils were selected based upon the laboratory testing completed for this and previous studies together with our local experience. Groundwater conditions were modeled two ways: one considering the nominal static conditions encountered during our subsurface investigations, and another emulating rapid drawdown conditions as may occur after a flood event.

Under these parameters, the factor of safety against global failure of the shoreline was generally determined to be satisfactory (1.3 or greater). Typical industry standard targets a minimum factor of safety of 1.3, or 1.5 for critical structures.

However, a vulnerability to rotational slope failure was identified where concentrated loads are applied in close proximity to descending slopes. We therefore recommend that a minimum distance of 25 feet be maintained between concentrated loads (staged materials, reach stackers and SPMTs, etc.) and the crest of descending slopes.

Additionally, it was found that slopes along the shoreline are in general marginally stable against shallow, surficial type failures in the event of rapid water level drawdown as may occur following a flooding event. If armoring of the shoreline slopes to enhance their surficial stability is not a regulatory preferable solution, the prompt repair of any shallow failures will be required should a triggering flood event occur. Failure to address these surficial sloughs could result in propagation of the failures, potentially impacting greater portions of the slope and eventually upland yard areas.

It should be understood that stability of the soil slope, approach embankment and foundation geometries were modeled under the conditions outlined herein. Changes in feature location, geometry or grading, along with erosion or natural events can impact global stability. We should be retained to perform additional analyses and consulting as the final plans are developed.

Finally, we note that in general, any permanent cuts or embankment fills along the waterways should be sloped no steeper than one vertical on three horizontal (1V:3H). Steeper slopes may be considered on a case-by-case basis. All slopes should be vegetated, armored with riprap or otherwise protected against erosion as appropriate.

YARD AREA PAVEMENTS

Our design parameters assume the existing fills will be left in place and stabilized as detailed in the **Earthwork** section of this report. The owner must accept some degree of risk for excessive pavement settlement or failure if the existing fills are left in place. As previously indicated, whatever filling is required in the yard area should occur early in the construction schedule so as to limit post-construction settlements.

Reach Stacker and SPMT Use

The gravel-surface pavement section presented below was developed in conjunction with Tensar, primarily in consideration of the outsize reach stacker and SPMT loads that will traverse the site. PCASE software and assumed parameters based on the findings of our investigation were used in its development. We understand the end user acknowledges some rutting, aggregate kick-out and/or settlement of the aggregate surface will occur over time, and that they will periodically re-dress and re-level the yard area surface as needed in the course of their operations.

Except where noted and as applicable, all materials should meet the requirements specified in the latest edition of the New York State Department of Transportation (NYSDOT) Standard Specifications for Construction and Materials.

Reinforced Aggregate-Surface Pavement Design			
Layer	**Description**	**NYSDOT Reference**	**Thickness (inches)**
1	Surface Aggregate	Section 733-04, Type 2	12
2	Base Aggregate	Section 733-04, Type 2 (or AASHTO #57 blend)	18
3	Geogrid	Section 737-07 (Tensar NX850 or equal)	Single ply
4	Base Aggregate	Section 733-04, Type 2 (or AASHTO #57 blend)	18
5	Geogrid	Section 737-07 (Tensar NX850 or equal)	Single ply
6	Non-woven Separation/ Drainage Geotextile	Table 737-01C	Single ply

Construction of the yard area pavement section and the reinforced approach embankment section at the bridge should be coordinated to ensure proper overlap and to ensure that placed geogrids/geotextiles are not damaged in the course of utility installation. The geogrid should be

installed per the manufacturer's specifications, with prescribed overlap at seams, unless detailed otherwise.

Tower Section and Transition Piece Storage

The pavement section listed above should be provided throughout the storage yard area and anywhere that reach stackers or SPMTs will move about.

As outlined previously herein, plans call for the tower sections to be stored/staged horizontally on moveable storage fixtures, one on each end. Each fixture is to have two bearing plates which will bear on the storage yard's gravel surface. With each plate 20 sq.ft. in plan area, this results in a unit contact pressure upwards of 22,000 psf as currently planned.

While it is understood that settlement beneath the tower section storage fixtures need only be limited such that the tower sections remain off the ground, such settlements should be maintained within practical limits to avoid excessive tensile stresses in the geogrid reinforcement, which may result in damage to or failure of the grid and pavement system. To this end, we recommend the bearing plates be proportioned such that their contact pressure is limited to about 10,000 psf or less when bearing on the gravel pavement surface.

It is understood the transition pieces are to be staged in a vertical position, on modular jersey barrier-like units approximately 4.1 feet wide at their base and 32.8 to 45.9 feet in length. Each transition piece is to be supported on three of these units, and based on the information provided, we estimate that contact pressures at the base of the units bearing on the yard's gravel surface will be between 3,300 psf and 4,700 psf. We expect that differential settlement beneath these units will be maintained within the reported tolerable limit of 3 inches provided that loads do not exceed those indicated and are applied uniformly as shown. Nevertheless, we recommend that settlement beneath the transition pieces stored vertically be carefully monitored upon initial loading due to the uncertainty associated with the underlying previously filled subgrades.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements and design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

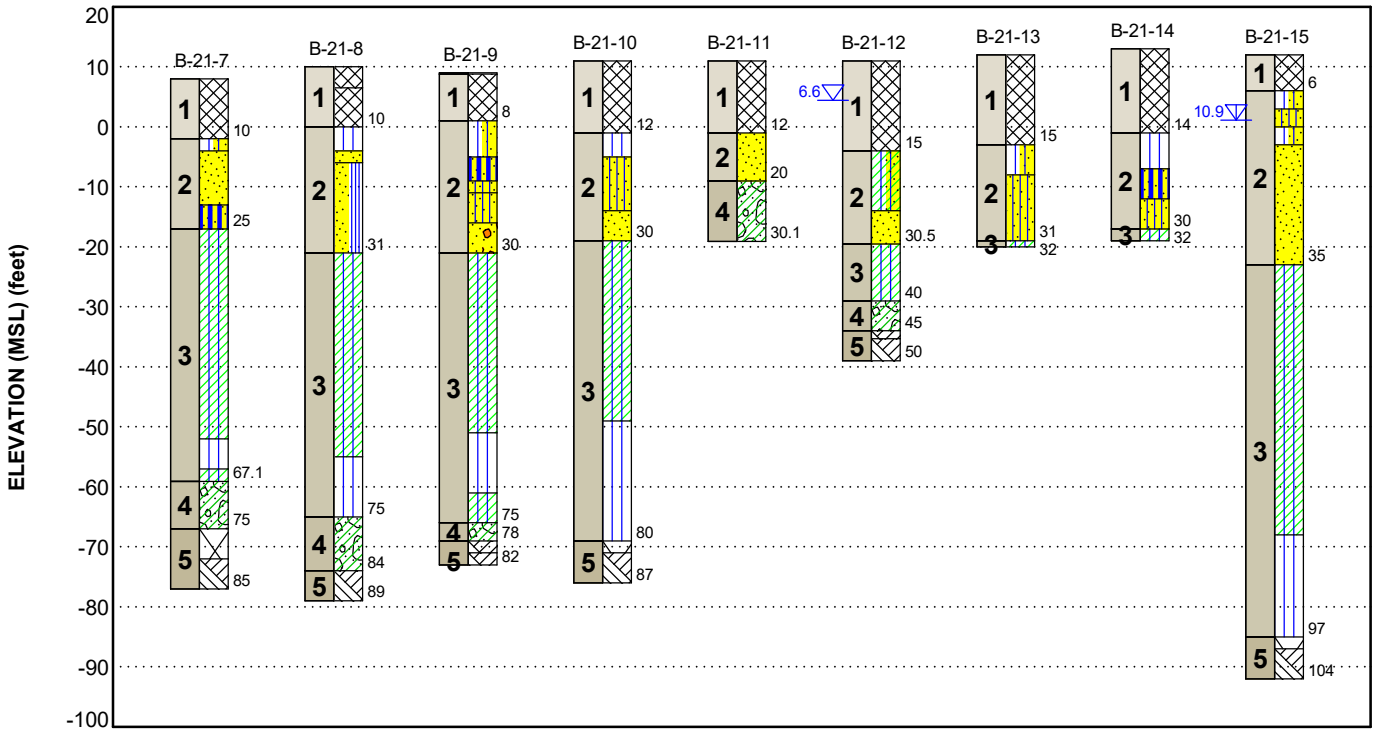
FIGURES

Contents:

GEOMODEL

Proposed Marmen Manufacturing Facility ■ Glenmont, NY
Terracon Project No. JB215020

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fill	In general coal ash on the west side and south end of the site. Elsewhere sand, silt, gravel and/or clay in varying proportion, along with occasional org. and/or foreign matter
2	Alluvium	Sand with lesser amounts of gravel, frequently intermixed or interbedded with silts and/or clays. Relatively minor amounts of organics common.
3	Silt and Clay	Glaciolacustrine silt and clay deposit.
4	Glacial Till	Fine sand and silt with embedded coarser sands, gravel, rock fragments. Some cobbles and boulders. Sometimes clayey.
5	Bedrock	Shale bedrock. Upper few feet relatively weathered.

LEGEND

- Fill
- Sandy Silt
- Glacial Till
- Poorly-graded Sand with Silt
- Poorly-graded Sand with Gravel
- Silt with Sand
- Silty Clay
- Weathered Rock
- Topsoil
- Silty Clay with Sand
- Poorly-graded Sand
- Silt
- Bedrock
- Silty Sand

▽ First Water Observation
▽ Second Water Observation

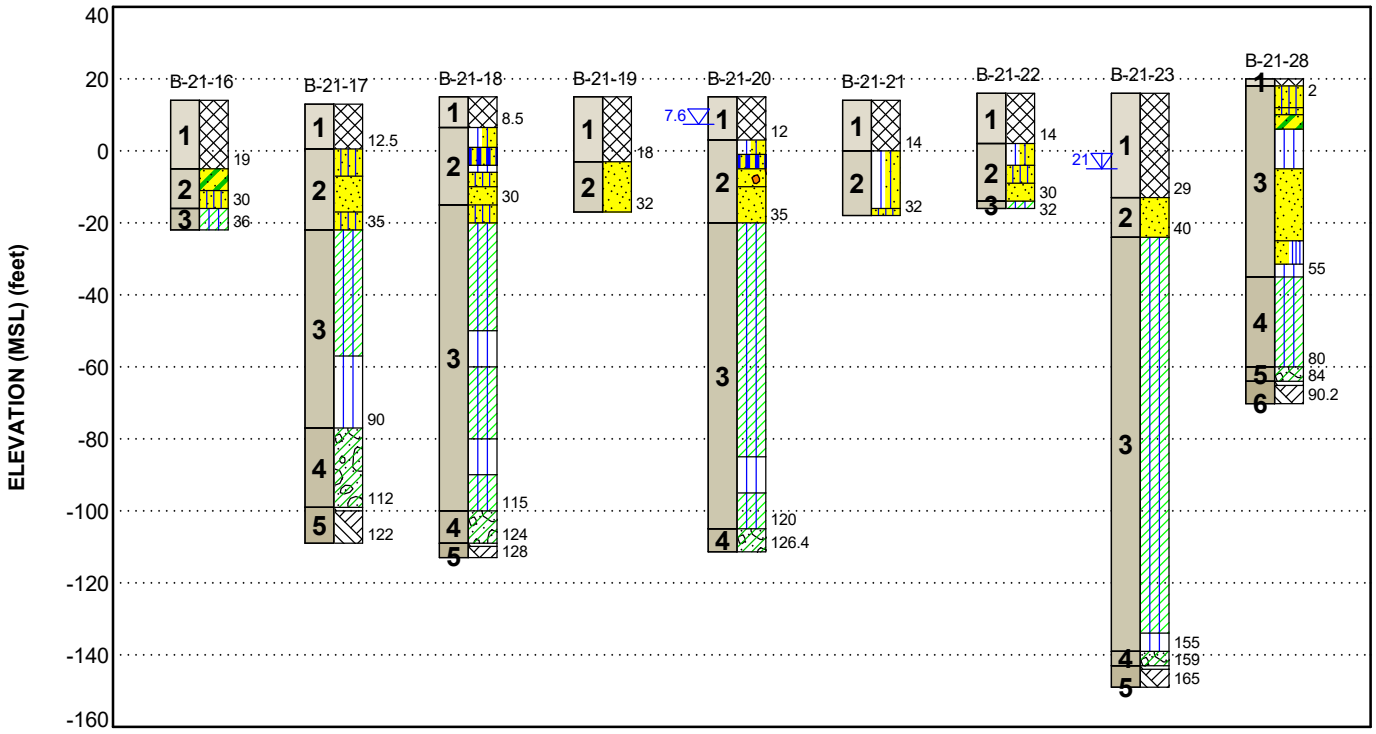
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Proposed Marmen Manufacturing Facility ■ Glenmont, NY
Terracon Project No. JB215020

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fill	In general coal ash on the west side and south end of the site. Elsewhere sand, silt, gravel and/or clay in varying proportion, along with occasional org. and/or foreign matter
2	Alluvium	Sand with lesser amounts of gravel, frequently intermixed or interbedded with silts and/or clays. Relatively minor amounts of organics common.
3	Silt and Clay	Glaciolacustrine silt and clay deposit.
4	Glacial Till	Fine sand and silt with embedded coarser sands, gravel, rock fragments. Some cobbles and boulders. Sometimes clayey.
5	Bedrock	Shale bedrock. Upper few feet relatively weathered.

LEGEND

- Fill
- Silty Clay
- Glacial Till
- Silt with Sand
- Poorly-graded Sand with Silt
- Clayey Sand
- Poorly-graded Sand
- Weathered Rock
- Sandy Silt
- Silty Sand
- Silt
- Bedrock
- Poorly-graded Sand with Gravel

▽ First Water Observation
▽ Second Water Observation

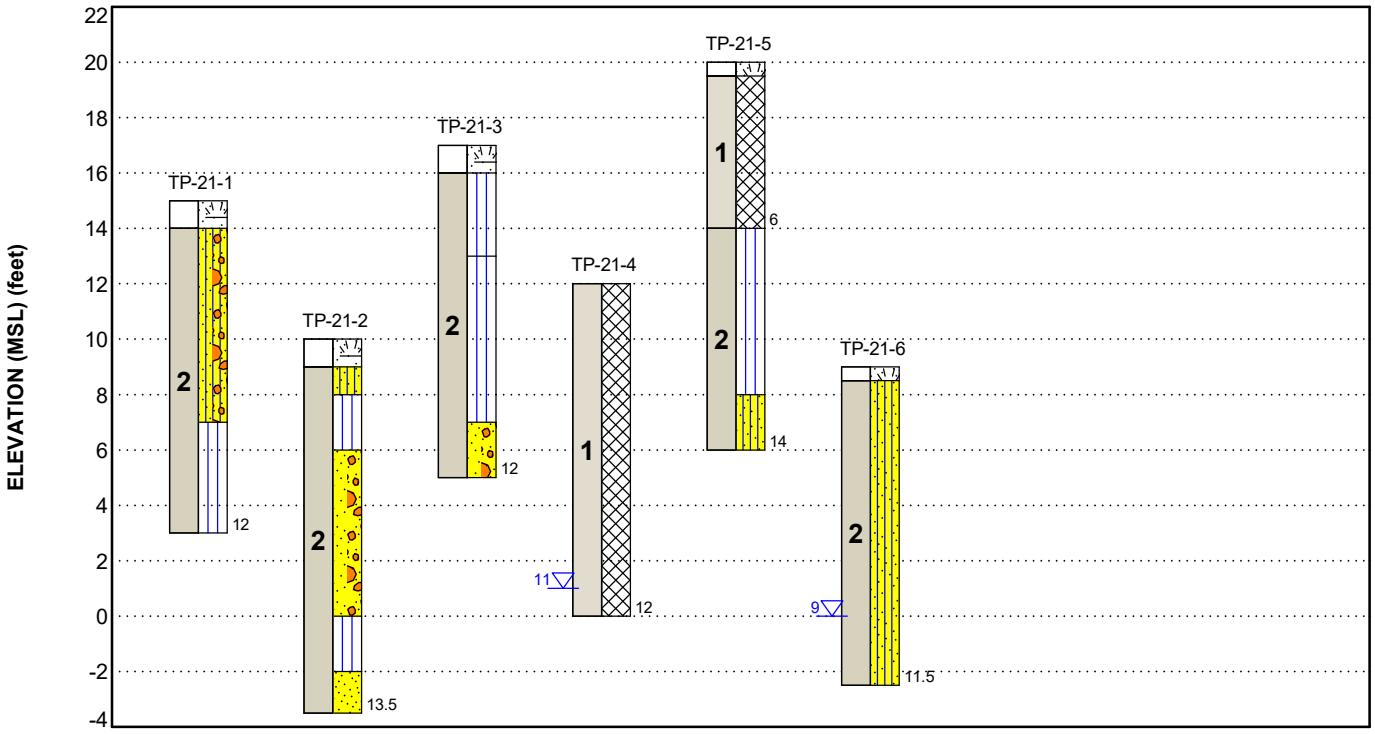
Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Proposed Marmen Manufacturing Facility ■ Glenmont, NY
Terracon Project No. JB215020

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fill	In general coal ash on the west side and south end of the site. Elsewhere sand, silt, gravel and/or clay in varying proportion, along with occasional org. and/or foreign matter
2	Alluvium	Sand with lesser amounts of gravel, frequently intermixed or interbedded with silts and/or clays. Relatively minor amounts of organics common.
3	Silt and Clay	Glaciolacustrine silt and clay deposit.
4	Glacial Till	Fine sand and silt with embedded coarser sands, gravel, rock fragments. Some cobbles and boulders. Sometimes clayey.
5	Bedrock	Shale bedrock. Upper few feet relatively weathered.

LEGEND

- Topsoil
- Silty Sand
- Fill
- Silty Sand with Gravel
- Poorly-graded Sand with Gravel
- Silt
- Poorly-graded Sand

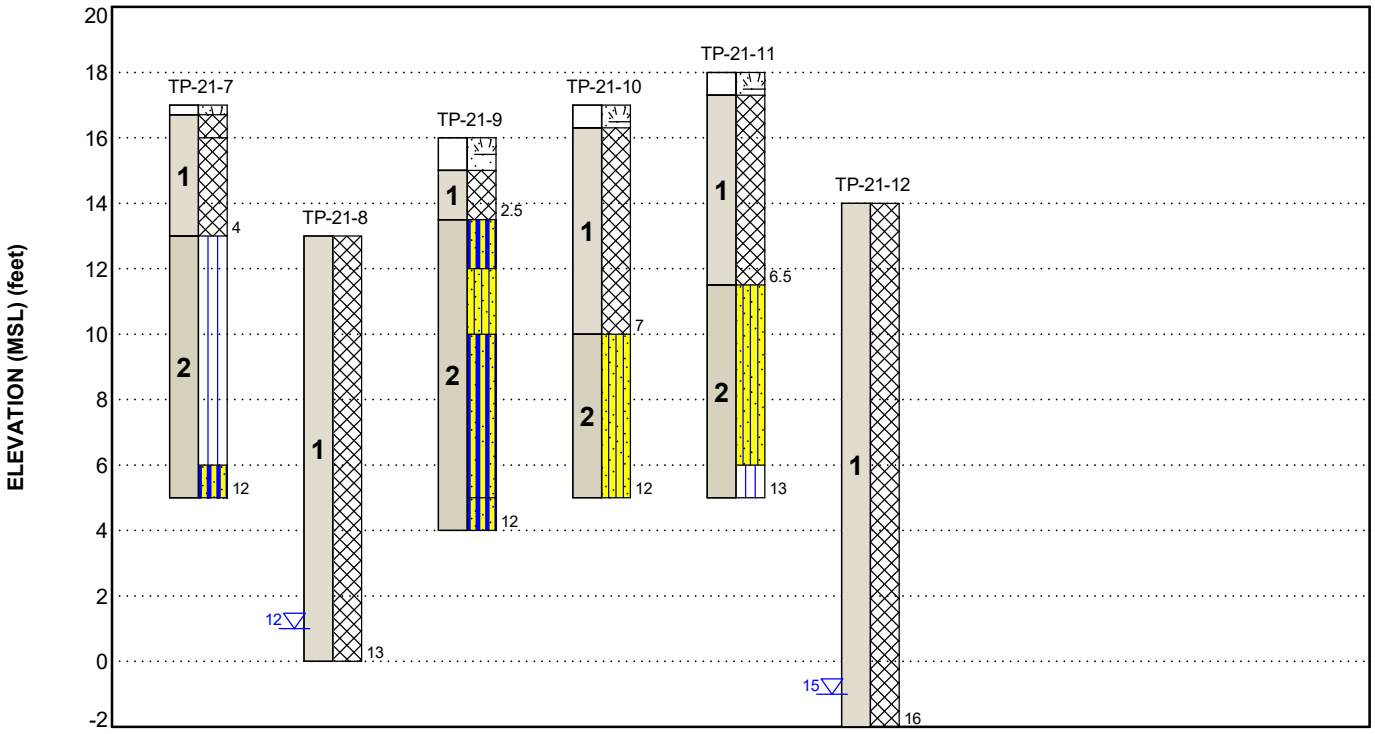
▽ First Water Observation
▽ Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Proposed Marmen Manufacturing Facility ■ Glenmont, NY
Terracon Project No. JB215020



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Fill	In general coal ash on the west side and south end of the site. Elsewhere sand, silt, gravel and/or clay in varying proportion, along with occasional org. and/or foreign matter
2	Alluvium	Sand with lesser amounts of gravel, frequently intermixed or interbedded with silts and/or clays. Relatively minor amounts of organics common.
3	Silt and Clay	Glaciolacustrine silt and clay deposit.
4	Glacial Till	Fine sand and silt with embedded coarser sands, gravel, rock fragments. Some cobbles and boulders. Sometimes clayey.
5	Bedrock	Shale bedrock. Upper few feet relatively weathered.

LEGEND

- Topsoil
- Fill
- Silt
- Sandy Silt
- Silty Sand

▽ First Water Observation
▽ Second Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time. Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Boring Nos.	Boring Depth (feet)	Location
B-21-7 thru B-21-23, B-21-28	30.1 to 165.0	Proposed building footprints

Test Pit Nos.	Test Pit Depth (feet)	Location
TP-1 thru TP-12	11.5 to 16	Proposed building footprints and yard area

Test Location Layout and Elevations: The test boring and test pit locations were selected on the basis of the preliminary plant layout provided to us and were established in the field by Terracon using a hand-held GPS unit, taped measurements and/or visual reference from existing site features. The boreholes and test pits were located as planned, within the limitations of access, existing structures and/or utilities.

Ground surface elevation at each borehole/test pit location was estimated based upon our interpolation between topographic contours shown on the site plans provided to us. If more precise locations and/or elevations are desired, the as-completed test locations should be surveyed.

Subsurface Exploration Procedures: The test borings were made using a standard rotary drill rig equipped with hollow-stem augers, flush-joint casing and rock core tooling. As the borehole was advanced, the soils were generally sampled at intervals of five feet or less in accordance with the Standard Method for Penetration Test and Split-Barrel Sampling of Soils, ASTM D1586. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling 30-inches. The number of blows required to advance the sampling spoon the middle 12-inches of a normal 24-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the subsurface logs at the corresponding test depths.

A total of three undisturbed Shelby tube samples were taken (or attempted) in the silt and clay (or otherwise soft subgrade soils) as indicated on the boring logs.

Upon meeting refusal, the refusal material was typically cored to allow its characterization. The coring was completed in general accordance with ASTM D2113 – Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation using an NQ-size double tube core barrel.

The boreholes were backfilled with auger cuttings and/or sand upon their completion.

Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs.

The soil and rock core samples were placed in appropriate containers and taken to our soils laboratory for visual classification by a geologist or geotechnical engineer. The soils were described based on the material's color, texture and plasticity in general accord with the Unified Soil Classification System (USCS) as summarized herein. Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Final individual boring logs were prepared, and they represent the Geotechnical Engineer's interpretation of the field logs and include modifications as appropriate based on observations and/or testing of the samples in our laboratory.

The test pits were excavated using a track excavator and observed by a geotechnical engineer from our office. The soils at the test pit locations were classified as the excavations were made and were logged as described above. Upon the completion of each test pit, the excavation was methodically backfilled in lifts, with each lift tamped with the excavator bucket.

The subsurface logs for the test borings and test pits are presented herein, along with a summary sheet and key which explains the terms and symbols used in their preparation.

Laboratory Testing

Selected recovered samples from the test borings were submitted for laboratory testing as part of the subsurface investigation, to confirm the visual classifications and to provide quantitative index properties for use in the geotechnical evaluation. This testing was performed in general accordance with the following standard methods:

- ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil - and Rock by Mass (35 samples tested)
- ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils (w/o hydrometer) (16 samples tested)
- ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils (w/ hydrometer) (8 samples tested)
- ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (7 samples tested)
- ASTM D2974 - Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils (4 samples tested)

- ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (4 samples tested)

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above

SITE LOCATION

Proposed Marmen Manufacturing Facility ■ Glenmont, NY
February 2022 ■ Terracon Project No. JB215020

Terracon GeoReport

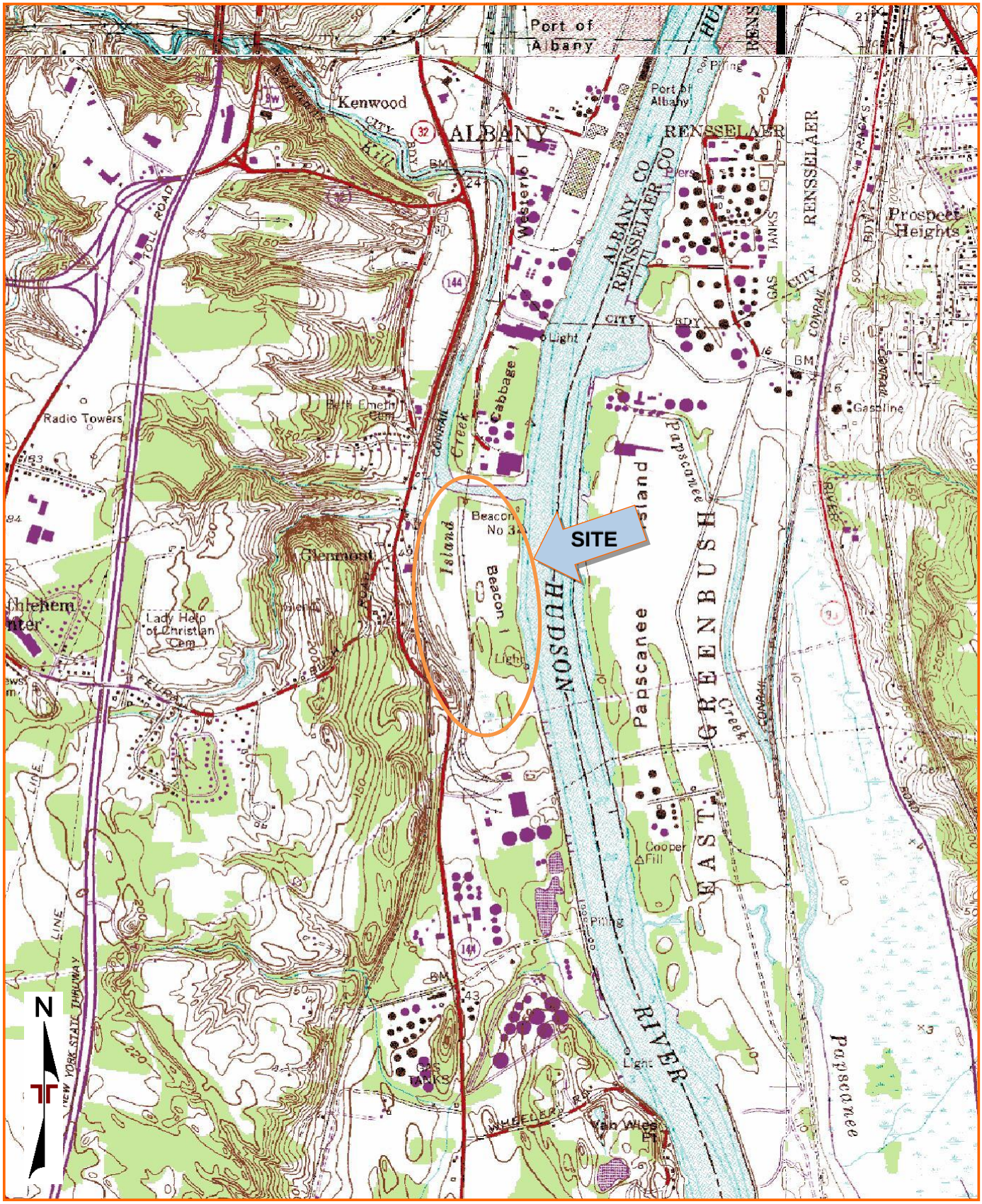
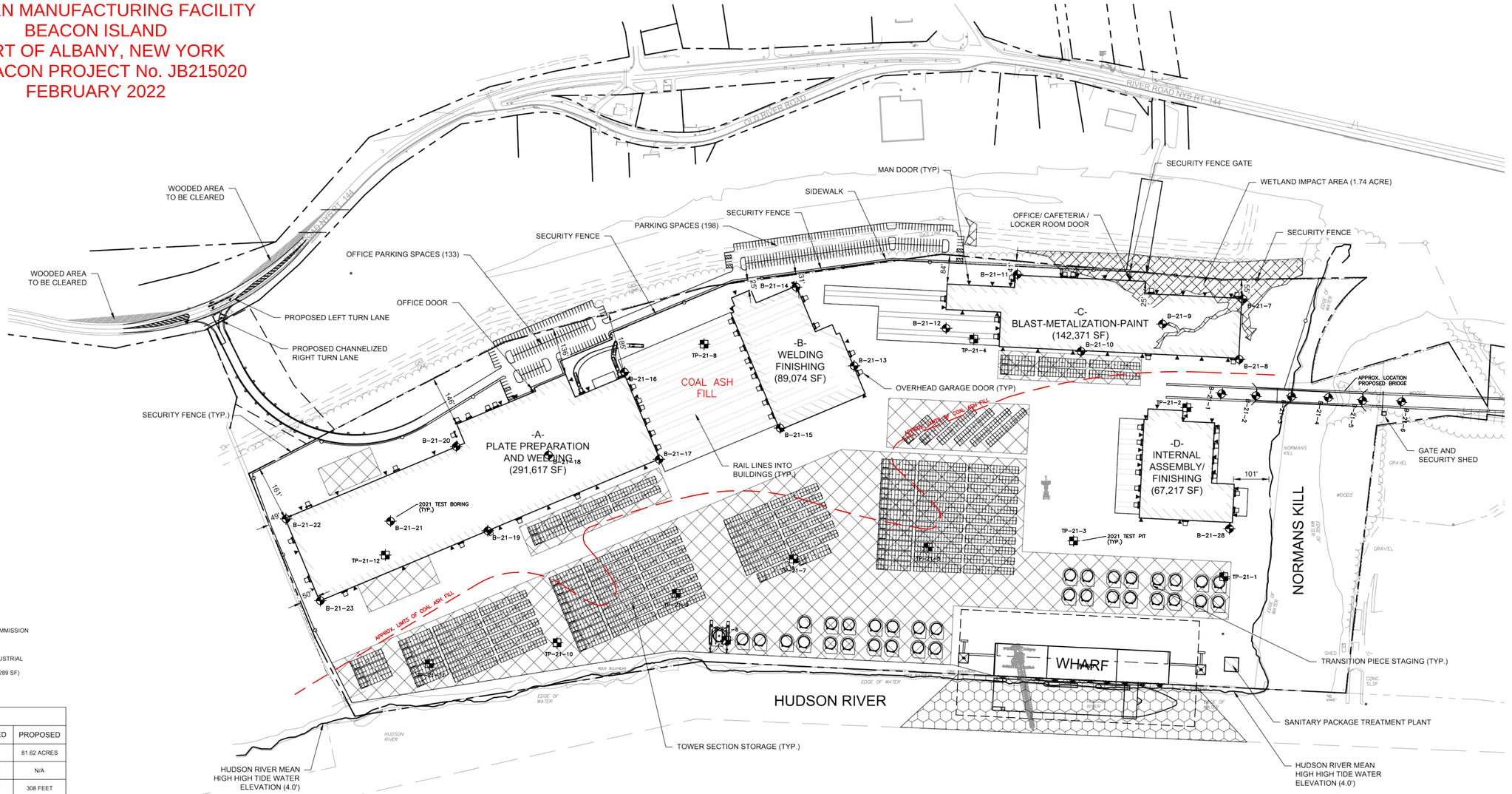


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: ALBANY, NY (1/1/1994), TROY SOUTH, NY (1/1/1980), DELMAR, NY (1/1/1980) and EAST GREENBUSH, NY (1/1/1980).

EXPLORATION PLAN
MARMEN MANUFACTURING FACILITY
BEACON ISLAND
PORT OF ALBANY, NEW YORK
TERRACON PROJECT No. JB215020
FEBRUARY 2022



PROJECT DATA

1. APPLICANT / LAND OWNER:
   ALBANY PORT DISTRICT COMMISSION
   106 SMITH BOULEVARDS
   ALBANY, NEW YORK 12205
2. EXISTING ZONING: HEAVY INDUSTRIAL
3. LOT AREA: 81.62 ACRES (3,555,289 SF)
4. BUILDING HEIGHT: 85 FT

SITE DATA		
FEATURE	REQUIRED	PROPOSED
MINIMUM LOT SIZE, NONRESIDENTIAL	5 ACRES	81.62 ACRES
MINIMUM FRONT YARD, FROM RIGHT-OF-WAY	100 FEET	N/A
MINIMUM FRONT YARD, FROM CENTER LINE	125 FEET	308 FEET
MINIMUM SIDE YARD	25 FEET	308 FET
MINIMUM REAR YARD	50 FEET	753 FFET
MINIMUM HIGHWAY FRONTAGE	150 FEET	2140 FEET
MAXIMUM HEIGHT	LESSER OF 4 STORIES OR 60 FEET	85 FEET*
MINIMUM LOT DEPTH	200 FEET	2850 FEET
MINIMUM LOT WIDTH	150 FEET	757 FEET
MAXIMUM LOT COVERAGE	30%	16.6%

* WILL REQUEST A VARIANCE

ZONING:

EXISTING: ±81.62 ACRES HEAVY INDUSTRIAL

PROPOSED: ±81.62 ACRES HEAVY INDUSTRIAL

TAX ACCOUNT NUMBERS: 98.00-2-10.23
98.01-2-1

PARKING:

1 SPACE FOR EACH 2 EMPLOYEES ON MAXIMUM WORKING SHIFT.

TOTAL EMPLOYEES = 350

REQUIRED:
175 TOTAL SPACES REQUIRED

PROVIDED:
CAR PARKING 331 SPACES PROVIDED
331 TOTAL SPACES PROVIDED

ADA SPACES REQUIRED:
PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN

REQUIRED (331 SPACE LOT): 9 SPACES
PROVIDED (331 SPACE LOT): 9 SPACES

LEGEND

- PROPERTY LINE
- BUILDING SETBACK
- EXISTING RAIL LINE
- EXISTING TREE LINE
- DITCH CENTERLINE
- ROADSIDE SWALE
- OVERHEAD DOORS
- MAN DOORS
- PROPOSED BUILDING FOOTPRINT
- MATERIAL STORAGE AREAS
- WETLAND IMPACT AREAS
- WHARF DREDGING AREA

McFarland Johnson
60 RAILROAD PLACE
SUITE 402
SARATOGA SPRINGS, NEW YORK 12866
P:518-580-9380 F:518-580-9383
SaratogaROM@mjinc.com

PROJECT MILESTONE
CONCEPT PLANS

NO.	DATE	DESCRIPTION

CLIENT: ALBANY PORT DISTRICT COMMISSION

PROJECT: ALBANY, NEW YORK
PORT OF ALBANY EXPANSION

DRAWN	JES
DESIGNED	AJF
CHECKED	AJF
SCALE	1"=40'
DATE	MAY 2021
PROJECT	18641.00

DRAWING TITLE
GENERAL LAYOUT PLAN

DRAWING NUMBER
SP-00

---- OF 7

C:\USERS\SMEARNS\ACCDOCS\MCFARLAND JOHNSON INC\PORT OF ALBANY EXPANSION\PROJECT FILES\18641.00 GEN LAYOUT.DWG

EXPLORATION RESULTS

Contents:

Test Boring and Test Pit Logs (47 pages)
Laboratory Test Results (26 pages)

Note: All attachments are one page unless noted above

BORING LOG NO. B-21-7

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6070° Longitude: -73.7673°

Approximate Surface Elev.: 8 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.0		**FILL - COAL ASH**, dark gray, moist to wet, very loose
	10.0	-2+/-	
2	10.0		**SILT WITH SAND (ML)**, seams of organics and fine to medium sand, gray to brown, wet, very soft
	12.0	-4+/-	
	12.0		**POORLY GRADED SAND (SP)**, occasional gray silty sand seams, fine to coarse grained, brown, wet, very loose to loose
			Grades with trace gravel
	21.0	-13+/-	
	21.0		**SANDY SILT (ML)**, with bands of clay, gray, wet, soft
	25.0	-17+/-	
3	25.0		**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft to soft
			Grades to varved silt and clay from about 30-35'

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
5		18	1-1-1-1 N=2		
		22	1-1/12"-1 N=1		
		21	WH/24"		
		24	WH/24"		99.4
10		24	WH/24"		
		22	WH/24"		
		22	WH/12"-2-4 N=2		
15		19	2-3-2-3 N=5		
20		19	WH/12"-3-2 N=3		
25		22	WH/12"-4-3 N=4		
30		24	WH/24"		
35		22	WH/24"		
40		24	WH/24"		
45		24	WH/24"		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 80', NQ core barrel to 85'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 06-28-2021 | Boring Completed: 06-28-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-7

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6070° Longitude: -73.7673°

Approximate Surface Elev.: 8 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
3							
			50	X	24	WR/24"	
			55	X	22	WR/18"-WH	
	60.0	-52+/-	60	X	6	3-2-2-2 N=4	26.4
	65.0	-57+/-	65	X	24	WR/12"-WH/12"	
4	67.1	-59+/-	70	X	5	47-17-16-17 N=33	
5	75.0	-67+/-	75		1	50/2"	
	80.0	-72+/-	80		37	REC=62% RQD=8%	
	85.0	-77+/-	85				

BANDED SILT AND CLAY (CL-ML), gray, wet, very soft to soft
(continued)

SILT (ML), trace clay, gray, wet, soft

BANDED SILT AND CLAY (CL-ML), gray, wet, very soft

SILTY GRAVEL (GM), frequent cobbles and boulders, gray, wet, dense, (GLACIAL TILL)
Difficult rollerbit advancement noted at about 67.1'

WEATHERED SHALE

SHALE, gray, moderately weathered with occasional 1-2" thick completely weathered bands, very close to close fracture spacing with high angle joints and bedding, very poor RQD
Graywacke layer from about 83-83.5'
Frequent siltstone lenses from 83.5-85'

Boring Terminated at 85 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 80', NQ core barrel to 85'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 06-28-2021 | Boring Completed: 06-28-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-8

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6070° Longitude: -73.7667°

Approximate Surface Elev.: 10 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.0	10+/-	**FILL - SILT WITH SAND (ML)**, occasional clay seams, trace roots and organic seams, gray, moist, medium stiff
	3.5	6.5+/-	**FILL - COAL ASH**, fine to medium grained, dark gray, moist to wet, very loose to loose
2	10.0	0+/-	**SILT (ML)**, little organics, gray, wet, very soft **Grades to pieces of wood, gray to brown at 10.5'** **Grades to occasional fine to medium sand and clay seams**
	14.0	-4+/-	**POORLY GRADED SAND (SP)**, trace silt, fine to medium grained, brown, wet, very loose
	16.0	-6+/-	**POORLY GRADED SAND WITH SILT (SP-SM)**, fine to medium grained, brown, wet, loose
	31.0	-21+/-	**Grades to trace gravel**
3			**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft to stiff

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
			20	2-4-4-4 N=8		22.8
			19	4-4-5-6 N=9		
5			17	2-2-1-1 N=3		
			18	WH/12"-2-2 N=2		
			24	WH/24"		
10			24	WH/24"	13.5	53.4
			24	WH/24"		
			18	WH/12"-2-2 N=2		
15			24	2-2-2-2 N=4		
20			24	WH-2-2-2 N=4		
25			22	2-3-4-5 N=7		26.8
30			20	2-3-6-4 N=9		
35			24	WH/24"		
40			24	WH/24"		
45			24	WH/24"		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 84', NQ core barrel to 89'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-07-2021 | Boring Completed: 07-09-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-8

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6070° Longitude: -73.7667°

Approximate Surface Elev.: 10 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft to stiff *(continued)*	50		X	24	WH/24"		
			Grades to banded silt and clay	55		X	24	WR/12"-WH/12"		
				60		X	24	WR/24"		
	65.0	-55+/-		65		X	24	WR/12"-5-5 N=5		
			SILT (ML), occasional clay bands and fine sand partings, gray, wet, medium stiff to stiff	70		X	7	5-5-7-7 N=12		
4	75.0	-65+/-		75		X	22	WH-7-16-17 N=23		
			CLAYEY GRAVEL WITH SAND (GC), gray, wet, medium dense to dense, (GLACIAL TILL)	80		X	19	6-11-22-26 N=33		
	84.0	-74+/-								
5			**SHALE**, gray, occasional quartz veins, slightly weathered, weak, close to moderate fracture spacing with high angle joints and fractures, poor RQD	85			58	REC=97% RQD= 47%		
	89.0	-79+/-								
			Boring Terminated at 89 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 84', NQ core barrel to 89'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-07-2021 | Boring Completed: 07-09-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-9

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6064° Longitude: -73.7671°

Approximate Surface Elev.: 9 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.2	9+/-	**TOPSOIL**
			FILL - COAL ASH, dark gray, moist to wet, very loose
			Little organics noted
	8.0	1+/-	
			SILT WITH SAND (ML), little organics, gray to brown, wet, very soft
			Fine to medium grained sand lenses from about 10 to 14'
	14.0	-5+/-	
			SANDY SILT (ML), with clay, trace organics, gray to brown, wet, very soft
			Grades to trace gravel
	18.0	-9+/-	
2	20.0	-11+/-	**SILTY SAND (SM)**, trace gravel, fine to medium grained, gray to brown, wet, very loose
			SILTY SAND (SM), with clay partings (approx. 1/8" thick), fine grained, brown, wet, very loose
	25.0	-16+/-	
			POORLY GRADED SAND WITH GRAVEL (SP), trace silt, fine to coarse grained, brown, wet, loose
	30.0	-21+/-	
3			**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
			4	WH/24"		
			22	WH/24"		
5			1	WH/24"		
			19	WH/24"		
			24	WH/24"		
10			22	WH/24"		
			24	WH/24"		
			19	WH/24"		
15			24	WH/24"		
			18	WH/18"-2		
20			21	2-1-1/12" N=1		
25			21	4-5-4-5 N=9		
30			24	WH/24"		
35			24	WH/24"		
40			22	WH/24"		
45			24	WH/24"		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 78', NQ core barrel to 82'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-29-2021 | Boring Completed: 07-29-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-9

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6064° Longitude: -73.7671°

Approximate Surface Elev.: 9 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft *(continued)*	50		X	24	WR/12"-WH/12"		
				55		X	24	WR/18"-WH		
	60.0	-51+/-		60		X	24	6-4-3-1 N=7		
			SILT (ML), occasional clay bands, gray, wet, very soft to medium stiff	65		X	24	WH/12"-1-1 N=1		
	70.0	-61+/-		70		X	24	WH/24"		
			BANDED SILT AND CLAY (CL-ML), gray, wet, very soft							
	75.0	-66+/-		75		X	4	50/4"		
4	78.0	-69+/-	**CLAYEY GRAVEL WITH SAND (GC)**, occasional cobbles and boulders, gray, wet, very dense, (GLACIAL TILL)							
5	80.0	-71+/-	**SANDSTONE**, gray, slightly weathered, medium strong, moderate fracture spacing with high angle joints and fractures, fair RQD	80			42	REC=88% RQD=58%		
	82.0	-73+/-	**SHALE**, with quartz veins, gray, slightly weathered, weak rock, very close to close fracture spacing with high angle joints and fractures, fair RQD							
			Boring Terminated at 82 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 78', NQ core barrel to 82'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-29-2021 | Boring Completed: 07-29-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-10

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6057° Longitude: -73.7668°

Approximate Surface Elev.: 11 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0.0					18	1-1-2-1 N=3		
							12	1/12"-1/12" N=1		
				5			5	WH/24"		31.7
							2	WH/24"		
							22	WH/24"		
				10			24	WH/24"	8.2	46.7
		12.0	-1+/-							
2							24	WH/24"		
				15			18	WH/18"-1		
							24	1-2-2-3 N=4		34.9
				20			21	2-2-2-2 N=4		
		25.0	-14+/-							
				25			18	3-4-4-3 N=8		
		30.0	-19+/-							
3				30			24	WH/24"		
				35						
				40			24	WH/24"		
				45						

SILT - COAL ASH, dark gray, moist to wet, very loose

Trace rootlets noted

Little organics noted

SILT (ML), little organics, occasional sand lenses, brown, wet, very soft
Aquatic shells encountered at about 13'

SILTY SAND (SM), trace organics, fine to medium grained, gray to brown, wet, loose

POORLY GRADED SAND (SP), trace gravel, fine to medium grained, brown, loose

VARVED SILT AND CLAY (CL-ML), gray, wet, very soft

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 82', NQ core barrel to 87'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-25-2021 | Boring Completed: 08-25-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-10

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6057° Longitude: -73.7668°

Approximate Surface Elev.: 11 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3										
			VARVED SILT AND CLAY (CL-ML), gray, wet, very soft *(continued)*							
			Grades to banded silt and clay	50						
						X	24	WH/24"		
				55						
		60.0	-49+/-	60						
			SILT (ML), occasional clay bands, gray, wet, very soft to medium stiff			X	24	WH/24"		
				65						
				70		X	24	3-2-3-5 N=5		
				75						
		80.0	-69+/-	80						
		82.0	**PROBABLE WEATHERED ROCK** -71+/-				2	50/2"		
5			**SHALE**, frequent siltstone lenses and occasional quartz veins, slightly weathered (highly weathered 82 to 82.4' and 85.2 to 85.8'), weak rock, close to moderate fracture spacing with high angle joints, fair RQD	85			60	REC=100% RQD=56%		
		87.0	-76+/-							
			Boring Terminated at 87 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 82', NQ core barrel to 87'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-25-2021 | Boring Completed: 08-25-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-11

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6052° Longitude: -73.7676°

Approximate Surface Elev.: 11 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1							1	WH/24"		
							1	WH/24"		
				5			22	WH/24"		
							24	WH/24"		
							24	WH/24"		
				10			22	WH/24"		
		12.0	-1+/-							
2							21	WH/12"-2-2 N=2		
				15			17	WH-2-1-1 N=3		
							19	2-2-1-2 N=3		
		20.0	-9+/-							
4				20			7	29-50/2"		
				25			1	50/1"		
		30.1	-19+/-							
				30			1	50/1"		

FILL - COAL ASH, dark gray, moist to wet, very loose

Little organics noted

POORLY GRADED SAND (SP), trace silt seams and trace organics, fine to medium grained, gray to brown, wet, very loose

SILTY SAND WITH GRAVEL (SM), occasional cobbles and boulders, gray, wet, very dense, (GLACIAL TILL)

Sampler Refusal at 30.1 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 30'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-01-2021 | Boring Completed: 09-01-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-12

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6047° Longitude: -73.7670°

Approximate Surface Elev.: 11 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.0		**FILL - COAL ASH**, dark gray, moist to wet, very loose **Trace rootlets noted** **Little organics noted**
1	15.0	-4+/-	
2	15.0		**SILTY CLAY WITH SAND (CL-ML)**, trace to little organics, gray to brown, wet, very soft
2	25.0	-14+/-	
2	25.0		**POORLY GRADED SAND (SP)**, trace silt and gravel, fine to coarse grained, gray to brown, wet, loose
2	30.5	-19.5+/-	
3	30.5		**BANDED SILT AND CLAY (CL-ML)**, gray, wet, soft
3	40.0	-29+/-	
4	40.0		**CLAYEY SAND WITH GRAVEL (SC)**, frequent cobbles and boulders, gray, wet, very dense, (GLACIAL TILL)
4	45.0	-34+/-	
5	46.3	-35.5+/-	**SHALE**, with frequent siltstone lenses and quartz veins, gray to black, slightly weathered, weak rock, very close fracture spacing with high angle joints/fractures, poor RQD

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
0			18	1-1-2-1 N=3		
			21	1-1-1-1 N=2		
5	▽		24	1-1/12"-1 N=1		
			12	1/24"		
			19	WH/24"		
10			19	WH/18"-2		
			10	WH/24"		
15			24	WH/24"		
20			22	WH/24"		
25			13	3-3-2-2 N=5		
30			21	4-2-2-2 N=4		
35			24	4-2-1-1 N=3		
40			2	50/2"		
45			50	REC=83%		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 45', NQ core barrel to 50'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

▽ *6.6' after 8-10' sample*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-31-2021 | Boring Completed: 08-31-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-12

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6047° Longitude: -73.7670°

Approximate Surface Elev.: 11 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
5		50.0	-39+/-	50				RQD=38%		

GRAYWACKE, fine-grained, gray to black, slightly weathered, medium strong, moderate fracture spacing with high angle joints/fractures, poor RQD *(continued)*

Boring Terminated at 50 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 45', NQ core barrel to 50'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *6.6' after 8-10' sample*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-31-2021 | Boring Completed: 08-31-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-13

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6039° Longitude: -73.7666°

Approximate Surface Elev.: 12 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0					4	WH-1-2-1 N=3		
							22	1-1-1-1 N=2		
				5			21	WH/24"		
							24	WH/24"		
							24	WH/24"		
				10			21	1-1/12"-1 N=1		
		15.0	-3+/-	15			19	WH/24"		
		20.0	-8+/-	20			18	1-1/12"-1 N=1		
2										
				25			17	WH-3-2-2 N=5		
		31.0	-19+/-	30			21	4-3-2-2 N=5		
3		32.0	-20+/-							

FILL - COAL ASH, trace rootlets, dark gray, moist to wet, very loose

Little wood/organics nioted

SILT WITH SAND (ML), little organics, gray to brown, wet, very soft

SILTY SAND (SM), trace organics, fine to medium grained, gray, wet, very loose to loose

Grades to trace gravel at about 25'

BANDED SILT AND CLAY (CL-ML), gray, wet, soft

Boring Terminated at 32 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 30'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-07-2021 | Boring Completed: 09-07-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-14

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6035° Longitude: -73.7675°

Approximate Surface Elev.: 13 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DESCRIPTION	RECOVERY (In.)	FIELD TEST RESULTS
1	0		**FILL - COAL ASH**, trace rootlets, dark gray, moist to wet, very loose	1	WH/18"-1
				2	1-1-1-1 N=2
				0	WH/18"-1
				17	WH/24"
				24	WH/24"
				7	WH-1-1/12" N=1
	14.0	-1+/-		18	WH/24"
	20.0	-7+/-	**SILT (ML)**, with clay, trace sand, little organics, gray, wet, very soft	22	WH/24"
2			**SANDY SILT (ML)**, trace organics, brown to gray, wet, very soft	14	WH/18"-2
	25.0	-12+/-	**SILTY SAND (SM)**, fine to medium grained, gray, wet, loose	19	2-2-2-3 N=4
	30.0	-17+/-			
3	32.0	-19+/-	**BANDED SILT AND CLAY (CL-ML)**, gray, wet, soft	24	3-2-2-3 N=4
			Boring Terminated at 32 Feet		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 30'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-07-2021 | Boring Completed: 09-07-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-15

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6034° Longitude: -73.7660°

Approximate Surface Elev.: 12 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		6.0	6+/-	**FILL - COAL ASH**, dark gray, moist to wet, very loose	5			10	WH/24"		
								14	WH/24"		
								13	WH-1-1/12" N=1		
		9.0	3+/-	**SILT WITH SAND (ML)**, some organics, gray to brown, moist, very soft to soft	10	▽		22	1-2-2-2 N=4		
		12.0	0+/-	**SILTY SAND (SM)**, some roots and organics, gray to brown, wet, very loose				24	WH/24"		
		15.0	-3+/-	**SILT WITH SAND (ML)**, some organics, dark brown, moist, very soft	15			18	WH/24"		
2								22	WH/24"		
				POORLY GRADED SAND (SP), trace silt bands, fine to medium grained, brown, wet, loose to medium dense				21	3-3-3-3 N=6		
				Grades to grayish brown	20			18	2-3-2-2 N=5		
				Grades to trace gravel	25			19	4-4-6-8 N=10		
		35.0	-23+/-		30			19	4-3-4-6 N=7		
3				**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft	35			24	WH/24"		
					40			24	WH/24"		
					45						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 99', NQ core barrel to 104'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

▽ *10.9' after weekend with drillhead at 35'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-18-2021 | Boring Completed: 08-18-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-15

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6034° Longitude: -73.7660°

Approximate Surface Elev.: 12 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft *(continued)*	50		X	24	WR/12"-WH/12"		
				55						
			Grades to varved	60		X	24	WR/24"		
				65						
			Grades to banded	70		X	6	WR/24"		
				75						
		80.0	-68+/-	80						
			SILT (ML), trace rootlets, occasional clay bands, gray, wet, soft to stiff			X	24	7-7-5-7 N=12		
				85						
				90		X	24	WH/12"-1-1 N=1		
				95						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 99', NQ core barrel to 104'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *10.9' after weekend with drillhead at 35'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-18-2021 | Boring Completed: 08-18-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-15

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6034° Longitude: -73.7660°

Approximate Surface Elev.: 12 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3		97.0	-85+/-							
		WEATHERED ROCK								
		99.0	-87+/-							
5		**SHALE and GRAYWACKE**, alternating bands (approx. 6-12" thick) of shale and graywacke, gray, slightly weathered, weak to medium-strong, very close to moderate fracture spacing with high angle joints, poor RQD		100			0 48	50/0" REC=80% RQD=47%		
		104.0	-92+/-							
		Boring Terminated at 104 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 99', NQ core barrel to 104'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *10.9' after weekend with drillhead at 35'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-18-2021 | Boring Completed: 08-18-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-16

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6021° Longitude: -73.7666°

Approximate Surface Elev.: 14 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1							19	1-1-2-1 N=3		
							18	1-1-1-1 N=2		
				5			22	1-1-1-1 N=2		
							24	WH/12"-1-1 N=1		
							24	WH/24"		
				10			18	1-1/18"		
							13	WH/24"		
				15						
							22	WH/24"		
2				20			18	2-2-1-1 N=3		
				25			19	2-3-3-4 N=6		
3				30			24	WH/24"		
							0			
				35			15			

FILL - COAL ASH, trace rootlets, dark gray, moist to wet, very loose

Little organics noted

19.0 -5+/-

CLAYEY SAND (SC), fine to coarse grained sand with clay bands, brown, wet, very loose

25.0 -11+/-

SILTY SAND (SM), trace gravel, fine to medium grained, gray, wet, loose

30.0 -16+/-

BANDED SILT AND CLAY (CL-ML), gray, wet, very soft

36.0 -22+/-

Boring Terminated at 36 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 32'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-08-2021 | Boring Completed: 09-08-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-17

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6024° Longitude: -73.7657°

Approximate Surface Elev.: 13 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0	0.5+/-	**FILL - COAL ASH**, dark gray, moist to wet, very loose to loose
	12.5		
2	12.5	0.5+/-	**SILTY SAND (SM)**, little organics, gray to brown, wet, very loose to medium dense
			Grades to trace gravel
	20.0	-7+/-	
	20.0	-7+/-	**POORLY GRADED SAND (SP)**, fine to medium grained, brown, wet, loose
			Grades to fine to coarse, trace gravel
	30.0	-17+/-	
	30.0	-17+/-	**SILTY SAND (SM)**, gray to brown, wet, loose
	35.0	-22+/-	
3	35.0	-22+/-	**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft
	45.0		

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
0		0	2-3-3-5 N=6		
		10	2-1-2-2 N=3		
5		13	2-1-1-1 N=2		
		21	WH/24"		
		18	WR-WH/18"		
10		22	WH/24"		34.6
		22	WH/24"		
		24	WH/12"-4-2 N=4		48.3
15		24	4-4-6-6 N=10		
20		21	3-3-3-3 N=6		
25		19	3-4-5-7 N=9		20.3
30		19	4-4-4-4 N=8		
35		24	WH/24"		
40		24	WH/24"		30.5
45					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 112', NQ core barrel thru boulder seam 90 to 105'. NQ core barrel to 122'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-11-2021 | Boring Completed: 08-11-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-17

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6024° Longitude: -73.7657°

Approximate Surface Elev.: 13 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft *(continued)*	50		X	24	WR/12"-WH/12"		
			Grades to banded	55						
				60		X	24	WH/24"		
				65						
		70.0	-57+/-	70		X	24	WR/18"-WH		
			SILT (ML), occasional clay bands, gray, wet, very soft to soft	75						
				80		X	24	4-1-1-12 N=2		17.5
				85						
		90.0	-77+/-	90			0	50/0"		
4			**CLAYEY SAND WITH GRAVEL (SC)**, occasional to frequent cobbles and boulders, gray **Hard sampler refusal at about 90', cored through frequent cobble and boulder seams in the glacial till from about 90 to 105'**				60	REC=100%		
				95						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 112', NQ core barrel thru boulder seam 90 to 105'. NQ core barrel to 122'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-11-2021 | Boring Completed: 08-11-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-17

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6024° Longitude: -73.7657°

Approximate Surface Elev.: 13 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
4			**CLAYEY SAND WITH GRAVEL (SC)**, occasional to frequent cobbles and boulders, gray *(continued)*				24	REC=40%		
				100						
							46	REC=76%		
				105						
				110						
		112.0	-99+/-							
		113.0	**HIGHLY WEATHERED SHALE** -100+/-							
5			**SHALE**, frequent siltstone lenses and graywacke bands, occasional quartz veins, gray, slightly to moderately weathered, weak rock to medium-strong, close to moderate fracture spacing with high angle joints, very poor to poor RQD **Core Run #1: Very Poor RQD**	115			30	REC=50% RQD=13%		
			Core Run #2: Poor RQD, highly weathered from 117 to 117.5', graywacke with quartz seams from 117.5 to 119.5'	120			42	REC=70% RQD=32%		
		122.0	-109+/-							
			Boring Terminated at 122 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 112', NQ core barrel thru boulder seam 90 to 105'. NQ core barrel to 122'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-11-2021 | Boring Completed: 08-11-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-18

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6015° Longitude: -73.7657°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1	0.0	15+/-	**FILL - COAL ASH**, dark gray, moist, very loose	0			12	1-1-1-1 N=2		
							2	WH/24"		
				5			1	WH/24"		
							2	WH/24"		
							22	WH/24"		
				10			22	WH/24"		44.8
			Pieces of wood observed from 12-14'				24	WH/24"	11.2	59.1
	8.5	6.5+/-								
2			**SILT WITH SAND (ML)**, little organics, gray to brown, wet, very soft							
	14.0	1+/-								
			SANDY SILT (ML), little organics, occasional clay and sand lenses, brown, wet, very soft to soft	15			6	1/12"-1/12" N=1		
							24	WH/12"-3-3 N=3		
	19.0	-4+/-								
	21.0	-6+/-	**SILT (ML)**, little organics, brown, wet, very soft	20			24	WH/24"		
			SILTY SAND (SM), little organics, gray, wet, very loose							
	25.0	-10+/-								
			POORLY GRADED SAND (SP), trace silt and gravel, fine to medium grained, gray, wet, loose	25			17	3-3-4-3 N=7		
	30.0	-15+/-								
3			**SILTY SAND (SM)**, fine to medium grained, brown, wet, loose	30			21	3-3-4-4 N=7		
	35.0	-20+/-								
			VARVED SILT AND CLAY (CL-ML), gray, wet, very soft	35			24	WR-WH/18"		35.5
				40						
				45			24	WR/18"-WH		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 123', NQ core barrel to 128'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-18

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6015° Longitude: -73.7657°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft *(continued)*	50						
			Grades to banded	55		X	24	WR/18"-WH		89.9
		65.0	-50+/-	60						
			SILT (ML), gray, wet, very soft	65		X	24	WR/18"-WH		
		75.0	-60+/-	70						
			BANDED SILT AND CLAY (CL-ML), gray, wet, very soft	75		X	22	WR-WH/18"		
				80						
				85		X	24	WH/24"		
		95.0	-80+/-	90						
			SILT (ML), occasional clay bands, gray, wet, medium stiff	95		X		7-3-5-8		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 123', NQ core barrel to 128'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-18

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6015° Longitude: -73.7657°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
			SILT (ML), occasional clay bands, gray, wet, medium stiff *(continued)*				24	N=8		
		105.0		-90+/-						
3			**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft - seam primarily silt noted				24	WR/24"		20.1
		115.0		-100+/-						
4			**CLAYEY SAND WITH GRAVEL (SC)**, occasional cobbles and boulders, gray, moist, very dense				7	28-50/5"		
		124.0		-109+/-						
		124.9	**WEATHERED SHALE**	-110+/-						
5			**GRAYWACKE**, occasional shale lenses, gray, slightly weathered, weak to medium strong, very close to moderate fracture spacing with high angle joints, poor RQD				48	REC=80% RQD=28%		
		128.0		-113+/-						
			Boring Terminated at 128 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 123', NQ core barrel to 128'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 08-04-2021 | Boring Completed: 08-04-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-19

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6010° Longitude: -73.7649°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0					12	WH/12"-1/12"		
							14	WH/12"-1/12"		
				5			13	WH-1-1-1 N=2		
							14	1-1-1-1 N=2		
							14	1/12"-1/12" N=1		
				10			9	1-1/18"		
							10	WH-1/12"-1 N=1		
				15			1	WH/24"		
		18.0	-3+/-							
2										
				20			12	3-2-2-2 N=4		
				25			12	2-2-4-4 N=6		
				30			12	3-3-4-3 N=7		
		32.0	-17+/-							

FILL - COAL ASH, dark gray, moist to wet, very loose

Little organics noted

Poor recovery 15-17', grades to occasional clayey seams

POORLY GRADED SAND (SP), trace silt and gravel, fine to medium grained, gray to brown, wet, loose

Grades to trace organics

Boring Terminated at 32 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 30'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-03-2021 | Boring Completed: 09-03-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-20

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6008° Longitude: -73.7658°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1	0.0	15	**FILL - COAL ASH**, dark gray, moist to wet, very loose				4	1-1/12"-1 N=1		
							18	1/12"-1/12" N=1		
			Pieces of wood, trace organics from about 4 to 7'	5			7	WH/12"-1-2 N=1		
					▽		24	WH/24"		106.4
							0	WH/24"		
				10			22	WH/24"		
	12.0	3+/-								
			SILT WITH SAND (ML), little organics, gray to brown, wet, very soft to soft				22	WH/24"		39.5
	16.0	-1+/-		15			24	WH/12"-3-2 N=3		
			SANDY SILT (ML), trace organics and roots, fine grained, brown, wet, very soft				24	WH/24"	3.7	44.7
	20.0	-5+/-								
2			**POORLY GRADED SAND WITH GRAVEL (SP)**, trace silt, fine to medium grained, brown, wet, loose	20			21	3-4-3-4 N=7		
	25.0	-10+/-								
			POORLY GRADED SAND (SP), trace silt, fine to medium grained, brown, wet, loose to medium dense	25			21	WH-3-4-4 N=7		
			Grades to fine to coarse grained, trace gravel	30			19	3-5-5-3 N=10		
	35.0	-20+/-								
3			**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft	35			24	WH/24"		
			Fine sand seam, trace roots at about 41'	40			24	WH/24"		33.2
				45						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 120', NQ core barrel thru boulders to 123', roller bit to 125'.

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

▽ *7.6' after 6-8' sample*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-20-2021 | Boring Completed: 07-20-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-20

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6008° Longitude: -73.7658°

Approximate Surface Elev.: 15 (Ft.) +/-

DEPTH ELEVATION (Ft.)

MODEL LAYER	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3	50						
			X	24	WR/12"-WH/12"		
	55						
	60						
			X	24	WR/24"		
	65						
	70						
			X	24	WR/18"-WH		
	75						
	80						
			X	24	WR/12"-WH/12"		31.1
	85						
	90						
			X	24	WR/18"-WH		
	95						

BANDED SILT AND CLAY (CL-ML), gray, wet, very soft *(continued)*

Grades to varved silt and clay

Grades to banded silt and clay

Grades to varved silt and clay

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 120', NQ core barrel thru boulders to 123', roller bit to 125'.

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *7.6' after 6-8' sample*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-20-2021 | Boring Completed: 07-20-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-20

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6008° Longitude: -73.7658°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3	100.0	-85+/-	100						
						24	WH/24"		
			105						
	110.0	-95+/-	110						
						5	WR/24"		
			115						
	120.0	-105+/-	120						
4						12	50/5"		
						17			
	126.4	-111.5+/-	125						
						12	73-31-50/5"		

BANDED SILT AND CLAY (CL-ML), gray, wet, very soft *(continued)*

SILT (ML), occasional clay bands, gray, wet, very soft

BANDED SILT AND CLAY (CL-ML), gray, wet, very soft

CLAYEY GRAVEL WITH SAND (SC), occasional to frequent cobbles and boulders, gray, moist to wet, very dense, (GLACIAL TILL)
Cored through frequent cobbles and boulders from 120 to 123'

Sampler Refusal at 126.4 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 120', NQ core barrel thru boulders to 123', roller bit to 125'.

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *7.6' after 6-8' sample*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-20-2021 | Boring Completed: 07-20-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-21

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6002° Longitude: -73.7650°

Approximate Surface Elev.: 14 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1							14	WH/24"		
							15	WH/24"		
				5			7	1/12"-1/12" N=1		
							24	1-1-1-1 N=2		
							24	2-1-2-1 N=3		
				10			12	1-1/12"-1 N=1		
		14.0	0+/-				14	WH/24"		
2				15			24	WH/24"		
							24	WH/24"		
				20			18	WH/24"		
				25			24	WH/24"		
		30.0	-16+/-	30			22	WH/24"		
		32.0	-18+/-							

FILL - COAL ASH, dark gray, moist to wet, very loose

Frequent roots from about 4 to 6', occasional to trace roots 6 to 8'

SILT WITH SAND (ML), trace clay seams, occasional to trace organics, brown to black, wet, very soft
Little organics from 14-18'

Few 0.5" thick organic bands noted

SILTY SAND (SM), trace organics, gray to brown, wet, very loose

Boring Terminated at 32 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 30'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-02-2021 | Boring Completed: 09-02-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-22

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.5994° Longitude: -73.7650°

Approximate Surface Elev.: 16 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1			**FILL - COAL ASH**, dark gray, moist, very loose to loose				12	WH/24"		
							18	WH-2-2-3 N=4		
				5			14	2-2-2-3 N=4		
							24	2-2-2-2 N=4		
			Becomes wet				18	1-1-1-1 N=2		
			Little organics noted	10			6	1-1-1/12" N=1		
			Reed-like stalk noted				10	WH/18"-1		
		14.0	2+/-							
			SILT WITH SAND (ML), some organics and rootlets/roots, brown to gray, wet, very soft	15			10	WH/24"		
			Trace aquatic shell fragments from 16 to 18'				24	WH/24"		
		20.0	-4+/-							
2			**SILTY SAND (SM)**, occasional organic silty seams, fine to medium grained, gray, wet, loose	20			14	WH-5-4-6 N=9		
		25.0	-9+/-							
			POORLY GRADED SAND (SP), fine to medium grained, brown, wet, medium dense	25			12	2-2-11-14 N=13		
		30.0	-14+/-							
3			**VARVED SILT AND CLAY (CL-ML)**, gray grading to brown, wet, stiff	30			24	4-6-5-7 N=11		
		32.0	-16+/-							
			Boring Terminated at 32 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 30'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-03-2021 | Boring Completed: 09-03-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-23

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.5997° Longitude: -73.7641°

Approximate Surface Elev.: 16 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0					1	4-4-2-1 N=6		
							12	2-2-2-2 N=4		
				5			12	1-2-2-3 N=4		
							19	6-5-6-5 N=11		
							21	WH/24"		
				10			24	WH/24"		
							22	WH/24"		89.2
				15			22	WH/24"		
							19	WH/24"		
				20	▽		24	WR/24"		
				25			24	WH/18"-1		
		29.0	-13+/-							
2				30			21	3-5-5-4 N=10		22.1
				35			19	3-3-3-4 N=6		
		40.0	-24+/-	40			24	WR/12"-WH/12"		
3				45			24	WR-WH/18"		30.0

FILL - COAL ASH, trace roots, dark gray, moist, loose to medium dense

Becomes wet

Trace organics noted

Trace pieces of wood

POORLY GRADED SAND (SP), fine to medium grained, brown, wet, loose to medium dense

Piece of wood encountered at about 32'

VARVED SILT AND CLAY (CL-ML), gray, wet, very soft

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 160', NQ core barrel to 165'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

▽ *21' after overnight with drillhead at ~90'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-10-2021 | Boring Completed: 07-13-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-23

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.5997° Longitude: -73.7641°

Approximate Surface Elev.: 16 (Ft.) +/-

DEPTH ELEVATION (Ft.)

MODEL LAYER	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3						**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft *(continued)*		
		50		X	24	WH/24"		
						Grades to banded silt and clay		
		55		X	24	WR/12"-WH/12"		
						Grades to varved silt and clay		
		60		X	24	WR-WH/18"		
						Grades to banded silt and clay		
		65		X	24	WR-WH/18"		
		70		X	24	WR/12"-WH/12"		
		75						
		80		X	24	WR/12"-WH/12"		
		85						
		90		X	24	WR-WH/18"		
		95						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 160', NQ core barrel to 165'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *21' after overnight with drillhead at ~90'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-10-2021 | Boring Completed: 07-13-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-23

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.5997° Longitude: -73.7641°

Approximate Surface Elev.: 16 (Ft.) +/-

DEPTH ELEVATION (Ft.)

MODEL LAYER	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
3	100				
				VARVED SILT AND CLAY (CL-ML), gray, wet, very soft *(continued)*	
				Grades to varved silt and clay	
		X	24	WR/18"-WH	
	105				
	110				
		X	24	5-3-3-7 N=6	20.6
				Grades to occasional fine sand partings, medium-stiff at 110-112' sample	
	115				
	120				
		X	24	WR/24"	
				Grades to banded silt and clay	
	125				
	130				
		X	24	WH/24"	
				Grades to varved silt and clay	
	135				
	140				
		X	24	WR/24"	

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 160', NQ core barrel to 165'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *21' after overnight with drillhead at ~90'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-10-2021 | Boring Completed: 07-13-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-23

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.5997° Longitude: -73.7641°

Approximate Surface Elev.: 16 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**VARVED SILT AND CLAY (CL-ML)**, gray, wet, very soft *(continued)*	145						
3	150.0	-134+/-	**SILT (ML)**, with occasional clay seams, gray, wet, very soft	150		X	24	WR/24"		
4	155.0	-139+/-	**SILTY SAND (SM)**, trace gravel, fine grained, gray, wet, very dense, (GLACIAL TILL)	155		X	15	40-50/5"		
5	159.0	-143+/-								
5	160.0	-144+/-	**WEATHERED SHALE**	160			0	50/0"		
5			**SHALE**, with quartz veins, slightly weathered, weak rock, very close to close fracture spacing with high angle fractures, poor RQD				58	REC=96% RQD=45%		
5	165.0	-149+/-	**Sandstone and siltstone lenses from 164 to 165'**	165						
			Boring Terminated at 165 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 160', NQ core barrel to 165'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

▽ *21' after overnight with drillhead at ~90'*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-10-2021 | Boring Completed: 07-13-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-28

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6069° Longitude: -73.7649°

Approximate Surface Elev.: 20 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
1	0.0		**POSSIBLE FILL - SILT WITH SAND (ML)**, some mottling, trace rootlets and gravel, occasional clayey seams, brown, moist, stiff
	2.0	18+/-	
			SILTY SAND (SM), trace rootlets and gravel, brown, moist, medium dense
			Grades to very moist
	8.0	12+/-	
	10.0	10+/-	**SILTY SAND (SM)**, occasional fine to medium grained sand seams, trace organics, gray, wet, very loose
			CLAYEY SAND (SC), with wet, gray clay seams, fine to coarse grained, gray, wet, medium dense
	14.0	6+/-	
			SILT (ML), trace organics and clay, gray to brown, wet, very soft
			Brown clay seams from 16-25'
	25.0	-5+/-	
3			**POORLY GRADED SAND (SP)**, trace silt, fine to medium grained, brown, wet, loose to medium dense
			Grades to fine to coarse sand
			Grades to gray, trace gravel
	45.0	-25+/-	
			POORLY GRADED SAND WITH SILT (SP-SM), trace gravel, fine to medium grained, gray, wet, medium dense

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
		12	2-4-5-7 N=9
		14	5-6-7-10 N=13
5		19	21-10-9-9 N=19
		19	6-5-5-7 N=10
		21	WH/18"-1
10		22	8-10-11-12 N=21
		24	8-8-10-10 N=18
15		24	WH/24"
		24	WH/24"
20		24	WH/24"
25		21	3-2-4-3 N=6
30		19	7-5-4-5 N=9
35		19	4-4-6-6 N=10
40		24	4-6-5-5 N=11
45		18	6-7-7-4 N=14

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 85.2', NQ core barrel to 90.2'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

Logged by: JCH
WH = Weight of Hammer
WR = Weight of Rods

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-01-2021 | Boring Completed: 07-01-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

BORING LOG NO. B-21-28

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6069° Longitude: -73.7649°

Approximate Surface Elev.: 20 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
3			**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, fine to medium grained, gray, wet, medium dense *(continued)*	50		X	19	7-7-7-3 N=14		
		51.5	-31.5+/-							
			SILT (ML), occasional fine to medium sand seams, trace gravel, gray, wet, stiff							
		55.0	-35+/-	55		X	24	WR-WH/18"		
4			**BANDED SILT AND CLAY (CL-ML)**, gray, wet, very soft	60		X	24	WR-WH/18"		
				65		X	24	WR/18"-WH		
				70		X	24	2-1/12"-1 N=1		
			Trace organics noted 75-77'	75		X	24	WR/18"-WH		
		80.0	-60+/-	80		X	22	21-16-14-24 N=30		
5			**SILTY GRAVEL WITH SAND (GM)**, gray, wet, dense, (GLACIAL TILL)							
		84.0	-64+/-							
		85.2	**WEATHERED SHALE** -65+/-	85			1	50/2"		
6			**SHALE**, gray, occasional quartz veins, slightly weathered, weak rock, close fracture spacing with high angle joints and bedding, poor RQD **Frequent siltstone seams from about 87-89'**				56	REC=96% RQD=45%		
		90.2	-70+/-	90						
			Boring Terminated at 90.2 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Tricone rollerbit to 85.2', NQ core barrel to 90.2'

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater measurements not obtained as water was used for borehole advancement

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 07-01-2021 | Boring Completed: 07-01-2021

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215020

TEST PIT LOG NO. TP-21-1

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6070° Longitude: -73.7643°

Approximate Surface Elev.: 15 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
		1.0	14+/-							
			TOPSOIL, dark brown, approx. 1' topsoil at ground surface							
2			**SILTY SAND WITH GRAVEL (SM)**, brown, moist	5						
		8.0	7+/-							
			CLAYEY SILT (ML), gray, moist, (operator notes greater excavation resistance)	10						
		12.0	3+/-							
			Test Pit Terminated at 12 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-2

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6062° Longitude: -73.7662°

Approximate Surface Elev.: 10 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
		1.0 **TOPSOIL**, dark brown, approx. 1' topsoil w/ roots at ground surface	9+/-							
		2.0 **SILTY SAND (SM)**, brown, moist	8+/-							
		4.0 **CLAYEY SILT (ML)**, mottled, gray, moist	6+/-							
2		**POORLY GRADED SAND WITH GRAVEL (SP)**, trace silt, brown, moist, occasional clay nodules noted		5						
		10.0	0+/-	10						
		12.0 **SILT (SM)**, with organics, gray, wet, some roots, water seeps in from this layer, hole caves below this depth	-2+/-							
		13.5 trace silt, fine to coarse grained, brown, very moist	-3.5+/-							
		Test Pit Terminated at 13.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-17-2021 | Test Pit Completed: 09-17-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-3

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6057° Longitude: -73.7644°

Approximate Surface Elev.: 17 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
		1.0	16+/-							
			TOPSOIL, dark brown, approx. 1' topsoil at ground surface							
			CLAYEY SILT (ML), with sand, mottled, brown, moist							
		4.0	13+/-							
			- water seeps in at brown/gray interface							
2			**CLAYEY SILT (ML)**, with sand, trace gravel, organics, gray, moist, (operator notes greater excavation resistance) - grades lean clay	5						19.6
		10.0	7+/-							
		12.0	**POORLY GRADED SAND WITH GRAVEL (SP)**, trace silt, fine to medium grained, brown, very moist, occasional clay nodules noted up to 3-4 inches in size	10						
			5+/-							
			Test Pit Terminated at 12 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-4

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

MODEL LAYER	GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.6049° Longitude: -73.7674° Approximate Surface Elev.: 12 (Ft.) +/- DEPTH / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		**FILL - COAL ASH**, dark gray, very moist, nil topsoil at ground surface, some roots in upper 1' - hole caves below 3' - becomes wet - hole caves excessively below 10', ash becomes saturated w/ pudding-like consistency 12.0 0+/- ***Test Pit Terminated at 12 Feet***	5 10	▽					67.3

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH
- ground in this area shakes underfoot when tracked over by excavator

WATER LEVEL OBSERVATIONS

▽ *At completion of test pit*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-17-2021 | Test Pit Completed: 09-17-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-5

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6045° Longitude: -73.7646°

Approximate Surface Elev.: 20 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0.5	19.5+/-							
			TOPSOIL, dark brown, approx. 6" topsoil at ground surface							
			FILL - SILTY SAND WITH GRAVEL (SM), little organics, gray, moist, (fuel oil odor noted)							
			- grades poorly graded sand with gravel	5						
		6.0	14+/-							
2			**CLAYEY SILT (ML)**, with sand, trace gravel, organics, gray, moist, (operator notes greater excavation resistance)	10						
		12.0	8+/-							
		14.0	**SILTY SAND (SM)**, gray-brown, very moist 6+/-							
			Test Pit Terminated at 14 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-6

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6040° Longitude: -73.7636°

Approximate Surface Elev.: 9 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
2		0.5	8.5+/-							
				5						
				10						
		11.5	-2.5+/-							

TOPSOIL, dark brown, approx. 6" topsoil at ground surface

SILTY SAND (SM), brown, moist, some roots in upper 3'

- grades poorly grades sand with silt (SP-SM)
- becomes wet, caves excessively below this depth
- some rootlets, little woody organics noted 6' - 7'

Test Pit Terminated at 11.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

▽ *At completion of test pit*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-7

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6035° Longitude: -73.7648°

Approximate Surface Elev.: 17 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DESCRIPTION
1		0.3	16.5+/-	**TOPSOIL**, dark brown, approx. 3" topsoil at ground surface
		1.0	16+/-	**FILL - COAL ASH**
		4.0	13+/-	**FILL - LEAN CLAY**, with rootlets, blocky texture, gray, moist
2				**CLAYEY SILT (ML)**, with sand, trace gravel, organics, gray, moist
		11.0	6+/-	
		12.0	5+/-	**SANDY SILT (ML)**, brown, moist
				Test Pit Terminated at 12 Feet

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
5						18.9
10						

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-8

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6028° Longitude: -73.7669°

Approximate Surface Elev.: 13 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0								63.9
				5						
				10	▽					
		13.0	0+/-							

FILL - COAL ASH, dark gray, very moist, nil topsoil at ground surface, some roots in upper 1'

- hole caves below 2'

- becomes wet

- hole caves excessively below 11', ash becomes saturated w/ pudding-like consistency

Test Pit Terminated at 13 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:

- logged by JSH
- ground in this area shakes underfoot when tracked over by excavator

WATER LEVEL OBSERVATIONS

▽ *At completion of test pit*

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-17-2021 | Test Pit Completed: 09-17-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-9

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6025° Longitude: -73.7642°

Approximate Surface Elev.: 16 (Ft.) +/-

MODEL LAYER	DEPTH	ELEVATION (Ft.)	
	1.0	15+/-	**TOPSOIL**, dark brown, approx. 1' topsoil at ground surface
1	2.5	13.5+/-	**FILL - SILTY SAND WITH GRAVEL**, brown-gray, moist, piece concrete noted
	4.0	12+/-	**SANDY SILT (ML)**, with clay, mottled, gray, moist
	6.0	10+/-	**SILTY SAND (SM)**, gray, moist
2	11.0	5+/-	**SANDY SILT (ML)**, with clay, rootlets, brown-gray, moist - operator notes easier excavtion effort below 8'
	12.0	4+/-	**SANDY SILT (ML)**, trace organics, brown, very moist
			Test Pit Terminated at 12 Feet

DEPTH (Ft.): 5, 10

WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | ORGANIC CONTENT (%) | WATER CONTENT (%)

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-10

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6016° Longitude: -73.7636°

Approximate Surface Elev.: 17 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
		0.7	16.5+/-							
1			**TOPSOIL**, dark brown, approx. 8" topsoil at ground surface **FILL - SILTY SAND WITH GRAVEL**, brown-gray, moist, occasional angular cobbles, clayey lumps, little brick, slag, wood noted	5						
		7.0	10+/-							
2			**SILTY SAND (SM)**, brown, moist	10						
		12.0	5+/-							
			Test Pit Terminated at 12 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-11

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.6005° Longitude: -73.7634°

Approximate Surface Elev.: 18 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
		0.7	17.5+/-							
1			**TOPSOIL**, dark brown, approx. 8" topsoil at ground surface **FILL - SILTY SAND WITH GRAVEL**, brown, moist, trace plastic, metal, cinders - becomes gray, w/ little wood, stalky organics, cobbles	5						
		6.5	11.5+/-							
2			**SILTY SAND (SM)**, trace organics, gray, moist, occasional clayey lumps noted	10						
		12.0	6+/-							
		13.0	**SILT (ML)**, with sand, bown-gray, moist ***Test Pit Terminated at 13 Feet***	5+/-						

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

No measurable groundwater in test pit upon completion of excavation

Terracon
30 Corporate Cir Ste 201
Albany, NY

Test Pit Started: 09-16-2021 | Test Pit Completed: 09-16-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

TEST PIT LOG NO. TP-21-12

PROJECT: Proposed Marmen Manufacturing Facility

CLIENT: McFarland Johnson
Saratoga Springs, NY

SITE: River Road
Glenmont, NY

LOCATION See Exploration Plan

Latitude: 42.5999° Longitude: -73.7648°

Approximate Surface Elev.: 14 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	ORGANIC CONTENT (%)	WATER CONTENT (%)
1		0		5						70.8
				10						
		16.0	-2+/-	15	▽					

FILL - COAL ASH, dark gray, very moist, nil topsoil at ground surface, some reedy vegetation in upper few feet

- becomes wet, hole caves below 10'

- some reedy vegetation, swampy odor noted
- ash becomes saturated w/ pudding-like consistency

Test Pit Terminated at 16 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
3' wide excavator bucket

Abandonment Method:
Test pit backfilled in lifts, tamped with excavator bucket

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation interpolated from topographic site plan.

Notes:
- logged by JSH

WATER LEVEL OBSERVATIONS

▽ *At completion of test pit (and rising)*

Terracon
30 Corporate Cir Ste 201
Albany, NY

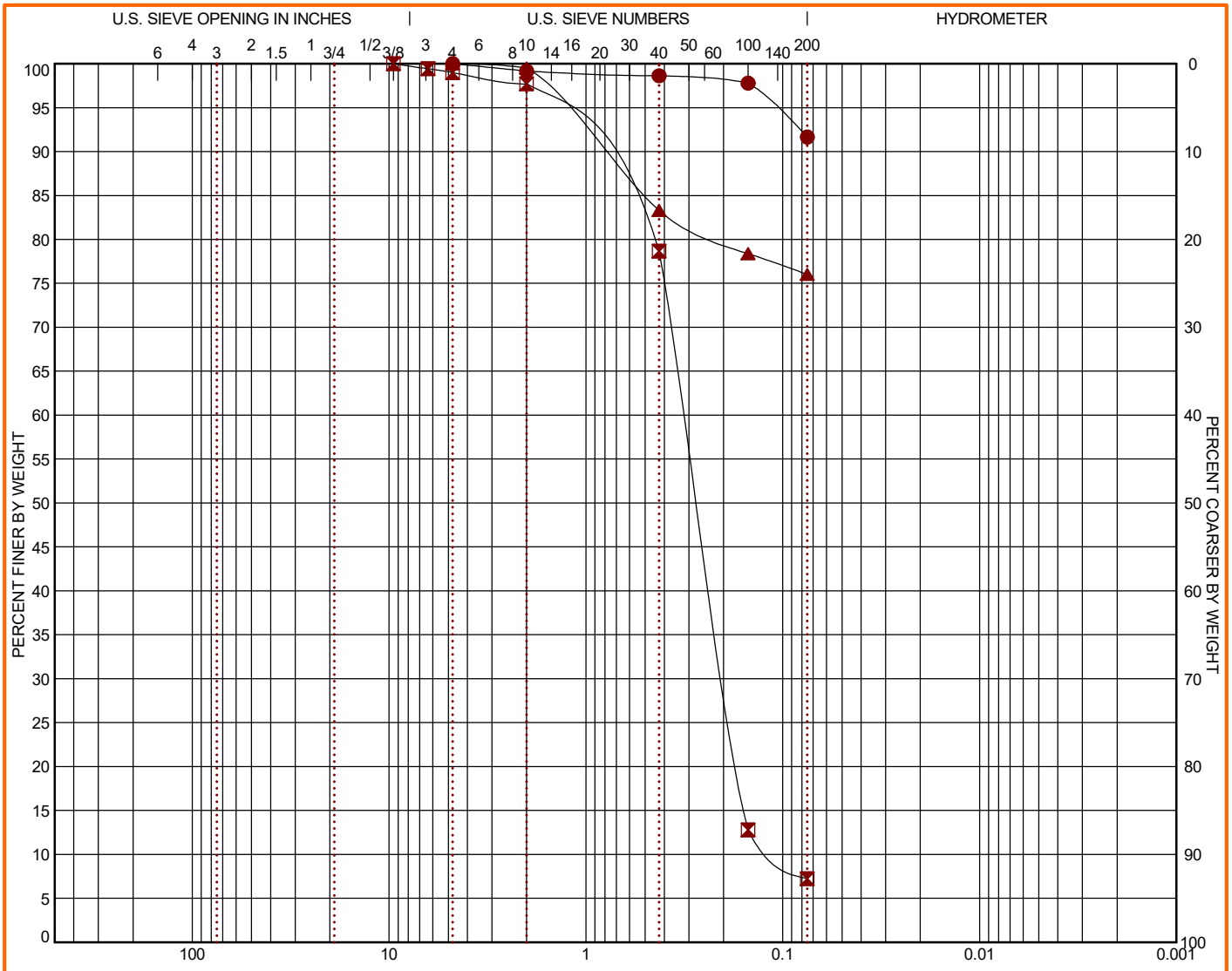
Test Pit Started: 09-17-2021 | Test Pit Completed: 09-17-2021

Excavator: Kobelco SK270SR | Operator: Peter K. Frueh Excavating

Project No.: JB215020

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-21-7	6 - 8	0.0	0.0	8.4		91.6		ML
⊠	B-21-8	25 - 27	0.0	1.0	91.7		7.3		SP-SM
▲	B-21-10	4 - 6	0.0	0.0	24.0		76.0		ML

GRAIN SIZE	●	⊠	▲
D_{60}		0.316	
D_{30}		0.197	
D_{10}		0.106	

COEFFICIENTS	●	⊠	▲
C_C		1.16	
C_U		2.99	

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	3/8"	100.0	#4	100.0
#10	99.15	#4	99.43	#10	99.51
#40	98.63	#10	98.98	#40	83.3
#100	97.78	#40	97.7	#100	78.37
#200	91.65	#100	78.68	#200	76.01
		#200	12.78		
			7.25		

SOIL DESCRIPTION	
●	SILT (ML)
⊠	POORLY GRADED SAND with SILT (SP-SM)
▲	SILT with SAND (ML)

REMARKS	
●	
⊠	
▲	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

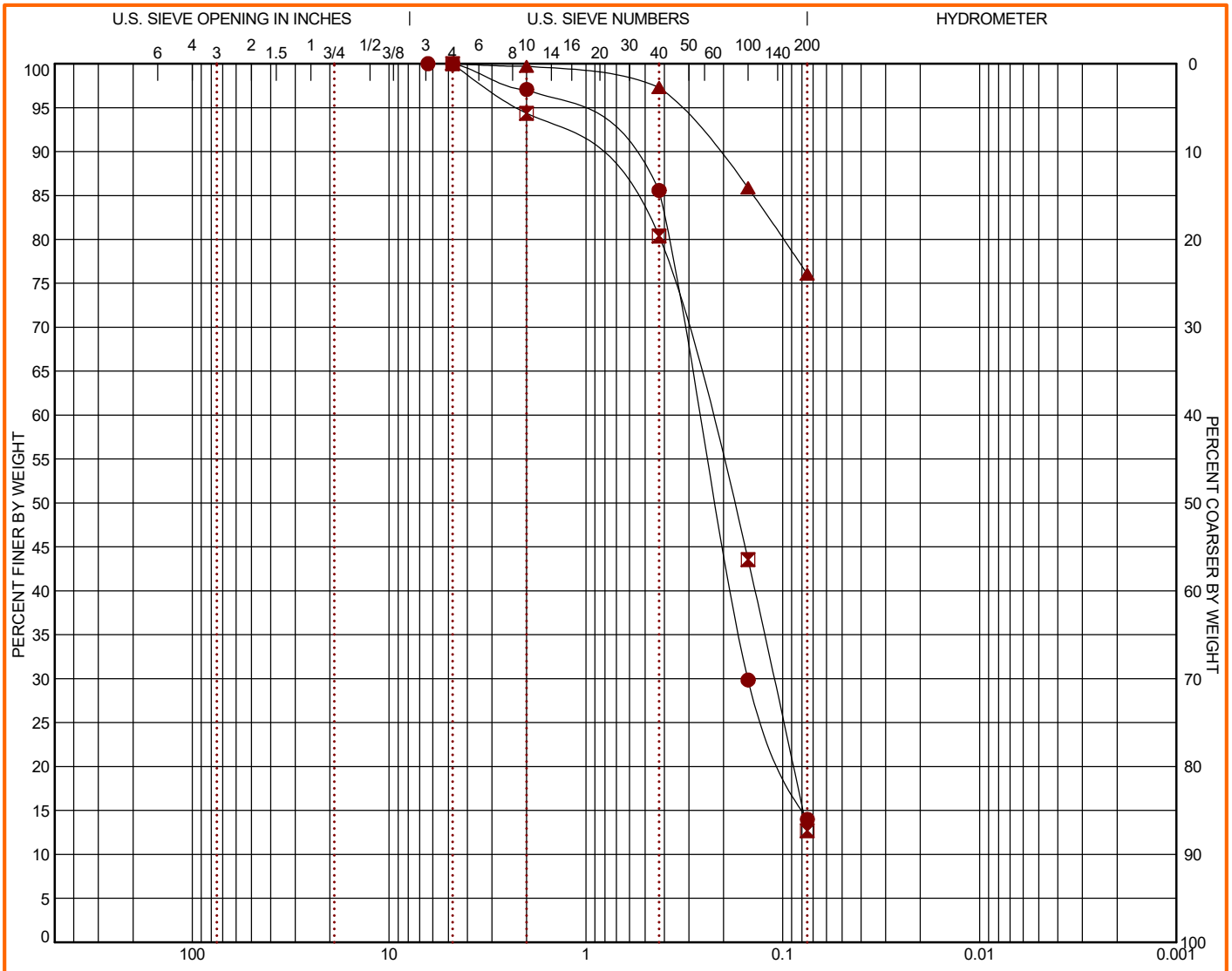
PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS 1 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 9/16/21

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-21-10	16 - 18	0.0	0.0	86.0		14.0		SM
⊠	B-21-17	14 - 16	0.0	0.0	87.3		12.7		SM
▲	B-21-20	6 - 8	0.0	0.0	23.9		76.1		ML

GRAIN SIZE	●	⊠	▲
D_{60}	0.264	0.239	
D_{30}	0.15	0.111	
D_{10}			

COEFFICIENTS	●	⊠	▲
C_C			
C_U			

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	#4	100.0	#4	100.0
#10	99.99	#10	94.35	#10	99.7
#40	97.06	#40	80.38	#40	97.29
#100	85.57	#100	43.57	#100	85.87
#200	29.86	#200	12.69	#200	76.05
	13.99				

SOIL DESCRIPTION	
●	SILTY SAND (SM)
⊠	SILTY SAND (SM)
▲	SILT with SAND (ML)

REMARKS	
●	
⊠	
▲	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

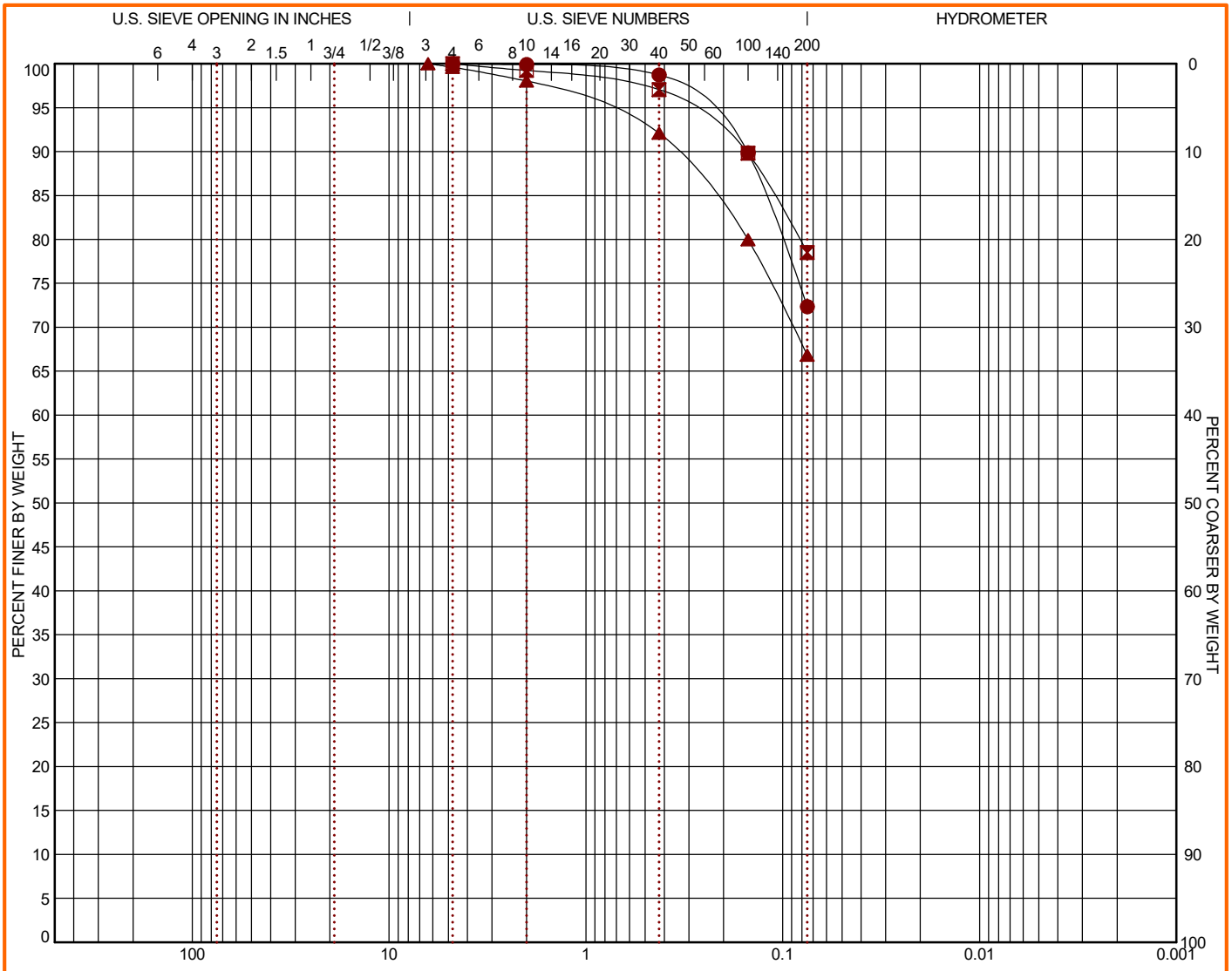
CLIENT: McFarland Johnson
Saratoga Springs, NY

GRAIN SIZE: USCS 1 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 9/16/21

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	S-1	1 - 1.1	0.0	0.0	27.7		72.3		ML
⊠	S-2	1 - 3	0.0	0.0	21.5		78.5		ML
▲	S-3	1 - 3	0.0	0.4	32.8		66.8		ML

GRAIN SIZE	●	⊠	▲
D_{60}			
D_{30}			
D_{10}			

COEFFICIENTS	●	⊠	▲
C_C			
C_U			

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#4	100.0	#4	100.0	#4	100.0
#10	99.9	#10	99.23	#10	99.59
#40	98.72	#40	97.06	#40	98.02
#100	89.86	#100	89.8	#100	92.1
#200	72.34	#200	78.52	#200	79.97
					66.83

SOIL DESCRIPTION

- ● SILT with SAND (ML)
- ⊠ SILT with SAND (ML) (coal ash)
- ▲ SANDY SILT (ML)

REMARKS

- ●
- ⊠
- ▲

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

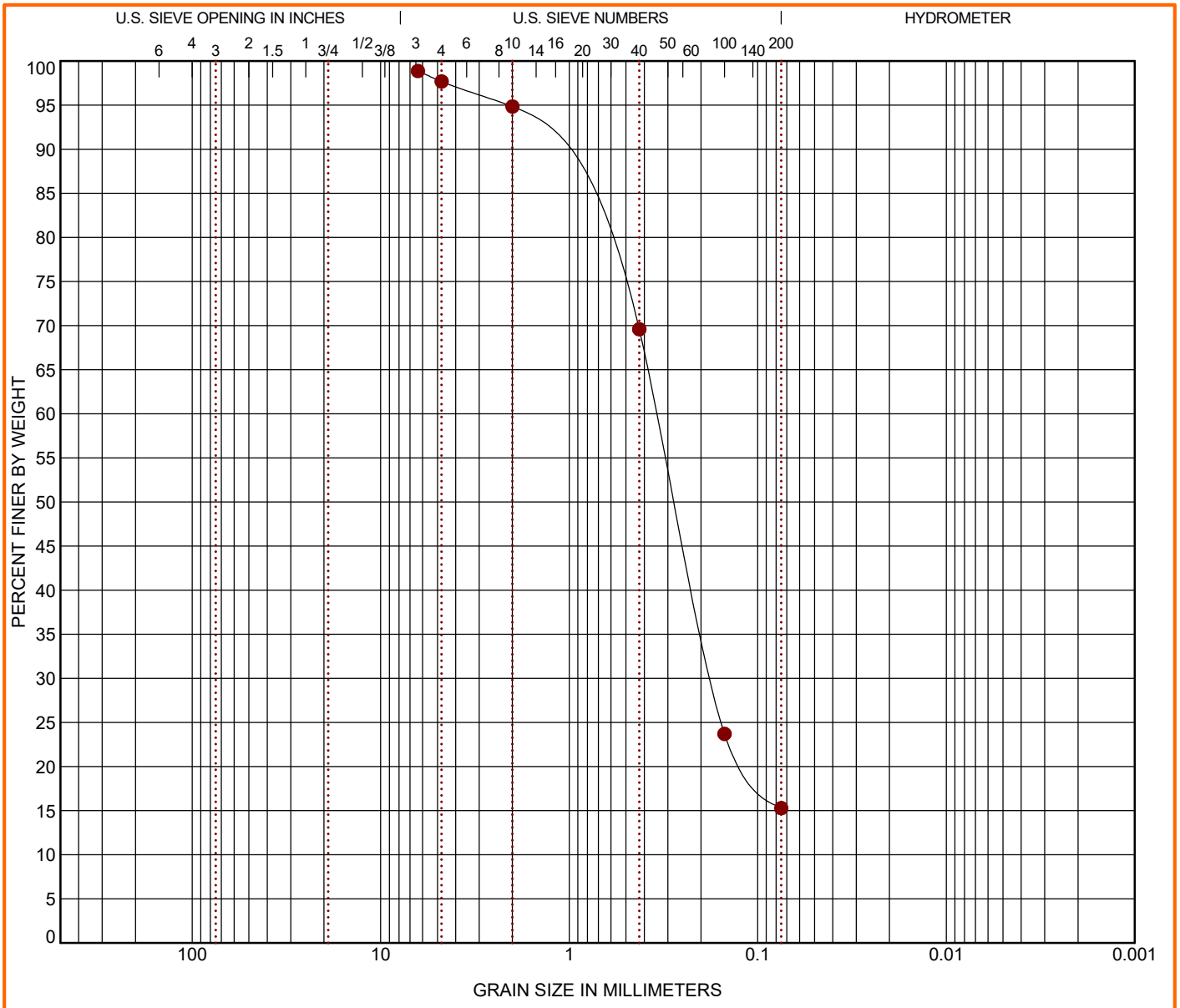
CLIENT: McFarland Johnson
Saratoga Springs, NY

GRAIN SIZE: USCS 1 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 9/16/21

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-1	4 - 4.5	SILTY SAND (SM)		NP	NP	NP		

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-1	4 - 4.5	6.35	0.342	0.173			1.2	82.4		15.3	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

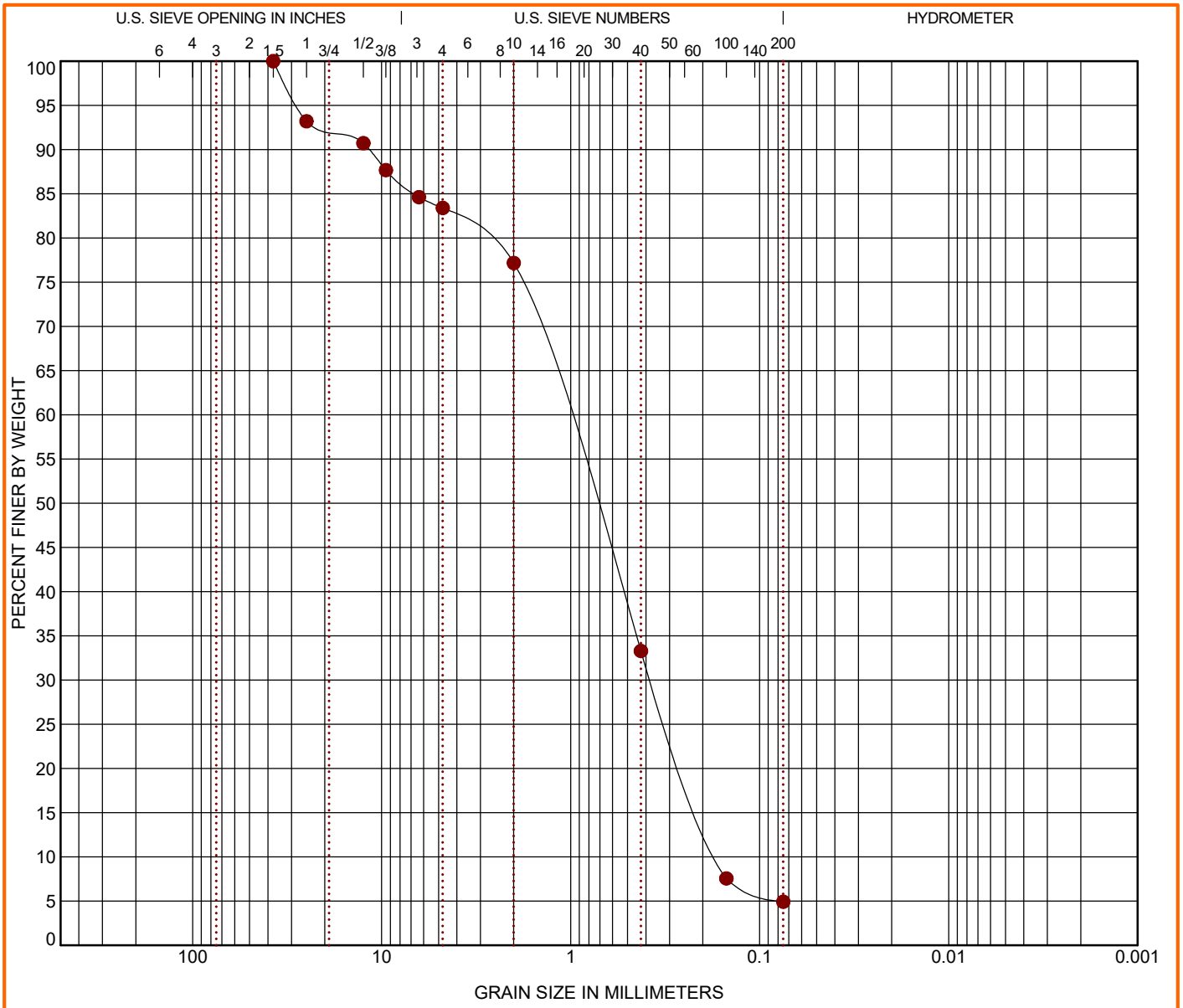
PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 10/4/21

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-2	5 - 5.5	POORLY GRADED SAND with GRAVEL (SP)		NP	NP	NP	0.77	6.59

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-2	5 - 5.5	37.5	1.091	0.372	0.166	0.0	16.6	78.5		4.9	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

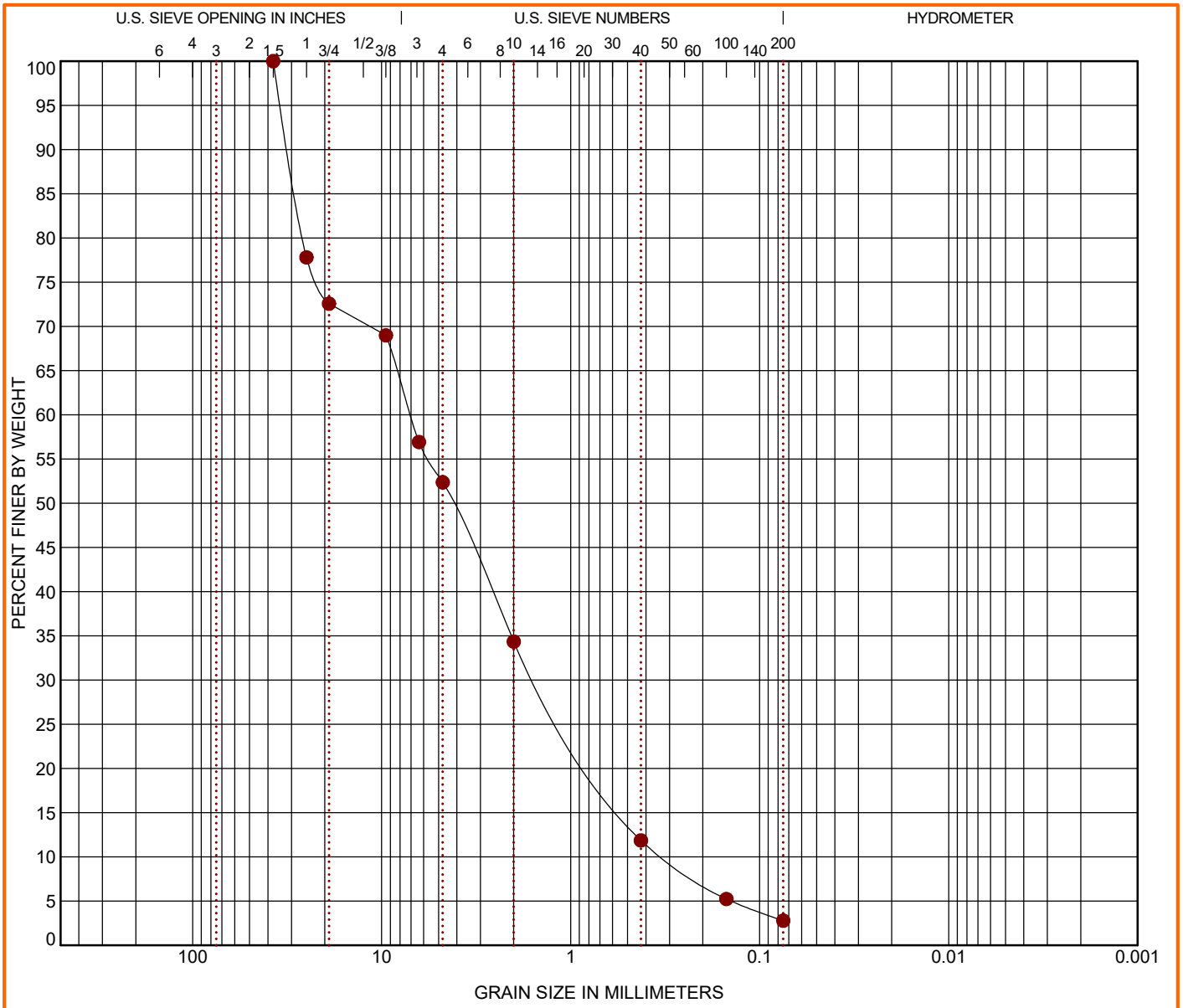
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-5	4 - 4.5	POORLY GRADED SAND with GRAVEL (SP)		NP	NP	NP	0.98	22.17

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-5	4 - 4.5	37.5	7.038	1.483	0.317	0.0	47.6	49.6		2.8	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

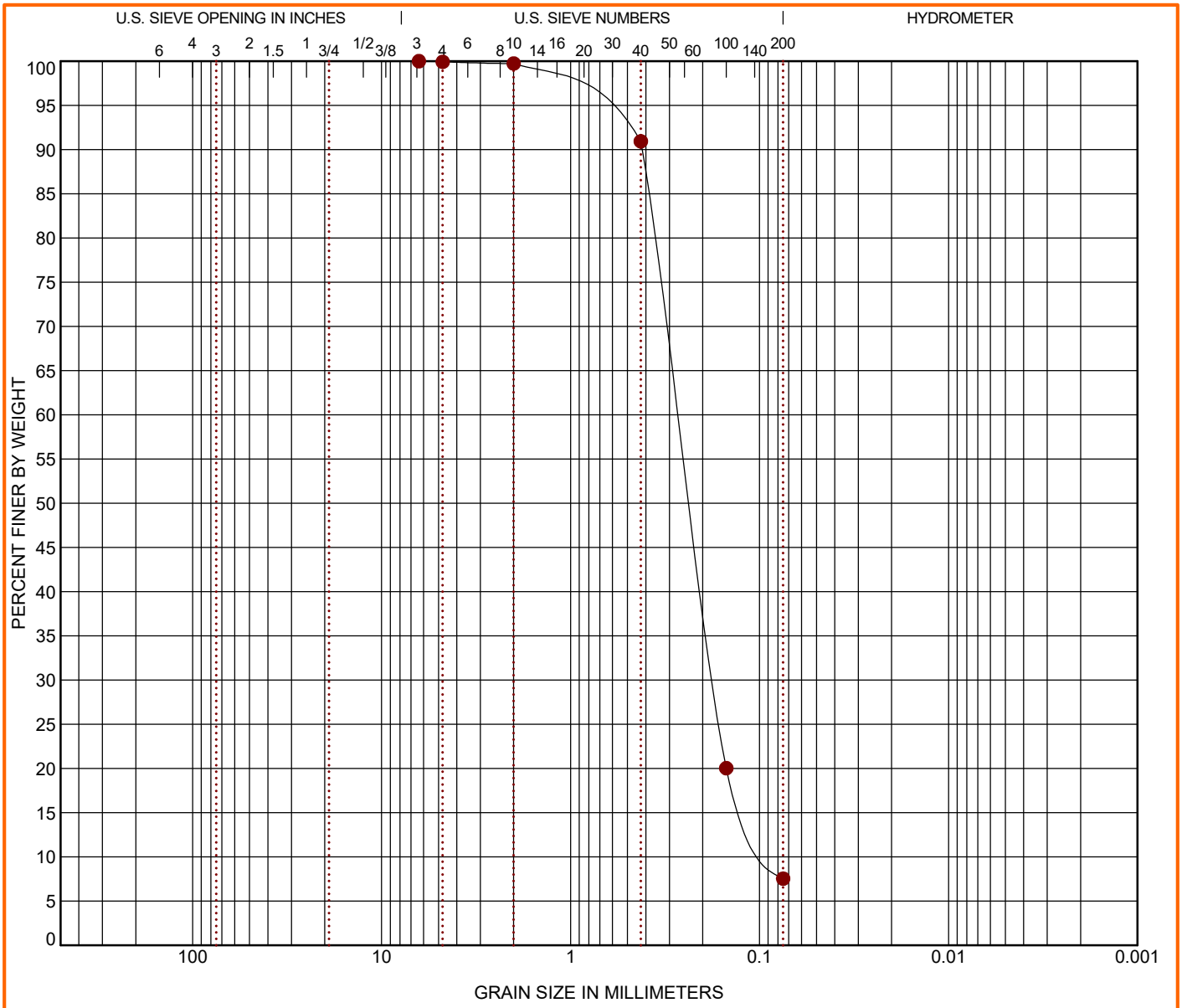
PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 10/4/21

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-6	6 - 6.5	POORLY GRADED SAND with SILT (SP-SM)		NP	NP	NP	1.30	3.14

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-6	6 - 6.5	6.35	0.27	0.174	0.086	0.0	0.1	92.4		7.5	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

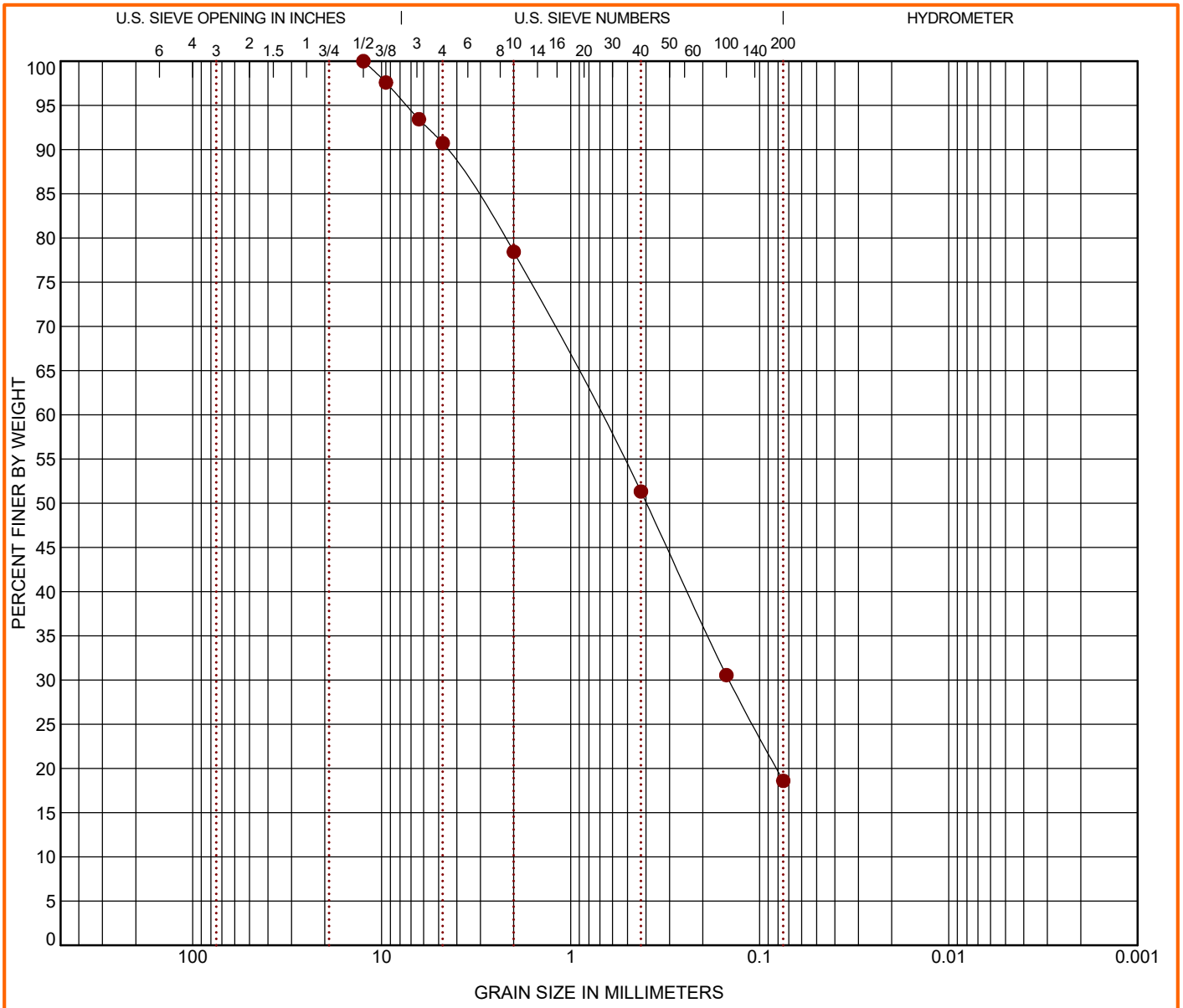
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-9	5 - 5.5	SILTY SAND (SM)		NP	NP	NP		

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-9	5 - 5.5	12.5	0.698	0.145		0.0	9.3	72.1		18.6	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

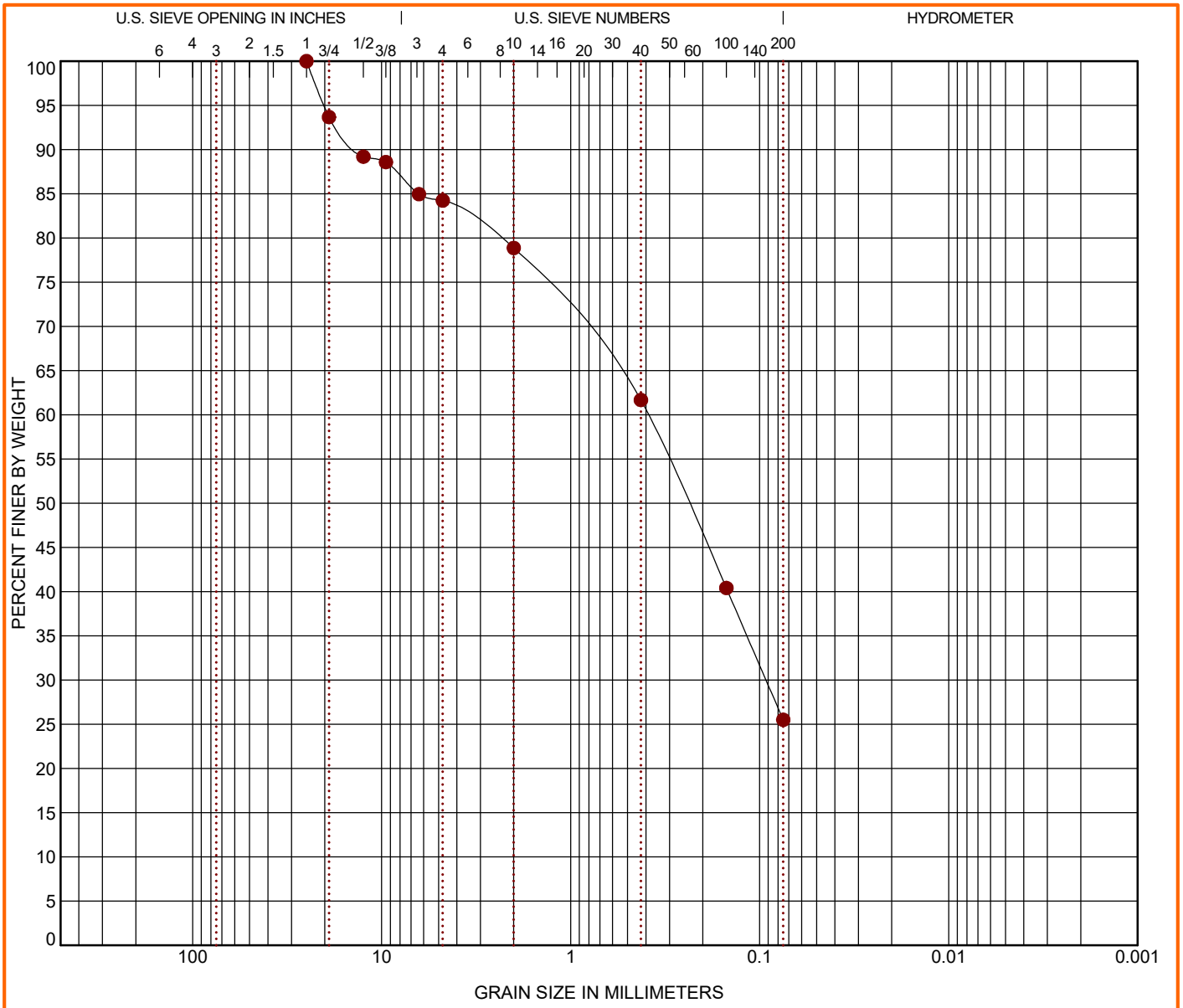
PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 10/4/21

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-10	4 - 4.5	SILTY SAND with GRAVEL (SM)		NP	NP	NP		

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-10	4 - 4.5	25	0.392	0.092		0.0	15.8	58.7		25.5	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

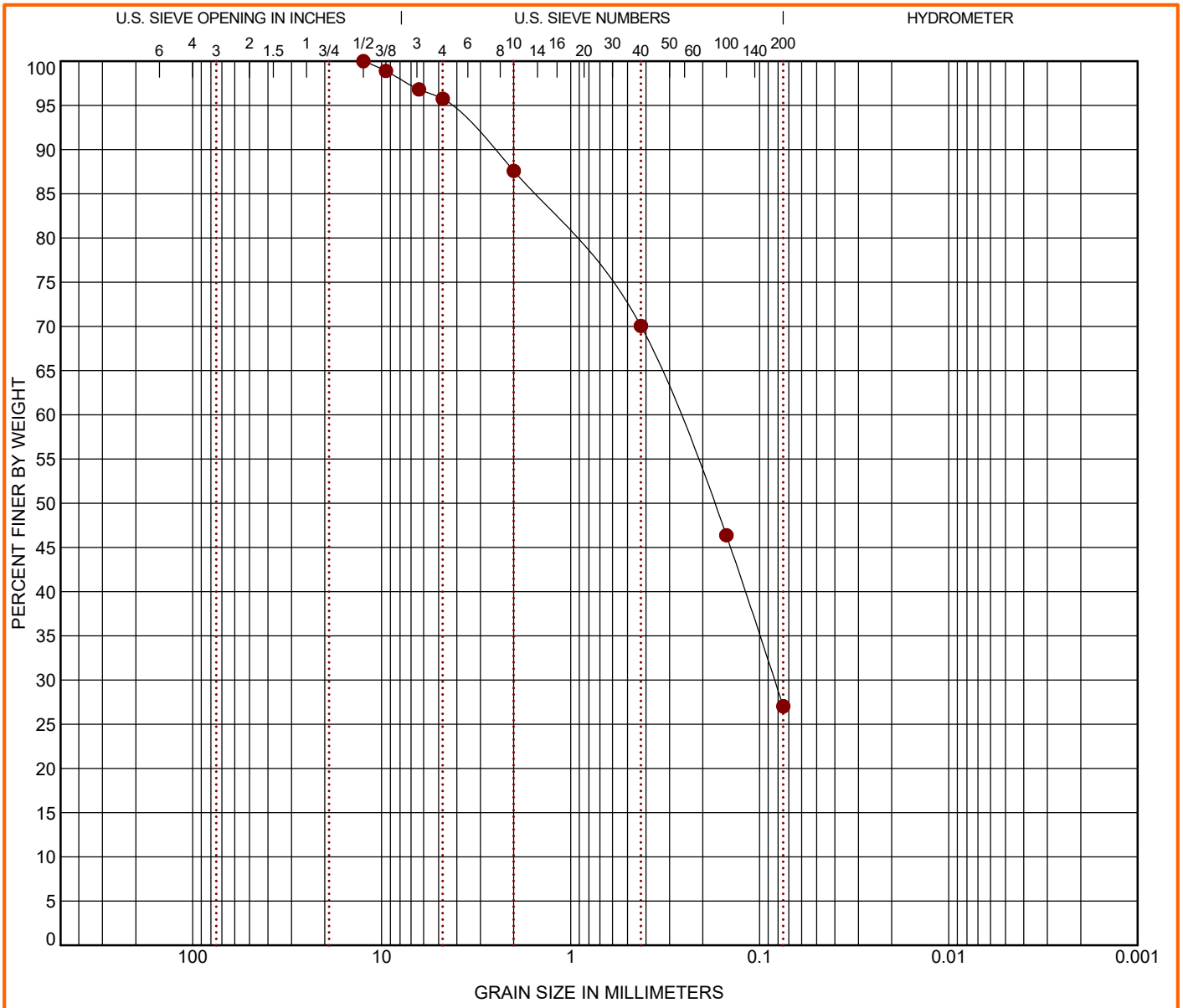
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
TP-21-11	4 - 4.5	SILTY SAND (SM)		NP	NP	NP		

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
TP-21-11	4 - 4.5	12.5	0.273	0.083		0.0	4.3	68.7		27.0	

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

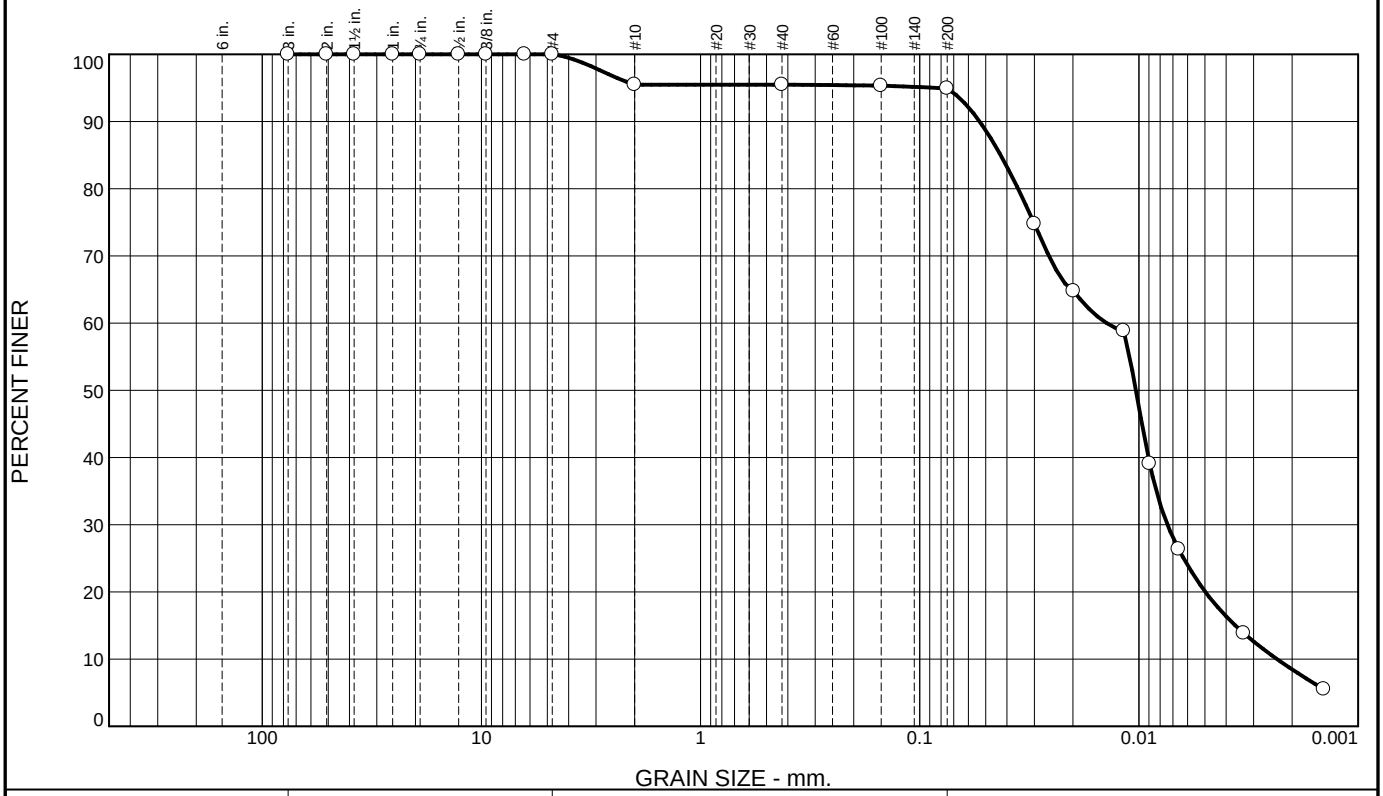
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215020 PORT OF ALBANY MA.GPJ TERRACON_DATATEMPLATE.GDT 10/4/21

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.5	0.0	0.6	74.8	20.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	95.5		
#40	95.5		
#100	95.3		
#200	94.9		

* (no specification provided)

Material Description

SILT

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.0533 D_{85}= 0.0428 D_{60}= 0.0140
D_{50}= 0.0103 D_{30}= 0.0074 D_{15}= 0.0036
D_{10}= 0.0023 C_u= 5.99 C_c= 1.67

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422

Source of Sample: B-21-17 80'-82'

Date: 9-9-21

Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson

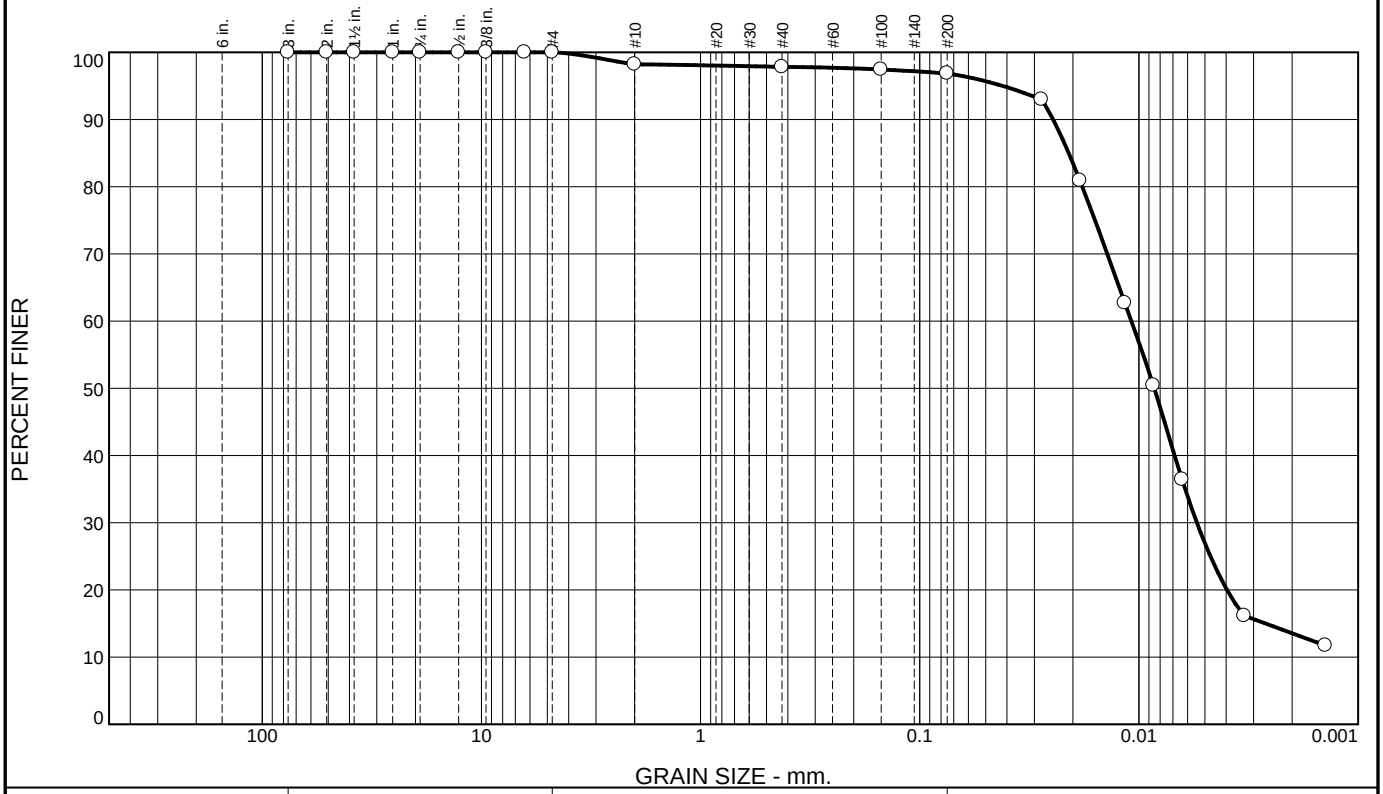
Project: Proposed Marmen Manufacturing Facility
Albany, NY

Project No: JB215020

Figure B-21-17 80'-82'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.8	0.4	1.0	69.9	26.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	98.2		
#40	97.8		
#100	97.4		
#200	96.8		

* (no specification provided)

Material Description

SILT

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.0246 D_{85}= 0.0209 D_{60}= 0.0108
D_{50}= 0.0085 D_{30}= 0.0054 D_{15}= 0.0026
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422

Source of Sample: B-21-18 105'-107' **Date:** 9-9-21

Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
Project No: JB215020 **Figure** B-21-18 105'-107'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.6	18.5	75.8	4.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	99.9		
#40	98.3		
#100	91.1		
#200	79.8		

* (no specification provided)

Material Description

SILT

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1348 D_{85}= 0.0948 D_{60}= 0.0414
D_{50}= 0.0308 D_{30}= 0.0177 D_{15}= 0.0102
D_{10}= 0.0077 C_u= 5.35 C_c= 0.98

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422

Source of Sample: B-21-23 12'-14'

Date: 9-9-21

Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson

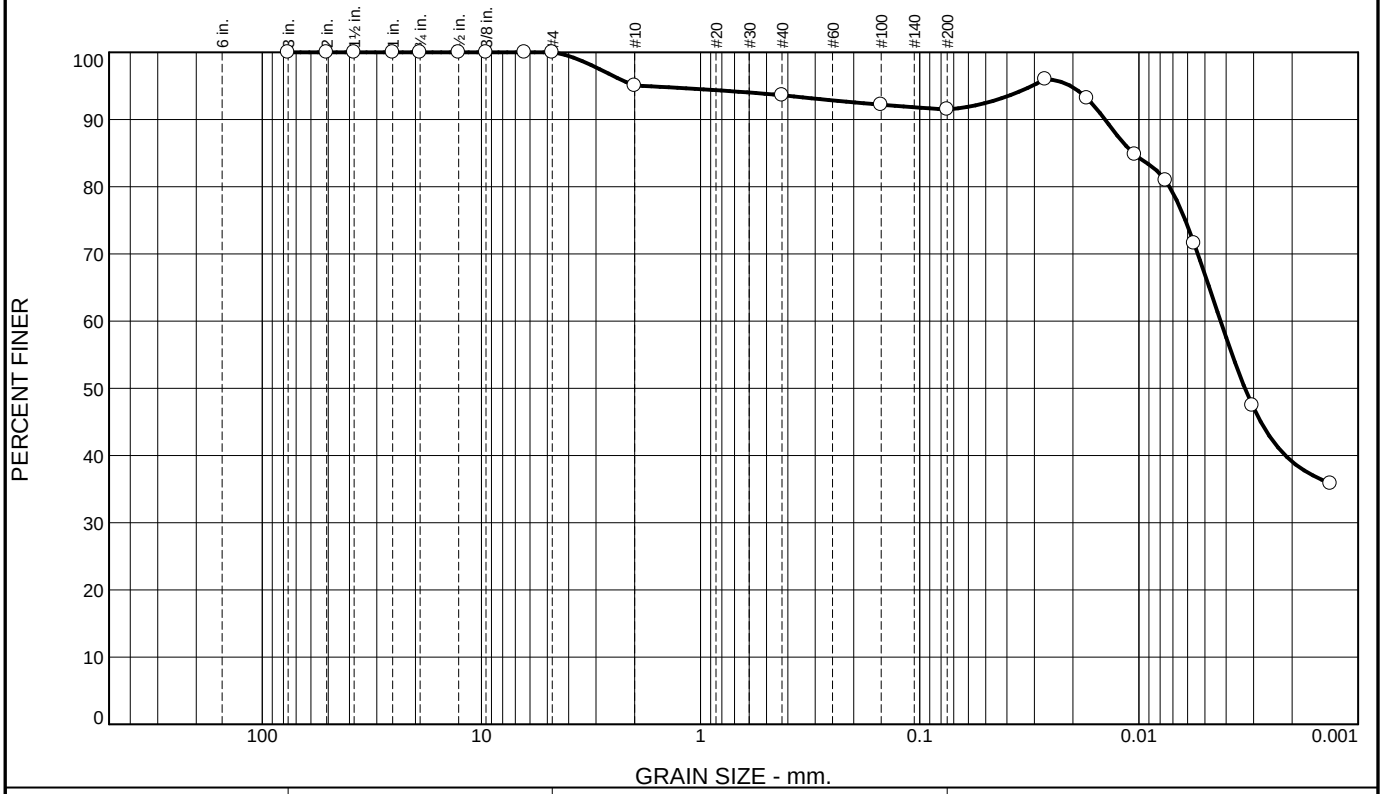
Project: Proposed Marmen Manufacturing Facility
Albany, NY

Project No: JB215020

Figure B-21-23 12'-14'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	5.0	1.4	2.1	24.6	66.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	95.0		
#40	93.6		
#100	92.2		
#200	91.5		

* (no specification provided)

Material Description

Lean Clay

Atterberg Limits

PL= 19 LL= 33 PI= 14

Coefficients

D_{90}= 0.0143 D_{85}= 0.0106 D_{60}= 0.0042
D_{50}= 0.0033 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Per ASTM D422

Source of Sample: TP-21-3 6'-6.5'

Date: 9-29-21

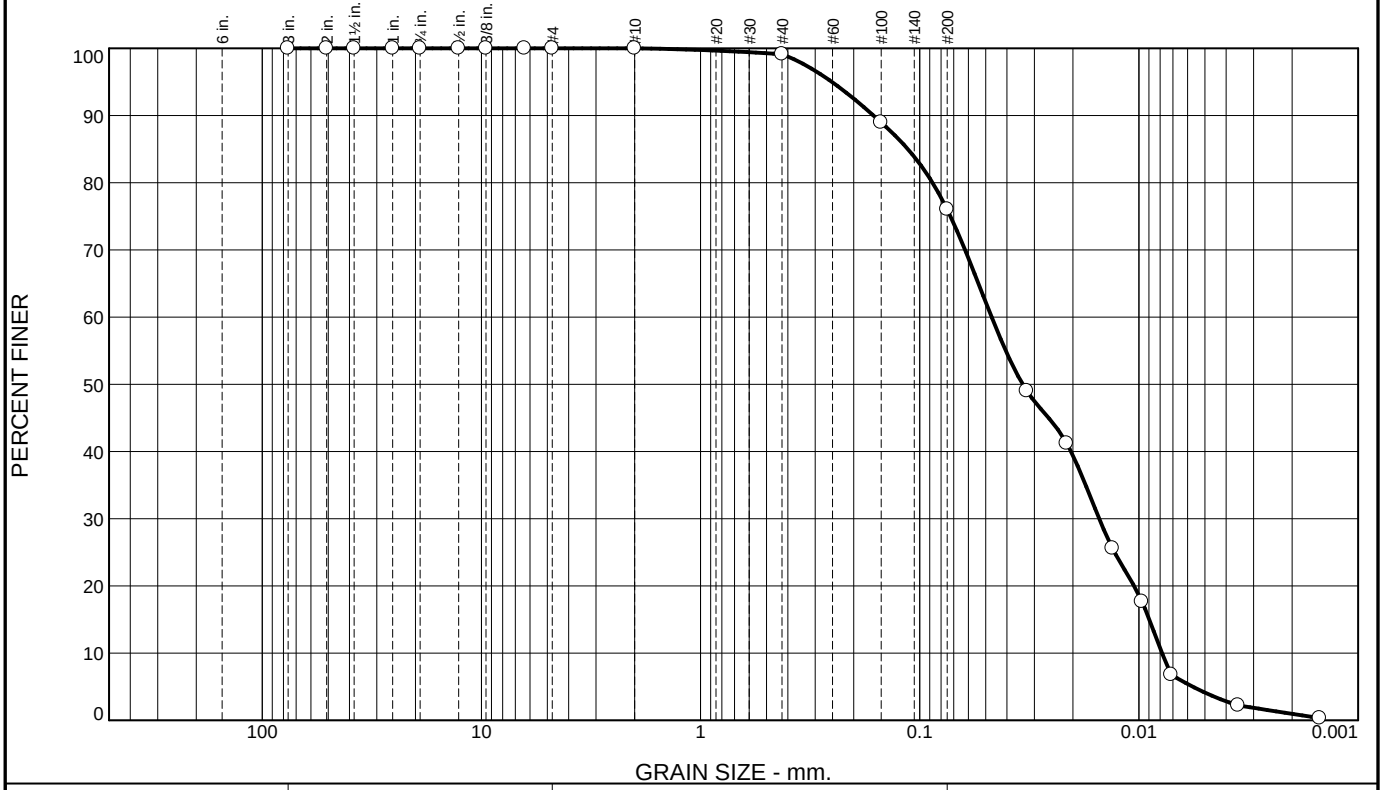
Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
Project No: JB215020 **Figure** TP-21-3 6'-6.5'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	23.1	71.9	4.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	100.0		
#40	99.1		
#100	89.0		
#200	76.0		

* (no specification provided)

Material Description

Silt with sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1626 D_{85}= 0.1134 D_{60}= 0.0470
D_{50}= 0.0339 D_{30}= 0.0152 D_{15}= 0.0090
D_{10}= 0.0078 C_u= 5.99 C_c= 0.63

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422

Source of Sample: TP-21-4 4'-4.5'

Date: 9-29-21

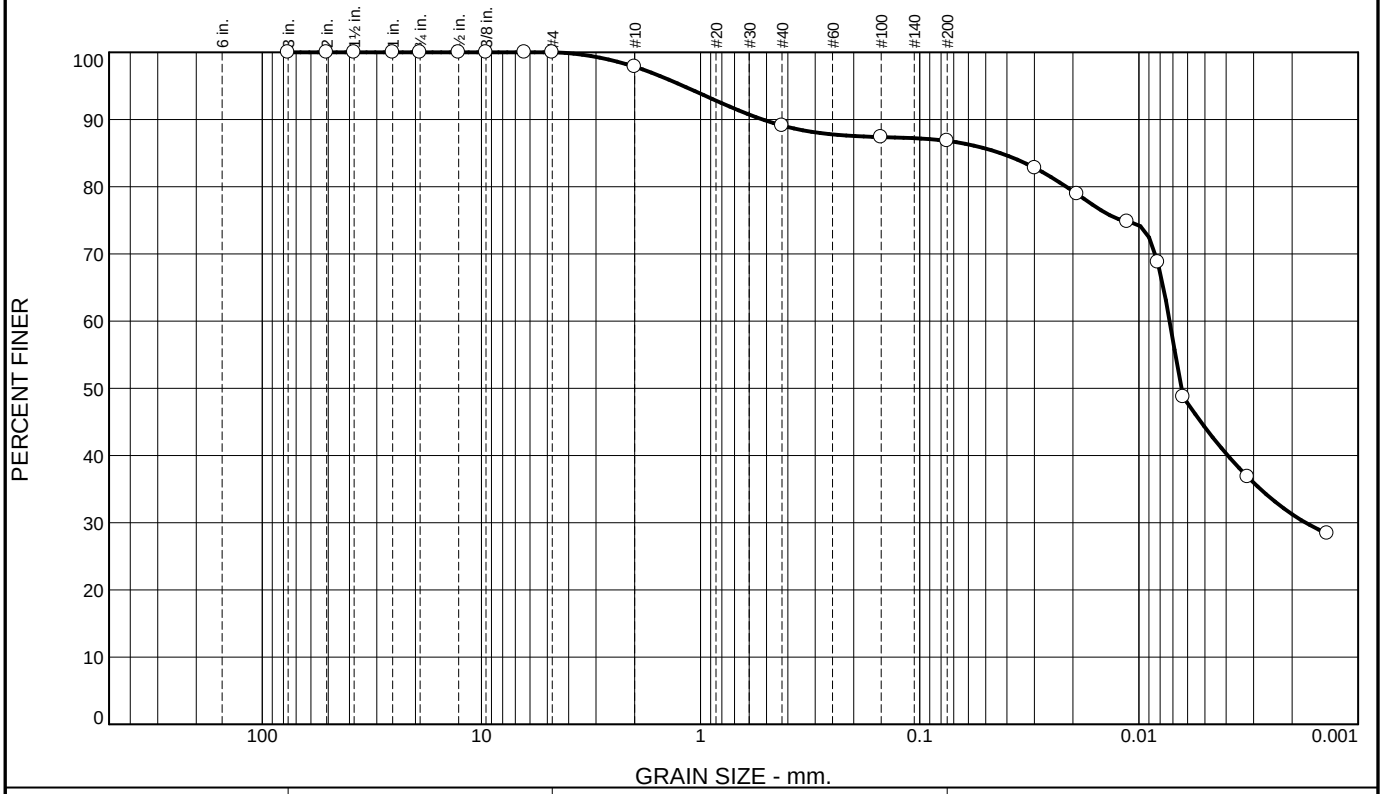
Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
Project No: JB215020 **Figure** TP-21-4 4'-4.5'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.1	8.8	2.3	42.6	44.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	97.9		
#40	89.1		
#100	87.4		
#200	86.8		

* (no specification provided)

Material Description

Lean Clay

Atterberg Limits

PL= 21 LL= 33 PI= 12

Coefficients

D_{90}= 0.5219 D_{85}= 0.0429 D_{60}= 0.0072
D_{50}= 0.0064 D_{30}= 0.0017 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Per ASTM D422

Source of Sample: TP-21-7 3'-3.5'

Date: 9-29-21

Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson

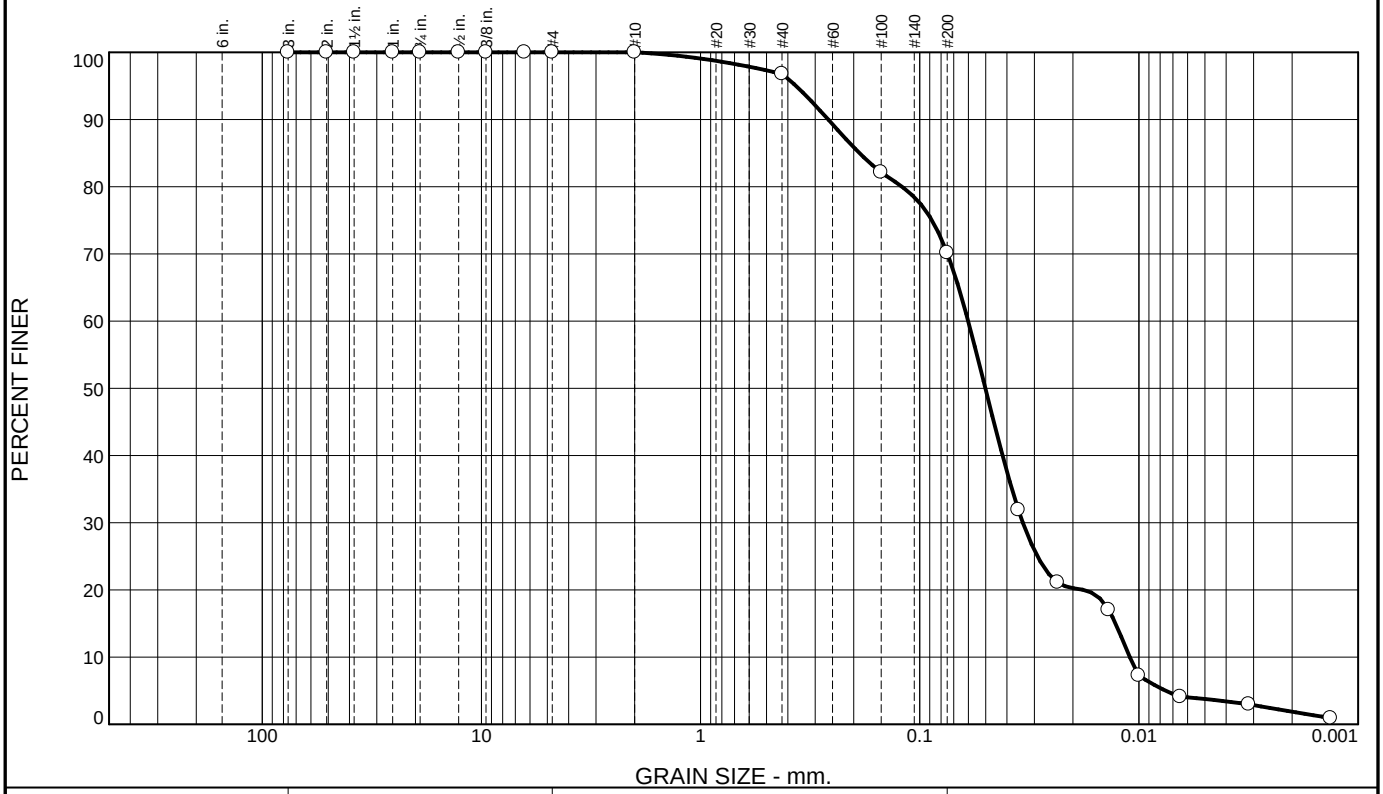
Project: Proposed Marmen Manufacturing Facility
Albany, NY

Project No: JB215020

Figure TP-21-7 3'-3.5'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.2	26.6	66.4	3.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	100.0		
#40	96.8		
#100	82.2		
#200	70.2		

* (no specification provided)

Material Description

Silt with sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.2617 D_{85}= 0.1883 D_{60}= 0.0601
D_{50}= 0.0502 D_{30}= 0.0338 D_{15}= 0.0128
D_{10}= 0.0110 C_u= 5.46 C_c= 1.73

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422

Source of Sample: TP-21-8 3'-3.5'

Date: 9-29-21

Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson

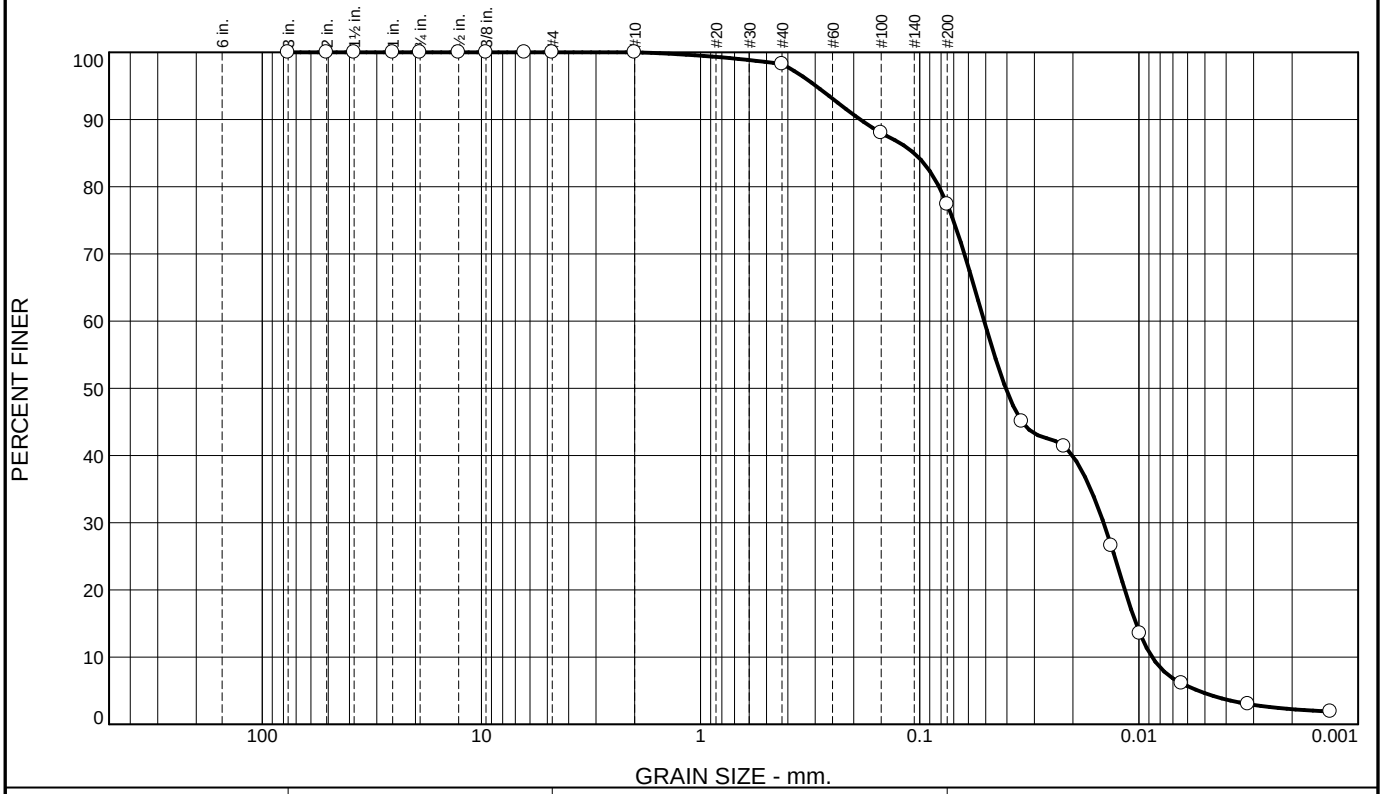
Project: Proposed Marmen Manufacturing Facility
Albany, NY

Project No: JB215020

Figure TP-21-8 3'-3.5'

Tested By: AB **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.7	20.9	72.8	4.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
2"	100.0		
1.5"	100.0		
1"	100.0		
0.75"	100.0		
0.5"	100.0		
0.375"	100.0		
0.25"	100.0		
#4	100.0		
#10	100.0		
#40	98.3		
#100	88.0		
#200	77.4		

* (no specification provided)

Material Description

Silt with sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1870 D_{85}= 0.1062 D_{60}= 0.0508
D_{50}= 0.0405 D_{30}= 0.0145 D_{15}= 0.0103
D_{10}= 0.0087 C_u= 5.83 C_c= 0.47

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422

Source of Sample: TP-21-12 5'-5.5'

Date: 9-29-21

Terracon Consultants-NY, Inc.

Albany, NY

Client: McFarland Johnson

Project: Proposed Marmen Manufacturing Facility
Albany, NY

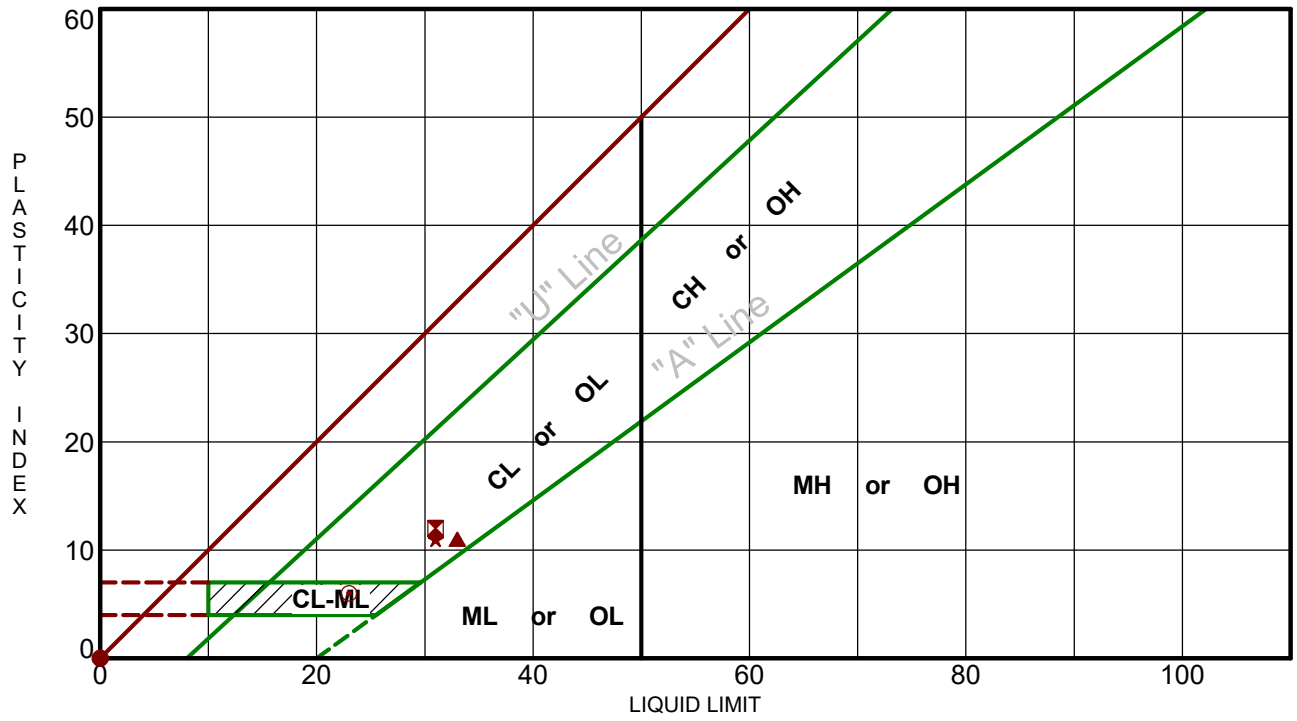
Project No: JB215020

Figure TP-21-12 5'-5.5'

Tested By: AB **Checked By:** JH

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	B-21-7	60 - 62	NP	NP	NP			
⊠	B-21-17	40 - 42	31	19	12		CL	Lean Clay
▲	B-21-18	35 - 37	33	22	11		CL	Lean Clay
★	B-21-20	40 - 42	31	20	11		CL	Lean Clay
⊙	B-21-23	110 - 112	23	17	6		CL-ML	Silty clay

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

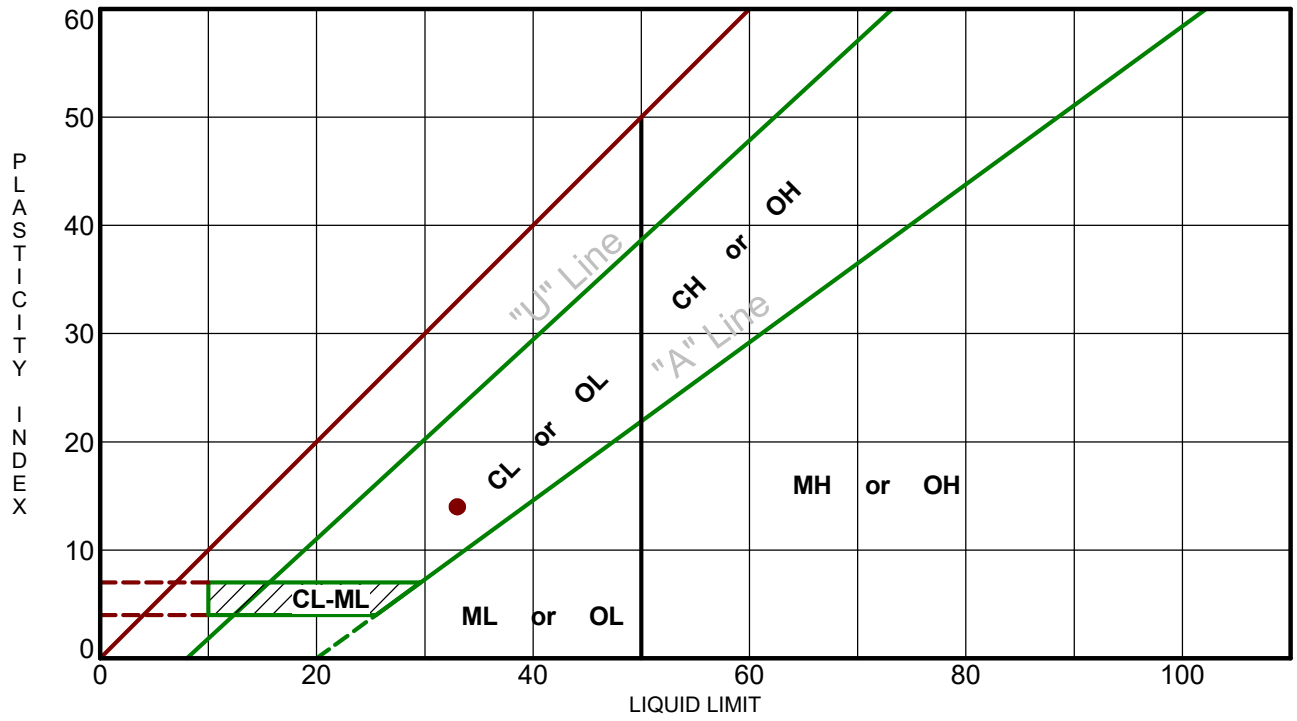
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● TP-21-3	6 - 6.5	33	19	14		CL	Lean Clay

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

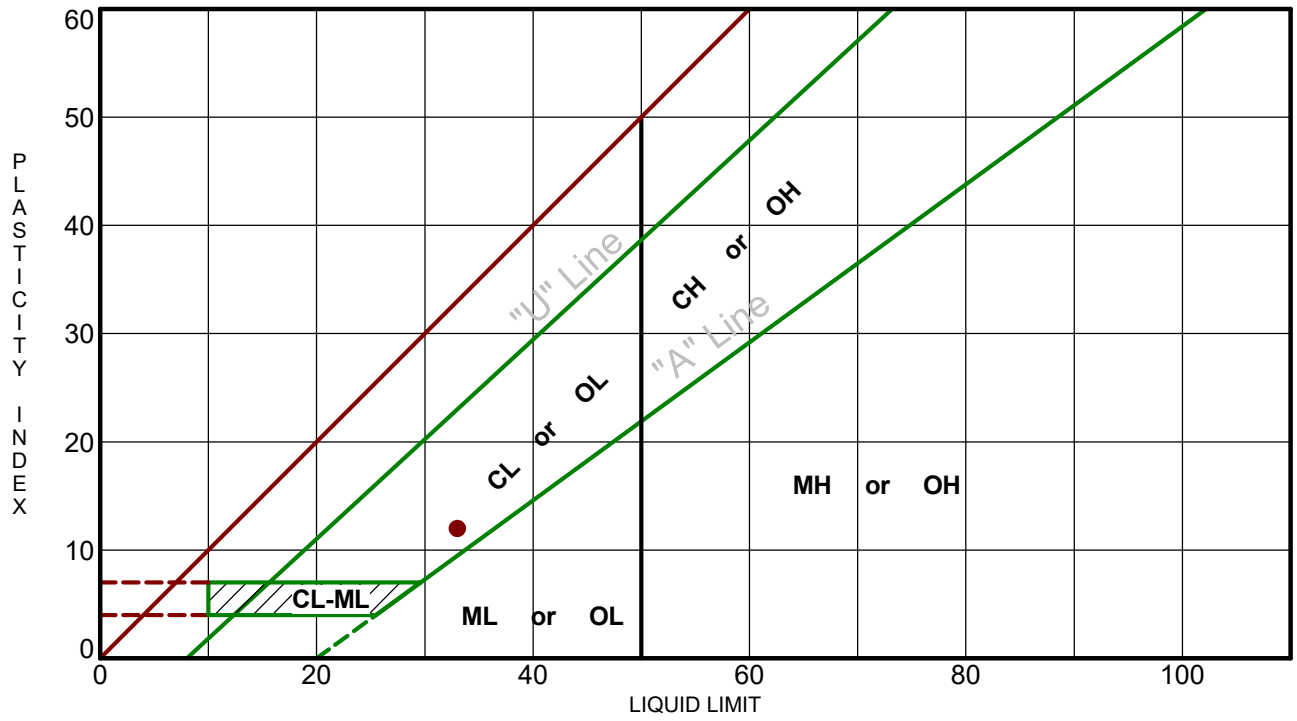
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● TP-21-7	3 - 3.5	33	21	12		CL	Lean Clay

PROJECT: Proposed Marmen Manufacturing Facility

SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)	Organic Content (%)
B-21-7	6-8	99.4	
B-21-7	60-62	26.4	
B-21-8	0-2	22.8	
B-21-8	6-8		13.5
B-21-8	10-12	53.4	
B-21-8	25-27	26.8	
B-21-10	4-6	31.7	
B-21-10	10-12	46.7	8.2
B-21-10	16-18	34.9	
B-21-17	10-12	34.6	
B-21-17	14-16	48.3	
B-21-17	25-27	20.3	
B-21-17	40-42	30.5	
B-21-17	80-82	17.5	
B-21-18	10-12	44.8	
B-21-18	12-14	59.1	11.2
B-21-18	35-37	35.5	
B-21-18	55-57	89.9	
B-21-18	105-107	20.1	
B-21-20	6-8	106.4	
B-21-20	12-13.4	39.5	
B-21-20	16-18	44.7	3.7
B-21-20	40-42	33.2	
B-21-20	80-82	31.1	
B-21-23	12-14	89.2	
B-21-23	30-32	22.1	
B-21-23	45-47	30.0	
B-21-23	110-112	20.6	
S-1	1-1.1	41.1	
S-2	1-3	54.9	
S-3	1-3	67.7	
TP-21-3	6-6.5	19.6	
TP-21-4	4-4.5	67.3	
TP-21-7	3-3.5	18.9	
TP-21-8	3-3.5	63.9	
TP-21-12	5-5.5	70.8	

PROJECT: Proposed Marmen Manufacturing Facility

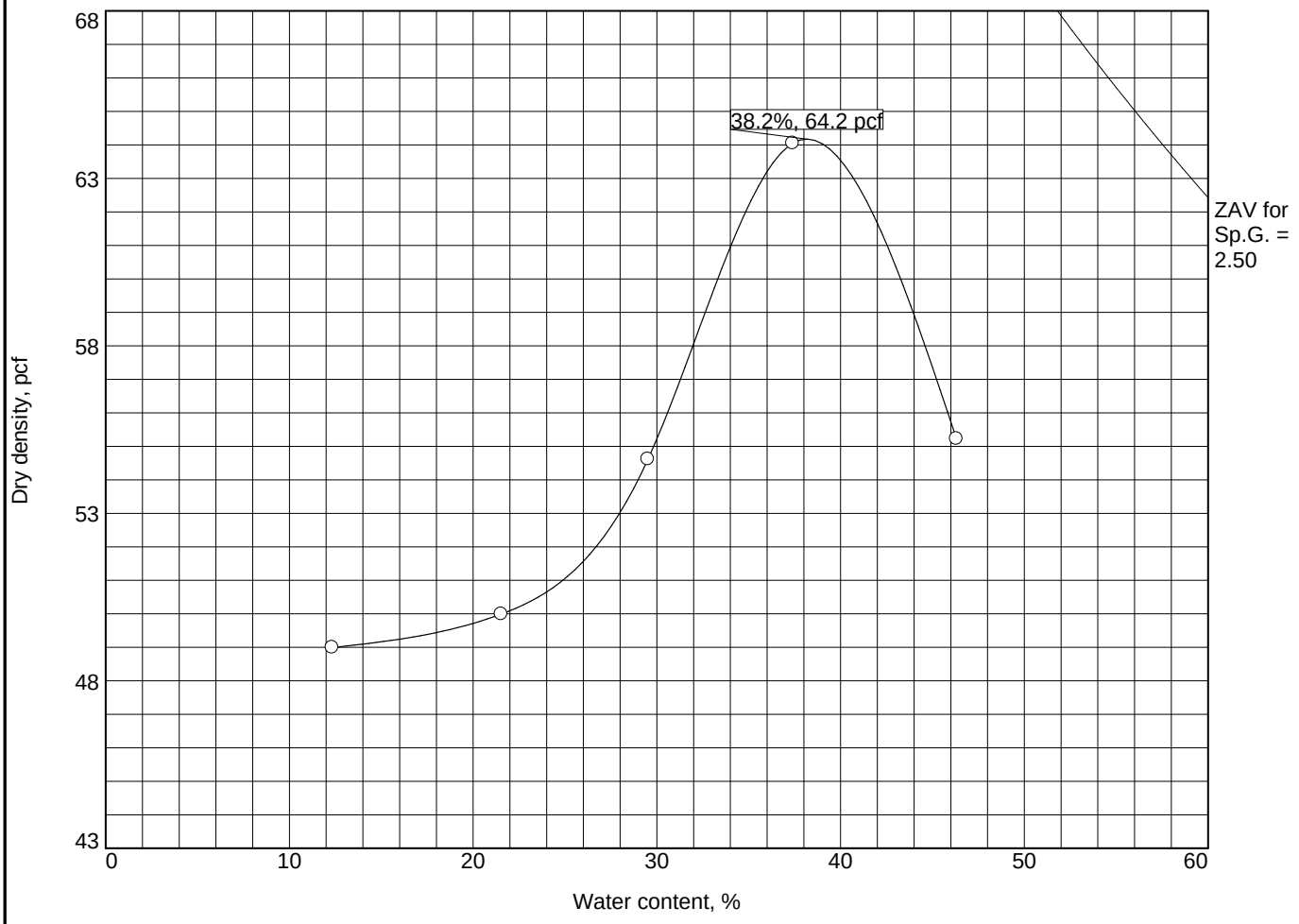
SITE: River Road
Glenmont, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215020

CLIENT: McFarland Johnson
Saratoga Springs, NY

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
1'-3'	ML			2.5				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 64.2 pcf Optimum moisture = 38.2 %	SILT with SAND (Coal ash)

Project No. JB215020 **Client:** McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
○**Source of Sample:** S-2 1'-3'

Terracon Consultants-NY, Inc.

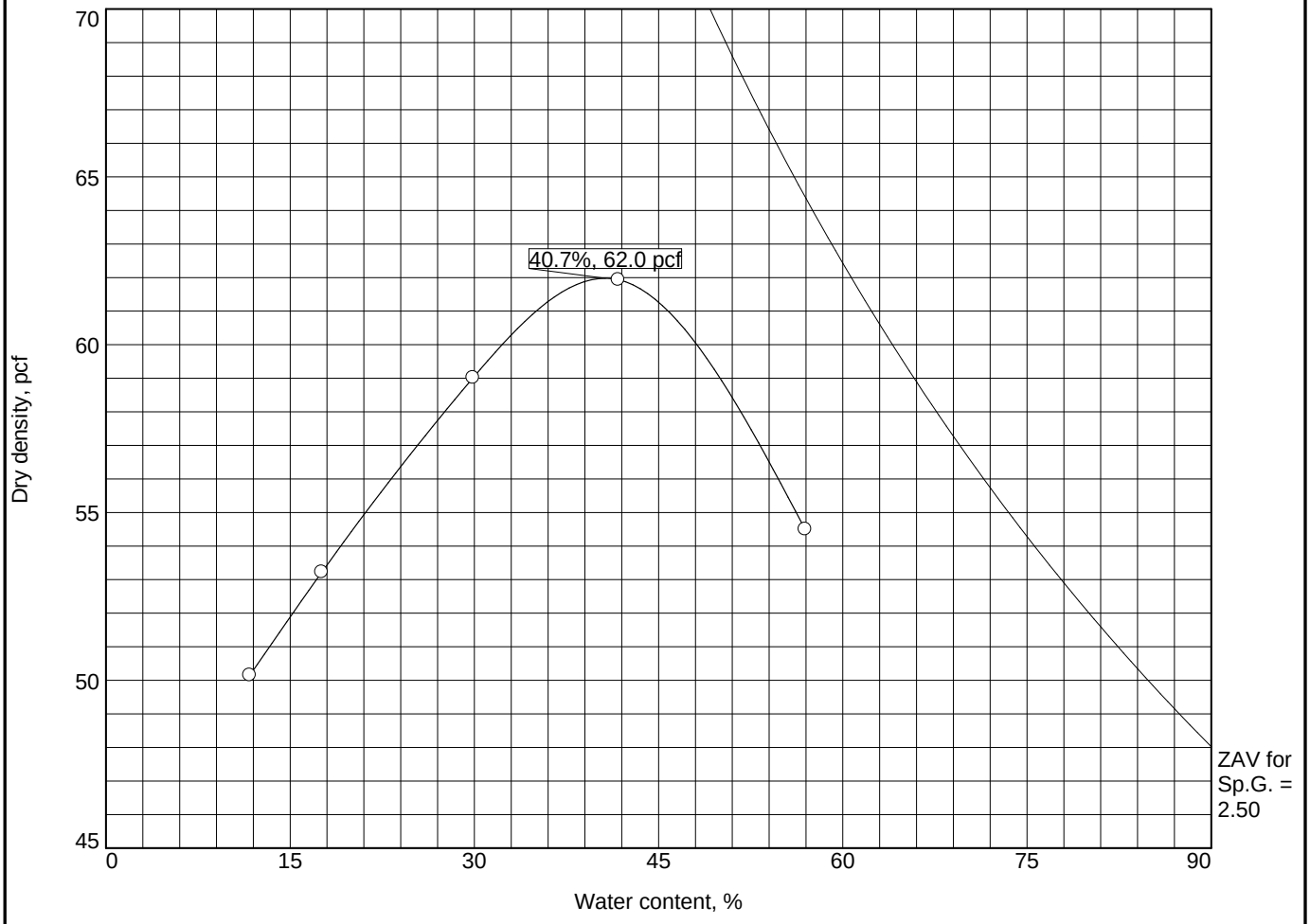
Albany, NY

Remarks:
Per ASTM D1557

Figure S-2 1'-3'

Tested By: AB **Checked By:** JH

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	ML	A-4(0)		2.5	NP	NP	0.0	76.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 62.0 pcf Optimum moisture = 40.7 %	Silt with sand (Coal ash)

Project No. JB215020 **Client:** McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
○**Source of Sample:** TP-21-4 4'-4.5'

Terracon Consultants-NY, Inc.

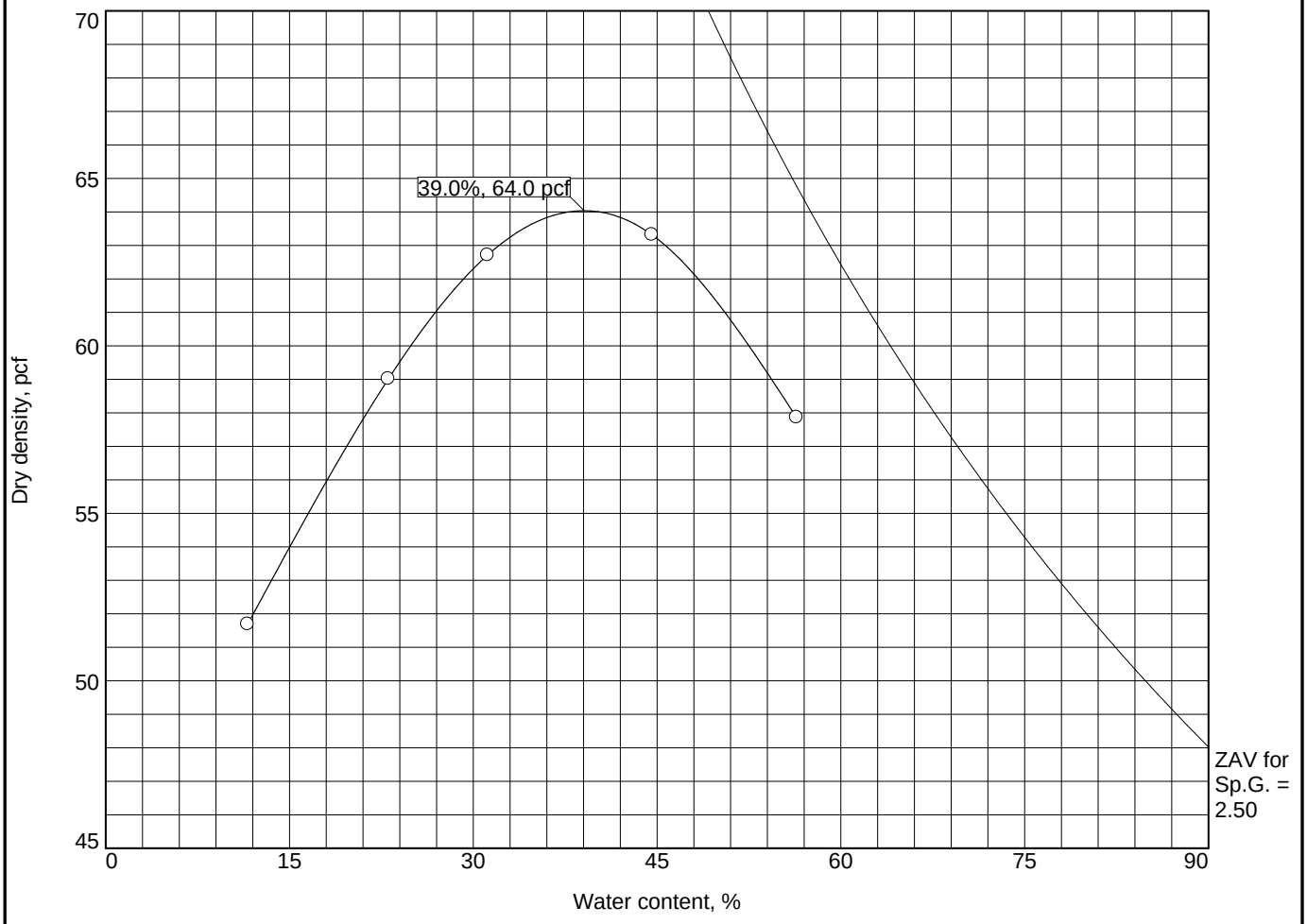
Albany, NY

Remarks:
Per ASTM D1557

Figure TP-21-4 4'-4.5'

Tested By: AB **Checked By:** JH

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	ML	A-4(0)		2.5	NP	NP	0.0	70.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 64.0 pcf Optimum moisture = 39.0 %	Silt with sand (Coal ash)

Project No. JB215020 **Client:** McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
○**Source of Sample:** TP-21-8 3'-3.5'

Terracon Consultants-NY, Inc.

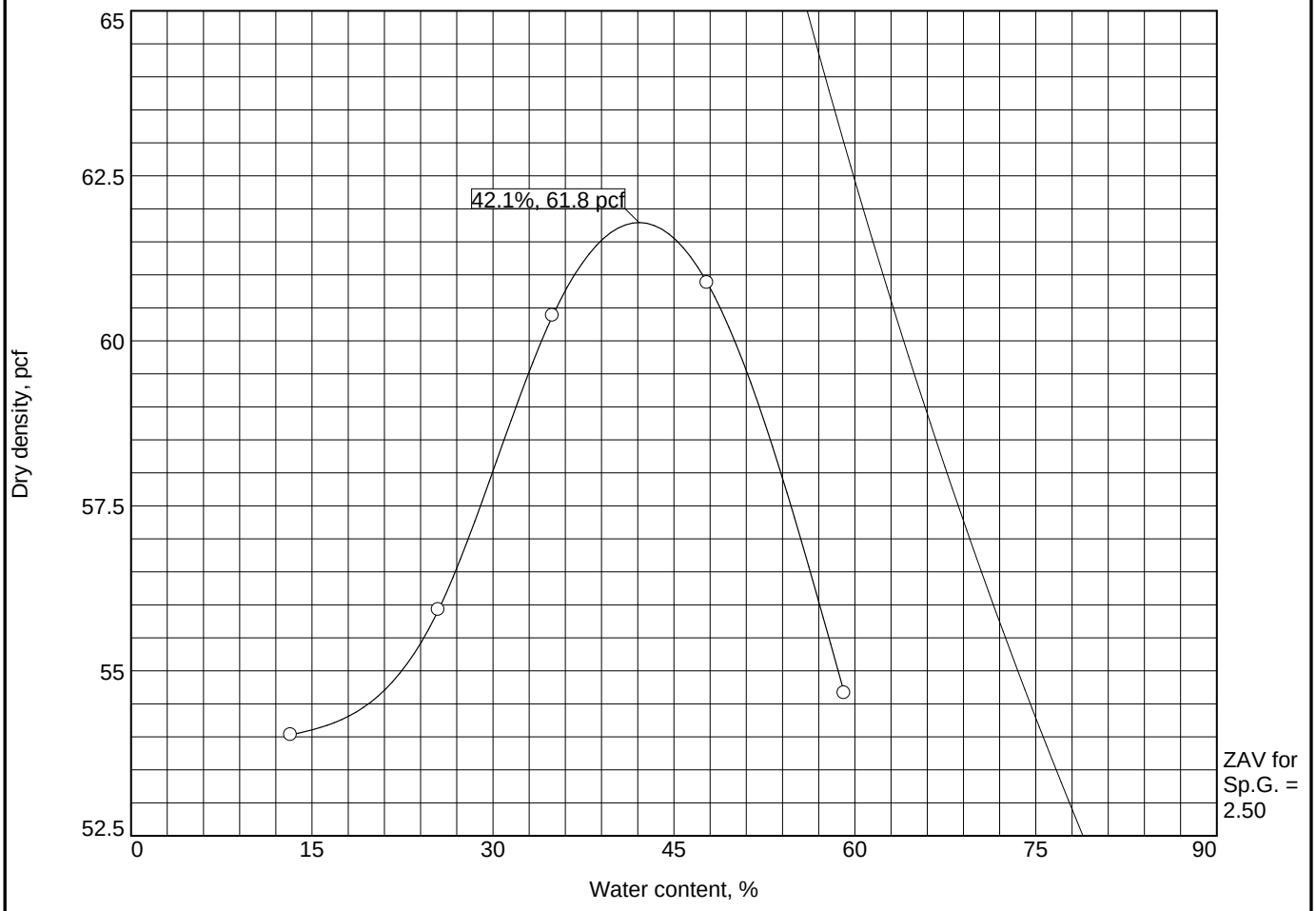
Albany, NY

Remarks:
Per ASTM D1557

Figure TP-21-8 3'-3.5'

Tested By: AB **Checked By:** JH

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	ML	A-4(0)		2.5	NP	NP	0.0	77.4

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 61.8 pcf Optimum moisture = 42.1 %	Silt with sand (Coal ash)

Project No. JB215020 **Client:** McFarland Johnson
Project: Proposed Marmen Manufacturing Facility
Albany, NY
○**Source of Sample:** TP-21-12 5'-5.5'

Terracon Consultants-NY, Inc.

Albany, NY

Remarks:
Per ASTM D1557

Figure TP-21-12 5'-5.5'

Tested By: AB **Checked By:** JH

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS
Proposed Marmen Manufacturing Facility ■ Glenmont, NY
Terracon Project No. JB215020

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Rock Core Grab Sample Shelby Tube Split Spoon	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

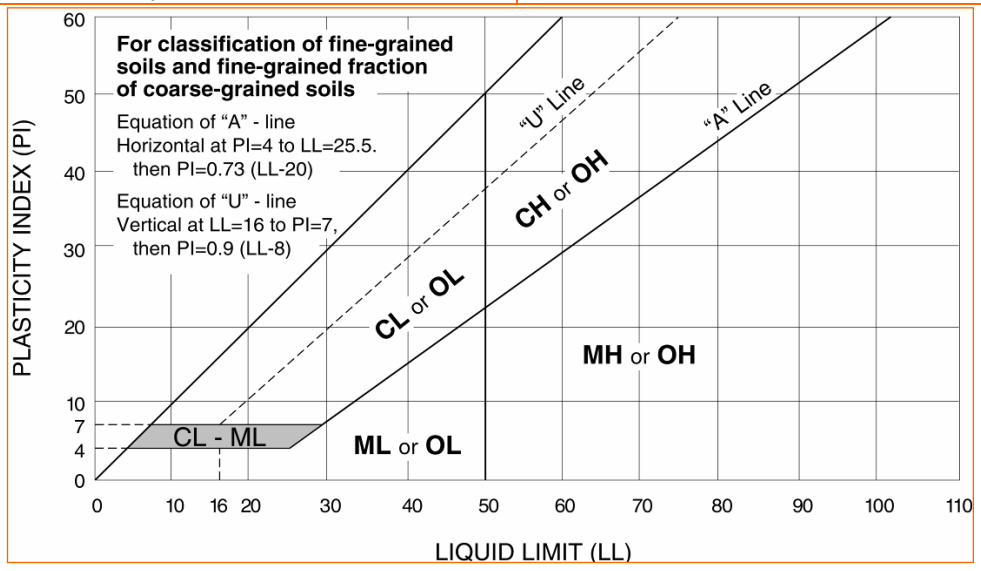
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



DESCRIPTION OF ROCK PROPERTIES

WEATHERING	
Term	**Description**
Unweathered	No visible sign of rock material weathering, perhaps slight discoloration on major discontinuity surfaces.
Slightly weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than in its fresh condition.
Moderately weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as corestones.
Highly weathered	More than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soil has not been significantly transported.

STRENGTH OR HARDNESS		
Description	**Field Identification**	**Uniaxial Compressive Strength, psi (MPa)**
Extremely weak	Indented by thumbnail	40-150 (0.3-1)
Very weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife	150-700 (1-5)
Weak rock	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer	700-4,000 (5-30)
Medium strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer	4,000-7,000 (30-50)
Strong rock	Specimen requires more than one blow of geological hammer to fracture it	7,000-15,000 (50-100)
Very strong	Specimen requires many blows of geological hammer to fracture it	15,000-36,000 (100-250)
Extremely strong	Specimen can only be chipped with geological hammer	>36,000 (>250)

DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		**Bedding Spacing (May Include Foliation or Banding)**	
Description	**Spacing**	**Description**	**Spacing**
Extremely close	< ¾ in (<19 mm)	**Laminated**	< ½ in (<12 mm)
Very close	¾ in – 2-1/2 in (19 - 60 mm)	**Very thin**	½ in – 2 in (12 – 50 mm)
Close	2-1/2 in – 8 in (60 – 200 mm)	**Thin**	2 in – 1 ft. (50 – 300 mm)
Moderate	8 in – 2 ft. (200 – 600 mm)	**Medium**	1 ft. – 3 ft. (300 – 900 mm)
Wide	2 ft. – 6 ft. (600 mm – 2.0 m)	**Thick**	3 ft. – 10 ft. (900 mm – 3 m)
Very Wide	6 ft. – 20 ft. (2.0 – 6 m)	**Massive**	> 10 ft. (3 m)

Discontinuity Orientation (Angle): Measure the angle of discontinuity relative to a plane perpendicular to the longitudinal axis of the core. (For most cases, the core axis is vertical; therefore, the plane perpendicular to the core axis is horizontal.) For example, a horizontal bedding plane would have a 0-degree angle.

ROCK QUALITY DESIGNATION (RQD) [1]	
Description	**RQD Value (%)**
Very Poor	0 - 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 - 100

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.

Reference: U.S. Department of Transportation, Federal Highway Administration, Publication No FHWA-NHI-10-034, December 2009
Technical Manual for Design and Construction of Road Tunnels – Civil Elements