GEOTECHNICAL REPORT

For: Kingstonian Development
19 Front Street
Kingston, New York

File No. 6439

Prepared for: Joseph A Bonura, Principal, Bonura Hospitality Group, Poughkeepsie, New York

Prepared by:

STATE OF NEW YORK
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Dated: December 17, 2017

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INTRODUCTION:

The preliminary subsurface investigation for the proposed Kingstonian Development to be located at 19 North Front Street, Kingston, New York, has been completed. Six (6) soil borings have been completed by Northeast Specialized Drilling, Inc., of Liverpool, New York. Four (4) cone probes were done by Conetec, Inc., of West Berlin, New Jersey. At the one of these locations additional in-situ testing was done including shear wave velocity measurements, and Marchetti dilatometer tests. Pore pressure dissipation tests were performed at several locations to determine the depth of the groundwater table and estimate the drainage properties of the site soils. The logs of these borings, cone probe tests, and other in-situ tests, along with a location diagram, have been included in the appendix of this report.

It is my understanding that the proposed construction will include two buildings; with a bridge connecting the buildings. There may be a swimming pool. There will be up to four levels of parking garage with a series of shops and apartments resting on the top of the parking garage. I have included renderings of the planned construction in the appendix.

A site plan showing the locations of the planned building footprints, the existing structures, and the existing topography has also been included in the appendix.

The buildings will impose light to moderate loads on the foundation soils. I have included a preliminary foundation plan and table showing the estimated foundation loads in the appendix. The column loadings might range up to about 950 kips with strip loadings up to 40 kips/foot.

The scope of my services has been limited to coordinating the field and laboratory investigation, analyzing the soils information, and providing a preliminary geotechnical report with preliminary foundation design recommendations.

A primary focus of this preliminary investigation has been to determine if the proposed construction can be supported on shallow foundations supplemented by ground improvement such as dynamic compaction and possibly rammed aggregate piers. If rammed aggregate piers are needed as an extension of the dynamic compaction process the purposes might be to lower seismic shocks on buildings close to the work area or to reduce settlements in local areas.

Environmental, site design, and structural design aspects of the project should be performed by qualified others.

A supplementary subsurface investigation is planned prior to finalizing the project plans and specifications. An outline of what this supplementary investigation might include has been provided later in this report.

FIELD INVESTIGATION PROCEDURES:

The soil borings were performed with a truck-mounted drilling rig. The borings were advanced using 3.25 inch, I.D., hollow-stem augers.

Samples were obtained from the boring holes by means of the split-spoon sampling procedure. The standard penetration values obtained from this procedure have been indicated on the logs as “N” values and as blows for each six inches of penetration. Hand penetrometer readings for estimated unconfined compressive strengths were taken on some split spoon samples showing some cohesion. The results in tsf are shown on the logs.

Soil samples obtained from these procedures were examined in the field, sealed in containers, and shipped to the laboratory for further examination and classification.

A tube sample of the silts and clays was taken.

In addition to the field boring investigation, the soils engineer visited the site to observe the surface conditions.

The cone probe testing was done using a cone testing truck. A description of this vehicle and all the testing equipment used is included in the Conetec, Inc., project report in the appendix.

LABORATORY INVESTIGATION:

The samples were examined in the laboratory by the geotechnical engineer.

Nine (9) representative samples were subjected to grain size analysis testing by sieve analysis.

Five (5) samples were tested for atterberg limits to estimate the plasticity of the soils as it affects performance under load; handling properties; and drainage properties.

Forty eight (48) samples were tested for natural moisture content. Natural moisture contents allow extrapolation of grain size and plasticity information to other samples as well as providing economical information on compressibility, grain size, and handling characteristics.

One unit weight test was done on the tube sample.

The laboratory result sheets for these tests are included in the appendix.

IN-SITU TESTING:

The in-situ testing including measurement of the cone tip resistance, friction sleeve measurements, pore water measurements, shear wave velocity measurements, dilatometer testing, and pore water dissipation testing done by Conetec provide a great deal of subsurface information that supplements the standard penetration testing done with the boring rig and the laboratory testing.

The most commonly used information from the cone work is shown on the cone logs and on data sheets from the shear wave velocity testing and dilatometer testing in the appendix.

I have made reference in this report to other information coming from the basic cone values such as over-consolidation ratios, liquefaction safety factor estimates, and elastic modulus estimates that are available to me on the Conetec Data Services web site or in the Conetec "CPT and DMT Report" in the appendix of this report. If anyone would like to receive other cone data from the work done during this investigation, it can be provided.

SITE CONDITIONS:

The site is a gently sloping site with elevations of about 183 at North Front Street at the south end of the site and about 155 at the north end near Schwenk Drive. There is a low retaining wall separating east and west **parking areas** in the larger building area. The grade change is about 3 to 6 feet with the western side at a lower elevation.

The site has been in use primarily as a parking lot.

The surface appears to be generally well drained and stable.

The geology of the area features a relatively deep lacustrine soil deposit laid down in a glacial lake dating to the last post glacial epoch. The overburden soils consisting of sands, silts, and silty clays commonly extends to depths of over 100 feet. These layered soils rest on a stratum of dense glacial till which in turn rests on limestone or shale bedrocks.

These overburden soils are commonly slightly over-consolidated due to the removal of some glacial material by erosion as the Hudson River reached its present day bed or stream bottom level with elevations across the Valley becoming lower in this process.

There are existing buildings along the west side of the site and at the south end of the site which will need to be protected from construction vibrations.

SUBSURFACE CONDITIONS:

The specific subsurface conditions encountered at each boring location are indicated on the individual soil boring logs. However, to aid in the evaluation of this data, I have prepared a generalized description of the soil conditions based on the boring data.

The descriptions on the soil boring logs are those of the drill foremen. I reviewed them when I visually classified the soil samples and found the field descriptions to be good descriptions of the samples and to be matching the cone derived classifications (on the cone logs) quite well.

The cone probe logs describe a similar stratigraphy as do the soil boring logs with considerably more detail. The cone tip resistances, and friction sleeve values shown in the colored, graphical, logs provide a good estimate of the stiffness of the soil strata and the color coding provides a good general description of the soil types. In addition the cone probe logs reveal detail on the layering of the lacustrine soils with very many layers of sediments. The water levels are also shown on the cone logs.

There is a layer of in-situ fill on the site. The fill is generally loose or lower medium dense in compactness and consists of mixed soil textures with small amounts of miscellaneous fill materials such as brick fragments, cinders and ashes.. The depth of this fill varies from as much as 23 feet at the south end of the smaller building east of Fair Street to as little as 5 feet in the northern end of the larger building west of Fair Street.

Boring TB-6 describes the soils in the slope near North Front Street. The soils from elevation about 183 to about 21 feet deep or elevation 163 are layers of sand fill with traces of miscellaneous materials.

Another general pattern can be noted in the stratification of the site soils. Beneath the fill soils there is an upper series of layers of silt, silty sand, and silty clay or clayey silt soils in a loose to lower medium dense condition extending to a depth of about 40 feet. Just above a depth of about 40 feet there is a consistent pattern of sand layers which are shown in yellow on the cone testing logs.

The deeper soils below about 40 feet all the way to the dense glacial till at 94 feet to 101 feet deep the soils are uniformly layers of silts, fine sandy silts, clayey silts, and occasional thin silty clay layers in a very loose condition.

It is worth pointing out that here is a distinct difference between the subsurface conditions at shallower depths in the eastern (smaller) building and those in the western (larger) building. Some of the upper silt and silty clay strata are looser or softer than in the western building.

I have assumed for the purposes of this preliminary report that the deeper conditions are similar in both buildings. I have used the information from the boring TB-1 and cone probe at SCPT-17-01 to extend the information from the borings and probes in the eastern building for purposes of settlement estimation.

GROUNDWATER CONDITIONS:

The specific groundwater conditions are shown on the soil boring logs and on the cone probe logs. The levels on the cone probes are derived from the pore water dissipation testing at the cone probe locations. However, in general, the groundwater levels shown on the cone logs are about 20 feet below the ground surface.

The depths to ground water varied most noticeably at two locations. The samples became wet to saturated at a depth of about 15 to 17 feet at the TB-5 location and at about 22 to 25 feet at the TB-6 location. No cone probes were done near these locations to verify the saturation of soils below these depths.

Some fluctuation in groundwater levels and perched water conditions should be anticipated with variations in the seasonal rainfall and surface runoff.

ANALYSIS AND RECOMMENDATIONS:

Site Work:

The existing buildings and their foundations, surface topsoils, pavements, trees, stumps and debris should be removed prior to any ground improvement or other construction.

I recommend that dynamic compaction be used as a ground improvement method within the proposed building footprints extending at least 10 feet outside the building lines. In cases where the required ground improvement is close to an existing structure rammed aggregate piers might be used in lieu of dynamic compaction itself to control seismic velocities. Also local evaluations can be made including supplementary investigation to determine the best way to support the proposed structure in those areas.

The areas to be dynamically compacted should be graded to allow free movement of the cable crane used in the process.

The dynamic compaction process requires that the subgrade be at least 6 feet above the groundwater table. The preliminary site grading should take this into account. In local areas where groundwater might be mounded due to rain or runoff some material might need to be temporarily added to meet this requirement.

All building footprints will be compacted using the same grid patterns and applied energy.

Dynamic Compaction Recommendations:

The dynamic compaction and other ground improvement work should be done by a very experienced design/build contractor. I have provided my recommendations for this work below. The final "Work Plan" will need to be worked out by myself and the design/build contractor.

I recommend the application of a uniform amount of compaction energy over the building footprints extending to 10 feet outside the building lines. In addition to that I recommend that the individual spread footing foundation locations be treated with a pattern of drop points that depends on the size of the foundation. The larger footings may require up to five drop points each and the rest of the footing subgrades up to four drop points. The drop points would be arranged at the corners or at the corners and middle of the footing area.

I recommend that the building pads be compacted using an 8 ton weight and a drop height varying from 25 feet to 45 feet as required to compact the existing fill soils and the loose to medium dense virgin soils within the effective depth of the process. The appropriate amount of energy to be applied at each drop point can be evaluated by the response of the subgrade to the impact of the weight including the crater depth. The effective depth of dynamic compaction is generally taken to be a function of the energy of each blow in terms of height of drop and the magnitude of the weight itself and a coefficient which can vary depending on the subgrade soils, groundwater, presence of hard or soft layers, the amount of energy applied and other factors. On this site I recommend that the desired compaction can be achieved using a grid spacing of 9 feet by 9 feet. The energy can be applied in either one or two overlapping phases depending on the local subgrade conditions and the response to the dropping of the weight. The number of drops per drop point required will vary from about 5 to about 10. The need will be determined by the subgrade response.

The applied energy per unit area corresponding to the 9 foot by 9 foot grid with up to 10 drops of up to 45 feet with an 8 ton weight will be up to about 11,088 KJ/m2 in metric units. Assuming that about 20 feet or 6 meters of soil will be compacted, 230 kJ/m3 in terms of energy per cubic meter will be applied.

If any of the craters should exceed a depth of 3 feet, the crater should be filled with granular fill or crushed stone and additional drops applied until the bottom of the crater is tight or hard.

An ironing pass should follow the primary dynamic compaction work to better compact the soils above the bottom of crater depths. This is done using a weight with a lower static ground pressure and a lower drop height with impact areas overlapping.

Following the application of the dynamic compaction to the building footprint the surface should be rolled at least 7 times in each direction with a 20 ton-rated, dynamic, pad foot (sheeps foot type) roller to densify the shallow soils left disturbed by the crater formations at the drop points. The rollers with truncated pyramidal shaped "feet" will project the compaction energy deeper into the subgrade than will a smooth drum roller.

***Controlled Fill*:**

Controlled, relatively clean, granular fill can be spread in lifts not exceeding 12 inches in loose thickness. These materials should be compacted to a minimum of 95 percent of the maximum ASTM Specification D 1557-91 density, modified proctor.

Materials containing significant percentages of fine-grained soils or cohesive materials should be spread in lifts not exceeding 9 inches in loose thickness and compacted to a minimum of 90 percent of the same density standard.

On-site material may be difficult to compact during wet weather or poor drying conditions.

All controlled fill should be free of organic and/or frozen material.

Free-draining controlled fill should have less than 10 percent fines passing the #200 sieve. NYS DOT subbase items, Type 2 and Type 4 meet these requirements.

Soils compacted by the dynamic compaction procedure recommended above will not require in-place density testing.

***Building Foundations*:**

I recommend that the proposed structures be supported by spread footing foundations resting on virgin soils, controlled fill which, in turn, rests on these virgin materials or on dynamically compacted subgrades. Footings can be designed for a maximum, net, allowable soil bearing pressure of 3000 psf.

A minimum footing width of 2.0 feet is recommended for load-bearing strip footings. Isolated footings should be at least 4 feet wide

Exterior footings or footings in unheated areas should have a minimum of 4.0 feet of embedment for protection from frost action. Interior footings should have a minimum embedment of 2.0 feet below finished grade to develop the bearing value of the soils.

I recommend that 3 to 4 inches of NYS DOT subbase, Type 2 or 4, be placed over the subgrade and that the subgrade be well-tamped with a dynamic compactor. This will tighten soils loosened by the excavation and provide a uniform surface for placement of the reinforcing steel and the concrete itself.

I have estimated the settlements of footings designed for 3 ksf with the loads received on the foundation plan and schedule reduced by the estimated pressure removed from the footing location due to excavation to the design lowest finished floor elevation of about 151.5 feet. I have ignored the clear benefit of the stress relief provided by removal of the soil between footings. When the design has advanced, new settlement estimates and final foundation designs can take advantage of all stress relief from excavation as well as the final load estimates.

Basement or Retaining Walls:

All below-grade walls that retain soil should have a slotted drain pipe placed around the exterior base of the wall. The drain pipe should be a minimum of 6 inches in diameter and have a slot size suitable for the filter protection required for the select granular backfill used. A 1/8 inch wide slot will work with NYS DOT subbase items. A larger slot could be evaluated for the well graded crushed stone items. The drain tile should drain to a stormwater sewer, daylight, or a sump equipped with a pump.

The wall should then be backfilled with a controlled select granular material such as NYS DOT subbase Type 2 or 4. These gradations will work as a filter medium with a 1/8 inch slot size in the drain pipe. The material should extend away from the wall a horizontal distance of one half the height of the fill being placed. The upper 1 foot of material should be a fairly impermeable material or the backfill protected by pavement to shed surface water.

If these procedures are used, a lateral soil pressure of 52 psf per foot of retained soil can be used for design of the wall. This is an at-rest lateral soil pressure and is based on a moist unit weight of 125 pcf and an angle of internal friction of 36 degrees. A coefficient of base sliding of 0.45 can also be used for design.

Any surcharge load should also be added to the above pressures. The at-rest pressure coefficient is 0.41.

It may well be economical in the final design phase to use light weight backfills against retaining walls in some locations. Uniformly graded crushed stone, light weight aggregates, or geofoam could be used to reduce lateral pressures due to both lower unit weight and greater shear strength. This may allow economies compared to relying on the building frame to take the lateral load of conventional sand and gravel backfill.

***Ground Floor Slabs*:**

Floor slabs can be designed to rest on virgin, inorganic, soils; dymamically compacted subgrade soils; or on controlled fills resting on these materials. An 8-inch layer of well-graded, free-draining, granular material should be placed beneath the floor slab to provide drainage, act as a capillary break, and to provide better and more uniform support. I recommend that an AASHTO Size 57 stone; a NYS DOT size 1 or 1A stone be used as a slab base to allow more drainage capacity as well as good slab support.

In any areas below grade under-slab drainage is recommended to move groundwater seepage that may exceed the capacity of the slab base into the site drainage system. If water accumulated in the slab base, it might come upward at joints and create an icing problem in seasons.

The slabs should be designed or any wheel or post loads. A design coefficient of subgrade reaction of 100 pci can be used for design on granular subgrades. Area loads up to 200 to 300 psf will not require any special design attention.

The net loads in the building areas are near zero or negative which reduces any settlement due to uniform loads over large areas.

Foundation Plan and Preliminary Foundation Load Estimates:

I have included the preliminary foundation plan with a schedule of loads in the appendix. I have also included the design engineer's estimate of the average increase in net pressure on the subgrade soils due to these estimated loads broken down by areas designated A through F. These values of net average increase in pressure on the subgrade due to proposed loads by area can be compared to the load relief on the same subgrades due to the weight of soil to be excavated to reach design subgrade elevation. An estimated value for excavated in-situ soils could be assumed at 115 pcf to make this comparison.

Depending on the final design finished floor elevation for the ground slab at level -3 the net change in load is negative or only very slightly positive at the extreme north end of the two buildings.

Estimated Settlements and Design Loads:

I have estimated settlements using the Menard pressuremeter design rules. I have estimated the modulus values for the sands using the cone tip resistance values (qt) multiplied by 1.15. I have estimated the modulus of the silts and clays above a depth of 50 feet below existing grade using the qt values multiplied by 2.5. These are commonly used multipliers to calculate the Eo or Em values for pressuremeter analysis. The multiplier for the sands is lower because if an actual pressuremeter test were done the sands would show a modulus of about half of those in clays of equal elastic modulus (such as young's modulus) because the sands to not resist tension stresses that occur in PMT testing.

Below 50 feet I have used the elastic modulus values, Eo, from the dilatometer testing that was done from that level down to the glacial till. In my opinion these values are both higher and more accurate than those calculated from the cone tip (qt) values. If pressuremeter testing were done with a Menard type (stress controlled) pressurementer, it is likely that those modulus values would be even higher than the dilatometer values, but maybe not by much.

The estimated settlements will remain within the tolerable limits assumed at one inch maximum and 3/4 inches differential for the point loads or column loads up to 950 kips and strip loads up to 40 kips per foot for the buildings on shallow foundations.

I have included estimates of settlement in the appendix for three foundations where the highest point loads and strip loads are predicted for subgrade conditions depicted by the nearest boring and cone probe logs. I have chosen locations where the least load relief due to excavation is also indicated. These locations were at columns L-2, T-12, and L-6.5. The estimates were made for loads of 950 kips at L-2; 33 kips per foot at T-12; and 40 kips per foot at L-6.5. I reduced the recommended maximum allowable soil bearing pressure of 3 ksf as stated earlier in this report by the estimated stress relief due to excavation to design subgrade at 151.5. I took no settlement reduction for the soil removed between footings which provides a margin for probable future reductions in total settlements. Little change is likely to occur in estimated differential settlements.

If some of the design loads exceed these values, changes can be made to the foundation design to accommodate higher loads. If most cases, the footings can be made larger at the same or similar design pressure to gain a reduction in settlement.

It is also an option to stiffen the dynamically compacted top layer of the subgrade beyond the modulus achieved by the dynamic compaction process outlined earlier. This can be done by installing rammed aggregate piers to a depth of 8 to 10 feet at a grid spacing required to achieve the settlement reduction required. This process replaces the subgrade in areas requiring stiffening with heavily tamped crushed stone placed in cylindrical excavations augered in a grid pattern over the treated area. The modulus of the tamped stone may range in modulus up to 1000 tsf creating a layer at least the depth of the rammed aggregate piers that has a much higher composite modulus. That reduces the settlements. Where less stiffening is required rammed aggregate piers without pre-excavation could be installed.

If higher foundation loads are to be imposed, the geotechnical engineer should review these designs and provide a revised design to accommodate them along with the estimated settlement corresponding.

The structural design should consider the framing of the upper buildings at the joints in the structure of the supporting garages to better accommodate the greater potential for differential movements at those joints.

Seismic Design:

The site is a Class D site. This is based on a calculated Vs bar value of 614 ft/sec at the SCPT 17-01 location on the north end of the site. The earthquake response accelerations for the maximum considered earthquake for Kingston, NY, are as follows: (These values correspond to the IBC 2006/2009 values taken from 2003 USGS data.)

Ss	**0.172g**	**Short Period**
S1	**0.064g**	**Long Period**

The Vs values and the spreadsheet Vs bar calculation have been included in the appendix. The Conetec report provides more detail.

Liquefaction:

The cleaner sands and gravels below the water table are the most vulnerable to liquefaction during an earthquake event. Other things equal the shallower strata are more vulnerable than deeper strata.

My approach to estimating safety factors against liquefaction utilizes shear wave velocities when they are available. I calculate the safety factors based on an approach proposed by Ronald D. Andrus and Kenneth H. Stokoe II in their contribution to an article titled "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils." The article was published in the October, 2001, "Journal of Geotechnical and Geoenvironmental Engineering" in the October, 2001, issue.

I have checked two sand layers at SCPT-1701 that appear most vulnerable at that location and found that the safety factors were close to 2.0. I used the actual sieve tests from the nearby boring TB-1 to get the percentages of fines.

The application of ground improvement with dynamic compaction will increase these safety factors withing the range of effective depth plus depending on the specifics. The dynamic compaction should liquefy the strata that are vulnerable to liquefaction down to about 25 feet below the work surface.

I have assumed an earthquake magnitude of Mw=7.0 in this analysis.

Future or Supplementary Investigation:

The number of borings and cone probes done so far is relatively small for the total area of buildings planned. The focus was to get sufficient preliminary information for a preliminary design. My main focus has been to determine that a shallow foundation approach can be used economically for this design. There have been concerns expressed by others that this site has settlement issues and liquefaction issues due to the very deep loose and soft lacustrine soils on the site.

It is my opinion that the information in hand allows us to go ahead with shallow foundations from a settlement perspective. The liquefaction safety factors checked at SCPT 17-01 indicate that liquefaction issues can be addressed within the scope of the planned dynamic compaction program.

What I recommend for a scope of the additonal investigation at this point using the preliminary building design information and available subsurface information is the following:

One to two days of Additional Cone Testing with some additional shear wave velocity measurements and Marchetti dilatometer measurements.

Two days of additonal boring work.

Additional Laboratory Testing with a similar scope to that completed.

One to two days of pressuremeter testing depending on the results achieved with the additional dilatometer testing.

The principal issues include the following:

1. We need more detailed information in the south end of the smaller building.

2. We can check the shear wave velocity in some strata to determine whether any densification is required. We are unlikely to have safety factors less than 1.5 to 1.6 where liquefaction caused settlements become more significant, but we might want to reduce the possible

settlements due to liquefaction in strata having Fs less than 2.0. This is a quality issue.

3. Boring samples in sand layers below the water table that might have liquefaction safety factors less than 2.0 will allow sieve testing to refine the estimate.

4. The pressuremeter testing may allow us to design with higher elastic modulus values and control settlements with small footing sizes. The Menard (stress controlled) pressuremeter typically has allowed more aggressive foundation designs in the Hudson Valley clays such as those on this site. The dilatometer results achieved by Conetec were quite good and it may be that pressuremeter testing is not needed.

5. Due diligence requires the additional testing work in my opinion.

CONSTRUCTION PROCEDURES AND PROBLEMS:

All excavations of more than a few feet should be sheeted and braced or laid back to prevent sloughing in of the sides. Excavations should be designed by qualified engineers.

Excavations should not extend below adjacent footings, or utilities unless properly designed sheeting and bracing or underpinning is installed.

Sump-pit and sump-pump-type dewatering may be required in excavations or low areas during wet weather or if groundwater is encountered.

Temporary paving using coarse fill material or separation/ reinforcement geotextile and coarse fill material may be required for moving about the site during wet or thaw weather.

Subgrades should be kept from freezing during construction.

Water, snow, and ice should not be allowed to collect and stand in excavations or low areas of the subgrade.

Some obstacles, including old foundations, and building rubble may be encountered in excavations.

A qualified testing laboratory or engineer should be retained to monitor the qualities of the materials used and their placement.

A qualified engineer should observe the proof-rolling of subgrades and the dynamic compaction operations including the possible installation of rammed aggregate piers.

The buildings in the neighborhood should be inspected before work begins and monitored for seismic loads from the ground improvement work.

Kingstonian Development,
19 North Front Street
Kingston, New York

File No. 6439

CONTENTS OF APPENDIX:

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS

SS	:	Split-Spoon— $1^{3/4}$" I.D., 2" O.D., except where noted
S	:	Shelby Tube — 2" O.D., except where noted
PA	:	Power Auger Sample
DB	:	Diamond Bit — NX: BX: AX:
CB	:	Carboloy Bit — NX: BX: AX:
OS	:	Osterberg Sampler — 3" Shelby Tube
HS	:	Housel Sampler
WS	:	Wash Sample
FT	:	Fish Tail
RB	:	Rock Bit
WO	:	Wash Out

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted

WATER LEVEL MEASUREMENT SYMBOLS

WL	:	Water Level
WCI	:	Wet Cave In
DCI	:	Dry Cave In
WS	:	While Sampling
WD	:	While Drilling
BCR	:	Before Casing Removal
ACR	:	After Casing Removal
AB	:	After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils the accurate determination of ground water elevations is not possible in even several day's observation, and additional evidence on ground water elevations must be sought.

CLASSIFICATION

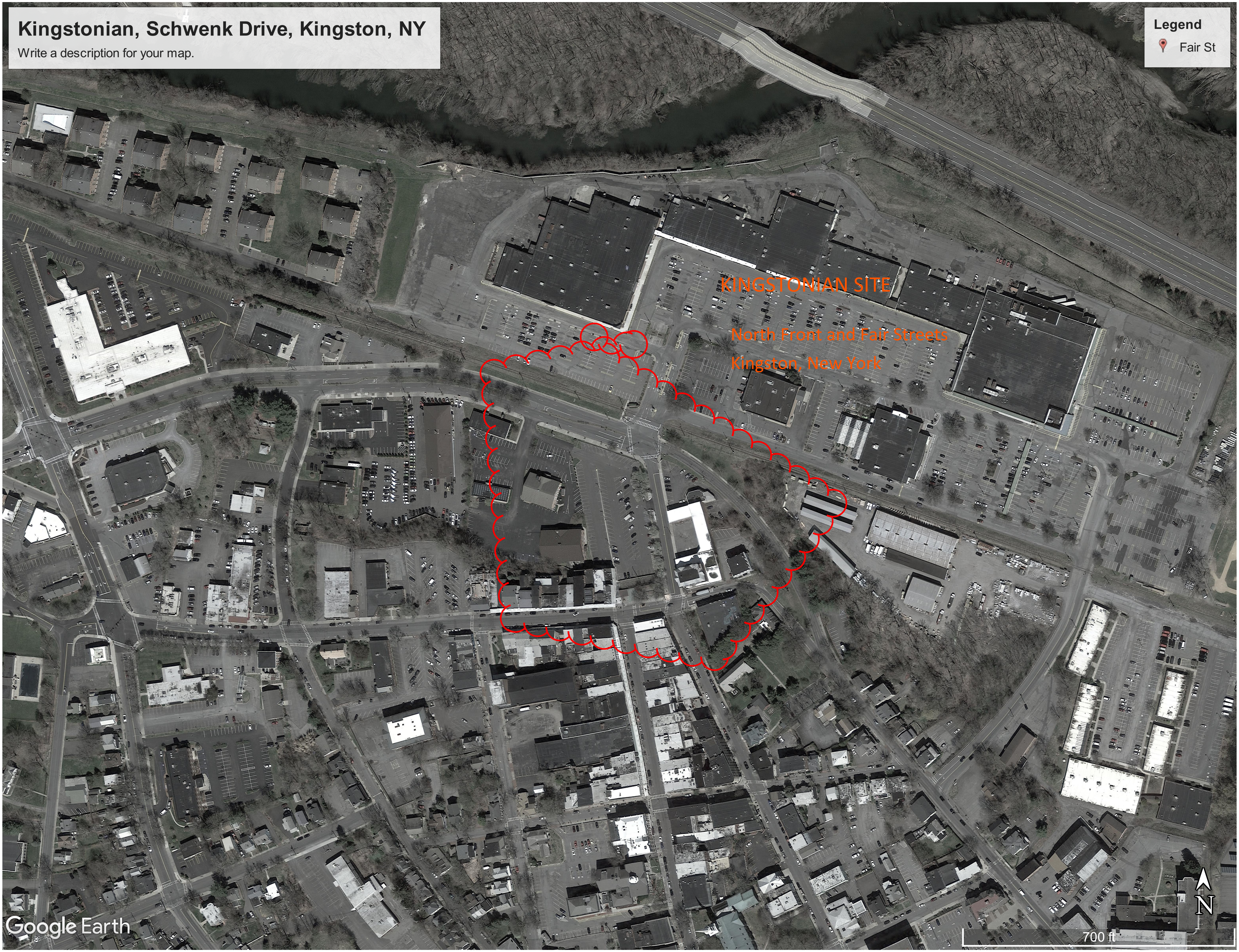
COHESIONLESS SOILS

"Trace"	:	1% to 10%	
"Trace to some"	:	10% to 20%	
"Some"	:	20% to 35%	
"And"	:	35% to 50%	
Loose	:	0 to 9 Blows	or equivalent
Medium Dense	:	10 to 29 Blows	or equivalent
Dense	:	30 to 59 Blows	or equivalent
Very Dense	:	≥ 60 Blows	or equivalent

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, then clay becomes the principle noun with the other major soil constituent as modifiers: i.e., silty clay. Other minor soil constituents may be added according to classification breakdown for cohesionless soils; i.e., silty clay, trace to some sand, trace gravel.

Soft	:	0.00 — 0.59 tons/ft²
Medium	:	0.60 — 0.99 tons/ft²
Stiff	:	1.00 — 1.99 tons/ft²
Very Stiff	:	2.00 — 3.99 tons/ft²
Hard	:	≥ 4.00 tons/ft²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KINGSTONIAN SITE
North Front and Fair Streets
Kingston, New York
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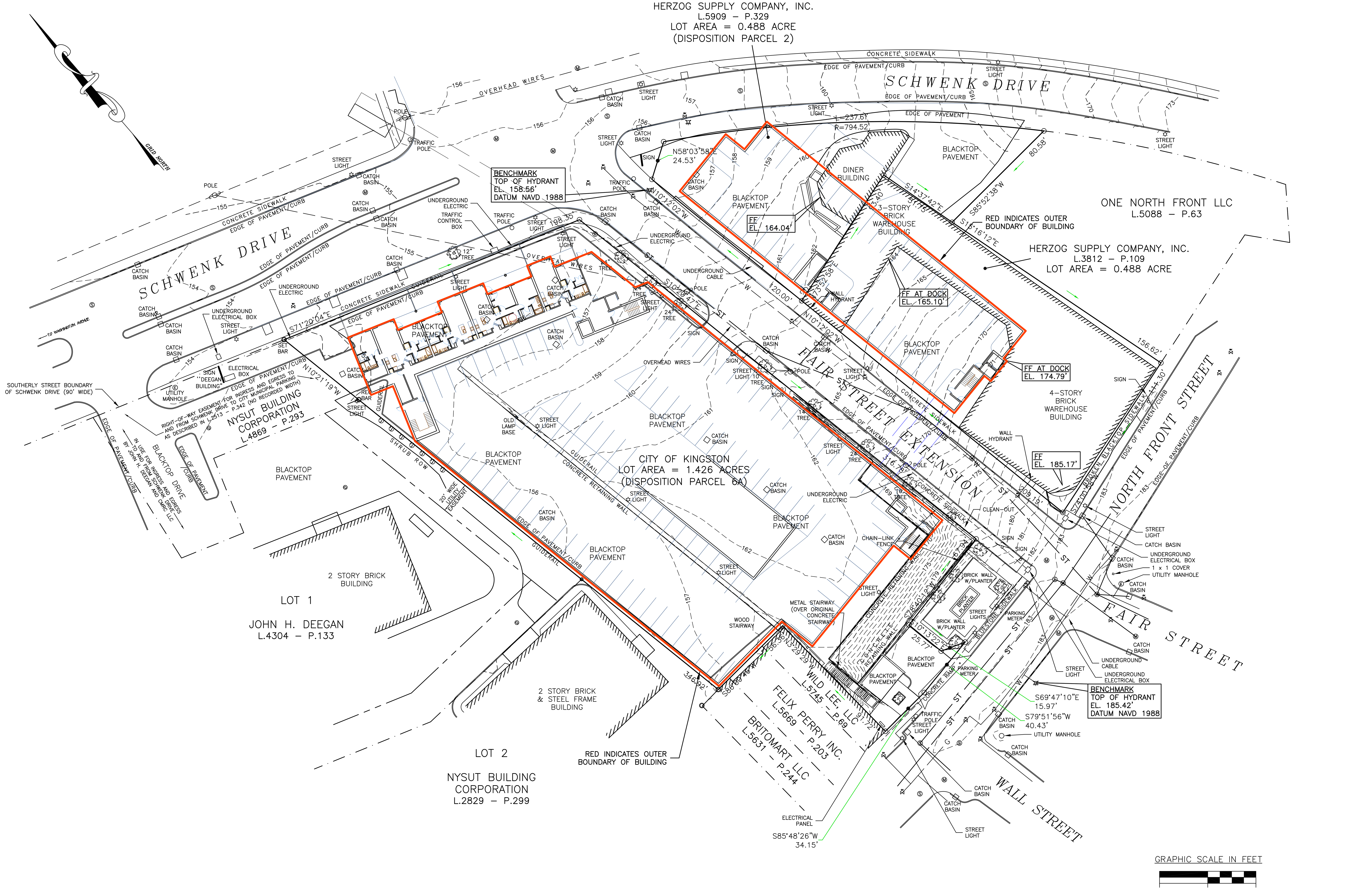

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This map may not be used in connection with a "Survey Affidavit" or similar document, statement or mechanism to obtain title insurance for any subsequent owner or future grantees.

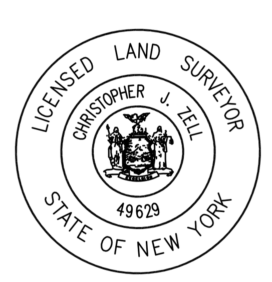
Only copies from the original of this survey marked with an original of the surveyor's seal shall be considered valid true copies.

The location of underground improvements or encroachments, if any exist or are shown hereon, are not certified.

Certifications indicated hereon signify that this survey was prepared in accordance with the existing Code of Practice for Land Surveyor's adopted by the New York State Association of Professional Land Surveyor's, Inc. Said certifications shall run only to the person for whom the survey is prepared and on his behalf to the title company, governmental agency and lending institution listed hereon and to the assignees of the lending institution. Certifications are not transferable to additional institutions or subsequent owners.

TAX MAP REFERENCE
City of Kingston, Section No. 48.80
Block 1, Lots 24.120, 25 & 26

DEED REFERENCE
Liber 3812 of Deeds at Page 109
Liber 5909 of Deeds at Page 329



BRINNIER & LARIOS, P. C.

PRELIMINARY

EXISTING CONDITIONS MAP

OF THE SITE OF THE PROPOSED

KINGSTONIAN

NORTH FRONT AND FAIR STREETS

CITY OF KINGSTON ULSTER COUNTY NEW YORK

JUNE 22, 2017 SCALE: 1" = 30'

AJH

MACKENZIE ARCHITECTS P.C.

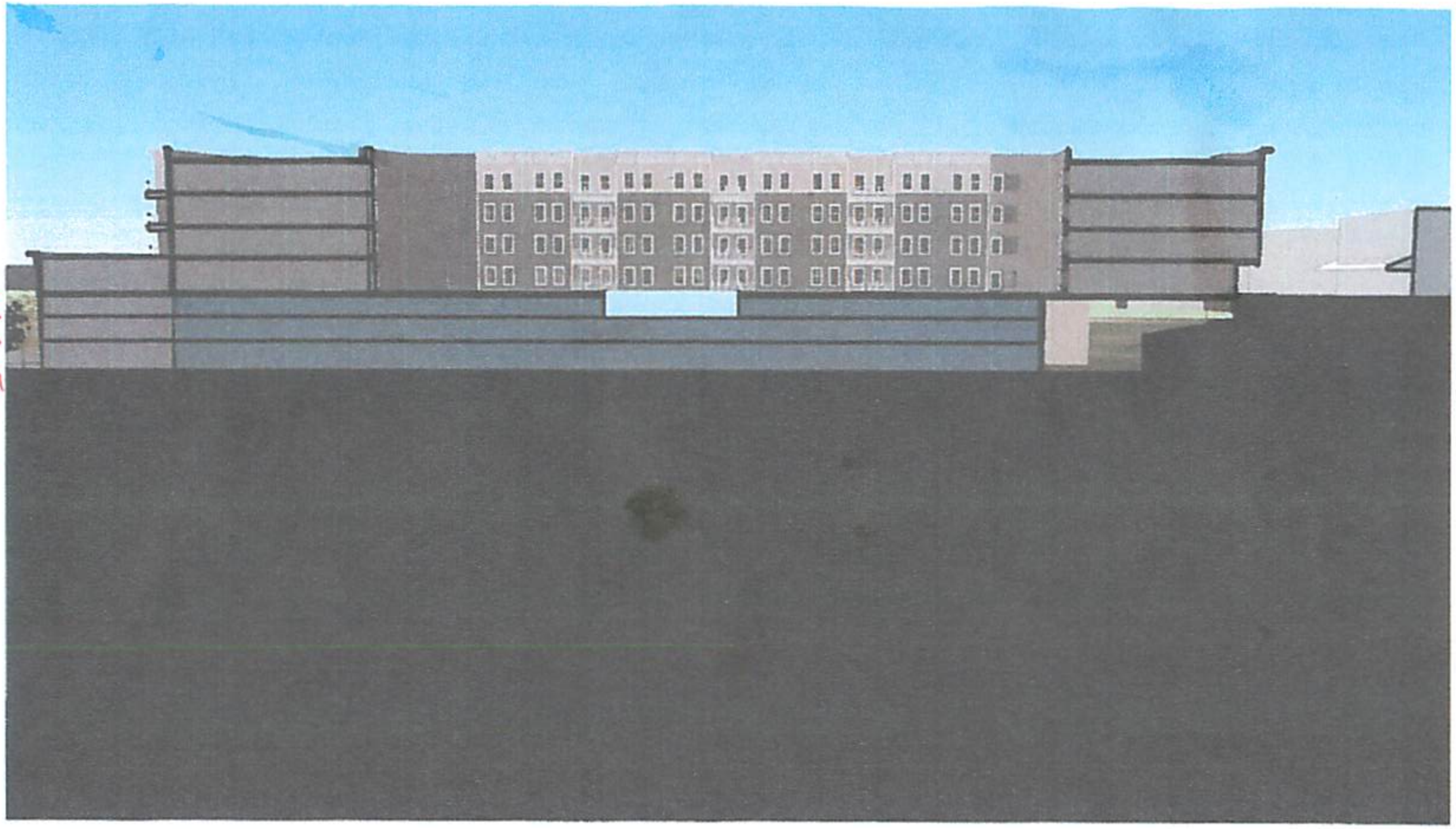
162 Battery Street, Burlington, Vermont 05401 802.863.7177 (T) www.mackenziearchitects.com

Preliminary Concept
Kingston Mixed Use Development
View from Front Street

JM Development Group LLC
Poughkeepsie, NY
Date: July 21, 2017

L 1 183.5'
L-1 172.83'
L-2 162.16'
L-3 151.5'

SUNKEN FRONT YARD, SET BELOW SCHWENK



183.0' FRONT ST.

PRELIMINARY FLOOR ELEVATIONS 11/1/17

MACKENZIE ARCHITECTS P.C.

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Preliminary Concept
Kingston Mixed Use Development
Building Section at Pool

JM Development Group LLC
Poughkeepsie, NY
Date: September 6, 2017

LEVEL 1 (MACKENZIE LEVEL -3)
1/16" = 1'-0 WHEN PLOTTED ON 24"x36" PAPER

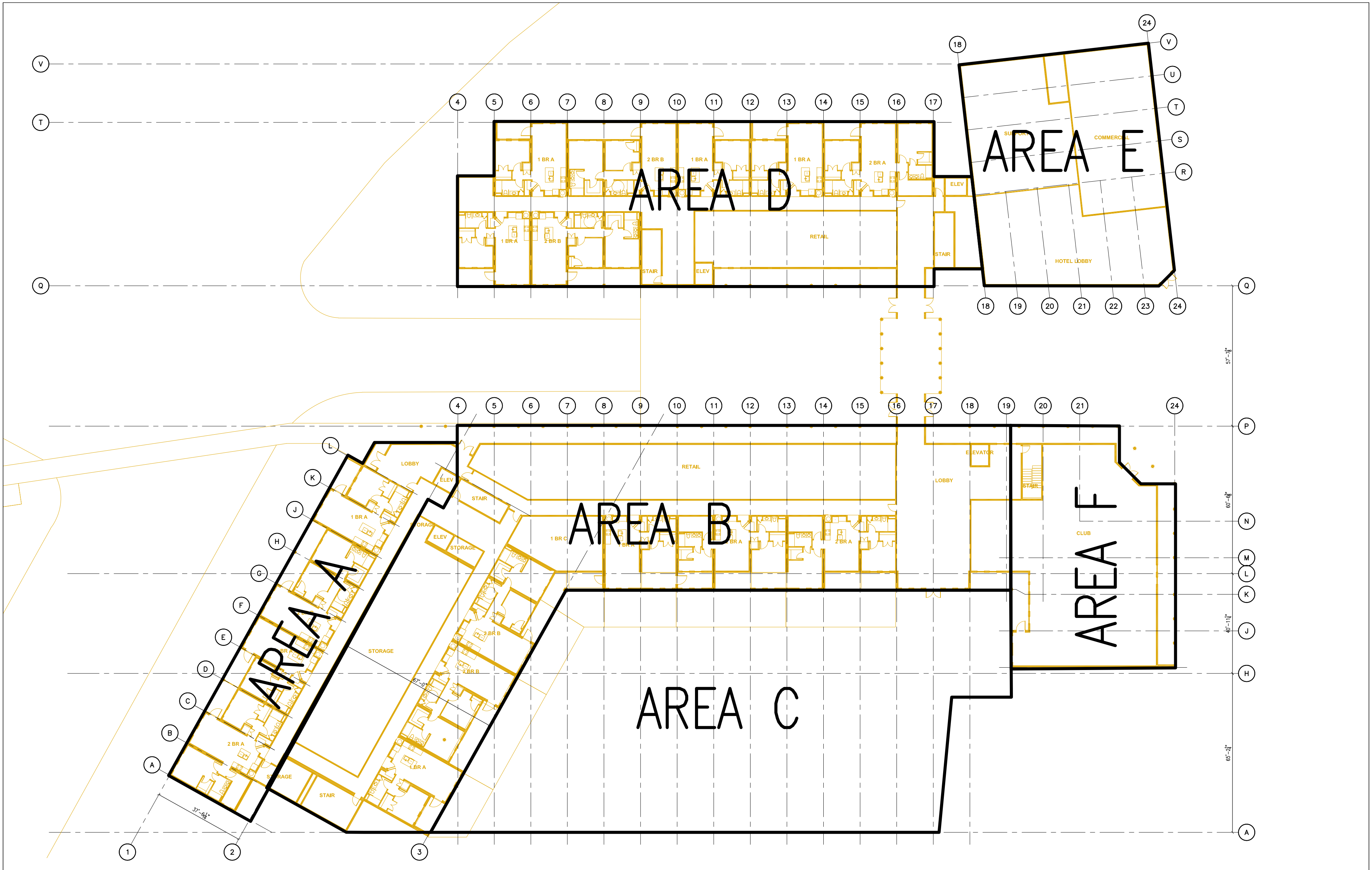
LEVEL 4 (MACKENZIE LEVEL 1)
1/16" = 1'-0 WHEN PLOTTED ON 24"x36" PAPER

Kingstonian
Preliminary Foundation Loads
11/8/17

Martin Hain
Knight Consulting Engineers, Inc.

Foundation Loads at Lev 1 (Level -3 on Mackenzie Drawings)	Dead	Live	Snow	Drifting Snow	Units
Point Load at A-3	163	275	50	0	k
Point Load at H-5.7	265	448	81	0	k
Point Load at L-7.2	102	173	31	0	k
Grid 2 between Grids A and K	9.31	7.37	1.34	0.00	kpf
Grid A between Grids 1 and 2	0.98	1.65	0.30	0.30	kpf
Grid A between Grids 2.6 and 17	11.65	6.03	1.34	0	kpf
Grids B-L between Grids 1 and 2	1.95	3.3	0.6	0.6	kpf
Grid H between Grids 5 and 15.5	15.55	9.54	2.12	0.00	kpf
Point Loads at H-2 and H-5	354	318	71	0	k
Point Load at H-15.5	288	259	58	0	k
Point Load at H-19	144	130	29	0	k
Grid L between Grids 6.5 and 15.5	19.18	13.90	2.30	0.00	kpf
Point Loads at L-2 and L-6.5	470	459	76	0	k
Point Loads at L-15.5 and L-19	387	377	63	0	k
Grid P between Grids 4.4 and 19	14.33	9.08	1.21	0.00	kpf
Grid Q between Grids 3 and 18	15.34	10.05	1.34	0.00	kpf
Grid T between Grids 4 and 5.8, between Grids 7.4 and 15.9, and between Grids 17 and 18	17.74	11.67	1.34	0.00	kpf
Point Loads as T-5.8, T-7.4, T-15.9 and T-17	160	146	17	0	k
Grid V between Grids 4.8 and 18	7.35	1.62	0.00	0.00	kpf

Foundation Loads at Lev 4 (Level 1 on Mackenzie Drawings)	Dead	Live	Snow	Drifting Snow	Units
Grids 18 and 24 between Grids Q and R	0.65	1.07	0.26	0.00	kpf
Grids 19-23 between Grids Q And R	1.30	2.15	0.52	0.00	kpf
Grid H between Grids 19 and 24	0.98	1.65	0.30	0.00	kpf
Grids J and K between Grids 19 and 24	1.95	3.30	0.60	0.00	kpf
Grid M between Grids 20 and 24	1.95	3.30	0.60	0.00	kpf
Grid N between Grids 21 and 24	1.95	3.30	0.60	0.00	kpf
Grid R between Grids 18 and 24	0.68	1.11	0.27	9.00	kpf
Grids S-U between Grdis 18 and 24	1.35	2.23	0.54	18.00	kpf
Grid V between Grids 18 and 24	0.68	1.11	0.27	9.00	kpf

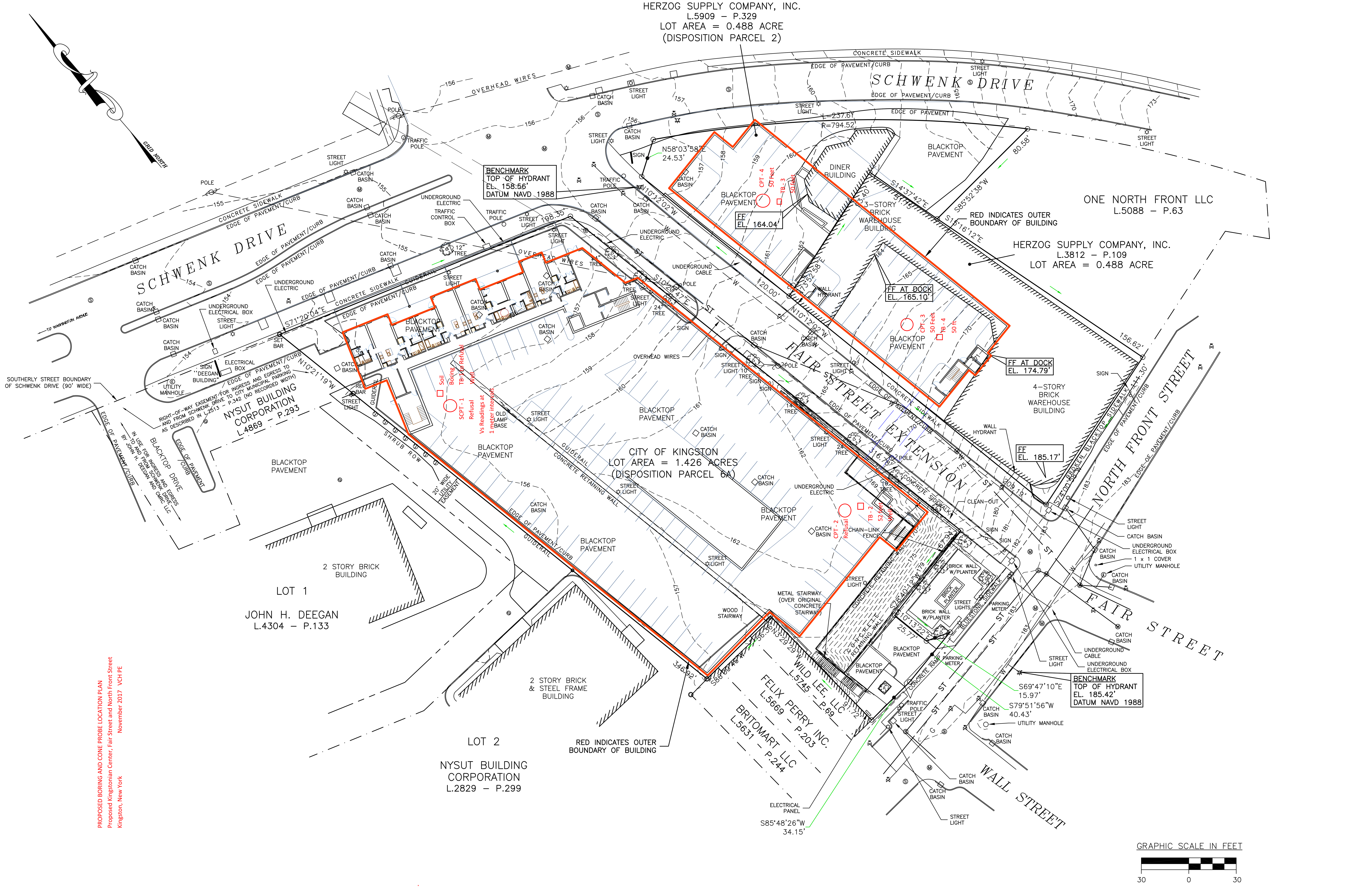


LEVEL 4 (MACKENZIE LEVEL 1)
1/16" = 1'-0 WHEN PLOTTED ON 24"x36" PAPER

Area (sf)	6414	23473	19392	13555	7461	6212

	Dead Load (psf)	Live Load (psf)	Snow Load (psf)	Total Load (psf)	Floor Load (k)					
					Area A	Area B	Area C	Area D	Area E	Area F
Lev 4 Roof Load	20		40	60		1408		813		373
Lev 4 Modular Floor	20	55		75		1760		1017		466
Lev 3 Roof Load	20		40	60					448	
Lev 3 Modular Floor	20	55		75		1760		1017	560	466
Lev 2 Modular Floor	20	55		75		1760		1017	560	466
Lev 2 Roof Load	20		60	80	513					
Lev 1 Modular Floor	20	55		75	481					
Lev 1 Composite Slab Interior	80	55		135		3169		1830		
Lev 1 Composite Slab Exterior	80	100		180			3491			
Lev -1 Modular Floor	20	55		75	481					
Lev -1 Double Tee Floor	60	40		100		2347	1939	1356		
Lev -2 Modular Floor	20	55		75	481					
Lev -2 Double Tee Floor	60	40		100		2347	1939	1356		

	Total Loads at Foundation					
	Area A	Area B	Area C	Area D	Area E	Area F
Total Load at Foundation (k)	1956	14553	7369	8404	1567	1770
Total Load at Foundation (Total Load/Area, psf)	305	620	380	620	210	285
Foundation Bearing Level	-3	-3	-3	-3	1	1



Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of Section 7209, Subdivision 2 of the New York State Education Law.

This map may not be used in connection with a "Survey Affidavit" or similar document, statement or mechanism to obtain title insurance for any subsequent owner or future grantees.

Only copies from the original of this survey marked with an original of the surveyor's seal shall be considered valid true copies.

The location of underground improvements or encroachments, if any exist or are shown hereon, are not certified.

Certifications indicated hereon signify that this survey was prepared in accordance with the existing Code of Practice for Land Surveyor's adopted by the New York State Association of Professional Land Surveyor's, Inc. Said certifications shall run only to the person for whom the survey is prepared and on his behalf to the title company, governmental agency and lending institution listed hereon and to the assignees of the lending institution. Certifications are not transferable to additional institutions or subsequent owners.

TAX MAP REFERENCE
City of Kingston, Section No. 48.80
Block 1, Lots 24.120, 25 & 26

DEED REFERENCE
Liber 3812 of Deeds at Page 109
Liber 5909 of Deeds at Page 329

LICENSED LAND SURVEYOR
CHRISTOPHER J. ZELL
49629
STATE OF NEW YORK

BRINNIER & LARIOS, P. C.

PRELIMINARY

EXISTING CONDITIONS MAP
OF THE SITE OF THE PROPOSED
KINGSTONIAN
NORTH FRONT AND FAIR STREETS
CITY OF KINGSTON ULSTER COUNTY NEW YORK
JUNE 22, 2017 SCALE: 1" = 30'

AJH

NORTHEAST NSD SPECIALIZED DRILLING, INC.

BORING LOG

PROJECT:	Bonura Hospitality - Kingstonian Project	**JOB NUMBER:**	G097-17
LOCATION:	Kingston, New York	**BORING NUMBER:**	TB-1
CLIENT:	Bonura Hopsitality Group - JM Development	**SURFACE ELEVATION:**	As Obtained by Client

				GROUND WATER READINGS		
					Depth to Water:	Casing At:
DATE STARTED:	11/21/17	**DATE COMPLETED:**	11/21/17	**WHILE DRILLING:**	19.8'	20.0'
DRILLER:	Marc Cheney	**HELPER:**	Zack Cheney Al Linstruth	**BEFORE CASING REMOVED:**	8.9'	98.0'
CASING TYPE:	3 1/4" Hollow Stem Augers			**AFTER CASING REMOVED:**	None Noted	
DRILL RIG:	Truck Mounted Central Mine Equipment Model 55			**CAVED AT DEPTH:**	4.2'	

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
					2 1/2" Asphalt Pavement	0.2
1a	0.2'-1.2'	5-8-9-5	N/17	16	Grey Crushed Rock and SILT (moist) ~*Fill*~	
1b	1.2'-2.0'				Brown Slag, SILT, Ash and Asphalt (moist) ~*Misc. Fill*~	
2a	2.0'-2.3'	4-6-4-4	N/10	13	Similar Miscellaneous Fill (moist) ~*Miscellaneous Fill*~	2.3
2b	2.3'-4.0'				Brown cmf SAND, trace SILT (moist, medium compact) ~*Fill*~	
3	4.0'-6.0'	3-2-2-2	N/4	14	Similar Soil (moist, loose) ~*Fill*~	
4a	6.0'-7.8'	2-3-2-2	N/5	16	Similar Soil (moist, loose) ~*Fill*~	7.8
4b	7.8'-8.0'				Brown SILT, trace fine SAND, trace CLAY (moist, medium	
					stiff) 0.50 Tsf	
5	10.0'-12.0'	1-1-2-2	N/3	13	Brown SILT, trace fine SAND, trace CLAY, trace Decayed	
					Wood (moist, soft) 0.50 Tsf	
6a	15.0'-16.1'	3-3-2-3	N/5	18	Similar Soil (moist, medium stiff) 0.25 Tsf	16.1
6b	16.1'-17.0'				Brown mf SAND, trace SILT (moist, loose)	
7	20.0'-22.0'	2-2-1-WH	N/3	20	Similar Soil (saturated, very loose)	

Notes:

Key to Drilling Terms: N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; C - % of Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-1

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
8	25.0'-27.0'	3-2-2-2	N/4	18	Brown mf SAND, trace SILT (saturated, loose)	
9	30.0'-32.0'	3-5-4-5	N/9	18	Similar Soil (saturated, loose)	
10	35.0'-37.0'	3-4-3-3	N/7	19	Similar Soil (saturated, loose)	
11a	40.0'-41.0'	3-4-3-2	N/7	20	Similar Soil (saturated, loose)	41.0
11b	41.0'-42.0'				Grey/Brown SILT, some CLAY, trace fine SAND (saturated,	
					medium stiff) 0.00 Tsf	
12	45.0'-47.0'	3-2-2-2	N/4	10	Similar Soil (saturated, medium stiff) 0.00 Tsf	
					95 Ft/Lbs @ 47.7'	
13	47.0'-49.0'	2-3-2-2	N/5	20	Similar Soil (saturated, medium stiff) 0.25 Tsf	
14	50.0'-52.0'	2-2-2-2	N/4	18	Similar Soil (saturated, medium stiff) 0.50 Tsf	
U1	52.0'-54.0'	Shelby Tube		U/24	Grey SILT, some CLAY (saturated)	
					Soil Classification obtained from Bottom of Shelby Tube	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; U - Undisturbed Shelby Tube Sample; U/Recovery

C - % Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-1

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
15	54.0'-56.0'	3-2-2-2	N/4	24	Grey SILT, some CLAY, trace fine SAND (staurated,	
					medium stiff) 0.00 Tsf	
16	60.0'-62.0'	2-2-2-3	N/4	18	Similar Soil (saturated, medium stiff) 0.00 Tsf	
17	62.0'-64.0'	3-2-2-4	N/4	14	Similar Soil (saturated, medium stiff) 0.00 Tsf	
18	75.0'-77.0'	2-3-2-2	N/5	14	Similar Soil (saturated, medium stiff) 0.00 Tsf	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-1

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
19	85.0'-87.0'	WH-WH-3-2	N/3	14	Grey SILT, some CLAY, trace fine SAND (saturated, soft)	
					0.00 Tsf	
20	95.0'-97.0'	3-26-17-13	N/43	14	Grey/Brown SILT, some cmf SAND, little fine GRAVEL	
					(moist, hard) 2.00 Tsf	
21	98.0'-100.0'	28-19-14-25	N/33	12	Dark Grey SILT, some cmf SAND, little cmf GRAVEL (moist,	
					hard) 2.25 Tsf	
					Bottom of Boring @ 100.0'	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

BORING LOG

PROJECT:	Bonura Hospitality - Kingstonian Project	**JOB NUMBER:**	G097-17
LOCATION:	Kingston, New York	**BORING NUMBER:**	TB-2
CLIENT:	Bonura Hopsitality Group - JM Development	**SURFACE ELEVATION:**	As Obtained by Client

				GROUND WATER READINGS		
					Depth to Water:	Casing At:
DATE STARTED:	11/22/17	**DATE COMPLETED:**	11/22/17	**WHILE DRILLING:**	14.7'	20.0'
DRILLER:	Marc Cheney	**HELPER:**	Zack Cheney Al Linstruth	**BEFORE CASING REMOVED:**	19.6'	50.0'
CASING TYPE:	3 1/4" Hollow Stem Augers			**AFTER CASING REMOVED:**	9.9'	
DRILL RIG:	Truck Mounted Central Mine Equipment Model 55			**CAVED AT DEPTH:**	14.4'	

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
					4" Asphalt Pavement	0.3
1	0.3'-2.3'	10-16-17-14	N/33	12	Brown/Grey cmf SAND and SILT, some cmf GRAVEL (moist,	
					compact) *~Fill~*	
2	5.0'-7.0'	8-9-7-13	N/16	16	Brown mf SAND, trace SILT (moist, medium compact) *~Fill~*	
3	10.0'-12.0'	14-13-11-5	N/24	12	Brown cmf SAND, some Brick, little SILT, trace mf GRAVEL,	
					trace Ash, trace Slag (moist, medium compact)	
					~Miscellaneous Fill~	
4	15.0'-17.0'	1-WH-1-3	N/1	10	Brown cmf SAND, some SILT, little cmf GRAVEL, trace Brick,	
					trace Decayed Wood (moist, very loose) *~Miscellaneous Fill~*	
						20.0
5	20.0'-22.0'	1-1-1-2	N/2	18	Brown cmf SAND, trace SILT (saturated, very loose)	
6	25.0'-27.0'	3-2-3-4	N/5	10	Similar Soil (saturated, loose)	

Notes:

Key to Drilling Terms: N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; C - % of Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-2

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
7	30.0'-32.0'	6-7-9-11	N/16	17	Brown cmf SAND, trace SILT (saturated, medium compact)	
8	35.0'-37.0'	6-7-6-7	N/13	12	Similar Soil (saturated, medium compact)	
9a	40.0'-41.9'	6-9-9-10	N/18	14	Similar Soil (saturated, medium compact)	41.9
9b	41.9'-42.0'				Brown SILT and CLAY, trace Interlayered fine SAND (saturated,	
					very stiff)	
10	45.0'-47.0'	6-5-5-7	N/10	16	Brown/Grey SILT, trace CLAY, trace fine SAND, trace Decayed	
					Wood (wet, stiff) 0.25 Tsf	
11	50.0'-52.0'	8-9-10-12	N/19	10	Grey SILT, trace Interlayered CLAY, trace Interlayered fine SAND	
					(saturated, very stiff) 0.50 Tsf	
					Bottom of Boring @ 52.0'	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

BORING LOG

PROJECT:	Bonura Hospitality - Kingstonian Project	**JOB NUMBER:**	G097-17
LOCATION:	Kingston, New York	**BORING NUMBER:**	TB-3
CLIENT:	Bonura Hopsitality Group - JM Development	**SURFACE ELEVATION:**	As Obtained by Client

				GROUND WATER READINGS		
					Depth to Water:	Casing At:
DATE STARTED:	11/20/17	**DATE COMPLETED:**	11/20/17	**WHILE DRILLING:**	24.7'	25.0'
DRILLER:	Marc Cheney	**HELPER:**	Zack Cheney Al Linstruth	**BEFORE CASING REMOVED:**	25.1'	30.0'
CASING TYPE:	3 1/4" Hollow Stem Augers			**AFTER CASING REMOVED:**	None Noted	
DRILL RIG:	Truck Mounted Central Mine Equipment Model 55			**CAVED AT DEPTH:**	20.7'	

SAMPLE NUMBER	**DEPTH OF SAMPLE**	**BLOW COUNTS OF SAMPLER DRIVE (per 6")**	**C/N**	**RECOVERY (Inches)**	**DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)**	**DEPTH OF STRATA CHANGE**
					1" Asphalt Pavement	0.1
1	0.1'-2.0'	9-11-13-10	N/24	16	Grey Crushed Rock and SILT, trace cmf SAND (moist)	
					~Fill ~	
2	2.0'-4.0'	5-5-5-4	N/10	12	Similar Fill (moist) *~Fill~*	
3	4.0'-6.0'	6-9-7-6	N/16	10	Brown cmf SAND and Slag, some Brick, little Ash (moist)	
					~Miscellaneous Fill~	
4	6.0'-8.0'	5-3-2-1	N/5	12	Similar Miscellaneous Fill (moist) *~Miscellaneous Fill~*	
5	10.0'-12.0'	2-2-2-1	N/4	6	Similar Miscellaneous Fill (moist) *~Miscellaneous Fill~*	
						15.0
6	15.0'-17.0'	2-1-2-2	N/3	4	Brown SILT, trace CLAY, trace fine SAND (moist, soft)	
7	20.0'-22.0'	3-3-2-3	N/5	16	Similar Soil (moist to wet, medium stiff)	
8	22.0'-24.0'	1-1-WH-1	N/1	16	Similar Soil (wet, very soft)	
						25.0

Notes:

Key to Drilling Terms: N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; C - % of Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-3

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
9	25.0'-27.0'	6-7-6-5	N/13	10	Brown fine SAND, trace SILT (saturated, medium compact)	
10	30.0'-32.0'	4-3-3-4	N/6	13	Brown cmf SAND, trace SILT (saturated, loose)	
					Bottom of Boring @ 32.0'	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

BORING LOG

PROJECT:	Bonura Hospitality - Kingstonian Project	**JOB NUMBER:**	G097-17
LOCATION:	Kingston, New York	**BORING NUMBER:**	TB-4
CLIENT:	Bonura Hopsitality Group - JM Development	**SURFACE ELEVATION:**	As Obtained by Client

				GROUND WATER READINGS		
					Depth to Water:	Casing At:
DATE STARTED:	11/20/17	**DATE COMPLETED:**	11/20/17	**WHILE DRILLING:**	18.9'	18.0'
DRILLER:	Marc Cheney	**HELPER:**	Zack Cheney Al Linstruth	**BEFORE CASING REMOVED:**	26.2'	30.0'
CASING TYPE:	3 1/4" Hollow Stem Augers			**AFTER CASING REMOVED:**	None Noted	
DRILL RIG:	Truck Mounted Central Mine Equipment Model 55			**CAVED AT DEPTH:**	12.5'	

SAMPLE NUMBER	**DEPTH OF SAMPLE**	**BLOW COUNTS OF SAMPLER DRIVE (per 6")**	**C/N**	**RECOVERY (Inches)**	**DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)**	**DEPTH OF STRATA CHANGE**
					1" Asphalt Pavement	0.1
1a	0.1'-1.4'	7-5-6-4	N/11	16	Brown SILT and cmf SAND, little Slag, trace Ash, trace	
					Brick (moist, stiff) *~Miscellaneous Fill~*	
1b	1.4'-2.0'				Brown cmf SAND, trace fine GRAVEL, trace SILT (moist,	
					medium compact) *~Fill~*	
2	2.0'-4.0	4-4-2-2	N/6	10	Similar Fill (moist, loose) *~Fill~*	
3	4.0'-6.0'	3-2-1-3	N/3	6	Similar Fill (moist, very loose) *~Fill~*	
4	6.0'-8.0'	3-2-2-3	N/4	10	Similar Fill (moist, loose) *~Fill~*	
5	10.0'-12.0'	1-2-1-1	N/3	3	White Ash and Slag, little Brick (moist) *~Miscellaneous Fill~*	
6	15.0'-17.0'	1-1-1-1	N/2	8	Similar Miscellaneous Fill (moist) *~Miscellaneous Fill~*	
7	17.0'-19.0'	1-1-1-1	N/2	8	Similar Miscellaneous Fill (moist to wet) *~Miscellaneous Fill~*	
8	19.0'-21.0'	1-1-2-1	N/3	3	Similar Miscellaneous Fill (wet to saturated)	
					~Miscellaneous Fill~	
9	21.0'-23.0'	3-2-2-2	N/4	0	*No Sample Recovery - 2 Attempts*	
10	23.0'-25.0'	3-3-4-6	N/7	4	Similar Miscellaneous Fill (saturated) *~Miscellaneous Fill~*	

Notes:

Key to Drilling Terms: N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; C - % of Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-4

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
11a	25.0'-26.1'	3-4-4-5	N/8	16	Brown cmf SAND, some Wood, trace Brick (moist, losoe)	
					~Miscellaneous Fill~	26.1
11b	26.1'-27.0'				Brown SILT, little Decayed Wood, trace CLAY (moist, stiff)	
12	30.0'-32.0'	2-1-2-3	N/3	16	Similar Soil (moist, soft)	
					Bottom of Boring @ 32.0'	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

BORING LOG

PROJECT:	Bonura Hospitality - Kingstonian Project	**JOB NUMBER:**	G097-17
LOCATION:	Kingston, New York	**BORING NUMBER:**	TB-5
CLIENT:	Bonura Hopsitality Group - JM Development	**SURFACE ELEVATION:**	As Obtained by Client

				GROUND WATER READINGS		
					Depth to Water:	Casing At:
DATE STARTED:	11/22/17	**DATE COMPLETED:**	11/22/17	**WHILE DRILLING:**	None Noted	15.0'
DRILLER:	Marc Cheney	**HELPER:**	Zack Cheney Al Linstruth	**BEFORE CASING REMOVED:**	27.9'	30.0'
CASING TYPE:	3 1/4" Hollow Stem Augers			**AFTER CASING REMOVED:**	None Noted	
DRILL RIG:	Truck Mounted Central Mine Equipment Model 55			**CAVED AT DEPTH:**	14.9'	

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
					2 1/2" Asphalt Pavement	0.3
1a	0.3'-1.1'	6-6-8-9	N/14	18	Grey Crushed Stone and SILT (moist) *~Fill~*	
1b	1.1'-2.3'				Brown cmf SAND, trace SILT, trace Ash, trace Slag (moist,	
					medium compact) ~Miscellaneous Fill~	
2	5.0'-7.0'	5-4-2-3	N/6	13	Brown cmf SAND, trace SILT (moist, loose) *~Fill~*	
3a	10.0'-11.4'	2-2-2-3	N/4	20	Similar Soil (moist, loose) *~Fill~*	11.4
3b	11.4'-12.0'				Brown SILT, trace CLAY, trace fine SAND (moist, meidum	
					stiff) 1.00 Tsf	
4	15.0'-17.0'	1-1-2-2	N/3	18	Similar Soil (moist to wet, soft) 0.25 Tsf	
5	20.0'-22.0'	2-1-2-2	N/3	19	Similar Soil (wet, soft) 0.50 Tsf	
6	25.0'-27.0'	2-1-2-3	N/3	18	Grey/Brown mf SAND, trace SILT (saturated, very loose)	

Notes:

Key to Drilling Terms: N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; C - % of Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-5

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
						30.0
7	30.0'-32.0'	4-5-6-5	N/11	16	Grey/Brown mf SAND, trace SILT (saturated, very loose)	
					Bottom of Boring @ 32.0'	

Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

BORING LOG

PROJECT:	Bonura Hospitality - Kingstonian Project	**JOB NUMBER:**	G097-17
LOCATION:	Kingston, New York	**BORING NUMBER:**	TB-6
CLIENT:	Bonura Hopspitality Group - JM Development	**SURFACE ELEVATION:**	As Obtained by Client

				GROUND WATER READINGS		
					Depth to Water:	Casing At:
DATE STARTED:	11/22/17	**DATE COMPLETED:**	11/22/17	**WHILE DRILLING:**	None Noted	25.0'
DRILLER:	Marc Cheney	**HELPER:**	Zack Cheney Al Linstruth	**BEFORE CASING REMOVED:**	None Noted	30.0'
CASING TYPE:	3 1/4" Hollow Stem Augers			**AFTER CASING REMOVED:**	None Noted	
DRILL RIG:	Truck Mounted Central Mine Equipment Model 55			**CAVED AT DEPTH:**	14.9'	

SAMPLE NUMBER	**DEPTH OF SAMPLE**	**BLOW COUNTS OF SAMPLER DRIVE (per 6")**	**C/N**	**RECOVERY** (Inches)	**DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)**	**DEPTH OF STRATA CHANGE**
					1" Asphalt Pavement - 8" Concrete	0.8
1	0.8'-2.8'	5-5-5-4	N/10	10	Brown cmf SAND, trace SILT, trace Brick (moist, medium	
					compact) *~Miscellaneous Fill~*	
2	2.8'-4.8'	4-5-4-4	N/9	12	Similar Fill (moist, loose) *~Miscellaneous Fill~*	
3	5.0'-7.0'	3-4-4-3	N/8	6	Brown cmf SAND, trace SILT, trace Brick, trace Slag (moist,	
					loose) *~Miscellaneous Fill~*	
4	10.0'-12.0'	2-2-2-2	N/4	8	Similar Fill (moist, loose) *~Miscellaneous Fill~*	
5	15.0'-17.0'	5-4-3-3	N/7	10	Similar Fill (moist, loose) *~Miscellaneous Fill~*	
6	20.0'-22.0'	5-5-5-4	N/10	11	Brown mf SAND, trace SILT (moist, medium compact) *~Fill~*	

Notes:

Key to Drilling Terms: N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"; C - % of Bedrock Core Recovery

NORTHEAST NSD SPECIALIZED DRILLING, INC.

Job No.: G097-17 Boring No.: TB-6

SAMPLE NUMBER	DEPTH OF SAMPLE	BLOW COUNTS OF SAMPLER DRIVE (per 6")	C/N	RECOVERY (Inches)	DESCRIPTION OF SOIL (Color, Primary Matrix, Complementary Matrix)	DEPTH OF STRATA CHANGE
7	25.0'-27.0'	7-5-3-4	N/8	8	Brown mf SAND, trace SILT, trace Brick (wet, medium	
					compact) *~Miscellaneous Fill~*	27.0
8	30.0'-32.0'	1-2-1-2	N/3	20	Brown mf SAND, trace SILT (saturated)	
					Bottom of Boring @ 32.0'	

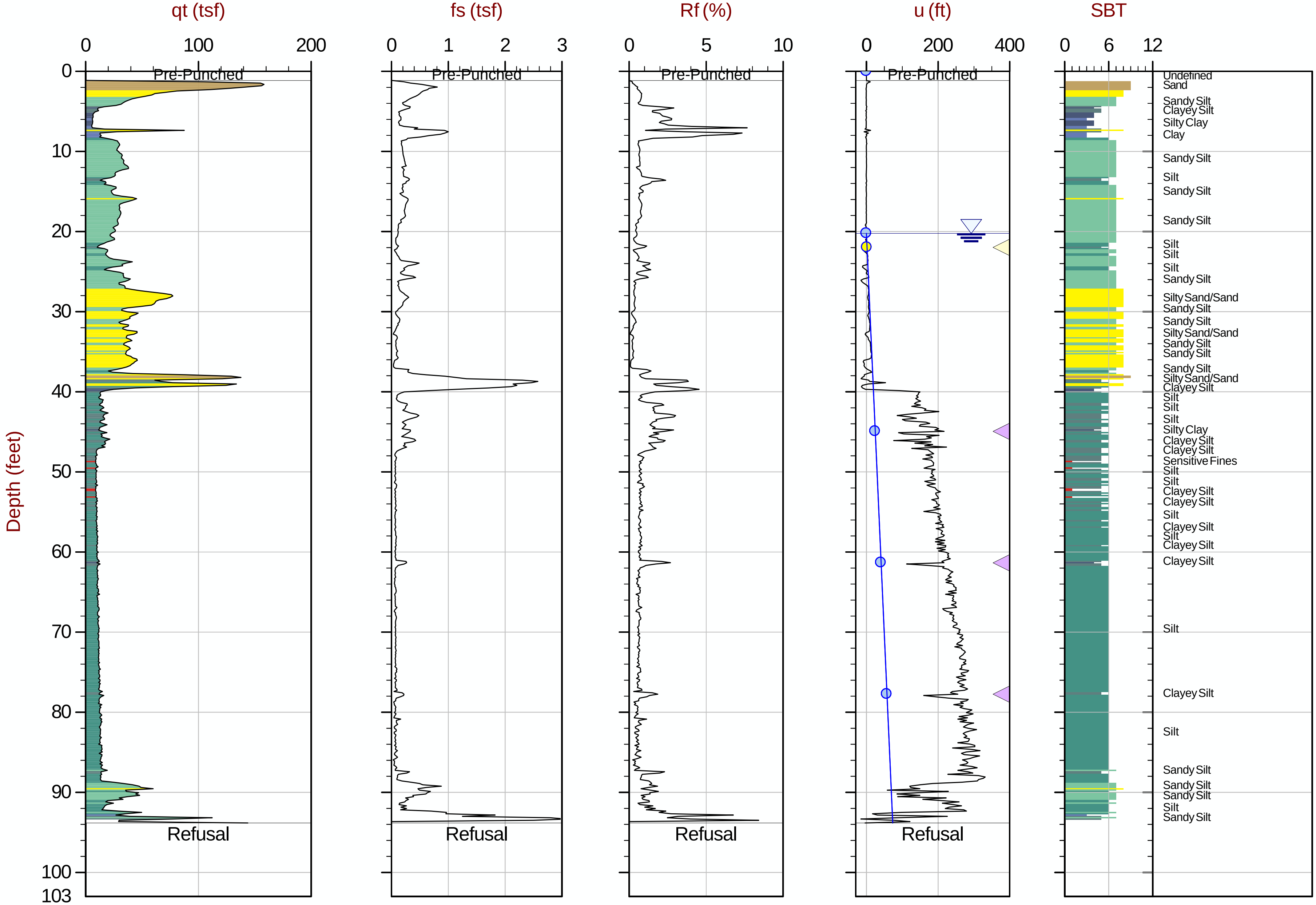
Notes:

N - No. of blows to drive sampler 12" w/ 140 lb. hammer falling / 30"

C - % Bedrock Core Recovery

Hoffman Engineering

Job No: 17-53167
Date: 2017-12-06 11:14
Site: 19 North Front Street, Kingston, NY
Sounding: SCPT17-01
Cone: 508:T1500F15U500



Max Depth: 28.600 m / 93.83 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53167_SP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4643153m E: 581210m

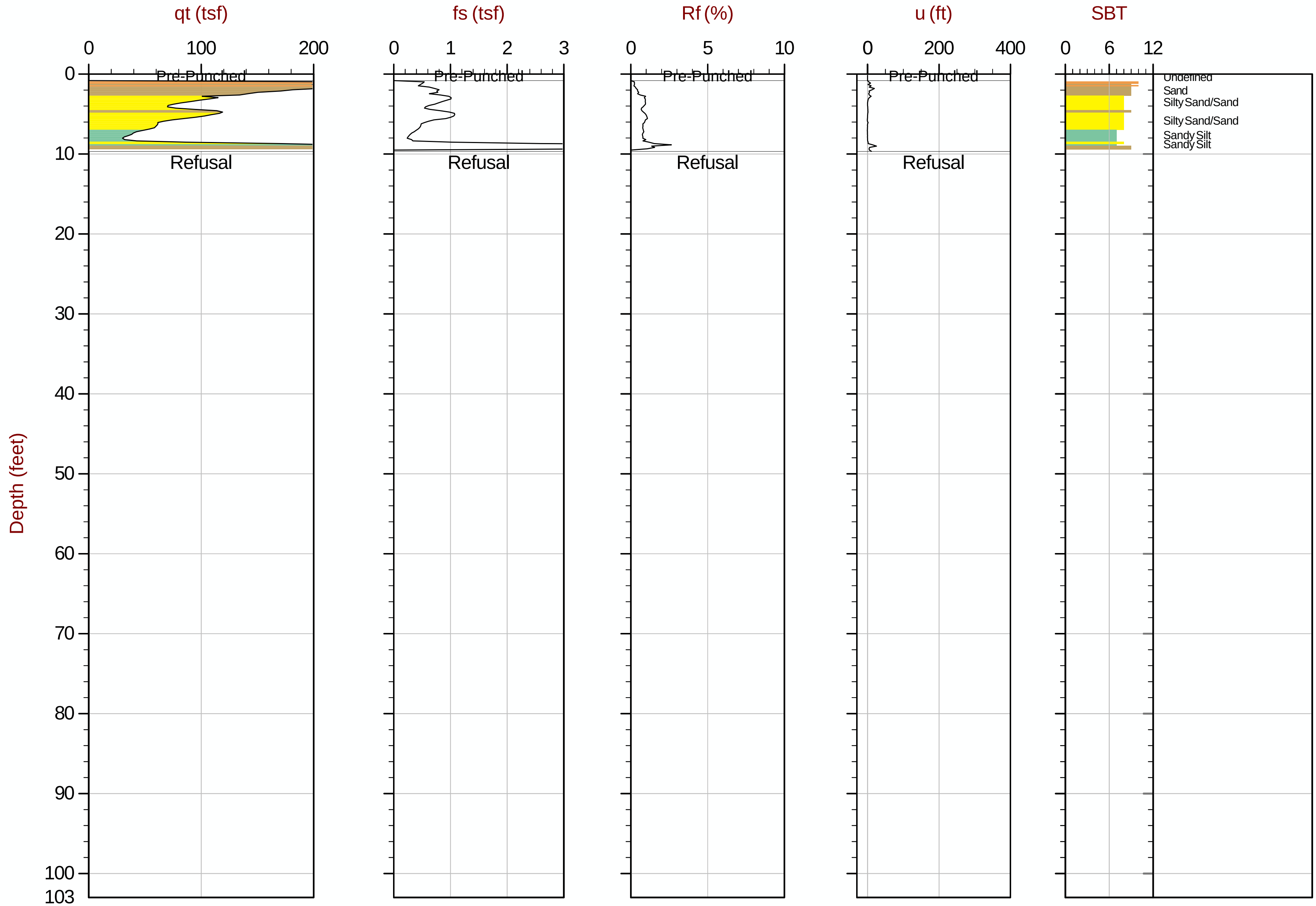
Hydrostatic Line | Ueq | Assumed Ueq | PPD, Ueq achieved | PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Hoffman Engineering

Job No: 17-53167
Date: 2017-12-06 13:23
Site: 19 North Front Street, Kingston, NY
Sounding: CPT17-02
Cone: 508:T1500F15U500



Max Depth: 2.950 m / 9.68 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53167_CP02.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4643078m E: 581265m

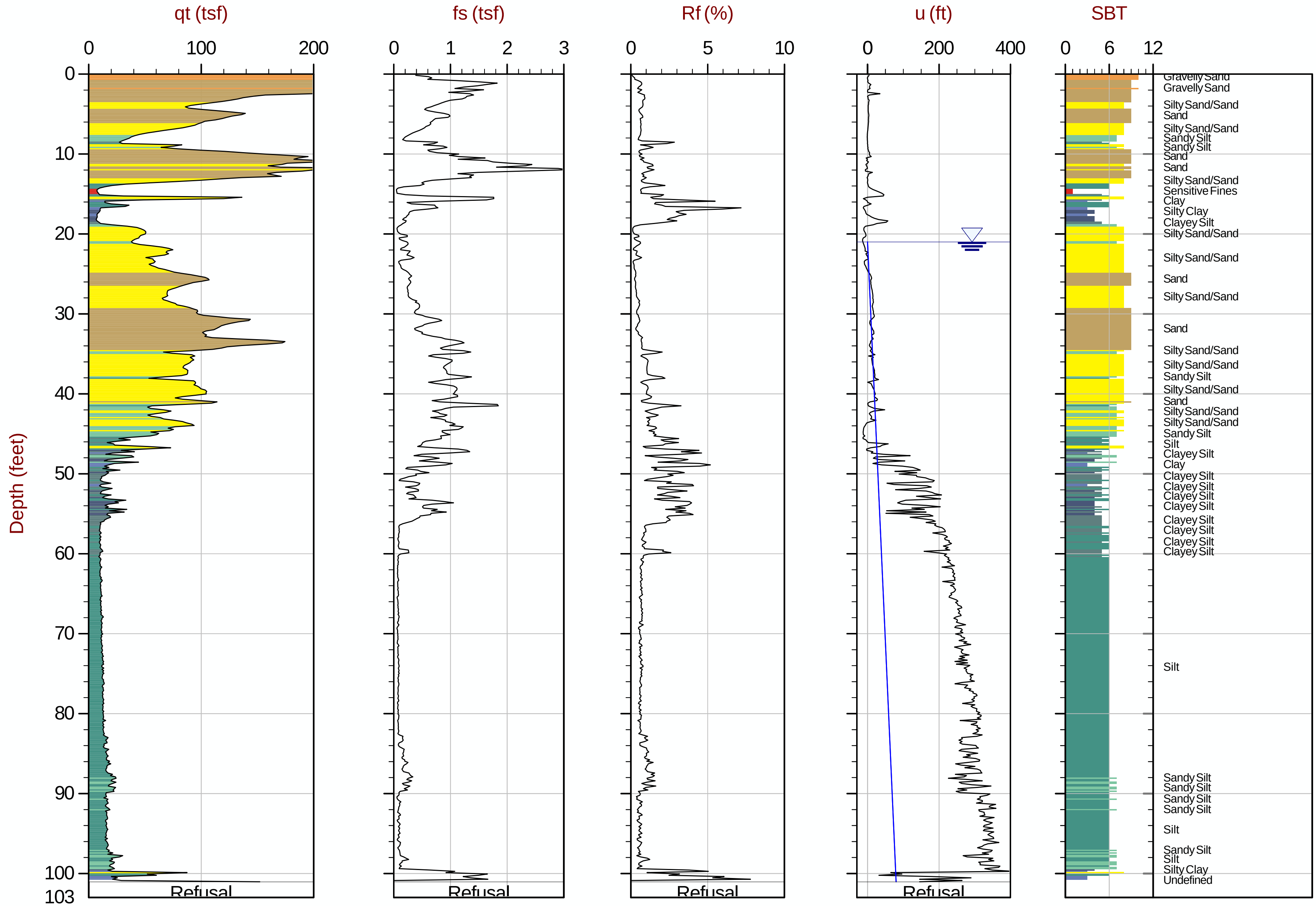
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Hoffman Engineering

Job No: 17-53167
Date: 2017-12-06 13:34
Site: 19 North Front Street, Kingston, NY
Sounding: CPT17-02A
Cone: 508:T1500F15U500



Max Depth: 30.800 m / 101.05 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53167_CP02A.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4643078m E: 581263m

Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

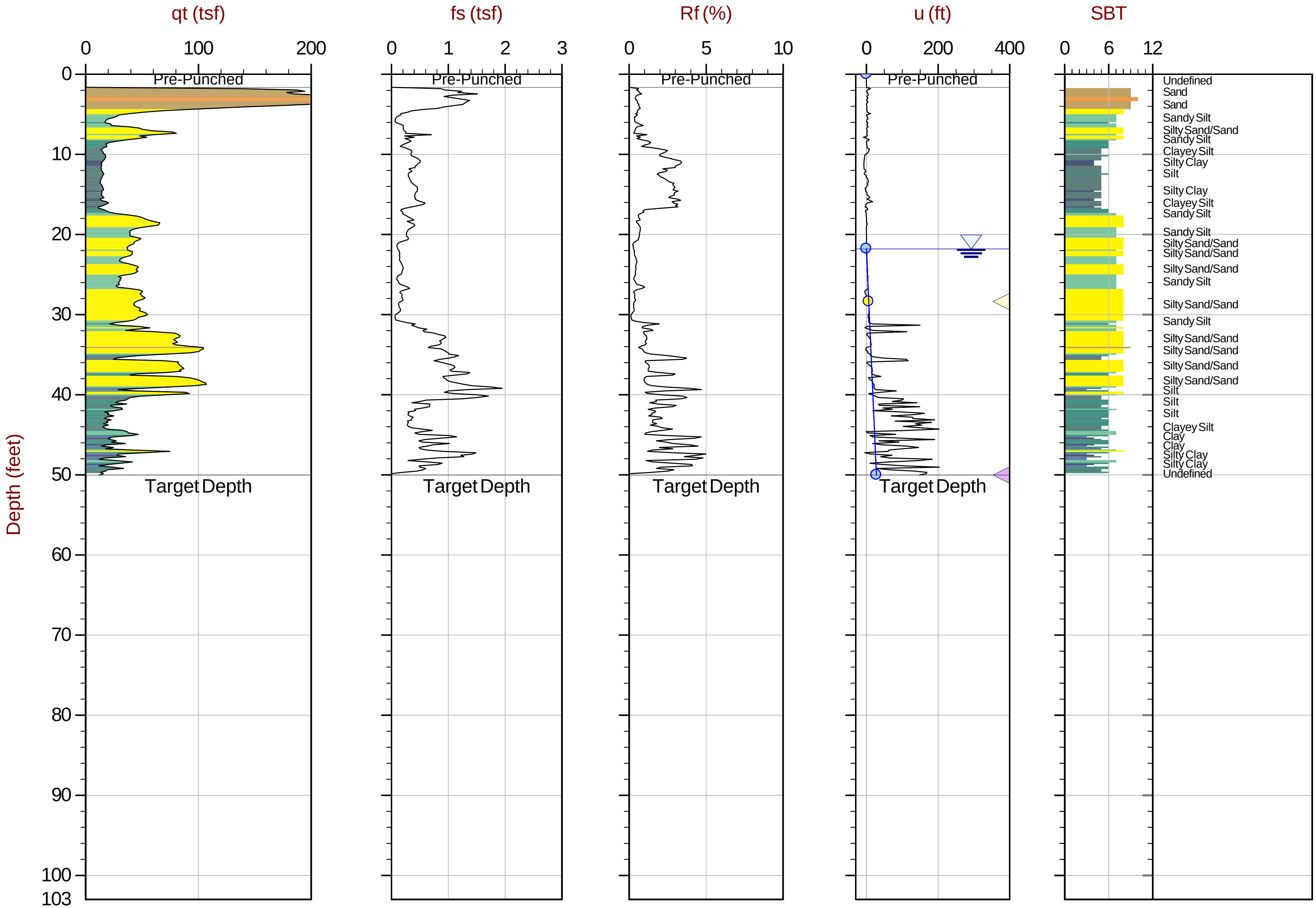
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Hoffman Engineering

Job No: 17-53167
Date: 2017-12-06 10:21
Site: 19 North Front Street, Kingston, NY

Sounding: CPT17-03
Cone: 508:T1500F15U500



Max Depth: 15.250 m / 50.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53167_CP03.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4643154m E: 581286m

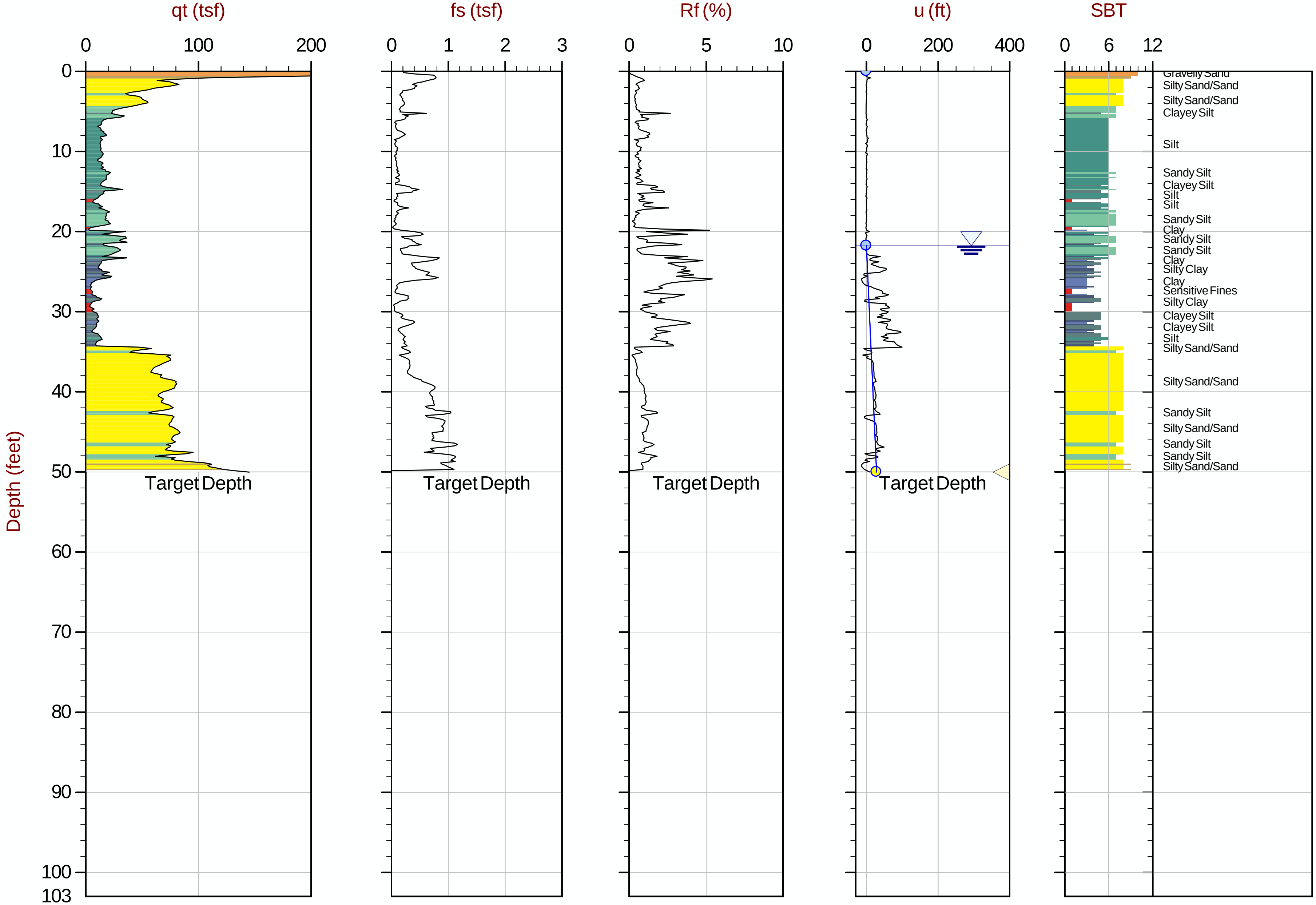
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Hoffman Engineering

Job No: 17-53167
Date: 2017-12-06 14:29
Site: 19 North Front Street, Kingston, NY
Sounding: CPT17-04
Cone: 508:T1500F15U500



Max Depth: 15.250 m / 50.03 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53167_CP04.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4643104m E: 581291m

Hydrostatic Line — Ueq — Assumed Ueq — PPD, Ueq achieved — PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

PW Laboratories, Inc.
6544 Fremont Road - East Syracuse, New York 13057
Office 315.437.1420 ~ Fax 315.503-3058~ pwlabsinc@hotmail.com

December 7, 2017

Ms. Natalie Meneilly
Northeast Specialized Drilling, Inc.
PO Box 28
Liverpool, New York 13088

Re: L-17006
Laboratory Testing
Kingstonian Project - Kingston, New York
Project #G097-17

Dear Natalie [meneilly@nsdrill.com]:

Enclosed are the results of laboratory testing performed at your request on forty-eight (48) bag soil samples delivered to our laboratory on 12/1/2017 for the above referenced project. Results include:

1. Natural Moisture Content ASTM D2216
Laboratory I.D. #34601 – 34648 — 48 Each

2. Sieve Analysis ASTM D422 & D1140
Laboratory I.D. #34604 – 34606, 34623, 34625, 34634, 34635, 34646, 34648 — 9 Each

3. Atterberg Limits D4318
Laboratory I.D. #34611, 34614 – 34615, 34633, 34644 — 5 Each

4. Unit Weight of Soil Specimens (Displacement Method) ASTM D7263
Laboratory I.D. #34614 — 1 Each

All requested tests have been completed on the previously received sample(s) for the above project. All sample remains are scheduled to be disposed of on **1/7/2018**. Please notify PW Laboratories, Inc. by letter or telephone prior to **1/7/2018** if you would prefer to pick up the sample(s) or that the sample(s) be retained by PW Laboratories, Inc. for an additional period.

Thank you for this opportunity to work with you.

PW Laboratories, Inc.

Patrick J. Edmiston
Laboratory Manager
PJE/bll

PW Laboratories, Inc.
6544 Fremont Road - East Syracuse, New York 13057
Office 315.437.1420 ~ Fax 315.503-3058 ~ pwlabsinc@hotmail.com

December 7, 2017

L-17006
Laboratory Testing
Kingstonian Project - Kingston, New York
Project #G097-17

Natural Moisture Content ASTM D2216

Laboratory I.D. #	Boring I.D.	Sample I.D.	Moisture Content as a Percent of Dry Weight
34601	TB-1	4B	21.5
34602	TB-1	5	26.1
34603	TB-1	6A	22.5
34604	TB-1	6B	4.9
34605	TB-1	7	25.8
34606	TB-1	8	33.4
34607	TB-1	9	22.8
34608	TB-1	10	22.7
34609	TB-1	11A	17.2
34610	TB-1	11B	31.6
34611	TB-1	12	30.2
34612	TB-1	13	31.4
34613	TB-1	14	33.3
34614	TB-1	U1	31.9
34615	TB-1	15	31.4
34616	TB-1	16	32.6
34617	TB-1	17	35.2
34618	TB-1	18	32.0
34619	TB-1	19	32.2
34620	TB-1	20	9.3
34621	TB-1	21	7.6
34622	TB-2	4	19.6
34623	TB-2	5	26.1
34624	TB-2	6	21.0
34625	TB-2	7	23.7
34626	TB-2	8	17.3
34627	TB-2	9A	15.5
34628	TB-2	10	23.6
34629	TB-2	11	21.5
34630	TB-3	5	16.5
34631	TB-3	6	25.0
34632	TB-3	7	28.2
34633	TB-3	8	29.2
34634	TB-3	9	23.3
34635	TB-3	10	24.1
34636	TB-4	3	7.6
34637	TB-4	4	5.3
34638	TB-4	6	29.8
34639	TB-4	7	19.8
34640	TB-4	11A	28.9
34641	TB-4	11B	31.7
34642	TB-4	12	36.2
34643	TB-5	3B	21.1
34644	TB-5	4	26.8
34645	TB-5	5	30.4
34646	TB-5	6	24.9
34647	TB-5	7	20.6
34648	TB-6	8	28.5

PW Laboratories, Inc.
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Sieve Analysis of Soil / Aggregate

Project Title: Laboratory Testing
Kingstonian Project - Kingston, New York
Project #G097-17

Project #: L-17006
Test Method: ASTM D422 & D1140

Report # 1
Report Date: December 7, 2017

			Sieve Size - Percent Passing Sieve													
Lab I.D. #	**Boring I.D.**	**Sample I.D.**	**1/2"**	**1/4"**	**#4**	**#10**	**#30**	**#40**	**#60**	**#100**	**#200**					
34604	TB-1	6B	--	--	--	--	100	98.5	67.4	21.4	7.5					
34605	TB-1	7	--	--	--	--	100	99.0	72.8	37.9	19.0					
34606	TB-1	8	100	99.7	99.5	98.9	97.9	91.7	48.1	28.6	17.6					
34623	TB-2	5	--	100	99.6	96.8	76.8	59.7	38.0	29.2	15.9					
34625	TB-2	7	--	--	--	100	99.7	97.6	57.8	18.9	6.6					
34634	TB-3	9	--	--	--	100	98.4	91.4	55.7	18.6	11.7					
34635	TB-3	10	--	--	100	99.4	81.6	53.3	20.3	13.9	10.2					
34646	TB-5	6	--	--	--	100	99.6	92.8	49.8	22.7	13.0					
34648	TB-6	8	--	--	--	--	100	99.9	99.6	91.9	42.0					

Sample mass, as received, meets minimum mass requirements of test method: **Yes** X **No** ____

Prewashed
Entire Sample X
Mass Retained on #200 Only ____
Not Prewashed: ____

Performed By: M.S. **Checked By:** Patrick Edmiston

Remarks:

PW Laboratories, Inc.
6544 Fremont Road - East Syracuse, New York 13057
Office 315.437.1420 ~ Fax 315.503-3058~ pwlabsinc@hotmail.com

December 7, 2017

L-17006
Laboratory Testing
Kingstonian Project - Kingston, New York
Project #G097-17

Atterberg Limits ASTM D4318

Lab I.D.#	Sample I.D.	Boring I.D.	Plastic Limit	Liquid Limit	Plasticity Index
34611	TB-1	12	20	28	8
34614	TB-1	U1	24	31	7
34615	TB-1	15	20	29	9
34633	TB-3	8	22	24	2
34644	TB-5	4	21	24	3

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December 7, 2017

L-17006
Laboratory Testing
Kingstonian Project - Kingston, New York
Project #G097-17

Unit Weight - Displacement Method (ASTM D7263)

Laboratory I.D.#	Sample I.D.	Boring I.D.	Unit Weight (PCF)	
			Moist	Dry
34614	U1	TB-1	132.6	100.5

CONETEC

Job No: 17-53167
Client: Hoffman Engineering
Project: 19 North Front Street, Kingston, NY
Sounding ID: SCPT17-01
Date: 06-Dec-2017

Seismic Source: Beam
Source Offset (ft): 1.97
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.58	4.92	5.30			
8.86	8.20	8.44	3.13	10.00	314
12.14	11.48	11.65	3.22	8.40	383
15.42	14.76	14.89	3.24	6.58	493
18.70	18.04	18.15	3.26	6.43	507
21.98	21.33	21.42	3.26	5.86	557
25.26	24.61	24.68	3.27	6.41	510
28.54	27.89	27.96	3.27	5.51	594
31.82	31.17	31.23	3.27	5.37	609
35.10	34.45	34.50	3.27	5.10	643
38.39	37.73	37.78	3.28	5.57	588
41.67	41.01	41.06	3.28	4.47	732
44.95	44.29	44.33	3.28	4.73	693
48.23	47.57	47.61	3.28	4.67	702
51.51	50.85	50.89	3.28	5.32	617
54.79	54.13	54.17	3.28	5.27	622
58.07	57.41	57.45	3.28	4.63	708
61.35	60.70	60.73	3.28	4.75	690
64.63	63.98	64.01	3.28	4.78	686
67.91	67.26	67.29	3.28	4.88	672
71.19	70.54	70.57	3.28	4.59	714
74.48	73.82	73.85	3.28	4.79	685
77.76	77.10	77.12	3.28	4.38	749
81.04	80.38	80.40	3.28	4.57	717
84.32	83.66	83.68	3.28	4.49	730
87.60	86.94	86.96	3.28	4.03	815
90.88	90.22	90.24	3.28	3.81	860
93.83	93.18	93.20	2.95	2.09	1413

JOB NAME Kingstonian Development **DATE** December 1, 2017

BORING NUMBER SCPT - 1 Vs bar for Site

Layer No.	Top Depth	Bott. Depth	di	Vs	di/N
1	0	8.2	8.2	314	0.02611465
2	8.2	11.48	3.28	383	0.008563969
3	11.48	14.76	3.28	493	0.006653144
4	14.76	18.04	3.28	507	0.006469428
5	18.04	21.33	3.29	557	0.005906643
6	21.33	24.61	3.28	510	0.006431373
7	24.61	27.89	3.28	594	0.005521886
8	27.89	31.17	3.28	609	0.005385878
9	31.17	34.45	3.28	643	0.005101089
10	34.45	37.73	3.28	588	0.005578231
11	37.73	41.01	3.28	732	0.004480874
12	41.01	44.29	3.28	693	0.004733045
13	44.29	47.57	3.28	702	0.004672365
14	47.57	50.85	3.28	617	0.005316045
15	50.85	54.13	3.28	622	0.005273312
16	54.13	57.41	3.28	708	0.004632768
17	57.41	60.7	3.29	690	0.004768116
18	60.7	63.98	3.28	686	0.004781341
19	63.98	67.26	3.28	672	0.004880952
20	67.26	70.54	3.28	714	0.004593838
21	70.54	73.82	3.28	685	0.004788321
22	73.82	77.1	3.28	749	0.004379172
22	77.1	80.38	3.28	717	0.004574616
22	80.38	83.66	3.28	730	0.004493151
22	83.66	86.94	3.28	815	0.00402454
22	86.94	90.22	3.28	860	0.003813953
22	90.22	100	9.78	1413	0.006921444

Sigma di 100 Sigma di/Netc 0.162854144

Vs BAR* = 614 feet/second

*Sigma di/Sigma di/Vs

LIQUIFACTION CALCULATIONS USING SHEAR WAVE VELOCITIES, Vs

JOB NAME **Kingstoniar** **Fs at 1 =** **1.997053368** **DATE** 17Dec17
Fs at 2 = **2.041872232**

Boring/Probe No.		SCPT-1701	Ss		Fa	Sms	Sds	PGA(Amax)				
		TB-1										
Mw	MSF	1	Ss site	0.172	1.6	0.2752	0.183466667	0.0733867	Point 1	Fines %	8	Low End of Fines Content
7		1.19	Magnitude Scaling Factor						Point 2	Fines %	20	Most Fines % Higher than this

Point	Depth	Sigma total	Sigma effect	rd	CSR	Vs	Vs1	V*s1	CRR	FL	GWL ft.	UnitWt m	Sat.thickne	Sat.Unit '	Bouy.UnitWt
1	21	2545	1733.8	0.95	0.06651857	160	168.3883748	213.5	0.1328411	1.9970534	8	115	13	125	62.6
2	35	4295	2610.2	0.95	0.07456646	180	171.0196177	207.5	0.1522552	2.0418722	8	115	27	125	62.6

Liquefaction Fs is 2.0 or more for Mw up to 7.0 OK
The 20 feet below design subgrade will be liquefied by dynamic compaction process.
The deeper strata in the upper sand layers are also in higher Vs range

SETTLEMENTS BY PRESSUREMETER METHOD

Kingstonian | Location L-2 | Cut from 155 to 151.5 & then Ftg Btm at 147.5 plus minus

Load (ki	Load (tons	**Ftg Width**	Design tsf	**Total Settlement (inches)**	**Add for Creep & Disturbance 0.25 inch**	Distortion(in	Spherical (in)	Ed** tsf	Ec* tsf	Alpha Note A	Gamma (	Gamma c
950	475	**18.00**	1.3	**0.78**	**1.03**	0.5451404	0.23307648	59	100	0.667	1.12	1.12

Calculation of Harmonic Distortion Modulus, Ed | see Menard p231 | 1/Ed =1/4(1/E1+1/0.85E2+1/E345+1/2.5E678+1/2.5E916)

E1(4 to13	E2(13 to22ft	E345(22to49)	E678(49to76)	E9/16(76 to	1/EMxCoeff 1/E1	1/0.85E2	1/E345	1/2.5E678	1/2.5E916	(1/Ed)	Ed**
100	60	46	50	50	0.01	0.01960784	0.02173913	0.008	0.008	0.0168367	59

Hardpan and rock below about 95 feet to 100 feet per report

Note Used Dilatometer Eo between 49 and 95 feet-about 1.85 times the Eo derived from qt X 2.5

Reduced Design load in tsf by 3.5 feet cut to FFE X 115 pcf/2000 = 0.20 tsf
Net Footing Load is 1.5-0.2 = 1.3 Ignore benefit of stress relief outside footing areas here.

*Ec is spherical strain modulus representing consolidation settlement directly beneath the footing (thickness of 1/2 ftg width)
**Ed is harmonic distortion settlement modulus here

Note A: Menard Alpha coefficient for overconsolidated silts is 2/3
Conservative when sands are included in profile

Assumed that E1 (about 4 to 13 ft below subgrade) will be stiffened from about 76 tsf to 100 tsf by DC
Assumed that E2 (about 13 ft to 22 ft below subgrade) will be stiffened from about 72 tsf to 100 tsf by DC

SETTLEMENTS BY PRESSUREMETER METHOD

Kingstonian Addition

Location L-6.5
Strip Foundation with up to 40 k/ft

Cut from 158 to 151.5 & then Ftg Btm at 147.5 plus minus

Load ((k/ft)	Load (ton)	**Ftg Widtl B in ft**	Net Design tsf reduced by excavation load relief	**Total Settlement (inches)**	**Add for Creep & Disturbance 0.25 inch**	Distortion(in	Spherical (in)	Ed** tsf	**Ec* tsf**	Alpha Note A	Gamma d	Gamma c
											Rheological Factors for long footing here	
40k/ft		**13.30**	1.12	**0.76**	**1.01**	0.5896224	0.165593867	61	100	0.667	2.2	1.25

Calculation of Harmonic Distortion Modulus, Ed see Menard p231

1/Ed =1/4(1/E1+1/0.85E2+1/E345+1/2.5E678+1/2.5E916)

E1(10.5 tc	E2(18 to 25f	E345(25to35)	E678(35to55 ft)	E9/16(55 to	1/E1	1/0.85E2	1/E345	1/2.5E678	1/2.5E916	(1/Ed)	Ed**
					1/EMxCoeff						
100	80	56	26	50	0.01	0.01470588	0.01785714	0.01538462	0.008	0.0164869	61

Hardpan and rock below about 95 feet to 100 feet per report

Note Used Dilatometer Eo between 55 and 95 feet-about 1.85 times the Eo derived from qt X 2.5

Reduced Design load in tsf by 6.5 feet cut to FFE X 115 pcf/2000 = 0.37 tsf
Net Footing Load is 1.5-0.2 = 1.3 Ignore benefit of stress relief outside footing areas here.

*Ec is spherical strain modulus representing consolidation settlement directly beneath the footing (thickness of 1/2 ftg width)
**Ed is harmonic distortion settlement modulus here

Note A Menard Alpha coefficient for overconsolidated silts is 2/3
Conservative when sands are included in profile

Assumed that E1 (about 4 to 13 ft below subgrade) will be stiffened from about 76 tsf to 100 tsf by DC
Assumed that E2 (about 13 ft to 22 ft below subgrade) will be stiffened from about 72 tsf to 100 tsf by DC
Used average dilatometer derived Eo below 50 feet deep from existing surface. Upper values are qt derived

SETTLEMENTS BY PRESSUREMETER METHOD

Kingstonian Addition

Location_T-12
Strip Foundation with up to 33 k/ft

Cut from 165 to 151.5 & then Ftg Btm at 147.5 plus minus

Load ((k/ft)	Load (ton)	Ftg Widtl B in ft	Net Design tsf reduced by excavation load relief	**Total Settlement (inches)**	**Add for Creep & Disturbance 0.25 inch**	Distortion(in	Spherical (in)	Ed** tsf	Ec* tsf	Alpha Note A	Gamma d	Gamma c
33		**11.00**	**0.724** 0.724	**0.47**	**0.72**	0.3789497	0.088533133	54	100	0.667	2.2	1.25

Rheological Factors for long footing here

Calculation of Harmonic Distortion Modulus, Ed   see Menard p231   1/Ed =1/4(1/E1+1/0.85E2+1/E345+1/2.5E678+1/2.5E916)

E1(17.5 tc	E2(23 to 28.	E345(28.5to45)	E678(45to61.5 ft)	E9/16(61.5 t	1/EMxCoeff 1/E1	1/0.85E2	1/E345	1/2.5E678	1/2.5E916	(1/Ed)	Ed**
100	80	26	123	50	0.01	0.01470588	0.03846154	0.00325203	0.008	0.0186049	54

Hardpan and rock below about 95 feet to 100 feet per report

Note Used Dilatometer Eo between 55 and 95 feet-about 1.85 times the Eo derived from qt X 2.5

Reduced Design load in tsf by 13.5 feet cut to FFE X 115 pcf/2000 = 0.78 tsf= net load of 0.724 tsf
Net Footing Load is 1.5-0.78 tsf = 0.724 tsf   Ignore benefit of excavation stress relief outside footing areas

*Ec is spherical strain modulus representing consolidation settlement directly beneath the footing (thickness of 1/2 ftg width)
**Ed is harmonic distortion settlement modulus here

Note A   Menard Alpha coefficient for overconsolidated silts is 2/3
Conservative when sands are included in profile

Assumed that E1 (about 4 to 13 ft below subgrade) will be stiffened from about 76 tsf to 100 tsf by DC
Assumed that E2 (about 13 ft to 22 ft below subgrade) will be stiffened from about 72 tsf to 100 tsf by DC
Used average dilatometer derived Eo below 50 feet deep from existing surface. Upper values are qt derived

TABLE 11-1 UNIFIED SOIL CLASSIFICATION
(Including Identification and Description)

Major Divisions			Group Symbols	Typical Names	Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)	Information Required for Describing Soils	Laboratory Classification Criteria
1	2		3	4	5	6	7
Coarse-grained Soils More than half of material is *larger* than No. 200 sieve size.	Gravels More than half of coarse fraction is larger than No. 4 sieve size.	Clean Gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixture, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture condition, and drainage characteristics.	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_e = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			GP	Poorly graded gravels or gravel-sand mixture, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.		Not meeting all gradation requirements for GW
		Gravels with Fines (Appreciable amount of fines)	GM	Silty gravels, gravel-and-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).	Give typical name; indicate approximate percentages of sand and gravel, maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses.	Atterberg limits below "A" line or P1 less than 4 — Above "A" line with P1 between 4 and 7 are borderline cases requiring use of dual symbols.
			GC	Clayey gravels, gravel-and-clay mixtures.	Plastic fines (for identification procedures see CL below).		Atterberg limits above "A" line with P1 greater than 7
	Sands More than half of coarse fraction is smaller than No.4 sieve size.	Clean Sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.		$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_e = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			SP	Poorly graded sands or gravelly sands, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.	Example: Silty sand, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains, coarse to fine; about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM).	Not meeting all gradation requirements for SW
		Sands with Fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).		Atterberg limits above "A" line or P1 less than 4 — Limits plotting in hatched zone with P1 between 4 and 7 are borderline cases requiring use of dual symbols.
			SC	Clayey sands, sand-clay mixtures.	Plastic fines (for identification procedures see CL below).		Atterberg limits above "A" line with Pl greater than 7

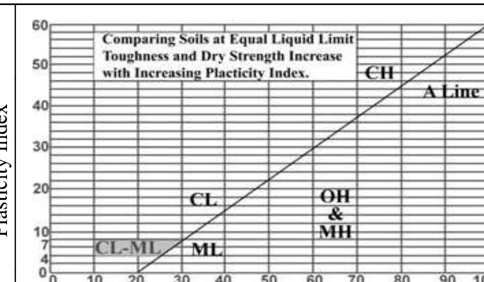
The No. 200 sieve size is about the smallest visible to the naked eye.

(For visual classification. the ¼-in. size may be used as equivalent to the No. 4 sieve size.)

Use grain-size curve in identifying the fractions as given under field identification.

Determine percentage of gravel and sand from grain-size curve. Depending on percentage of fine (fraction smaller than No. 200 sieve size) coarse-grained soils are classified as follows:
Less than 5% GW, GP, SW, SP,
More than 12% GM, GC, SM, SC.
5% to 12% Borderline cases requiring use of dual symbols.

Major Divisions		Group Symbols	Typical Names	Identification Procedure on Fraction Smaller than No. 40 Sieve Size. Dry Strength (Crushing Characteristics)	Dilatancy (Reaction to shaking)	Toughness (Consistency near PL)	Information Required for Describing Soils
Fine-grained Soils More than half of material is *smaller* than No. 200 sieve size.	Silts and Clays Liquid limit is less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	None to slight	Quick to slow	None	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high	None to very slow	Medium	
		OL	Organic silts and organic silty clays of low plasticity.	Slight to medium	Slow	Slight	Give typical name; indicate degree and character of plasticity; amount and maximum size of coarse grains; color in wet condition; odor, if any; local or geologic name and other pertinent descriptive information; and symbol in parentheses.
	Silts and Clays Liquid limit is greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	Slight to medium	Slow to none	Slight to medium	
		CH	Inorganic clays of high plasticity, fat clays.	High to very high	None	High	
		OH	Organic clays of medium to high plasticity, organic silts.	Medium to high	None to very slow	Slight to medium	Example: Clayey silt, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (ML)
Highly Organic Soils		Pt	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture			



LIQUID LIMIT
PLASTICITY CHART
For Laboratory classification of fine-grained soils

(1) Boundary classifications: Soils possessing characteristics of two groups are designed by combinations of group symbols. For example GM-GC, well-graded gravel-sand mixture with clay binder.
(2) All sieve sizes on this chart are U.S. standard.
(3) Adopted by Corps of Engineers and Bureau of Reclamation, January 1952

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Soil Characteristics Pertinent to Roads and Airfields

Major Divisions		Letter (1)	Name	Value as Subgrade When Not Subject to Frost Action	Value as Subbase When Not Subject to Frost Action	Value as Base When Not Subject to Frost Action	Potential Frost Action	Compressibility and Expansion	Drainage Characteristics	Compaction Equipment	Unit Dry Weight lb. per cu. ft.	Typical Design Values: CBR (2)	Typical Design Values: Subgrade Modulus k lb. per cu. in.
Coarse-Grained Soils	Gravel and Gravelly Soils	GW	Well-graded gravels or gravel-sand mixtures, little or no fines	Excellent	Excellent	Good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	125-140	40-80	300-500
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines	Good to excellent	Good	Fair to good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	110-140	30-60	300-500
		GM d	Silty gravels, gravel-sand-silt mixtures	Good to excellent	Good	Fair to good	Slight to medium	Very slight	Fair to poor	Rubber-tired roller, sheepsfoot roller; close control of moisture	125-145	40-60	300-500
		GM u		Good	Fair	Poor to not suitable	Slight to medium	Slight	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	115-135	20-30	200-500
		GC	Clayey gravels, gravel-sand-clay mixtures	Good	Fair	Poor to not suitable	Slight to medium	Slight	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	130-145	20-40	200-500
	Sand and Sandy Soils	SW	Well-graded sands or gravelly sands, little or no fines	Good	Fair to good	Poor	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller	110-130	20-40	200-400
		SP	Poorly graded sands or gravelly sands, little or no fines	Fair to good	Fair	Poor to not suitable	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller	105-135	10-40	150-400
		SM d	Silty sands, sand-silt mixtures	Fair to good	Fair to good	Poor	Slight to high	Very slight	Fair to poor	Rubber-tired roller, sheepsfoot roller; close control of moisture	120-135	15-40	150-400
		SM u		Fair	Poor to fair	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	100-130	10-20	100-300
		SC	Clayey sands, sand-clay mixtures	Poor to fair	Poor	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired roller, sheepsfoot roller	100-135	5-20	100-300
Fine-Grained Soils	Silts and Clays LL is less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Poor to fair	Not suitable	Not suitable	Medium to very high	Slight to medium	Fair to poor	Rubber-tired roller, sheepsfoot roller; close control of moisture	90-130	15 or less	100-200
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Poor to fair	Not suitable	Not suitable	Medium to high	Medium	Practically impervious	Rubber-tired roller, sheepsfoot roller	90-130	15 or less	50-150
		OL	Organic silts and organic silt-clays of low plasticity	Poor	Not suitable	Not suitable	Medium to high	Medium to high	Poor	Rubber-tired roller, sheepsfoot roller	90-105	5 or less	50-100
	Silts and Clays LL is greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Poor	Not suitable	Not suitable	Medium to very high	High	Fair to poor	Sheepsfoot roller, rubber-tired roller	80-105	10 or less	50-100
		CH	Inorganic clays of medium to high plasticity, organic silts	Poor to fair	Not suitable	Not suitable	Medium	High	Practically impervious	Sheepsfoot roller, rubber-tired roller	90-115	15 or less	50-150
		OH	Organic clays of high plasticity, fat clays	Poor to very poor	Not suitable	Not suitable	Medium	High	Practically impervious	Sheepsfoot roller, rubber-tired roller	80-110	5 or less	25-100
Highly Organic Soils		Pt	Peat and other highly organic soils	Not suitable	Not suitable	Not suitable	Slight	Very high	Fair to poor	Compaction not practical	—	—	—

Note:

(1) Unit Dry Weights are for compacted soil at optimum moisture content for modified AASHO compaction effort. Division of GM and SM groups into subdivision of d and u are for roads and airfields only. Subdivision is basis of Atterberg limits; suffix d (e.g., GMd) will be used when the liquid limit (LL) is 25 or less and the plasticity index is 6 or less; the suffix u will be used otherwise.

(2) The maximum value that can be used in design of airfields is, in some cases, limited by gradation and plasticity requirements.

GENERAL QUALIFICATIONS

This report has been prepared in order to aid in the evaluation of this property and to assist the architect and/or engineer in the design of this project. The scope of the project and the location described herein, and our description of the project represents our understanding of the significant aspects relevant to soil and foundation characteristics. In the event that any changes in the design or location of the proposed facilities, as outlined in this report, are planned, we should be informed so the changes can be reviewed and the conclusions of this report modified or approved in writing by ourselves.

It is recommended that all construction operations dealing with earthwork and foundations be inspected by an experienced soil engineer to assure that design requirements are fulfilled in the actual construction. If you wish, we would welcome the opportunity to review the plans and specifications when they have been prepared so that we may have the opportunity of commenting on the effect of soil conditions on the design and specifications.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings and/or test pits performed at the locations indicated on the location diagram and from any other information discussed in this report. This report does not reflect any variations which may occur between these borings and/or test pits. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in soil and rock conditions exist on most sites between boring locations and also such situations as groundwater conditions vary from time to time. The nature and extent of variations may not become evident until the course of construction. If variations then appear evident, it will be necessary for a reevaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of any variations.