Geotechnical Engineering Report

Colgate Divinity School Campus
Rochester, New York
May 17, 2019
Terracon Project No. J5195064

Prepared for:
ROC Goodman, LLC
Rochester, NY

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

May 17, 2019

ROC Goodman, LLC
550 Latona Road, Building E, Suite 501
Rochester, NY 14626

Attn: Mr. Angelo Ingrassia
P: (585) 225 0140
E: angelofactory@yahoo.com

Re: Geotechnical Engineering Report
Colgate Divinity School Campus
1100 S. Goodman Street
Rochester, New York
Terracon Project No. J5195064

Dear Mr. Ingrassia:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PJ5195064 dated May 2, 2019. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

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

Sincerely,
Terracon Consultants-NY, Inc.

STATE OF NEW YORK MICHELE A. FIORILLO 085888 LICENSED PROFESSIONAL ENGINEER
5/17/19

Lawrence J. Dwyer
Principal

Michele A. Fiorillo, PE
Geotechnical Department Manager

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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1100 S. Goodman Street
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INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed buildings at the existing Colgate Divinity School Campus located at 1100 S. Goodman Street in Rochester, 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
- Demolition considerations
- Excavation considerations
- Dewatering considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic Site Classification per IBC
- Lateral earth pressures
- Pavement design and construction
- Frost considerations

The geotechnical engineering scope of services for this project included the advancement of twenty-two test borings to depths ranging from approximately 6 to 40 feet below existing site grades. Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the field exploration are included on the boring logs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at 1100 S. Goodman Street in Rochester, New York.
Existing Improvements	Existing Colgate Divinity School Campus (i.e. buildings, parking lot, lawn, and wooded areas)
Current Ground Cover	Lawn areas, wooded areas, and asphalt paved parking lot and access road/driveways

Item	Description
Existing Topography	Undulating topography sloped along hillside and flattened in developed portions.
Geology[1]	The project site, which is situated within the eastern portion of Monroe County, is located within the Ontario Lowlands physiographic province. The soil deposits within this province generally consist of both glacially-derived deposits, such as glacial till (i.e. terminal and ground moraines), granular deposits (i.e. kame, glacial outwash, and beach ridges) and glacio-lacustrine deposits (i.e. varved silt, clay, and fine sand deposits). The Surficial Geologic Map of New York State Geological Survey, Finger Lakes Sheet map the surficial native soil deposits at the project site as glacial kame moraine deposits of silt and sand. The underlying bedrock is mapped as dolostone of the Lockport Group (Upper Silurian).

1. Surficial and Bedrock Geologic Map of New York. Consists of 5 sheets, 1:250,000: Finger Lakes; Hudson-Mohawk; Niagara; Lower Hudson; and Adirondack.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Site Plan with test boring locations and ground surface elevations, as well as finished floor elevations were provided by Costich Engineering. Structural load information was provided by Mr. Matthew Abate, Structural Engineer with Popli Group (Popli).
Project Description	Expansion of the Colgate Divinity School Campus with two new buildings and parking areas. A stormwater management area is also proposed within the southwestern portion of the site.

Item	Description
Proposed Structure	The project includes two new buildings: ■ The first building (herein designated as Building 100) is located within the northern portion of the site and consists of a 5-story apartment building with a footprint of about 23,800 square feet. This building will have 18 units per floor for a total of 90 units. ■ The second building (herein designated as Building 200) is located within the eastern portion of the site and consists of a 5-story apartment building with a footprint of approximately 10,000 square feet. This building will have 8 units per floor for a total of 40 units. ■ Both buildings include below grade parking areas for the entire building footprints.
Building Construction	Wood frame Concrete slabs Concrete spread footing foundations
Finished Floor Elevation	**Building 100:** First Floor (FF) at El. 609 feet +/-; Garage floor at El. 595+/- **Building 200:** First Floor (FF) at El. 613.5 feet +/-; Garage floor at El. 601.5+/-
Maximum Loads (Provided by Popli)	■ Columns: 300 kips ■ Walls: 7 kips per linear foot (klf) ■ Slabs: 100 pounds per square foot (psf)
Grading/Slopes	Based upon the plan provided by Costich, we anticipate the following: ■ **Building 100:** Up to 20 feet of earthwork cut may be required within the footprint of the proposed building to attain garage floor level El. 595 feet ■ **Building 200:** Up to 1 foot of earthwork fill and up to 13 feet of earthwork cut may be required within the footprint of the proposed building to attain garage floor level El. 601.5 feet ■ Final slope angles are expected to be 3H:1V (Horizontal: Vertical) or shallower.
Below-Grade Structures	Below grade parking is proposed for the new buildings.
Free-Standing Retaining Walls	Retaining walls are expected to be constructed as part of site development to achieve final grades. Construction design may consist of a combination of MSE block and masonry block walls.

Item	Description
Pavements	Paved driveway and parking will be constructed as part of the project. We assume both rigid (concrete) and flexible (asphalt) pavement sections should be considered. Anticipated traffic is as follows: ■ Autos/light trucks: 1,000 vehicles per day ■ Light delivery and trash collection vehicles: 10 vehicles per week ■ Tractor-trailer trucks: <1 vehicle per week The pavement design period is 20 years.

GEOTECHNICAL CHARACTERIZATION

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

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Surface**	Topsoil/Asphalt with Aggregate Base Course
2	**Native Soil**	Silty Sand; Poorly Graded Sand with Silt (SM, SP); trace to with gravel brown to light brown

Groundwater Conditions

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not observed in the borings while drilling, or for the short duration the borings could remain open. Borings B-7, B-8, B-11, and B-12 were left open for about 3 to 4 hours and groundwater was not observed.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

The subsurface conditions encountered in the test borings were generally consistent with the mapped surficial geology, which map the soils as glacial kame moraine deposits of sand with silt. In general, the site is suitable for the proposed construction based upon geotechnical conditions encountered during the exploration program.

At the time of our subsurface investigation, the site was occupied by the existing school buildings and associated pavement and lawn areas. The proposed new structures will be constructed mostly over existing vegetated or asphalt paved areas. As discussed in **Project Description**, up to 20 feet of earthwork cut may be required within the footprint of Building 100 to attain garage floor level El. 595 feet, and up to 1 foot of earthwork fill and up to 13 feet of earthwork cut may be required within the footprint of Building 200 to attain garage floor level El. 601.5 feet. Therefore, we anticipate the bearing grades at the foundation levels for both building should consist of medium dense (occasionally loose) native soils.

Because of the loose to medium-dense relative density of the in-situ soils, we recommend upon excavating to proposed subgrade elevations, exposed subgrades (beneath new pavement and floor slabs) and foundation bearing grades be proofrolled with proper compaction equipment. The compactive effort will help to improve the relative density of the bearing grades, and therefore, will help to better distribute the foundation loads. After suitable proofrolling, the proposed buildings may be supported on shallow foundations bearing upon a minimum of 9-inch thick layer of compacted imported Structural Fill placed upon stable proofrolled native soil.

The borings generally did not encounter in-place fill. However, since the project site has been developed over the years, it is possible in-place fill may be encountered in isolated portions of the site. Existing fill is not suitable to support foundations and (if encountered at the proposed bearing grade elevations) should be replaced with compacted imported Structural Fill within the foundation bearing zone, which is defined as the volume below 2/3 horizontal (H) to 1 vertical (V) lines extending outward and downward from the lower edges of the footing.

Support of pavements and floor slabs on or above existing fill (if encountered), is discussed in this report. However, even with the recommended construction testing services, there is an inherent risk for the owner that unsuitable material within or buried during re-grading will not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill from beneath floor slabs and pavement areas but can be reduced by following the recommendations contained in this report. To take advantage of the cost benefit of not removing the entire amount of undocumented fill from beneath floor slabs and pavement areas, the owner must be willing to accept the risk associated with building over the undocumented fills following the recommended reworking of the material.

The **Shallow Foundations** section addresses support of the buildings bearing on compacted Structural Fill placed upon stable native soil. The **Floor Slabs** section addresses support of the slab-on-grade. The **Pavements** section addresses design of pavement systems.

Monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We recommend Terracon be retained to evaluate soil bearing subgrades exposed after excavation to confirm they are suitable for footing, slab, or pavement support. Subsurface conditions in the explorations have been reviewed and evaluated with respect to the proposed construction plans known to us now.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork may include clearing and grubbing as well as demolition of existing structures, removal of unsuitable fill, excavations, and fill placement. 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 in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Demolition

As part of the construction, we anticipate removal of existing structures (i.e. slabs, retaining walls; pavement; underground utilities; etc.) may be required. Removed buried structures should be backfilled with approved Structural Fill, which is placed and compacted in accordance with recommendations presented in this report. We also recommend the following:

- Existing structures and utilities should be removed from beneath proposed foundations and floor slabs.
- Existing structures should be removed from proposed pavement areas to a minimum depth of 4 feet below finished grades. Existing floor slabs (if left at a minimum depth of 4 feet below finished grades) shall be broken up to promote drainage and minimize the potential for trapped water.
- We anticipate existing underground pipes may remain in-place if filled with Flowable Fill with a minimum compressive strength of 500 psi. Existing piping/structures should be disconnected and properly capped from other existing piping intended to be left in place and functioning prior to placing Flowable Fill.

Site Preparation

Existing vegetation and other deleterious materials should be removed from proposed development areas. We recommend stripping topsoil to depths that expose soils with less than 3 percent organic matter and no roots having a diameter greater than ¼ inch. Exposed surfaces within the footprint of the new structures should be free of mounds and depressions which could prevent uniform compaction. Except in areas to be excavated, stump holes and other holes caused by removal of tree roots and obstructions in wooded areas should be backfilled with suitable material and compacted in accordance with **Fill Compaction Requirements**.

Stripped materials consisting of vegetation and organic materials should be wasted from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Exposed subgrades should be proof-rolled with a minimum 10-ton (static weight) smooth drum roller compactor. We recommend a minimum of two overlapping passes in one direction, followed by two overlapping passes in a direction perpendicular to the first passes. The intent is to compact areas with relatively loose surficial soil, to re-compact areas loosened by stripping operations, and to identify unacceptable subgrade areas.

Proof-rolling should be performed in the presence of the Geotechnical Engineer. Areas which excessively deflect under the proof-roll should be delineated and subsequently addressed by the Geotechnical Engineer. Unstable subgrades, as identified by the Geotechnical Engineer, should be over-excavated from the building footprint, footing bearing zones, and pavement areas to competent material and replaced with compacted Structural Fill.

Existing Fill

The borings generally did not encounter in-place fill. However, since the project site has been developed over the years, it is possible in-place fill may be encountered in isolated portions of the site. Existing fill is not suitable to support foundations and (if encountered at the proposed bearing grade elevations) should be replaced with compacted Structural Fill within the foundation bearing zone. All grading should incorporate the limits of the proposed structures plus a minimum lateral extent of 1 foot.

If the owner elects to construct pavements and floor slabs on the existing fill, exposed subgrades beneath proposed pavement and floor slab areas should be proof-rolled as discussed in **Site Preparation**. Once areas of unsuitable materials have been remediated, and the subgrade has passed the proof-roll test, existing and undocumented fill that was removed can be evaluated for reuse as General Fill.

Fill Material Types

Fill required to achieve design grade should be classified as Structural Fill and General Fill. Structural Fill is material used below, or within 10 feet of structures, pavements or constructed slopes. General Fill is material used to achieve grade outside of these areas. Earthen materials used for Structural and General Fill should meet the following material property requirements:

Fill Type[1]	USCS Classification	Acceptable Location for Placement
Structural Fill[2]	GW, GW-GM, SW, SW-SM, SP, GP	All locations and elevations. NYSDOT Item 733-0402, Type 2 is suggested to be used as imported Structural Fill.
Slab Base	GW, GW-GM, SW, SW-SM, SP, GP	NYSDOT, Subbase Course, Type 2
General Fill[3]	GW, GP, GM, SW, SP, SM	General Fill may be used for general site grading; General Fill should not be used under settlement or frost-sensitive structures.
Non-Frost Susceptible (NFS) Fill[4]	GW, GP, SW, SP	All locations and elevations.
Crushed Stone	GP	For use on wet subgrades, as a replacement for Structural Fill and NFS Fill (if desired). Should be uniform ¾-inch angular Crushed Stone wrapped in a geotextile separation fabric (Mirafi 140N, or similar).
Lean Concrete	Not applicable	Can be used to level subgrades between foundations and native soils. Lean Concrete should be flowable, self-compacting concrete with a compressive strength between 750 and 2,000 psi.

1. Compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.
2. **Imported Structural Fill** should meet the following gradation specifications:

Structural Fill

Sieve Size	Percent Passing by Weight
2″	100
¼ in	25-60
No. 40	5-40
No. 200	0 - 10

3. General Fill should have a maximum particle size of 6 inches and no more than 20 percent by weight passing the No. 200 sieve.
4. NFS Fill should contain less than 5 percent material passing No. 200 sieve size.

Excavated on-site soils are anticipated to consist primarily of sand with silt and occasional gravel. Excavated non-organic soils (clean from roots, oversized particles, and vegetation) may likely be suitable for reuse as Structural Fill to attain proposed subgrade elevation, provided during construction proper compaction and optimum moisture content can be achieved. Moisture conditioning may be required to achieve proper compaction. The contractor is ultimately responsible for moisture conditioning of fill/backfill materials to achieve proper compaction.

Fill Compaction Requirements

Structural and General Fill should meet the following compaction requirements.

Item	Description
Maximum Lift Thickness	12 inches or less in loose thickness when heavy, self-propelled compaction equipment is used. 6 to 8 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used.
Minimum Compaction Requirements [1, 2]	95 percent of maximum theoretical
Water Content Requirements [1, 2]	Workable moisture levels

1. We recommend testing fill for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested, as required, until the specified moisture and compaction requirements are achieved. The zone of fill compacted to meet this criterion should extend at least 5 feet horizontally beyond the building footprint.
2. Maximum density and optimum water content as determined by the modified Proctor test (ASTM D 1557).

Utility Trench Backfill

Trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. Trenches should be backfilled with material that approximately matches the permeability characteristics of the surrounding soil to reduce the infiltration and preferential conveyance of surface water through the trench backfill. Fill placed as backfill for utilities located below the slab should consist of compacted Structural Fill or suitable bedding material.

Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The trench should provide an effective trench plug that extends at least 5 feet out from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for Structural Fill stated previously in this report.

Grading and Drainage

Grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5 percent away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary as part of the structure's maintenance program. Where paving or flatwork abuts the structure a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Excavations, for the proposed structure, are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs, pavements, and foundations. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

Groundwater was generally not observed in the borings. However, it should be anticipated the groundwater table could rise and affect earthwork, especially for the below grade parking areas excavation. If required, the contractor should select a dewatering method to lower groundwater at least 2 feet below the excavation subgrade in order to minimize bearing surface disturbance during construction of footings and utilities. Dewatering, if required, can likely be accomplished using filtered pumps placed in crushed stone. If ¾-inch crushed stone is used, a geotextile separation fabric (Mirafi 140N, or equivalent) should be placed between the crushed stone and on-site soil.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations. The contractor should be aware that slope height, slope inclination, and excavation depth should in no instance exceed OSHA guidelines. OSHA guidelines 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 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 shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of topsoil, proof-rolling and mitigation of areas delineated by the proof-roll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event that unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

As discussed in **Geotechnical Overview**, because of the loose to medium-dense relative density of the in-situ soils, we recommend proposed foundation bearing grades be proofrolled with proper compaction equipment. The compactive effort will help to improve the relative density of the bearing grades, and therefore, will help to distribute the foundation loads. If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

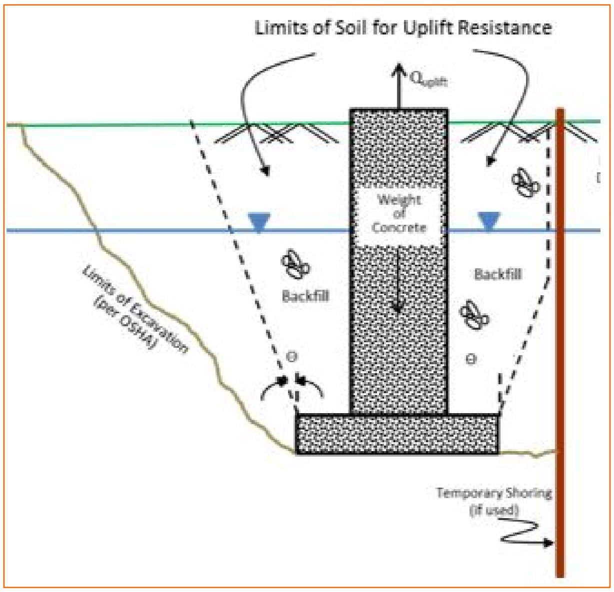
Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure [1, 2]	3,000 psf
Required Bearing Stratum [3]	Minimum 9 inches of compacted imported Structural Fill placed upon stable proofrolled soil. The Structural Fill should extend a lateral distance of 9 inches beyond the edges of the foundations.
Minimum Foundation Dimensions	Columns: 30 inches Continuous: 18 inches
Ultimate Passive Resistance [4] **(equivalent fluid pressures)**	390 pcf (compacted imported Structural Fill)
Ultimate Coefficient of Sliding Friction [5]	0.50 concrete on compacted imported Structural Fill
Minimum Embedment below Finished Grade [6]	Exterior footings in unheated areas: 48 inches Exterior footings in heated areas: 48 inches Interior footings in heated areas: 24 inches
Estimated Total Settlement from Structural Loads [2]	Less than about 1 inch
Estimated Differential Settlement [2, 7]	About 2/3 of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. These bearing pressures can be increased by 1/3 for transient loads unless those loads have been factored to account for transient conditions. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**.
3. Unsuitable or soft soils should be replaced according to the recommendations presented in the **Earthwork**.
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted Structural Fill be placed against the vertical footing face. The Structural Fill must extend out and up from the base of the foundation at an angle of at least 60 degrees from vertical for the passive case.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to uplift conditions.
6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7. Differential settlements are as measured over a span of 50 feet.

Design Parameters - Uplift Loads

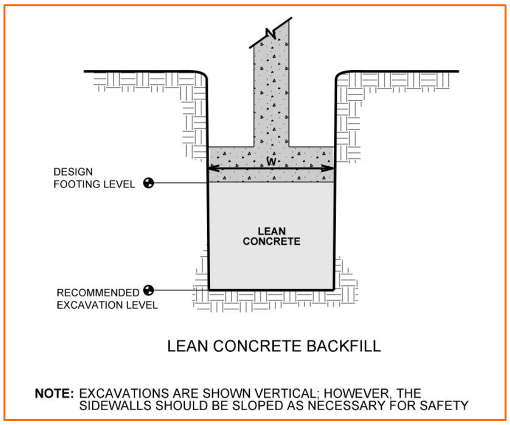
Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle, q, of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A maximum total unit weight of 120 pcf should be used for the backfill. This unit weight should be reduced to 65 pcf for portions of the backfill or natural soils below the groundwater elevation.



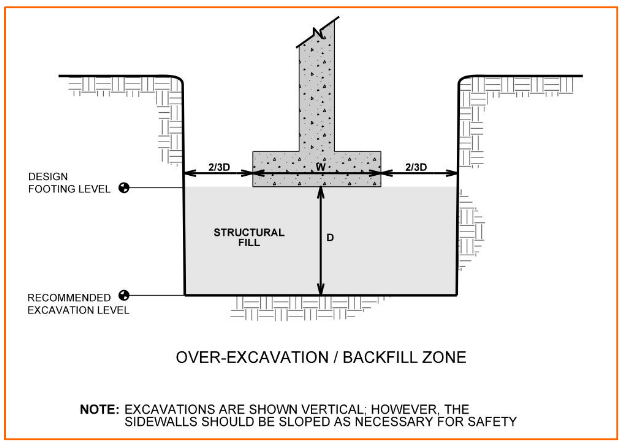
Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the sketch below.



Over-excavation for structural fill placement below footings should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with imported Structural Fill placed, as recommended in the **Earthwork** section.



SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification 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 in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC).

Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion **the Seismic Site Classification is D.** Subsurface explorations were extended to a maximum depth of 40 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the Slab Base material beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support [1]	Minimum 12 inches of imported select Slab Base compacted to at least 95% of Modified Proctor (ASTM D 1557) placed directly upon proofrolled stable on-site subgrade soils.
Estimated Modulus of Subgrade Reaction [2]	100 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

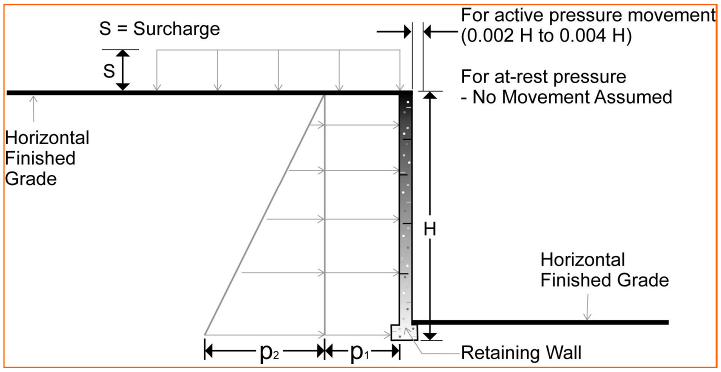
The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

LATERAL EARTH PRESSURES

We understand the type of retaining walls planned for portions of the site have not been determined. The lateral earth pressure recommendations given in this section are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever, or gravity type concrete walls. We have not included recommendations for design of modular block-geogrid reinforced backfill walls. These walls are typically subcontracted as design-build structures, since design details are often manufacturer specific. We would be pleased to provide recommendations and complete design and plans for the design of such wall systems upon request, once preliminary plans are established. Design recommendations for rigid wall foundations are presented in the following tables and paragraphs.

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The “at-rest” condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



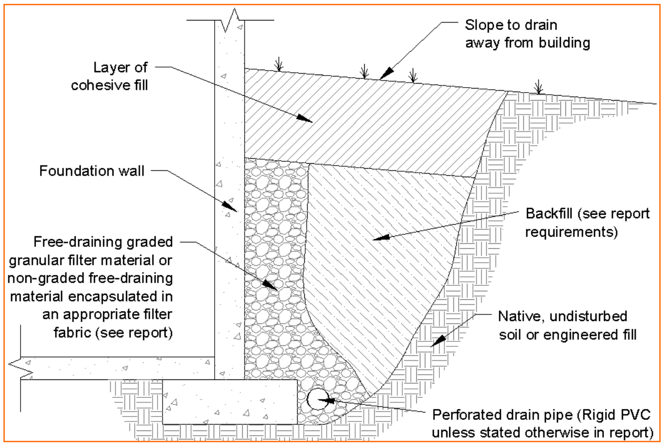
Lateral Earth Pressure Design Parameters			
Earth Pressure Condition [1]	Coefficient for Backfill Type [2]	Surcharge Pressure [3, 4, 5] p_1 (psf)	Effective Fluid Pressures (psf) [2, 4, 5] Drained
Active (Ka)	Granular - 0.31	(0.31) S	(37) H
At-Rest (Ko)	Granular - 0.47	0.47) S	(57) H
Passive (Kp)	Granular - 3.25	--	(390) H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance.
2. Uniform, horizontal backfill, compacted to at least 95 percent of the ASTM D 1557 maximum dry density, rendering a maximum unit weight of 120 pcf and friction angle of 32 degree.
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included. Hand operated equipment should be used within 4 feet of back of wall.
5. No safety factor is included in these values.

Backfill placed against structures should consist of granular soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively.

Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls and extends below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material such as NYSDOT Item 203.21 Select Structural Fill; however, we recommend less than 5% passing the No. 200 sieve. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 2 feet of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system.



As an alternative to free-draining granular fill, a pre-fabricated drainage structure may be used. A pre-fabricated drainage structure is a plastic drainage core or mesh which is covered with filter fabric to prevent soil intrusion and is fastened to the wall prior to placing backfill.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

Pavement designs were based on *AASHTO Guide for Design of Pavement Structures (1993)* and our experience with similar projects. The thickness of each course is a function of subgrade strength, traffic, design life, serviceability factors, and frost susceptibility.

A subgrade CBR of 4 was used for the AC pavement designs, and a modulus of subgrade reaction of 100 pci was use for the PCC pavement designs. Values were empirically derived based upon our experience with the sand subgrade soils and our understanding of the quality of the subgrade as prescribed by the **Site Preparation** conditions as outlined in **Earthwork**. A modulus of rupture of 600 psi was used for pavement concrete.

Pavement Section Thicknesses

Frost susceptibility is a major factor in the overall pavement section thickness. The total pavement structural sections presented in this report are based also upon the expected depth of freeze, which for the project site is anticipated at 48 inches. Based on local field data and experience, and provided positive pavement drainage is maintained, we anticipate the minimum pavement structural sections presented in the following sections are required to minimize pavement heave and keep cracking within tolerable amounts.

The following table provides options for Asphaltic Concrete and for Portland Cement Sections:

Asphaltic Concrete Design		
Layer	**Thickness (inches)**	
	Light Duty [1]	**Heavy Duty** [1]
Asphalt Top Course [2]	1.5	1.5
Asphalt Binder Course [2]	2.0	3.5
Asphalt Base Course	0	0
Aggregate Base Course [2]	12.0	12.0

1. See Project Description for more specifics regarding pavement type.
2. All materials should meet the current NYSDOT Department of Transportation (NYSDOT) Standard Specifications.
   - Asphalt Top Course – NYSDOT Section 402 for Type 12.5 F2 Top Course HMA, Item No. 402.127202
   - Asphalt Binder Course – NYSDOT Section 402 for Type 19 F9 Binder Course HMA, Item No. 402.197902
   - Asphalt Base Course – NYSDOT Section 402 for type 37.5 F9 Base Course HMA, Item No. 402.377902
   - Aggregate Base Course – NYSDOT Section 304 for Type 2 Subbase Course, Item No. 304.12

Portland Cement Concrete Design		
Layer	**Thickness (inches)**	
	Light Duty [1]	**Heavy Duty** [3]
PC Concrete [2]	6.0	8.0
Aggregate Base [2]	6.0	6.0

1. See Project Description for more specifics regarding traffic classifications.
2. All materials should meet the current NYSDOT Department of Transportation (NYSDOT) Standard Specifications.
   - Concrete Pavement – NYSDOT Section 500 for Concrete Class C, with a minimum compressive strength of 4,000 psi at 28 days.
   - Aggregate Base Course - Section 304 for Subbase Course, Item 304.12, Type 2.
3. In areas of anticipated heavy traffic, fire trucks, delivery trucks, or concentrated loads (e.g. dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles.

The estimated pavement sections provided in this report are minimums for the assumed design criteria, and as such, periodic maintenance should be expected. Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles. A maintenance program including surface sealing, joint cleaning and sealing, and timely repair of cracks and deteriorated areas will increase the pavement's service life. As an option, thicker sections could be constructed to decrease future maintenance.

Concrete for rigid pavements should have a minimum 28-day compressive strength of 4,000 psi and be placed with a maximum slump of 4 inches. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Where practical, we recommend early-entry cutting of crack-control joints in Portland cement concrete pavements. Cutting of the concrete in its "green" state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase. Subdrains should be sloped to provide positive gravity drainage to reliable discharge points. Periodic maintenance of subdrains is required for long-term proper performance.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. This is especially applicable for islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils. The civil design for the pavements with these conditions should include features to restrict or to collect and discharge excess water from the islands. Examples of features are edge drains connected to the storm water collection system, longitudinal subdrains, or other suitable outlet and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the Civil Engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

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/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.

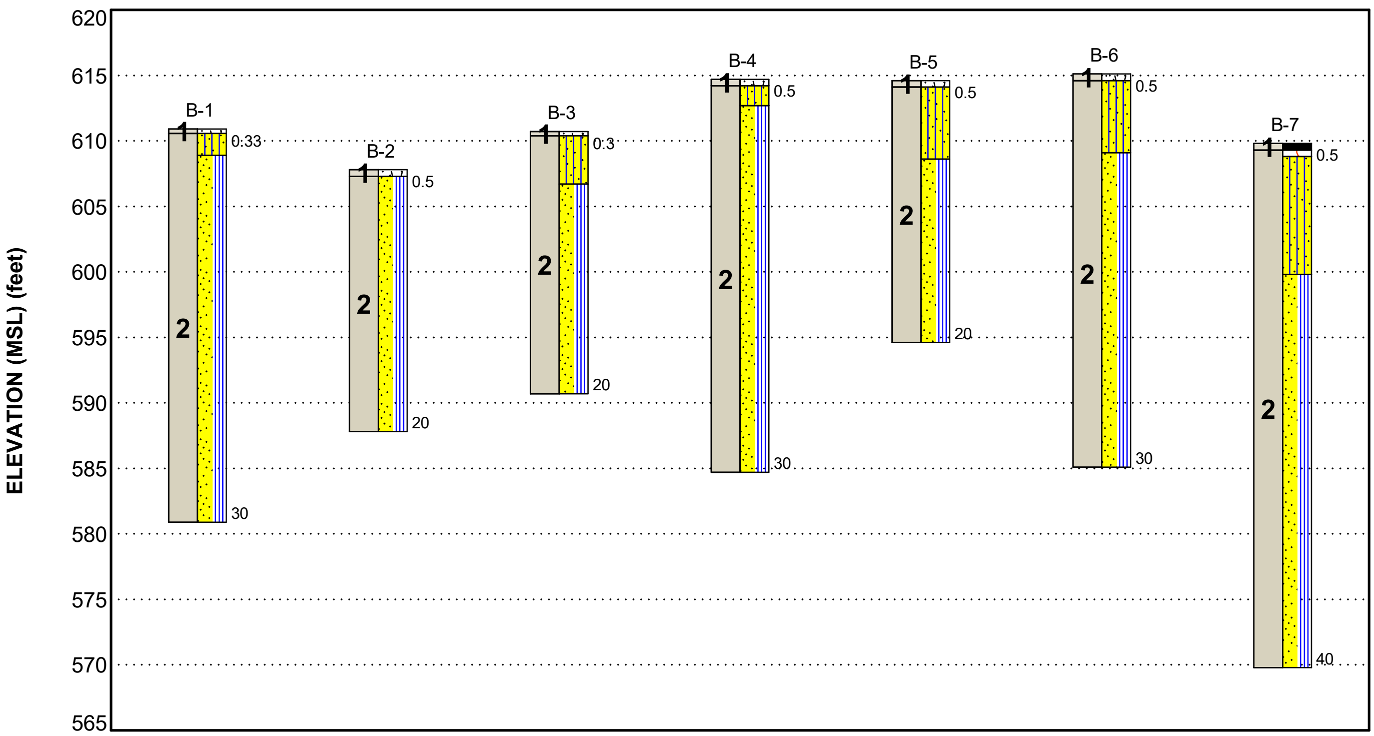
FIGURES

Contents:

GEOMODEL

Colgate Rochester Divinity School Campus ■ Rochester,
5/17/2019 ■ Terracon Project No. J5195064

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	Surface	Topsoil/Asphalt with Aggregate Base Course
2	Native Soil	Silty Sand; Poorly Graded Sand with Silt (SM, SP); trace to with gravel brown to light brown

LEGEND

- Topsoil
- Asphalt
- Silty Sand
- Aggregate Base Course
- Poorly-graded Sand with Silt

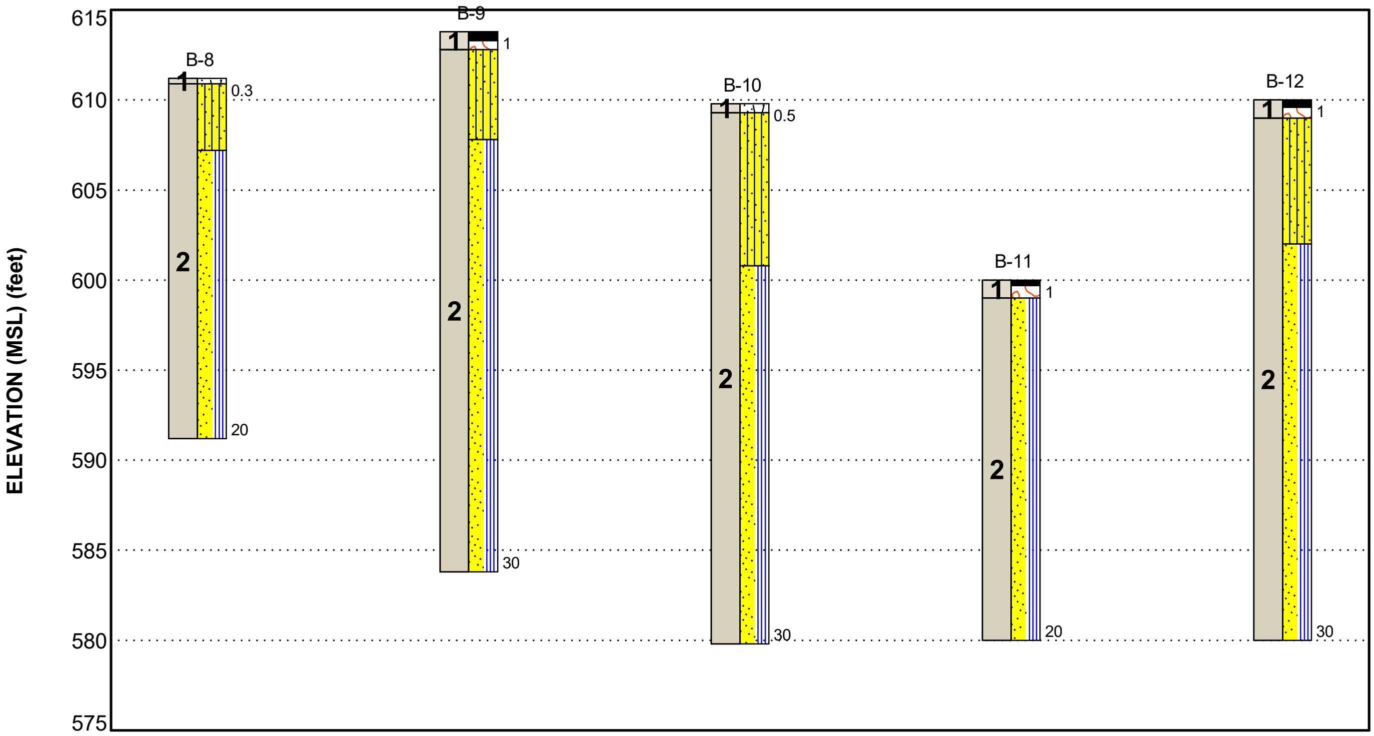
- First Water Observation
- Second Water Observation
- Third Water Observation

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

Colgate Rochester Divinity School Campus ■ Rochester,
5/17/2019 ■ Terracon Project No. J5195064



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Model Layer	Layer Name	General Description
1	**Surface**	Topsoil/Asphalt with Aggregate Base Course
2	**Native Soil**	Silty Sand; Poorly Graded Sand with Silt (SM, SP); trace to with gravel brown to light brown

LEGEND

- Topsoil
- Asphalt
- Silty Sand
- Aggregate Base Course
- Poorly-graded Sand with Silt

- First Water Observation
- Second Water Observation
- Third 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.

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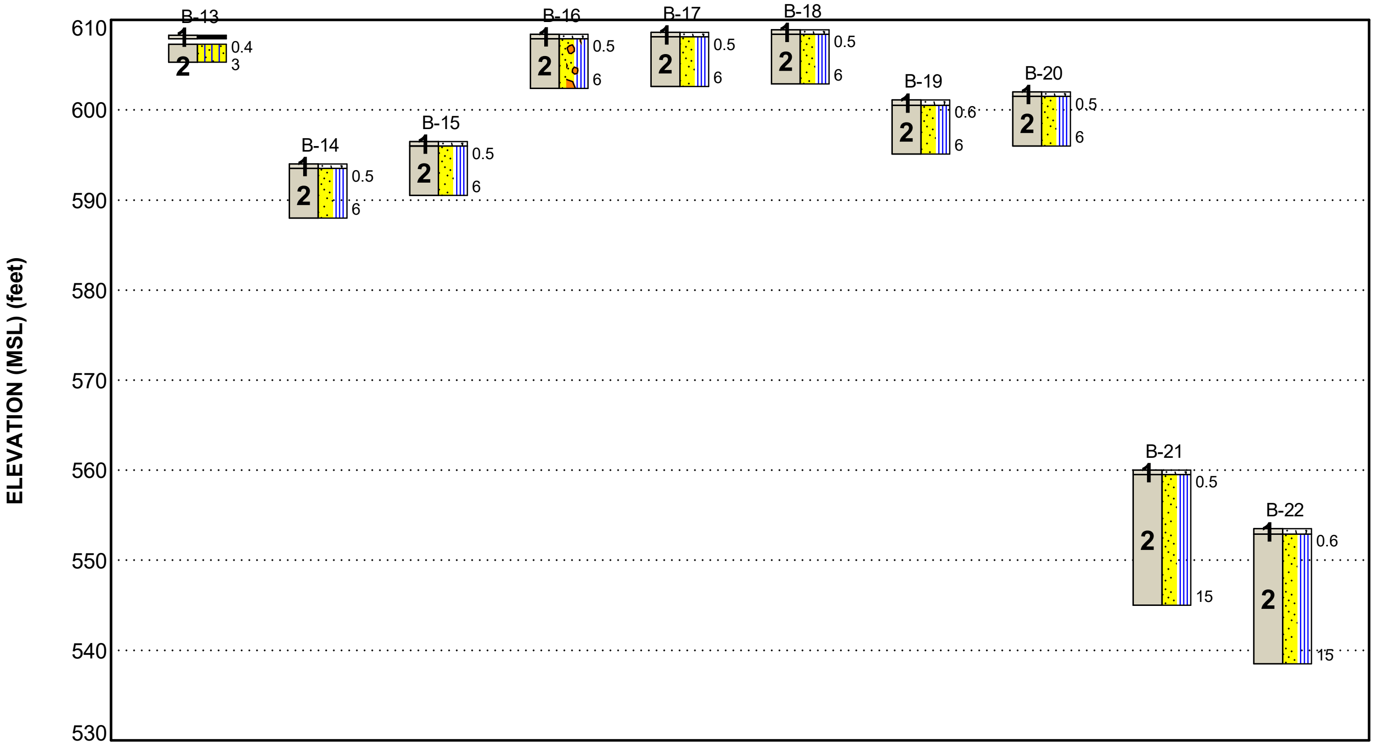
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

Colgate Rochester Divinity School Campus ■ Rochester,
5/17/2019 ■ Terracon Project No. J5195064

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	**Surface**	Topsoil/Asphalt with Aggregate Base Course
2	**Native Soil**	Silty Sand; Poorly Graded Sand with Silt (SM, SP); trace to with gravel brown to light brown

LEGEND

- Asphalt
- Silty Sand
- Topsoil
- Poorly-graded Sand with Silt
- Poorly-graded Sand with Silt and Gravel

- First Water Observation
- Second Water Observation
- Third 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

The field exploration program consisted of the following:

Number of Borings	Boring Depth (feet) [1]	Location
7 (B-1 through B-7)	20 to 40	Building 100
5 (B-8 through B-12)	20 to 30	Building 200
8 (B-13 through B-20)	6	Parking/Driveway Area
2 (B-21 and B-22)	15	Stormwater Management Area

1. Below ground surface.

Boring Layout and Elevations: The boring layout was completed by surveyors with Costich Engineering (Costich). Coordinates and ground surface elevations were provided to us by Costich.

Subsurface Exploration Procedures: We advanced the borings with two ATV-mounted rotary drill rigs using continuous hollow stem flight augers. Five split-barrel sampling spoon were generally obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. 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 a distance of 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 boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion. Pavements were patched with pre-mixed concrete, as appropriate.

Sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. 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. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations of the samples in our laboratory.

Laboratory Testing

The soil samples obtained from the borings were examined in our laboratory by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System. A grain-size analysis was completed on a combined sample obtained from boring B-7 in the interval depths of 2 to 10 feet.

PHOTOGRAPHY LOG

Photo:1

Photo:2

Photo:3

Photo:4

Photo:5

Photo:6

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan
Exploration Plans (2 pages)

Note: All attachments are one page unless noted above.

SITE LOCATION

Colgate Rochester Divinity School Campus ■ Rochester, NY

May 17, 2019 ■ Terracon Project No. J5195064

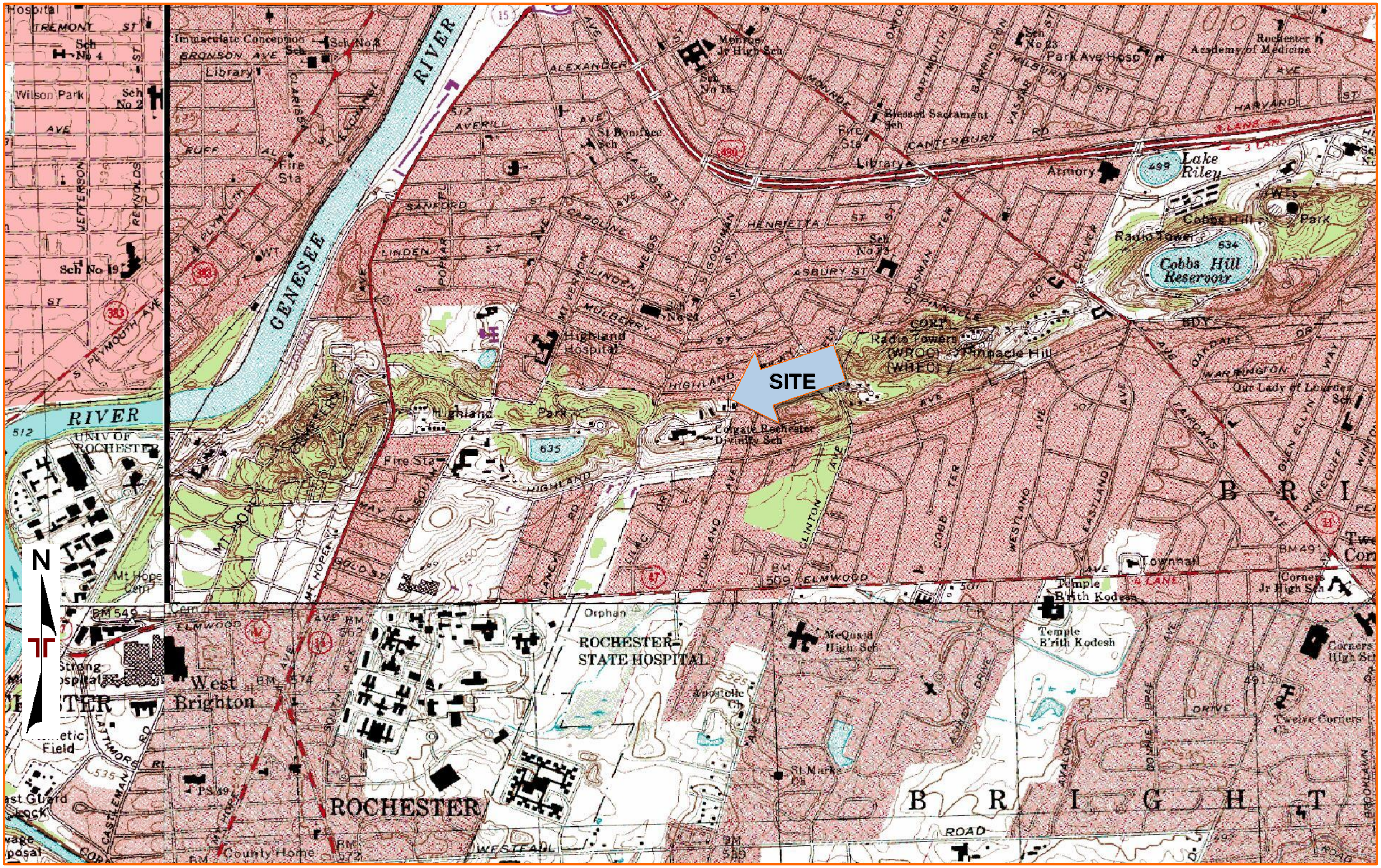


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: ROCHESTER WEST, NY (1/1/1994), ROCHESTER EAST, NY (1/1/1978), WEST HENRIETTA, NY (1/1/1978) and PITTSFORD, NY (1/1/1994).

EXPLORATION PLAN
Colgate Divinity School Campus ■ Rochester, New York
May 17, 2019 ■ Terracon Project No. J5195064

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

Base Map provided by Bing

EXPLORATION PLAN

Colgate Divinity School Campus ■ Rochester, New York

May 16, 2019 ■ Terracon Project No. J5195064

Terracon GeoReport

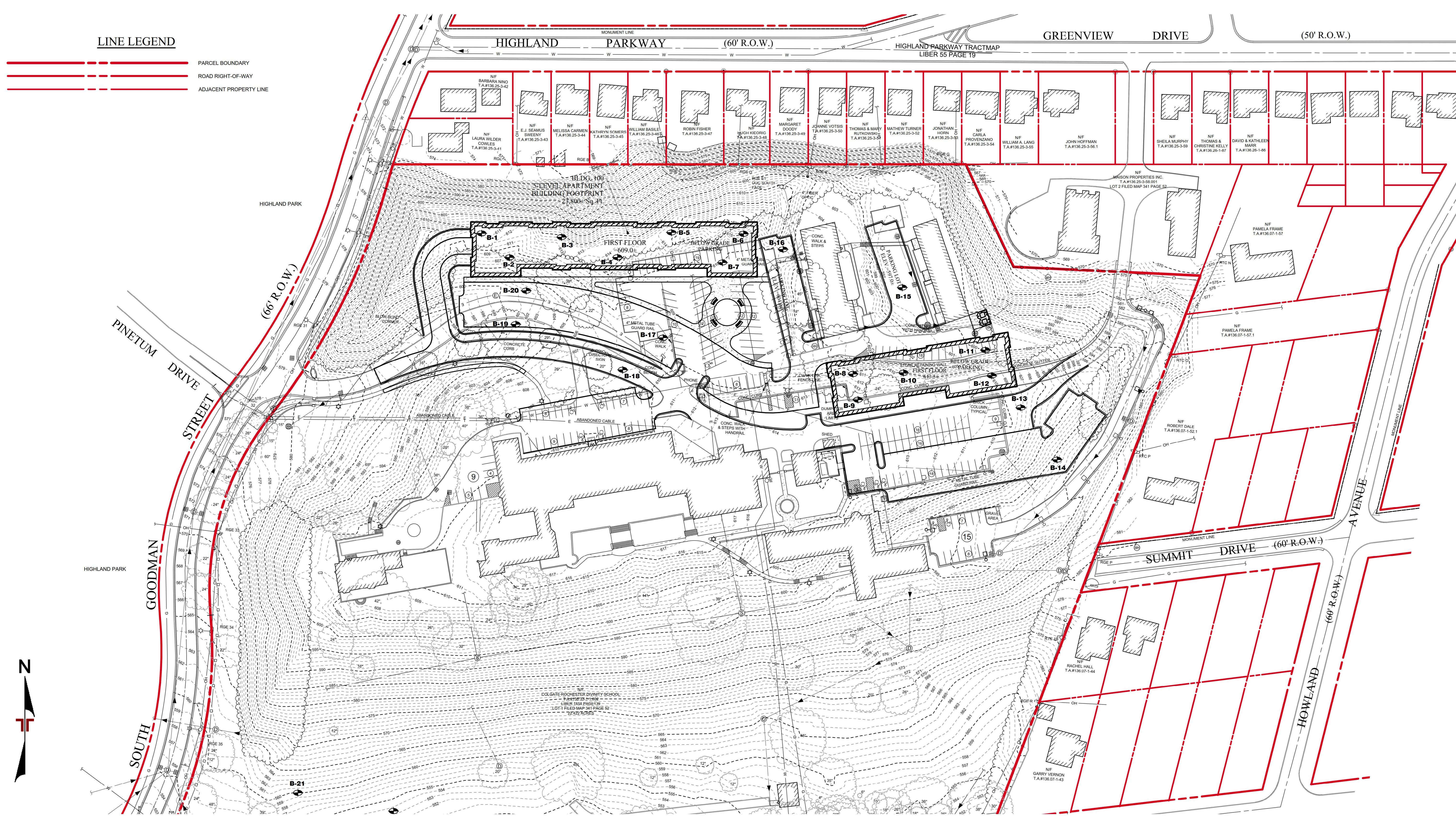


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Map prepared based upon a Plan prepared by Costich Engineering

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 through B-22)
Grain-Size Analysis

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.132821° Longitude: -77.599392°

Approximate Surface Elev.: 610.9 (Ft.) +/-

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.3	**TOPSOIL**	610.5+/-			X		1-1-2-1 N=3
		SILTY SAND (SM), brown, loose						
	2.0		609+/-			X		2-3-4-4 N=7
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, brown, loose to medium dense		5		X		4-5-6-6 N=11
						X		6-6-5-7 N=11
				10		X		5-6-7-8 N=13
				15		X		3-4-5-8 N=9
				20		X		2-7-8-9 N=15
				25		X		3-6-6-7 N=12
	30.0		581+/-	30		X		2-5-7-9 N=12

Boring Terminated at 30 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-13-2019	Boring Completed: 05-13-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-2

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132729° Longitude: -77.599257°

Approximate Surface Elev.: 607.8 (Ft.) +/-

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	607.5+/-					
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, orangish brown, loose to medium dense				X	14	1-2-1-2 N=3
		becomes brown				X	12	2-1-2-2 N=3
				5		X	12	1-2-3-5 N=5
		medium dense, becomes light brown				X	20	9-9-10-10 N=19
						X	20	7-8-9-10 N=17
				10				
				15		X	20	4-7-9-10 N=16
	20.0		588+/-	20		X	18	4-7-7-8 N=14
		Boring Terminated at 20 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-3

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.13281° Longitude: -77.598984°

Approximate Surface Elev.: 610.7 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.3	**TOPSOIL**	610.5+/-					
2	4.0	**SILTY SAND**, dark brown, loose	606.5+/-	0–2		X		1-2-2-2 N=4
				2–4		X		3-2-2-2 N=4
		POORLY GRADED SAND WITH SILT (SP-SM), brown, loose to medium dense		4–6		X		2-2-2-2 N=4
				6–8		X		3-2-2-2 N=4
				8–10		X		3-4-3-4 N=7
		becomes light brown		13–15		X		4-6-9-9 N=15
	20.0		590.5+/-	18–20		X		6-8-8-11 N=16

Boring Terminated at 20 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-4

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.132739° Longitude: -77.598703°

Approximate Surface Elev.: 614.7 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	614+/-					
	2.0	**SILTY SAND (SM)**, dark brown, loose, significant organic matter	612.5+/-			X	10	1-2-3-5 N=5
2		**SP-SM-POORLY GRADED SAND W/SILT (SP-SM)**, trace gravel, brown, medium dense				X	8	7-7-7-10 N=14
				5		X	8	12-9-8-9 N=17
						X	5	11-13-13-15 N=26
						X	24	6-9-9-8 N=18
				10				
		Becomes brown				X	20	4-6-6-8 N=12
				15				
						X	16	5-14-13-11 N=27
				20				
						X	21	3-6-9-12 N=15
				25				
		Becomes grayish brown				X	24	3-7-11-9 N=18
	30.0		584.5+/-	30				

Boring Terminated at 30 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-5

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132836° Longitude: -77.598421°

Approximate Surface Elev.: 614.6 (Ft.) +/-

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	614+/-					
2		**SILTY SAND (SM)**, brown, very loose to loose				X	12	1-1-2-1 N=3
						X	2	8-3-1-3 N=4
				5		X	1	2-3-4-4 N=7
	6.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, brown, medium dense	608.5+/-			X	1	4-5-6-7 N=11
						X	9	17-11-12-11 N=23
				10				
						X	16	5-4-6-6 N=10
				15				
						X	23	5-7-8-8 N=15
	20.0		594.5+/-	20				

Boring Terminated at 20 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-6

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.132833° Longitude: -77.598065°

Approximate Surface Elev.: 615.1 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	614.5+/-					
2		**SILTY SAND (SM)**, brown, very loose to loose				X	8	1-2-1-2 N=3
						X	13	1-2-3-4 N=5
		Frequent cobble fragments		5		X	20	1-3-5-5 N=8
	6.0		609+/-					
		POORLY GRADED GRAVEL WITH SILT (SP-SM), trace gravel, light brown, medium dense to dense				X	6	50/6"
						X	22	12-14-17-11 N=31
				10				
						X	12	13-10-11-10 N=21
				15				
						X	9	19-13-14-11 N=27
				20				
						X	16	6-8-9-7 N=17
				25				
						X	20	5-6-5-6 N=11
	30.0		585+/-	30				

Boring Terminated at 30 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-7

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132724° Longitude: -77.598158°

Approximate Surface Elev.: 609.8 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)
1	0.5	**ASPHALT**	609.5+/-
	1.0	**AGGREGATE BASE COURSE**	609+/-
	10.0	**SILTY SAND (SM)**, trace gravel, brown, medium dense	600+/-
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, brown, medium dense to dense	

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
0.5–2		Split spoon	10	-5-8-12
2–4		Split spoon	14	14-10-10-12 N=20
4–6		Split spoon	12	3-11-9-9 N=20
6–8		Split spoon	15	19-16-14-13 N=30
8–10		Split spoon	15	10-13-10-8 N=23
14–16		Split spoon	5	10-13-15-15 N=28
19–21		Split spoon	17	3-5-7-7 N=12
24–26		Split spoon	18	4-10-13-14 N=23
29–31		Split spoon	17	5-11-14-14 N=25

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with Auger Cuttings. Surface capped with concrete

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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-7

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132724° Longitude: -77.598158°

Approximate Surface Elev.: 609.8 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH / DESCRIPTION / ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, brown, medium dense to dense *(continued)*	35			20	6-12-14-16 N=26
		Becomes grayish-brown				22	9-17-21-20 N=38
		40.0 — 570+/-	40				
		Boring Terminated at 40 Feet					

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with Auger Cuttings. Surface capped with concrete

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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-8

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132316° Longitude: -77.597492°

Approximate Surface Elev.: 611.2 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.3	**TOPSOIL**	611+/-					
2		**SILTY SAND (SM)**, brown, very loose				X	6	1-1-1-1 N=2
						X	6	1-2-1-2 N=3
	4.0		607+/-					
		POORLY GRADED GRAVEL WITH SILT (SP-SM), trace gravel, light brown, loose to dense		5		X	6	2-2-2-3 N=4
		Frequent cobble fragments				X	1	4-5-6-5 N=11
						X	8	2-2-3-3 N=5
				10				
				15		X	18	1-2-1-2 N=3
						X	0	9-14-17-20 N=31
	20.0		591+/-	20				
		Boring Terminated at 20 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-9

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132224° Longitude: -77.597469°

Approximate Surface Elev.: 613.8 (Ft.) +/-

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)
1	0.5	**ASPHALT**	613.5+/-
1	1.0	**AGGREGATE BASE COURSE**	613+/-
2	6.0	**SILTY SAND (SM)**, brown, loose	608+/-
2	30.0	**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, brown, medium dense to dense	584+/-
		Boring Terminated at 30 Feet	

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1–2.5		SPT	5	-8-7-2
2.5–4.5		SPT	8	2-3-2-4 N=5
4.5–6.5		SPT	10	5-3-3-4 N=6
6.5–8.5		SPT	2	5-5-5-6 N=10
8.5–10.5		SPT	18	4-6-7-6 N=13
14.5–16.5		SPT	15	6-7-9-10 N=16
19.5–21.5		SPT	18	1-3-7-9 N=10
24.5–26.5		SPT	0	7-11-13-14 N=24
28.5–30		SPT	18	8-16-19-19 N=35

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-10

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132332° Longitude: -77.597233°

Approximate Surface Elev.: 609.8 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)
1	0.5	**TOPSOIL**	609.5+/-
2	9.0	**SILTY SAND (SM)**, brown, very loose to loose Frequent cobble fragments	601+/-
2	30.0	**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown, loose to medium dense	580+/-
		Boring Terminated at 30 Feet	

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
0–2		X	12	1-1-1-2 N=2
2–4		X	2	1-1-1-1 N=2
4–6		X	12	3-2-3-3 N=5
6–8		X	12	2-3-2-3 N=5
8–10		X	8	1-2-1-1 N=3
14–16		X	18	2-2-3-6 N=5
19–21		X	20	8-12-13-12 N=25
24–26		X	20	4-6-7-7 N=13
28–30		X	18	4-9-11-12 N=20

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-11

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132416° Longitude: -77.596811°

Approximate Surface Elev.: 600.0 (Ft.) +/-

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.3	**ASPHALT**	599.5+/-					
1	1.0	**AGGREGATE BASE COURSE**	599+/-				10	-11-6-5
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, brown to light brown, loose to dense					16	7-7-4-3 N=11
2				5			12	3-2-3-3 N=5
2							12	2-3-4-4 N=7
2							18	3-4-4-5 N=8
2				10				
2				15			0	20-14-16-21 N=30
2	20.0		580+/-	20			0	14-16-18-15 N=34

Boring Terminated at 20 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-12

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.13231° Longitude: -77.596803°

Approximate Surface Elev.: 610.0 (Ft.) +/-

MODEL LAYER	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.4	**ASPHALT**	609.5+/-			X	6	-3-3-3
	1.0	**AGGREGATE BASE COURSE**	609+/-					
2		**SILTY SAND (SM)**, brown, loose				X	10	3-3-3-3 N=6
				5		X	6	2-3-2-2 N=5
	8.0		602+/-			X	6	2-2-3-2 N=5
		POORLY GRADED SAND WITH SILT (SP-SM), trace gravel, brown to light brown, loose to dense				X	0	14-21-23-23 N=44
				10				
				15		X	14	4-4-5-4 N=9
				20		X	18	4-6-8-9 N=14
				25		X	12	8-17-11-11 N=28
	30.0		580+/-	30		X	12	6-5-6-6 N=11
		Boring Terminated at 30 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with Auger Cuttings. Surface capped with concrete

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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-13

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.132212° Longitude: -77.596623°

Approximate Surface Elev.: 608.3 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1		0.4	**ASPHALT**	608+/-					
2			**SILTY SAND (SM)**, brown, loose to very dense				X	8	1-3-3-4 N=6
		3.0		605.5+/-			X	1	2-50/1"
			Auger Refusal at 3 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-14

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.132014° Longitude: -77.596445°

Approximate Surface Elev.: 594.0 (Ft.) +/-

MODEL LAYER	DEPTH	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	593.5+/-					
2		**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown, loose				X	14	1-4-5-6 N=9
						X	12	5-2-5-5 N=7
	6.0		588+/-	5		X	8	5-3-2-2 N=5
		Boring Terminated at 6 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

BORING LOG NO. B-15

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132638° Longitude: -77.597246°

Approximate Surface Elev.: 596.5 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	596+/-					
2		**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown, loose to medium dense				X	10	1-2-4-5 N=6
						X	8	4-2-1-1 N=3
	6.0		590.5+/-	5		X	12	3-4-7-9 N=11

Boring Terminated at 6 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-15-2019	Boring Completed: 05-15-2019
Drill Rig: CME-550X	Driller: R. Brown
Project No.: J5195064	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL J5195064 COLGATE ROCHESTER.GPJ MODELLAYER.GPJ 5/17/19

BORING LOG NO. B-16

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.1328° Longitude: -77.5979°

Approximate Surface Elev.: 608.4 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	608+/-			X	12	1-1-2-1 N=3
2		**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, brown, very loose to loose				X	20	4-3-4-5 N=7
		Frequent rock fragments		5		X	1	7-8-9-10 N=17
	6.0		602.5+/-					

Boring Terminated at 6 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-17

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.132448° Longitude: -77.598458°

Approximate Surface Elev.: 608.6 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1		0.5 **TOPSOIL**	608+/-					
2		**POORLY GRADED SAND WITH SILT (SP-SM)**, brown, loose				X	20	1-1-2-4 N=3
						X	18	2-1-1-2 N=2
		6.0	602.5+/-	5		X	20	4-2-4-3 N=6

Boring Terminated at 6 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with Auger Cuttings. Surface capped with concrete

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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-18

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.13233° Longitude: -77.598672°

Approximate Surface Elev.: 608.9 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	608.5+/-					
2		**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown, very loose to loose				X	12	1-1-3-3 N=4
						X	16	2-5-3-2 N=8
	6.0		603+/-	5		X	20	3-3-5-3 N=8

Boring Terminated at 6 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL J5195064 COLGATE ROCHESTER.GPJ MODELLAYER.GPJ 5/17/19

BORING LOG NO. B-19

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.13249° Longitude: -77.599218°

Approximate Surface Elev.: 601.1 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1		0.6	**TOPSOIL**	600.5+/-					
2			**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown, loose to medium dense				X	14	1-2-3-6 N=5
							X	12	4-4-3-4 N=7
		6.0		595+/-	5		X	15	3-2-2-1 N=4
			Boring Terminated at 6 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-20

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.132613° Longitude: -77.599163°

Approximate Surface Elev.: 602.0 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH		ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1		0.5	**TOPSOIL**	601.5+/-					
2			**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, brown, loose to medium dense				X	21	1-2-4-4 N=6
							X	16	1-2-5-6 N=7
		6.0		596+/-	5		X	12	7-9-10-10 N=19

Boring Terminated at 6 Feet

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-14-2019	Boring Completed: 05-14-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-21

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC
Rochester, NY

SITE: 1100 S. Goodman Street
Rochester

LOCATION See Exploration Plan

Latitude: 43.130745° Longitude: -77.600287°

Approximate Surface Elev.: 560.0 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.5	**TOPSOIL**	559.5+/-					
2		**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown to light brown, very loose to loose				X	12	1-1-2-1 N=3
						X	1	2-2-2-2 N=4
				5		X	4	1-3-1-1 N=4
						X	8	5-13-13-13 N=26
				10		X	19	11-14-16-18 N=30
	15.0		545+/-	15		X	14	14-16-18-16 N=34
		Boring Terminated at 15 Feet						

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

BORING LOG NO. B-22

PROJECT: Colgate Rochester Divinity School Campus

CLIENT: ROC Goodman LLC Rochester, NY

SITE: 1100 S. Goodman Street Rochester

LOCATION See Exploration Plan

Latitude: 43.130676° Longitude: -77.5998°

Approximate Surface Elev.: 553.5 (Ft.) +/-

MODEL LAYER	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
1	0.6	**TOPSOIL**	553+/-					
2		**POORLY GRADED GRAVEL WITH SILT (SP-SM)**, trace gravel, brown to light brown, loose to dense				X	8	1-1-2-1 N=3
						X	4	2-6-3-2 N=9
				5		X	2	3-4-3-3 N=7
						X	10	2-2-4-5 N=6
						X	10	6-10-18-28 N=28
				10				
	15.0		538.5+/-			X	18	3-10-22-23 N=32
		Boring Terminated at 15 Feet		15				

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

Hammer Type: Automatic

Advancement Method:
3 1/4" Hollow Stem Augers

Abandonment Method:
Boring backfilled with auger 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.

Elevations were provided by others.

Notes:

WATER LEVEL OBSERVATIONS

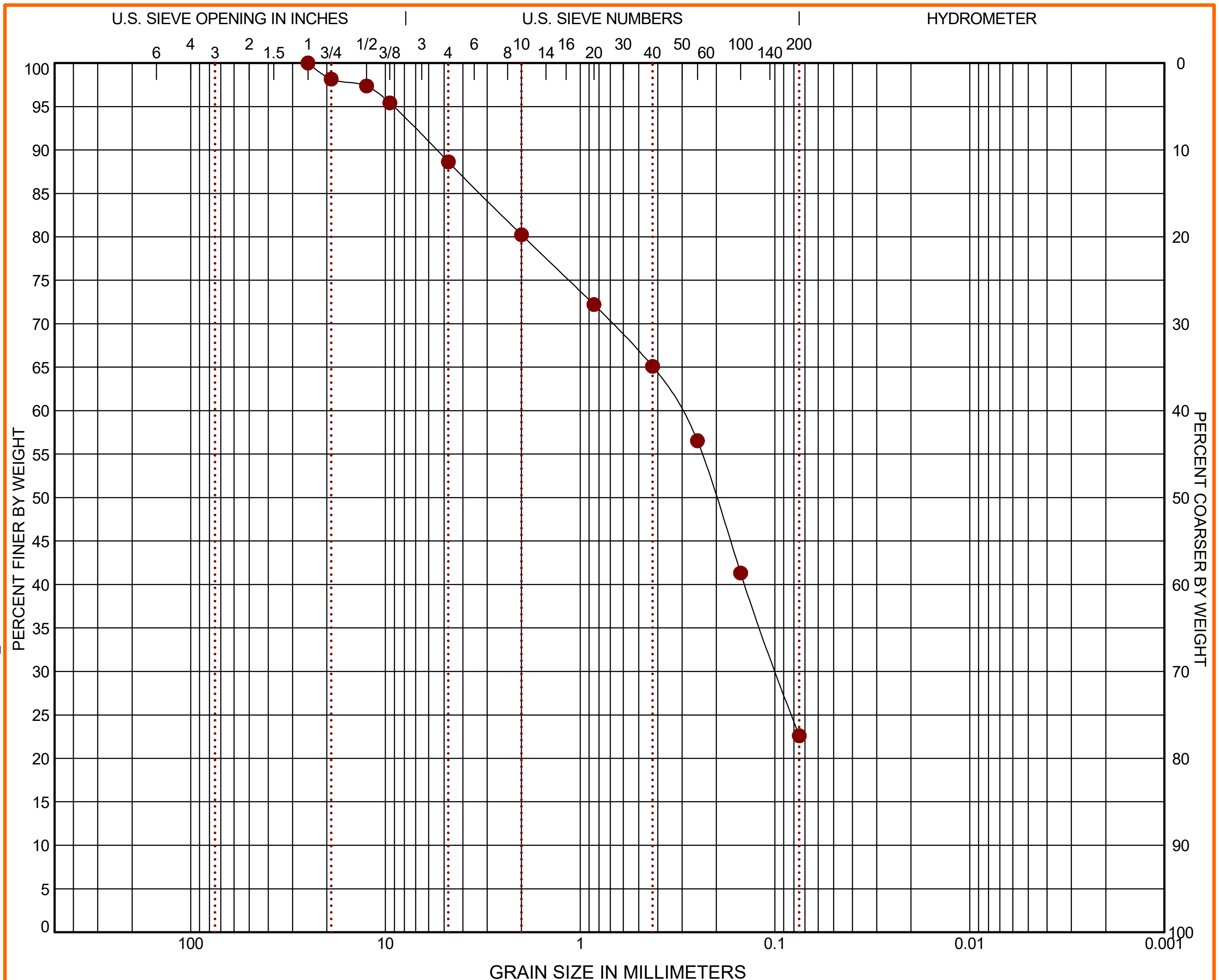
Groundwater not encountered

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

Boring Started: 05-16-2019	Boring Completed: 05-16-2019
Drill Rig: CME-550X	Driller: C. Sequist
Project No.: J5195064	

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-7	2 - 10	0.0	11.4	66.0		22.6		SM

GRAIN SIZE

	●		
D_{60}	0.31		
D_{30}	0.099		
D_{10}			

COEFFICIENTS

	●		
C_C			
C_U			

●					
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
1"	100.0				
3/4"	98.15				
1/2"	97.36				
3/8"	95.41				
#4	88.63				
#10	80.23				
#20	72.21				
#40	65.1				
#60	56.54				
#100	41.32				
#200	22.6				

SOIL DESCRIPTION

● SILTY SAND (SM)

REMARKS

●

PROJECT: Colgate Rochester Divinity School Campus

SITE: 1100 S. Goodman Street Rochester

Terracon
15 Marway Cir, Ste 2B
Rochester, NY

PROJECT NUMBER: J5195064

CLIENT: ROC Goodman LLC Rochester, NY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS 1 J5195064 COLGATE ROCHESTER.GPJ TERRACON_DATATEMPLATE.GDT 5/16/19

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES
DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Colgate Rochester Divinity School Campus ■ Rochester,
May 17, 2019 ■ Terracon Project No. J5195064

Terracon GeoReport

SAMPLING

Rock Core

Standard Penetration Test

WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

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.

FIELD TESTS

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 is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. 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

RELATIVE PROPORTIONS OF SAND AND GRAVEL		RELATIVE PROPORTIONS OF FINES	
Descriptive Term(s) of other constituents	Percent of Dry Weight	**Descriptive Term(s) of other constituents**	**Percent of Dry Weight**
Trace	<15	Trace	<5
With	15-29	With	5-12
Modifier	>30	Modifier	>12

GRAIN SIZE TERMINOLOGY		PLASTICITY DESCRIPTION	
Major Component of Sample	**Particle Size**	**Term**	**Plasticity Index**
Boulders	Over 12 in. (300 mm)	Non-plastic	0
Cobbles	12 in. to 3 in. (300mm to 75mm)	Low	1 - 10
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)	Medium	11 - 30
Sand	#4 to #200 sieve (4.75mm to 0.075mm	High	> 30
Silt or Clay	Passing #200 sieve (0.075mm)		

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification: Group Symbol	Soil Classification: 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 ³ 4 and 1 £ Cc £ 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 ³ 6 and 1 £ Cc £ 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" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K, L, M, N]
					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 / Liquid limit - not dried < 0.75	OH	Organic clay [K, L, M, P]
					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 ³ 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 ³ 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 ³ 30% plus No. 200 predominantly sand, add "sandy" to group name.

[M] If soil contains ³ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ³ 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.