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September 22, 2015 Job No: 15-573

Sweet Home Hotels, LLC
One Niagara Square
Buffalo, New York 14202

ATTN: Mr. Sam Johal

RE: Geotechnical Engineering Report
Proposed Hyatt House Hotel
1295 Sweet Home Rd., Amherst, N.Y.

Gentlemen:

This report presents the findings of the subsurface investigation program and geotechnical engineering recommendations for the above referenced project. The geographic orientation of the project site is illustrated on the U.S. Geologic Survey (USGS) site location map in Figure No. 1. The project site is illustrated in Figure No. 2, entitled "Test Boring and Observation Well Location Plan", which includes: the approximate location of eight test borings that were drilled and one groundwater observation well that was installed by Buffalo Drilling Company, Inc. (BDC); ground surface elevations; and additional site details.

EXPLORATION METHODS

Sampling Method: A truck mounted Diedrich D120 rotary drill rig was used to drill all borings to depths of approximately 25 feet below the ground surface by using 4-1/4 inch inside diameter (ID), continuous flight hollow stem augers. Samples were recovered by driving a standard split-spoon sampler (2-foot long by 1-3/8 inch inside diameter) 24 inches with a 140-pound hammer falling 30 inches per blow per the American Society of Testing and Materials (ASTM) Standard D1586. The number of blows from six to 18 inches of penetration is defined as the Standard Penetration Test (SPT) N-value. N-values of greater than 100 which infers the top of sound bedrock, were encountered at test bore locations B-1 and B-4, which were augered and sampled through the upper, severely weathered bedrock zone.

Bedrock was confirmed by coring all borings to approximate elevation 570 feet. Bedrock coring efforts were done with an NX-sized (2-1/8 inch I.D.) core barrel and impregnated diamond bit in accordance with ASTM Method D2113.

Any encountered groundwater conditions are documented in the field on the driller's logs for each test boring. If indicators of groundwater are observed on the sampling equipment, the depth to groundwater is also checked and measured through the hollow stem augers at the completion of the sampling efforts.

A groundwater observation well was installed at boring B-3, in general accordance with ASTM Method D5092. The observation well was constructed with two-inch inside diameter, flush joint threaded, schedule 40 PVC screen and riser pipe. The 20 foot length of well screen was a number 10 slot (i.e., 0.010 inch wide) and backfilled with a uniformly graded silicon sand (i.e., Ricci No. 00N) that was placed to about five feet below ground surface or one foot above top of screen. The well was sealed with a two-foot minimum thickness of bentonite chips. The remaining borehole annulus was sealed with auger cuttings to the ground surface. A protective J-plug was inserted in the top of the well. For convenience, the boring/well combination will be referred to as boring or well B/OW-3.

Classification/Identification: The retrieved soil samples were initially logged in the field by the driller, and a portion of each sample was placed and sealed in a glass jar. The retrieved rock cores were measured and stored in a wooden core box. The boring logs, which are included in Appendix A, were based upon the field logs and a second visual classification of recovered samples in the laboratory by a geologist. Classification/identification of samples, as noted on the boring logs, is based on the Unified Soil Classification System (USCS) in ASTM D2487/D2488. A schematic of the observation well construction details is included on the log for boring B/OW-3. Refer to Appendix C entitled, "Geotechnical Reference Standards", for an explanation of the terminology that is used for soil and rock descriptions.

Each rock core was examined on a run-by-run basis to determine the percentage of core recovery and Rock Quality Designation (RQD). Core recovery percentage is the ratio of the sample length recovered divided by the length of the core run times 100 percent. RQD is defined as the total length of all pieces of core that are greater than four inches divided by the length of the core run times 100 percent. Core recovery and RQD percentages are noted on the boring log.

Laboratory Testing: Laboratory soil testing was undertaken on several retrieved split spoon and bedrock samples. The overall laboratory testing program consisted of the following test methods:

- Water (Moisture) Content of Soil — ASTM D2216
- Unconfined Compressive Strength of Intact Rock Core Specimens — ASTM D2938
- Liquid Limit, Plastic Limit, and Plasticity Index of Soils — ASTM D4318

Table No. 1 presents the tabulated results of the physical/soil index properties. The associated graphical illustrations of the soil data are included in Appendix C. The bedrock physical property data are presented in Table No. 2.

SITE AND SUBSURFACE CONDITIONS

General: The project site is located on vacant land addressed as 1295 Sweet Home Road in the Town of Amherst, New York. The proposed development area is on the east side of Sweet Home Road and abuts the University of Buffalo. The overall site is about 2.4 acres and development is planned to include a six story hotel with 130 units.

The site has a sparce grass/vegetation cover and slopes about four feet from west to east. It is also noted that the site has been partially excavated during previous development efforts in 2009. Additional site development will include two stormwater structures and asphalt paved roadways and parking.

Subsurface Soil Conditions: In general, subsurface conditions, at the ground surface and underlying very thin topsoil layer, are noted to consist of an upper natural silty clay that overlies very stiff to hard glacial till over a thick layer of weathered shale bedrock. It is noted that an upper two foot layer of random fill was encountered at boring B-5 and topsoil thickness was not easily discernible, at less than one inch, and variable across the site.

At ground surface and beneath the thin topsoil veneer, the naturally deposited cohesive soil was encountered and extended between two and four feet deep. The cohesive soil predominantly consists of moderately plastic silty clay with trace amounts of sand and gravel. The consistency of the silty clay is stiff and this material is concluded to have a low expansion potential.

Beneath the silty clay and extending to weathered shale is stiff to hard glacial till. The glacial till layer is between two and four feet thick and somewhat similar to the overlying silty clay soil. The glacial till is described as moderately plastic silty clay with little amounts of coarse to fine sand and trace amounts of gravel. It is noted that borings B-1 and B-4 were extended with auger drill methods into weathered shale bedrock until sample spoon refusal at about elevation 582 feet. These retrieved samples are noted on the logs as glacial till with substantial amounts of shale fragments.

Bedrock: Based on sample spoon refusal, the top of weathered shale bedrock is between elevation 592 and 591 feet. However, based on test bores B-1 and B-4 which were drilled to auger refusal, top of competent or sound bedrock is about elevation 582 feet. The ten foot thick zone of severely weathered shale bedrock was identified by three of six shallow bedrock cores to contain voids between elevations 585 and 590 feet.

Rock coring efforts were undertaken at all test bore locations to an approximate total depth of 25 feet. Based on regional geology, the bedrock type in this area of Amherst, N.Y. is the Camillus Shale unit. Camillus Shale bedrock is described as moderately hard, slightly weathered, light gray, thin bedded, porous and argillaceous shale. The percent recoveries ranged between 30 percent in the upper sections and 90 percent near bottom of hole. The corresponding RQD values were zero percent (very poor quality) and 30 percent (poor quality). Table No. 2 presents uniaxial compressive strength and density data for intact shale cores.

Groundwater: No appreciable amounts of groundwater were encountered at test bore locations. A groundwater observation well was installed near the center of the building at boring B/OW-3. Groundwater after coring, as noted on logs and profile, is about elevation 580 feet. Water level readings at B/OW – 3, after bailing and recharge, was about elevation 575 feet.

Except for B/OW-3, groundwater readings were taken at the completion of drilling efforts and, therefore, an adequate amount of time for the groundwater level to return to static conditions was probably not allowed. Fluctuations in the groundwater level may occur due to other factors than those present during field operations.

EARTHQUAKE/SEISMIC CONSIDERATIONS

Site Class Definition: For the given site conditions, the most applicable site definition is Site Class C, as listed in Table 1613.5.2 of the Building Code of New York State, © 2010.

Liquefaction Potential: For the site conditions and Site Class C, the design spectral response acceleration parameters S_{DS}, at 0.2 seconds, and S_{D1}, at one second, are 0.18g and 0.058g (g = 32.2 feet/sec^2), respectively, for this part of Erie County, New York. These values have a two percent probability of being exceeded in 50 years. Based upon the above conditions and an approximate magnitude 6.0 earthquake on the Richter Scale, the potential for liquefaction or settlement of Site Class C soils is considered very low to non-existent.

FOUNDATION DESIGN AND CONSTRUCTION RECOMMENDATIONS

General: This section will present and discuss recommendations on foundation design and construction, placement of controlled fills, and subgrade and base layer requirements for concrete floor slabs/pads, paved parking and roadway areas.

Proposed site development is to consist of a six-story hotel structure, with approximately 6,000 square feet in first floor building footprint area. As shown in Figure No. 2, the proposed building will be located in the south end of the triangular shaped site. The eastern portion of the site was partially excavated during previous site efforts. Two proposed stormwater structures or planters are noted on the site plan.

Except for previously excavated areas in the eastern end of the site, ground surface is relatively level across the proposed building footprint and the project site with a slight downward slope from the west to the east directions. For the purposes of this report, the top of finish first floor for the proposed hotel is estimated to be at an elevation of 599.0 feet. As such, one to three feet of approved granular fill is needed to raise site grades within the proposed hotel limits to design subgrade elevation. Exterior grades are expected to be one-half foot or lower below top of first floor.

Site Preparation and Earthwork: General site preparation will include the demolition and complete removal of any encountered foundations and floor slabs, and removing all unsuitable surficial material (i.e., asphalt pavement, concrete, brick, expansive slag, organic or topsoil layer, and construction and demolition-like fill) to a depth where firm, naturally occurring soils or fills are encountered. It is recommended, particularly in the location of the proposed hotel, that any slag and/or cinder/ash containing material, if encountered, should be tested to determine the expansion and corrosion characteristics (where applicable for direct or potential contact with foundation elements and buried utilities) of these materials prior to their use on-site. Any rubble-like and brick fill, boulders, or wood fill in particular, if encountered, will require undercutting/removal. The proposed building and paved areas are to be proof rolled with a fully loaded ten-wheel dump truck. All encountered soft and disturbed zones should be undercut and stabilized with granular fill that is placed in compacted lifts prior to placement of additional fill materials above. Refer to Appendix E entitled "General Earthwork Specification" for definition of the fill types and gradations, recommended minimum compaction requirements for various site developments, and placement and compaction methods. The NYS Department of Transportation (NYSDOT) specification numbers for typical aggregate subbase/base course components are Item No. 304.12 (Metric) Subbase Course, Type 2 (< 2 inch maximum size), which is preferred, or Item No. 304.14 (Metric) Subbase Course, Type 4 (< 2 inch maximum size).

As shown in Figure No. 2, the project site is currently unoccupied by any structures. However, a significant portion of the site along and near the east property line has been previously excavate up to five feet or more. This area must be properly prepared (i.e. leveled and compacted) and backfilled with approved granular fill compacted to minimum 92 percent of maximum dry density in accordance with ASTM D1557.

It is unknown if any former residential/commercial structures existed on the project site. It is unknown if any former footings and foundation walls may be buried at the proposed site. Septic tank and system locations and the abandonment conditions or practices are normally unknown. If encountered during site development, it is recommended that any tanks and systems should be properly removed/treated/remediated relative to the proposed development and under the applicable local and state regulations. The remaining cavities, from the aforementioned items, should be backfilled with select/approved granular fill that is placed in compacted to the minimum recommendation, as noted in the General Earthwork Specification.

FOUNDATION DESIGN AND CONSTRUCTION RECOMMENDATIONS

General: The proposed six story hotel is reported to be a concrete block and plank design and primarily supported by perimeter and interior strip footings or grade beams supported on deep foundations. Due to the presence of voids in the upper weathered bedrock zone, a grouting program is recommended to minimize the possibility of collapse or settlement of shallow bearing strip footings. The recommended deep foundation option is small diameter drill piers extending to competent bedrock. Both foundation options will be further discussed below.

Shallow Foundations: Due to significant voids in three of six bedrock cores (B-2, 5 and 6) between elevations 590 and 585 feet, a grouting program is needed to assure sound and long term bearing of shallow footings. The procedure is suggested to include small diameter holes at ten foot intervals along strip footings and extending to elevation 580 feet. After placement of one inch diameter tremie pipe and during removal of casing or augers, a low strength cement grout is injected or pumped to fill the drilled hole and any encountered voids.

Due to an upper medium stiff clay layer at most test bore locations, perimeter and interior footings are recommended to bear at elevation 594.5 feet. All footings should bear on natural deposited, very stuff clay till or granular fill compacted to a minimum 95 percent of maximum dry density in accordance with ASTM D1557 and extending to very stiff clay till. Undercut areas beneath proposed foundations must extend laterally beyond each vertically projected edge of the foundation by a minimum distance equal to one-half the total depth of the undercut or equating to a slope of two vertical to one horizontal from the bottom foundation corner.

Wall footings should have a minimum two-foot width and column footings should have a minimum three-foot width. Based on the above described conditions, the recommended maximum net allowable foundation bearing pressure is 4,000 pounds per square foot (psf) of bearing area. All footings for the proposed building are recommended to be designed near the same contact pressure. The recommended maximum net allowable foundation bearing pressure is based on generally accepted design methods for cohesive soil conditions. Based on provisions of the above recommendations and estimated design requirements and utilization of proper construction procedures and experienced field supervision and testing personnel, total and differential settlements are estimated to be less than one inch and ¾'s inch, respectively. Refer to the engineering computations, which are included as Appendix D, for additional foundation design and construction details.

Deep Foundations: Cast-in-place, concrete filled, straight shaft drilled piers that are socketed into weathered bedrock and extending to elevation 582 feet is the recommended deep foundation option. Assuming a four foot deep perimeter grade beam, the poured length of exterior piers is about 13 feet. It is noted that groundwater was encountered at elevation 580 feet or deeper.

The concrete mix for drilled pier foundations is recommended to have a minimum 28-day unconfined compressive strength of 4,000 pounds per square inch (psi). Due to the dissolved sulfate concentrations within the bedrock groundwater in this regional area and without actual field data, type II Portland cement is preliminarily recommended for this below grade construction that is on or within the shale bedrock. For concrete that is cast near/at the existing ground surface, type I/II Portland cement is recommended.

The axial capacity of the drilled pier is derived from the ultimate bearing capacity of the tip and frictional resistance along the perimeter of the shaft. Based on a factor of safety of two and one-half, the recommended allowable compression load, based on end bearing and side resistance, is 45 kips per square foot of pier bearing area. The allowable uplift load should be based on the pier weight plus two kips per square foot of side resistance between elevations 593 and 582 feet. As such, the allowable compression load for 2.5 and 3.0 feet diameter drill piers extending to elevation 582 feet is 200 and 300 kips, respectively. Refer to computations sheets in Appendix D for additional details.

Additional Foundation Considerations: In addition to the above, the following recommendations will provide additional assurances with regard to proper foundation construction.

a) All fill placed beneath, adjacent, or above foundations must comply with the "General Earthwork Specification", included as Appendix E.
b) Backfill of foundations with approved select granular fill must be completed prior to placement of substantial superstructure loads, except for basement walls or substructure areas that may additionally require superstructure loads and possibly internal bracing.
c) The upper silty materials may rut and "pump" if exposed to excessive surface water and repeated construction traffic. Proper site management and fill placement operations are needed to minimize costly undercuts and subgrade repairs prior to placement of concrete slabs and asphalt pavement. It is noted that construction during wet/rainy and/or Fall and Spring conditions may require added precautions and possibly a thicker base layer to maintain a stable subgrade condition.
d) Step footings, if utilized, should have a rise to run ratio of 1:2, with a two-foot maximum rise and a four-foot minimum run between steps or as recommended by the design structural engineer.

Stabilization of Excavations: The trench/excavation sidewall stability concerns can be addressed with the Occupational Safety and Health Act (OSHA) requirements as set forth in Subpart P of 29 CFR Part

1926, Sections 1926.650 to 1926.652. In lieu of a properly designed shoring system, side slopes of the trench excavation should be one on one (vertical to horizontal distance) or flatter in cohesive soils or one on one and one-half or flatter in the granular materials, as required by OSHA.

Water must not be allowed to accumulate or pond on exposed foundation bearing grades. Surface water and groundwater from within the excavation must be either pumped, diverted or channelized by gravity flow to effectuate the construction of the proposed foundation. Pockets of localized perched groundwater may seasonally be expected to be encountered in the upper natural non-plastic silt and sand soil.

In addition, a high groundwater condition may be encountered when the natural cohesive soils/glacial tills are breeched in an effort to construct the deep foundations (i.e., drilled piers) that extend into the weathered shale bedrock. The drilled pier/foundation contractor would be responsible for the method to address the respective groundwater issue and, in part, depends on the volume of groundwater at each drilled pier/foundation location. Due to a deep groundwater level, only modest amounts of groundwater are expected.

First Floor Slab: For the most part and based on test results for similar soils/fills, moderately plastic cohesive natural soils/fills may be difficult to compact in a controlled manner considering the varying soil plasticity and natural moisture contents that are estimated to be at to wet of optimum, at the time of the investigation. The excavated and approvable soil/fill types are not expected to be available in any reasonable quantities. These soils/fills may be expected to be suitable for re-use as general fill with the implementation of uniformly applied soil conditioning (i.e., drying and blending) and compaction methods, if additional volume of soil for wall backfill or for raising site grades is needed.

Excavated and approvable granular (i.e., sand or gravel and non-plastic silt and sand) soil/fill are also not expected to be available in any reasonable quantity. For the most part, granular (i.e., sand or gravel) soil/fill is expected to be acceptable for on-site re-use, as general/ordinary fill without substantial reworking and/or modification, while silty fine-sized sand to non-plastic sandy silt may first require drying and blending.

Dissimilar excavated materials should not be commingled prior to their use on-site, unless designated for a green/vegetation area. General fill material is also recommended to be placed on prepared and approved subgrade and in accordance with previous recommendations.

A geotextile fabric (such as, Mirafi 600X or equal) that separates the subgrade and the approved/select granular base layer may be needed and is particularly recommended for sensitive cohesive/fine-grained/silty subgrade soil/fills. This approach will stabilize and provide a workable building pad condition with minimal required repairs.

The approved subgrade will most likely consist of either a thoroughly compacted (i.e., minimum 92 percent of the maximum dry density by ASTM D 1557), select/approved granular fill or the existing very stiff or better/thoroughly compacted natural silty clay soil at the proposed building location. Above the approved subgrade(s), a minimum eight-inch thick select granular fill (i.e., number two crusher run stone or equal) layer is recommended as the base course for the propose building concrete floor slab. The NYSDOT specification numbers for typical aggregate subbase/base course components are Item No. 304.12 (Metric) Subbase Course, Type 2 (< 2 inch maximum), which is preferred, or Item No. 304.14 (Metric) Subbase Course, Type 4 (< 2 inch maximum). This select granular base layer would be compacted to a minimum 95 percent of the maximum dry density by ASTM D 1557. The floor slab for the proposed building/structure is recommended to have a minimum four-inch thickness or as determined by the design structural engineer. The floor slab reinforcement should be provided through placement of wire mesh or plastic fibers and is also as determined by the design structural engineer.

At the discretion of the design architect, a vapor barrier may be considered for use in the proposed structure. The use of a thin gravel cushion, as a capillary break, or a thin sand cushion over a vapor barrier that is placed beneath the concrete slab is at the discretion of the design architect/engineer or as required by local code. Gradations of gravels that are satisfactory capillary breaks include 1 ¼-inch or ¾-inch crushed stone or aggregate per the ASTM D2321 Types IA, IB and II with less than 5 % fines. A number two crusher run stone may also be applicable, but the gradation and material property specifications must qualify.

At the assumed final site grades and based upon the thickness and character of the underlying natural silty clay soil, the recommended subgrade modulus at the top of the base layer for a concrete first floor slab bearing on an eight-inch thick compacted base layer (i.e., minimum 95 percent compaction) and prepared soil/fill approved subgrade (i.e., minimum 92 percent compaction) is recommended not to exceed 150 pounds per cubic inch (pci) with a Poisson Ratio of 0.40 for design purposes. Isolation of the floor slabs from the footings-piers-columns and walls do appear to be warranted.

Parking and Roadway Facilities: The characteristics of the natural silt and clay soils/fills and the known frost penetration in Western New York requires that specific attention is provided to the design and construction of paved roadway and parking areas. For pavement sections, isolated pockets of surficial silty/cohesive/fine-grained soil/fill may be encountered and may be too soft and wet (e.g., boring B-3) in the proposed parking and roadway areas. These types of soil/fill may be adequately conditioned (i.e., dried and blended) and compacted to support necessary construction equipment and normal pavement section. Otherwise, the removal/undercutting of the silty/cohesive/fine-grained soil/fill to a firm, approved subgrade and subsequent placement and compaction of select or approved granular fill will be required in order to accommodate the recommended pavement section.

For pavement sections, it is recommended that the subgrade surface is adequately graded and/or underdrains are installed to prevent water accumulation. Above the approved subgrade surface (i.e., minimum 92 percent compaction), a minimum eight-inch thick select granular layer is recommended as the base course for lightly traveled roadway and parking areas (standard duty section). A geotextile filter and strength fabric (such as, Mirafi 600X or equal) and minimum 12-inch thick base course are recommended for all truck routes and heavily traveled roadways (heavy duty section). If "pumping" of the silty/cohesive/fine-grained soil/fill subgrade occurs or is difficult to stabilize during construction for the standard duty section, an increase in the base thickness to that of the heavy duty section or a geotextile filter and strength fabric is recommended to be placed on the prepared and approved subgrade for the standard-duty section. The NYS Department of Transportation (NYSDOT) specification numbers for typical aggregate subbase/base course components are Item No. 304.12 (Metric) Subbase Course, Type 2 (< 2 inch maximum size), which is preferred, or Item No. 304.14 (Metric) Subbase Course, Type 4 (< 2 inch maximum size). The granular aggregate base layer is recommended to be compacted to a minimum 95 percent of maximum dry density (ASTM D1557).

The thickness of top and binder course layers should be determined in accordance with AASHTO methods. In summary, the minimum recommended asphalt thicknesses for the heavy duty section and standard duty section are three and one-half inches and three inches, respectively. The top and binder course layers are recommended to be designed and constructed in accordance with New York State Department of Transportation <u>Standard Specification</u>.

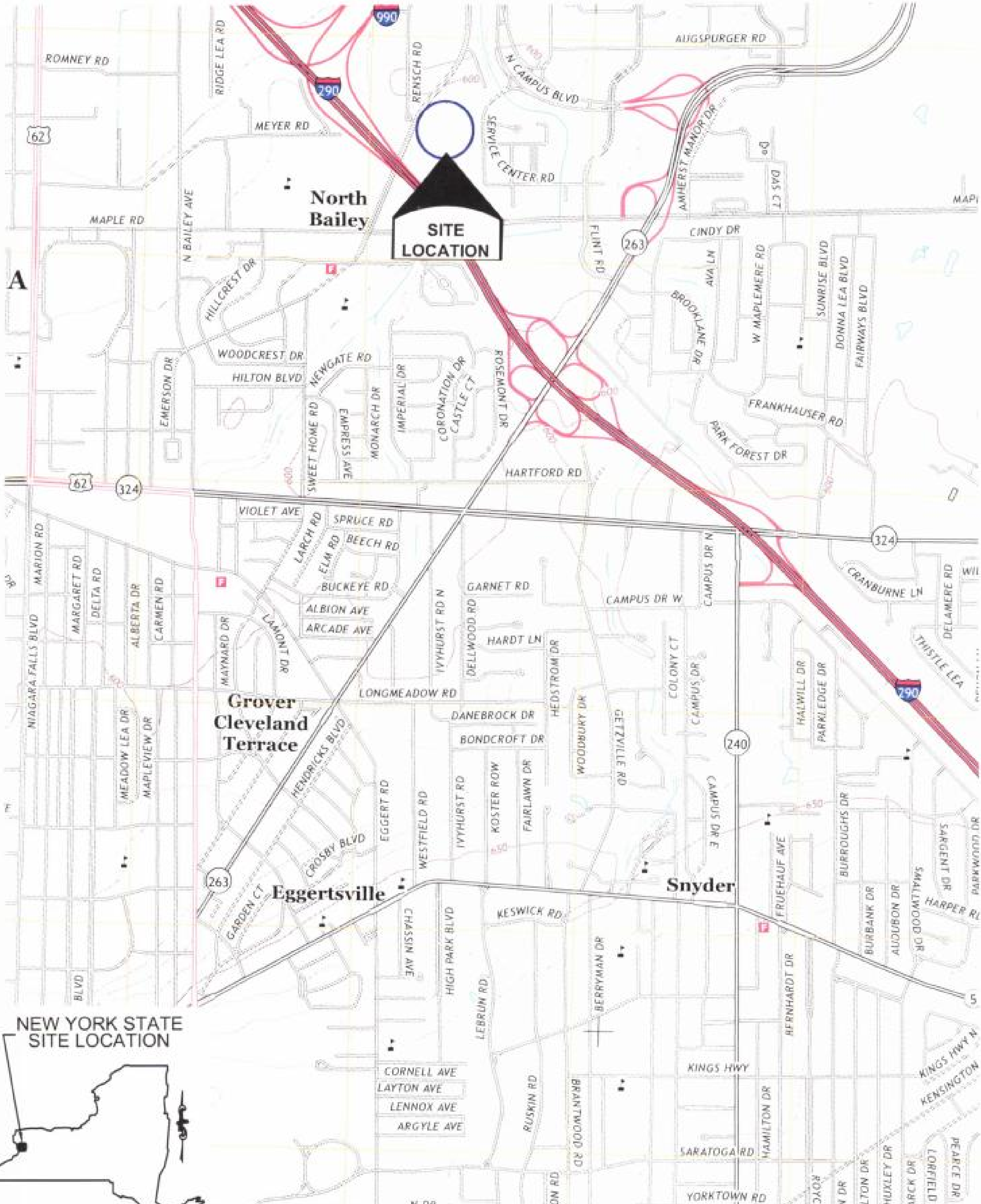
Portland cement concrete slabs should have minimum thicknesses of five inches for the standard duty section and six inches for the heavy duty section or as determined by the design structural engineer. The maximum soil subgrade modulus at the top of the base layer for concrete slab design purposes is recommended not to exceed 150 pounds per cubic inch (pci), with a Poisson Ratio of 0.40.

Limitations, Field Inspections and Monitoring: This report is based on the preliminary information that is provided by project representatives and the subsurface conditions that were encountered at the test boring locations. As detailed in Appendix F “Limitations”, modification regarding proposed building/structure locations and other site developments can result in changes to provided recommendations. It is recommended that the geotechnical engineer be provided the opportunity to generally review the final detailed design and contract specifications. Required earthwork and foundation construction should be done under the supervision of experienced construction personnel and in a manner consistent with proven methods. All site work should be carefully monitored and tested by experienced geotechnical personnel to assure compliance with earthwork and foundation construction specifications.

Thank you for the opportunity to assist on this project. If questions should arise, please call the undersigned at your earliest convenience.

Very truly yours,
BARRON & ASSOCIATES, INC.
and
BUFFALO DRILLING COMPANY, INC.

James S. Barron, P.E.
President/Geotechnical Engineer



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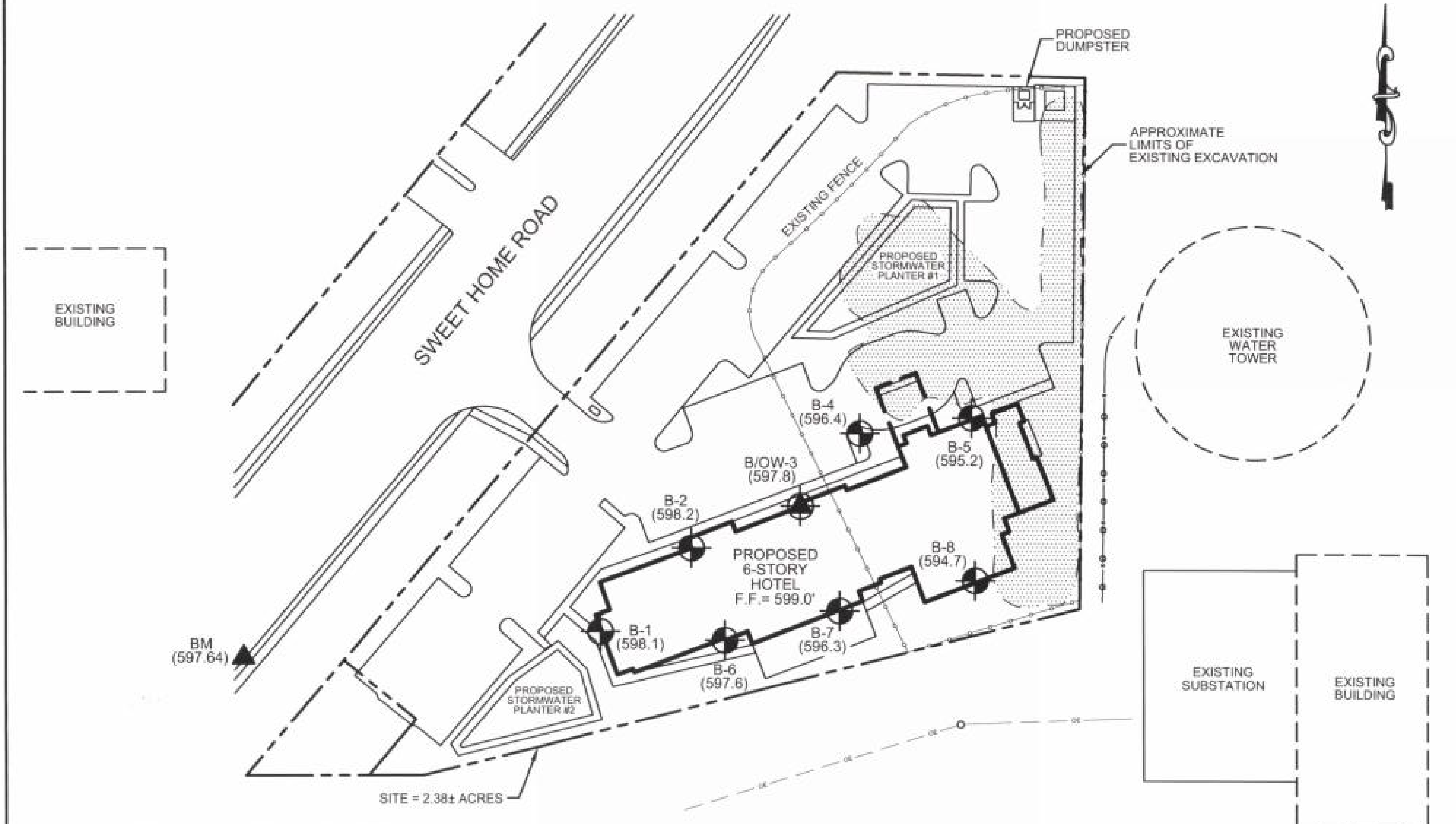
DRAWN: DAN KASPROWICZ

CLIENT: SWEET HOME HOTELS, LLC
1262 SWEET HOME ROAD
AMHERST, NEW YORK 14228

PROJECT: PROPOSED 6-STORY HYATT HOUSE HOTEL
1265 SWEET HOME ROAD
TOWN OF AMHERST, ERIE CO., NEW YORK 14228

USGS SITE LOCATION PLAN
BUFFALO NE, N.Y. QUAD
2013

JOB NO.: 15-573	SCALE: 1" = 2000' ±
DATE: 8/27/2015	FIGURE NO. 1



LEGEND	
B-2	= TEST BORING & NO.
B/OW-3	= TEST BORING / OBSERVATION WELL & NO.
(598.2)	= GROUND SURFACE ELEVATION (FT.)
BM	= BENCH MARK (NORTH RIM OF CATCH BASIN)

NOTES:

1. BORINGS, BUILDINGS, SITE FEATURES, PROPERTY LINE LOCATIONS, AND SCALE OF DRAWING ARE APPROXIMATE.
2. BASE MAP REFERENCE, BORING LOCATIONS, AND BENCH MARK ELEVATION PROVIDED BY TREDO ENGINEERS, TITLED "SITE GRADING PLAN - PROPOSED TEST BORING LOCATIONS", DWG. SP-102, PROJECT NO. 114055, DATED 5/18/2015.
3. EXISTING FEATURES OBTAINED FROM A FIELD SKETCH FROM A BARRON & ASOCIATES, P.C., REPRESENTATIVE ON 8/25/2015.

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PROJECT: PROPOSED 6-STORY HYATT HOUSE HOTEL
1265 SWEET HOME ROAD
TOWN OF AMHERST, ERIE CO., NEW YORK 14228

TEST BORING & OBSERVATION WELL LOCATION PLAN

0 40 80 160

JOB NO.: 15-573	SCALE: 1" = 80' ±
DATE: 8/26/2015	FIGURE NO. 2

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B&A JOB NO: 15-573
CLIENT: Sweet Home Hotels, LLC
PROJECT: Proposed Six Story Hyatt House Hotel
1265 Sweet Home Road
Town of Amherst, Erie Co., New York 14228

TABLE NO. 1
LABORATORY PHYSICAL SOIL TEST RESULTS

Boring No.	Sample No.	Depth	Moisture Content ASTM D2216	Organic Matter Content ASTM D2974	Unconfined Compressive Strength ASTM D2166	Wet Density ASTM D2166	Grain Size Analysis ASTM D422				Atterberg Limits ASTM D4318			USCS Soil Classification ASTM D2487 / ASTM D2488 *
							Gravel	Sand	Silt	Clay	LL	PL	PI	
		(ft.)	(%)	(%)	(psf)	(pcf)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(-)
B-1	S-1	0-2	23.8	-	-	-	-	-	-	-	-	-	-	CL
	S-2	2-4	-	-	-	-	-	-	-	-	-	-	-	NO SAMPLE
	S-3	4-6	16.9	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-4	6-8	22.8	-	-	-	-	-	-	-	47	26	21	CL-Till
	S-5	8-10	37.2	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-6	10-10.4	45.5	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-7	14-15.7	3.6	-	-	-	-	-	-	-	-	-	-	WEATHERED SHALE
B/OW-3	S-1	0-2	23.8	-	-	-	-	-	-	-	-	-	-	CL
	S-2	2-4	16.4	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-3	4-6	9.9	-	-	-	-	-	-	-	37	21	16	CL-Till
B-4	S-1	0-2	14.4	-	-	-	-	-	-	-	-	-	-	CL
	S-2	2-4	10.5	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-3	4-6	5.9	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-4	6-8	6.2	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-5	8-10	49.2	-	-	-	-	-	-	-	54	30	24	MH-Till
	S-6	10-12	11.0	-	-	-	-	-	-	-	-	-	-	MH-Till
	S-7	14-14.7	2.4	-	-	-	-	-	-	-	-	-	-	WEATHERED SHALE
B-5	S-1	0-2	3.9	-	-	-	-	-	-	-	-	-	-	CL-Fill
	S-2	2-4	10.5	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-3	4-5.7	7.4	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-4	6-6.1	-	-	-	-	-	-	-	-	-	-	-	NO SAMPLE
B-7	S-1	0-2	11.7	-	-	-	-	-	-	-	-	-	-	CL
	S-2	2-4	12.8	-	-	-	-	-	-	-	-	-	-	CL-Till
	S-3	4-5.2	11.6	-	-	-	-	-	-	-	-	-	-	CL-Till

* Soil classification based on visual identification and soil classification of adjacent samples (as applicable).

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B&A JOB NO: 15-573
CLIENT: Sweet Home Hotels, LLC
PROJECT: Proposed Six Story Hyatt House Hotel
1265 Sweet Home Road
Town of Amherst, Erie Co., New York 14228

TABLE NO. 2

SUMMARY TABLE OF BEDROCK UNIAXIAL COMPRESSIVE STRENGTH TESTS

Test Boring No.	Core Run No.	Sample Location		Moisture Content ASTM D2216	Wet Density ASTM D2166	Dry Density ASTM D2938	Uncapped Length / Diameter ASTM D2938	Failure Type	Maximum Compressive ASTM D2938			Rock Identification ASTM C294
		Depth Interval	Elevation Interval						Load	Strength		
		(ft.)	(ft.)	(%)	(pcf)	(pcf)	(in. / in.)	(-)	(lbs.)	(tsf)	(psi)	
B-1	C-3	23.13 - 23.46	574.97 - 574.64	0.1	169.9	169.8	4.05 / 2.05	COLUMNAR	13,140 [1]	287	3,991	CAMILLUS SHALE 2., 3.
B/OW-3	C-2	15.52 - 15.94	582.28 - 581.86	0.1	166.2	166.0	5.19 / 2.05	COLUMNAR	21,870 [1]	478	6,643	CAMILLUS SHALE 2., 3.
B-5	C-1	6.75 - 7.08	588.45 - 588.12	0.1	167.4	167.2	4.25 / 2.05	COLUMNAR	33,210 [1]	726	10,088	CAMILLUS SHALE 2., 3.
B-5	C-3	19.77 - 20.10	575.43 - 575.10	0.2	164.5	164.3	4.17 / 2.04	COLUMNAR	23,380 [1]	511	7,102	CAMILLUS SHALE 2., 3.

Notes:

1. Ends of sample capped prior to testing.
2. Sample appeared absent of limiting structures (fracture planes, vugs, etc.).
3. Rock identification based on the local geology according to New York State Geologic Maps.

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APPENDIX A

TEST BORING LOGS

BARRON & ASSOCIATES, P.C. &
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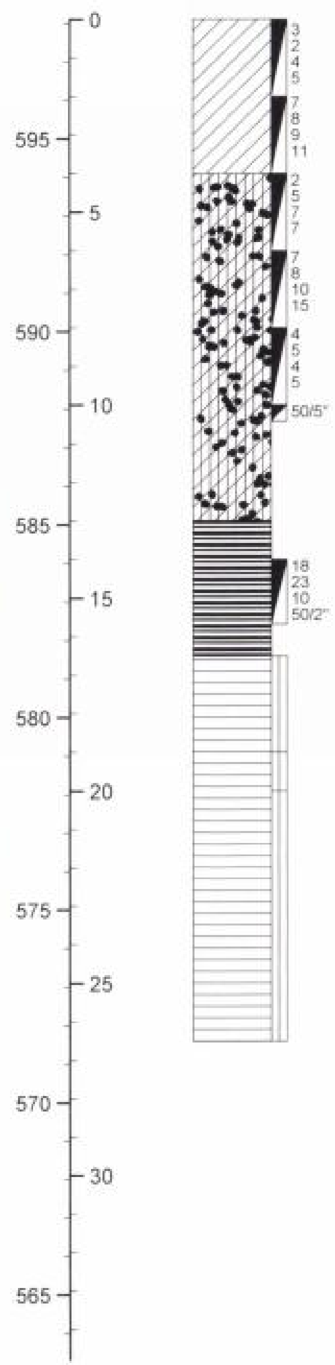
TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-1

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	8/31/15	**SURFACE ELEVATION (ft.):**	598.1
DATE COMPLETED:	9/1/15	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None

Elevation/ Depth (feet) — Soil Symbols, Sampler Symbols, Field Test Data



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1 : 0.0'- 2.0'	6	40	Dk. brown, m. stiff CLAY, some Silt, tr. f/c Sand, tr. Gravel, tr. Roots, mod. plastic, moist (CL)
S-2 : 2.0'- 4.0'	17	0	...grade: v. stiff (No Sample)
S-3 : 4.0'- 6.0'	12	50	Grayish brown, stiff CLAY, some Silt, little f. Sand, tr. Gravel, mod. plastic, moist (CL-Till)
S-4 : 6.0'- 8.0'	18	60	...grade: v. stiff
S-5 : 8.0'- 10.0'	9	80	...grade: stiff
S-6 : 10.0'- 10.4'	50+	90	...grade: Gray, little Shale fragments, wet
S-7 : 14.0'- 15.7'	33	60	Gray, dense Sand to gravel sized WEATHERED SHALE, tr. Silt, moist (WEATHERED SHALE)
C-1 : 16.5'- 20.0'	-	88 (53)	CAMILLUS SHALE: Dk. Gray, dense, thin bedded, SHALE with interbedded Gypsum, porous, argillaceous, sl. weathered, hard (CAMILLUS SHALE) # pieces > 1" = 6 # pieces > 1" = 2 longest piece = 11.0"
C-2 : 19.0'- 20.0'	-	29 (0)	...grade: banded # pieces > 1" = 1 # pieces > 1" = 0 longest piece = 1.0"
C-3 : 20.0'- 26.5'	-	75 (5)	...grade: thin bedded # pieces > 1" = 22 # pieces > 1" = 1 longest piece = 4.0"

Depth to Bottom of Hole: 26.5 feet

Started coring at 16.5' and lost water at 17.5'. Dry hole before coring, water at 18.5' after coring.

Logged by: E. Jensen

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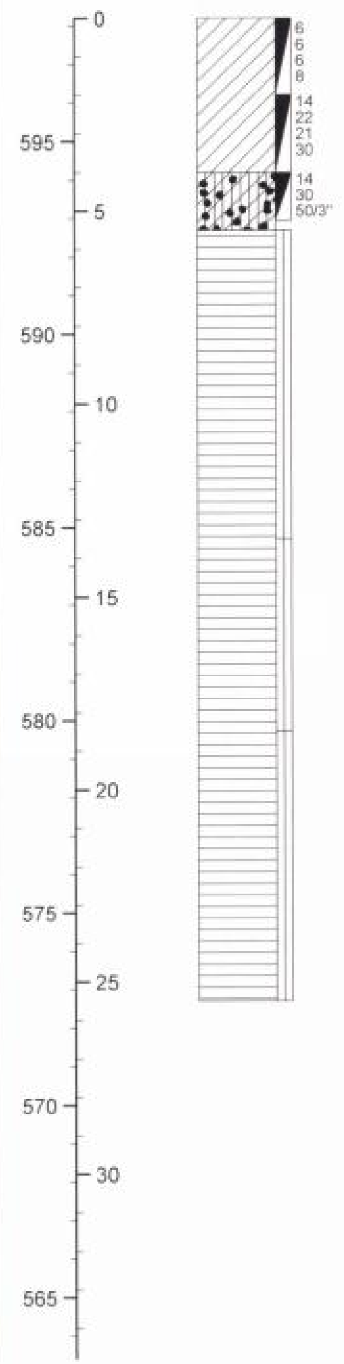
TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-2

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	8/28/15	**SURFACE ELEVATION (ft.):**	598.2
DATE COMPLETED:	8/28/15	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None

Elevation/ Depth (feet) — Soil Symbols Sampler Symbols Field Test Data



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1 : 0.0'- 2.0'	12	40	Dk. brown, m. stiff CLAY, some Silt, tr. f/c Sand, tr. Gravel, tr. Roots, mod. plastic, moist (CL)
S-2 : 2.0'- 4.0'	43	40	...grade: hard, little Gravel
S-3 : 4.0'- 5.3'	80+	75	Grayish brown, hard CLAY, some Silt, little f/c Sand, tr. Gravel, mod. plastic, moist (CL-Till)
C-1 : 5.5'- 13.5'	-	28 (0)	CAMILLUS SHALE: Dk. Gray, dense, banded, SHALE with interbedded Gypsum, porous, argillaceous, weathered, mod. hard (CAMILLUS SHALE) # pieces > 1" = 11 # pieces > 4" = 0 longest piece = 3.5" *(Driller noted a large void in rock from 8.0 to 11.0 feet.)*
C-2 : 13.5'- 18.5'	-	74 (37)	...grade: sl. weathered # pieces > 1" = 12 # pieces > 4" = 3 longest piece = 6.5"
C-3 : 18.5'- 25.5'	-	85 (28)	Same as C-2 # pieces > 1" = 28 # pieces > 4" = 4 longest piece = 7"
			Depth to Bottom of Hole: 25.5 feet

Void at 8' to 11', lost water at 13'. 6" void at 15' to 15.5'. Dry hole before coring after coring water is at 16.5'

Logged by: E. Jensen

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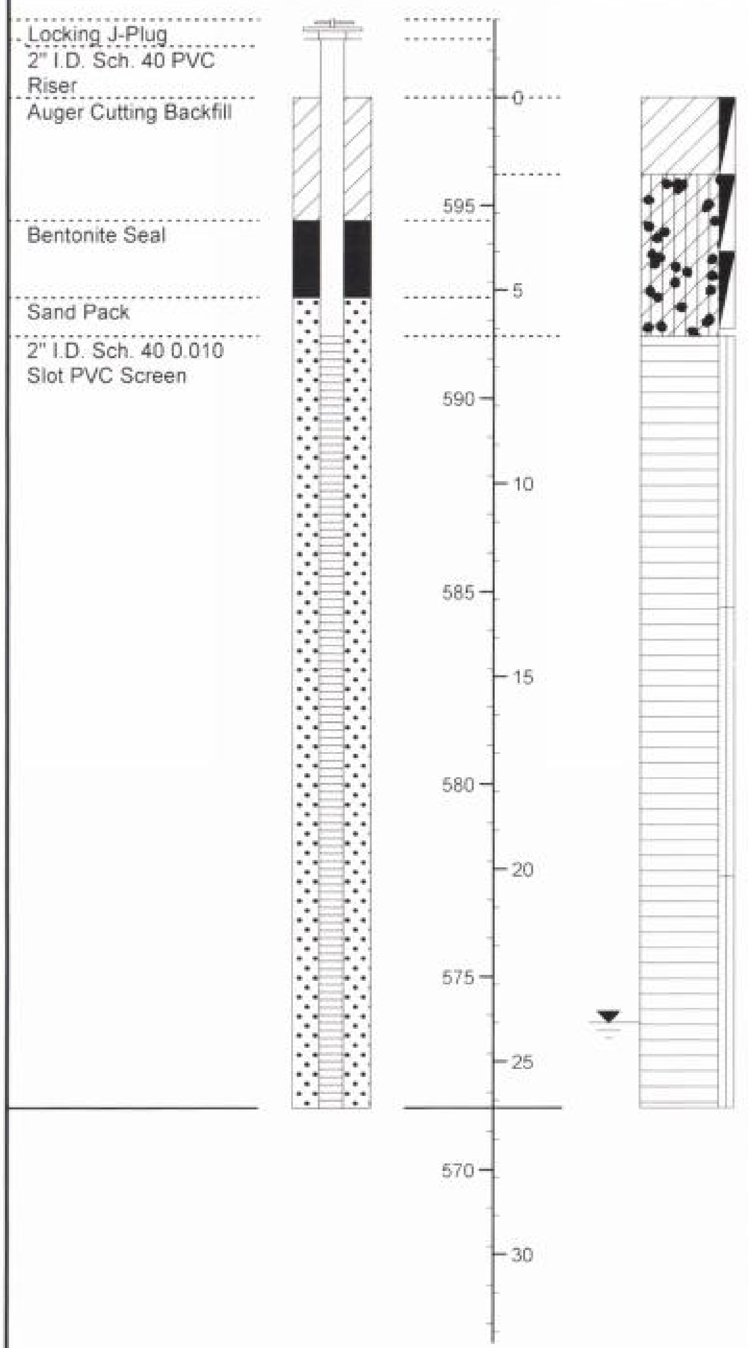
TEST BORING / OBSERVATION WELL SCHEMATIC

JOB No.: 15-573 **BORING No.:** B/OW-3

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	8/27/15	**SURFACE ELEVATION (FT):**	597.8
DATE COMPLETED:	8/27/15	**GROUNDWATER DEPTH (FT):** (measured at completion unless indicated below)	24.0

Observation Well Installation Details | Elevation/ Depth | Soil Symbols Sampler Symbols Field Test Data



Sample No.	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1	14	40	Dk. brown, stiff CLAY, some Silt, tr. f/c Sand, tr. Gravel, tr. Roots, mod. plastic, moist (CL)
S-2	20	50	Grayish brown, v. stiff CLAY, some Silt, little f/c Sand, tr. Gravel, mod. plastic, moist (CL-Till)
S-3	8	20	...grade: stiff, little Gravel
C-1	-	36 (14)	CAMILLUS SHALE: Dk. Gray, dense, thin bedded, SHALE with interbedded Gypsum, porous, argillaceous, weathered, hard (CAMILLUS SHALE) # pieces > 1" = 6 # pieces > 4" = 2 longest piece = 7.0"
C-2	-	58 (32)	Same as C-1 # pieces > 1" = 12 # pieces > 4" = 5 longest piece = 6.5"
C-3	-	93 (35)	Same as C-1 # pieces > 1" = 29 # pieces > 4" = 4 longest piece = 8.0"

Depth to Bottom of Hole: 26.2 feet

1. No groundwater encountered after installation.
2. Groundwater level at 18.5 feet B.G.S. on 9/23/15. Well bailed dry.
3. Groundwater level at 24.0 feet B.G.S. on 9/24/15.

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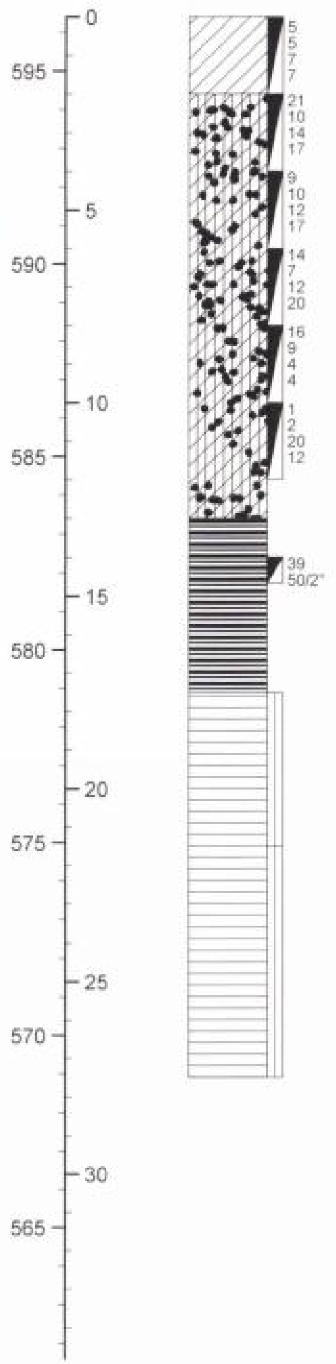
TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-4

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	9/2/15	**SURFACE ELEVATION (ft.):**	596.4
DATE COMPLETED:	9/2/15	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	See Notes

Elevation/ Depth (feet) | Soil Symbols Sampler Symbols Field Test Data



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1 : 0.0'- 2.0'	12	45	Dk. brown, stiff CLAY, some Silt, tr. f/c Sand, tr. Gravel, tr. Roots, mod. plastic, moist (CL)
S-2 : 2.0'- 4.0'	24	50	Grayish brown, v. stiff CLAY, some Silt, little f/c Sand, little Gravel, mod. plastic, moist (CL-Till)
S-3 : 4.0'- 6.0'	22	60	...grade: and Shale fragments
S-4 : 6.0'- 8.0'	19	20	Same as S-3
S-5 : 8.0'- 10.0'	13	40	...grade: stiff, and SILT, tr. Shale fragments (MH-Till)
S-6 : 10.0'- 12.0'	22	75	...grade: v. stiff, and Shale fragments
S-7 : 14.0'- 14.7'	50+	75	Gray, v. dense Sand to gravel sized WEATHERED SHALE, tr. Silt, moist (WEATHERED SHALE)
C-1 : 17.5'- 21.5'	-	69 (0)	CAMILLUS SHALE: Med. Lt. Gray, dense, banded, SHALE with interbedded Gypsum, porous, argillaceous, sl. weathered, mod. hard (CAMILLUS SHALE) # pieces > 1" = 12 # pieces > 4" = 0 longest piece = 3.0"
C-2 : 21.5'- 27.5'	-	47 (0)	Same as C-1 # pieces > 1" = 17 # pieces > 4" = 0 longest piece = 3.25"
			Depth to Bottom of Hole: 27.5 feet

1. No groundwater encountered before coring.
2. Water added to hole to aid coring effort.
3. Water level at 18.5' after coring.

Logged by: E. Jensen

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TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-5

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER: J. Gardner
SAMPLING METHODS: ASTM D1586 & D2113
DATE STARTED: 9/3/15
DATE COMPLETED: 9/4/15
TYPE OF DRILL RIG: Diedrich D-120 (Truck)
SIZE AND TYPE OF BIT: 4 1/4" H.S.A. & Nx Core
SURFACE ELEVATION (ft.): 595.2
GROUNDWATER DEPTH (ft.): None
(measured at completion unless indicated below)

Elevation/ Depth (feet)	Soil Symbols Sampler Symbols Field Test Data	Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
595 – 0	4, 6, 8, 10	S-1 : 0.0'- 2.0'	14	25	Dk. brown, stiff CLAY, and Asphalt, some Silt, little f/c Sand, little Gravel, mod. plastic, moist (CL-Fill)
	6, 10, 14, 20	S-2 : 2.0'- 4.0'	24	50	Grayish brown, v. stiff CLAY, some Silt, little f/c Sand, little Gravel, mod. plastic, moist (CL-Till)
590 – 5	9, 30, 31, 50/2"	S-3 : 4.0'- 5.7'	61	60	...grade: hard, and Shale fragments
	50/1"	S-4 : 6.0'- 6.1'	50+	0	Same as S-4 (No Sample)
		C-1 : 6.1'- 9.1'	-	44 (29)	CAMILLUS SHALE: Dk. Gray, dense, thin bedded, SHALE with interbedded Gypsum, porous, argillaceous, sl.weathered, hard (CAMILLUS SHALE) # pieces > 1" = 2 # pieces > 4" = 2 longest piece = 6.5"
585 – 10, 580 – 15		C-2 : 9.0'- 16.0'	-	28 (13)	Same as C-1 # pieces > 1" = 6 # pieces > 4" = 2 longest piece = 5.5" *(Driller noted a large void in rock from 9.0 to 11.5 feet.)*
575 – 20, 570 – 25		C-3 : 16.0'- 26.0'	-	80 (27)	Same as C-1 # pieces > 1" = 32 # pieces > 4" = 6 longest piece = 7.5"
565 – 30					Depth to Bottom of Hole: 26.0 feet

Auger refusal at 6'. Void at 9' to 11.5', lost water at 12'. Dry hole before coring, water at 17.5' after coring. Moved hole 70' Southwest.

Logged by: E. Jensen

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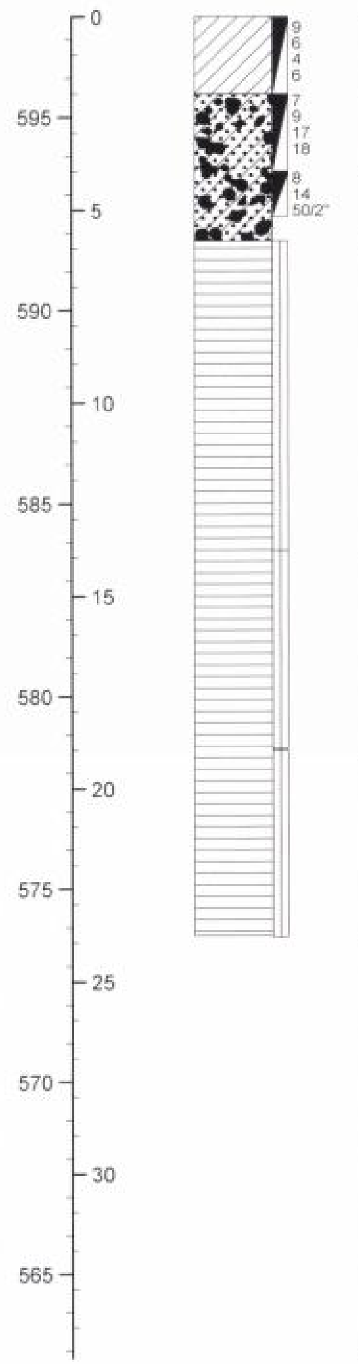
TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-6

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	8/28/15	**SURFACE ELEVATION (ft.):**	597.6
DATE COMPLETED:	8/28/15	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None

Elevation/ Depth (feet) — Soil Symbols Sampler Symbols Field Test Data



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1 : 0.0'- 2.0'	10	35	Dk. brown, stiff CLAY, some Silt, tr. f/c Sand, tr. Gravel, tr. Roots, mod. plastic, moist (CL)
S-2 : 2.0'- 4.0'	26	65	Grayish brown, v. stiff CLAY, some Silt, little f/c Sand, tr. Gravel, mod. plastic, moist (CL-Till)
S-3 : 4.0'- 5.2'	64+	100	...grade: hard
C-1 : 5.8'- 13.8'	-	29 (5)	CAMILLUS SHALE: Dk. Gray, dense, thin bedded, SHALE with interbedded Gypsum, porous, argillaceous, sl.weathered, hard (CAMILLUS SHALE) # pieces > 1" = 9 # pieces > 4" = 2 longest piece = 4.5" *(Driller noted a large void in rock from 8.5 to 11.5 feet.)*
C-2 : 13.8'- 19.0'	-	93 (55)	Same as C-1 # pieces > 1" = 13 # pieces > 4" = 5 longest piece = 10.0"
C-3 : 19.0'- 23.8'	-	90 (22)	Same as C-1 # pieces > 1" = 17 # pieces > 4" = 3 longest piece = 4.5"
			Depth to Bottom of Hole: 23.8 feet

8.5' to 11.5' void. Lost water at 12.5'. Dry hole before coring, lost water at 18.5' from ground surface after coring.

Logged by: E. Jensen

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TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-7

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	9/01/15	**SURFACE ELEVATION (ft.):**	596.3
DATE COMPLETED:	9/01/15	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None

Elevation/ Depth (feet)	Soil Symbols Sampler Symbols Field Test Data	Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
596.3 / 0	4, 8, 9, 10	S-1 : 0.0'- 2.0'	17	40	Dk. brown, v. stiff CLAY, some Silt, tr. f/c Sand, tr. Gravel, tr. Roots, mod. plastic, moist (CL)
	11, 12, 14, 14	S-2 : 2.0'- 4.0'	26	70	Grayish brown, v. stiff CLAY, some Silt, little f/c Sand, tr. Gravel, mod. plastic, moist (CL-Till)
	4, 5, 50/2"	S-3 : 4.0'- 5.2'	55+	50	...grade: wet
		C-1 : 5.7'- 15.7'	-	56 (20)	CAMILLUS SHALE: Dk. Gray, dense, thin bedded, SHALE with interbedded Gypsum, porous, argillaceous, sl.weathered, mod. hard (CAMILLUS SHALE) # pieces > 1" = 13 # pieces > 4" = 3 longest piece = 9.25"
		C-2 : 15.7'- 25.7'	-	81 (12)	Same as C-1 # pieces > 1" = 39 # pieces > 4" = 2 longest piece = 8.0"
					Depth to Bottom of Hole: 25.7 feet

Depth scale (feet): 0, 5, 10, 15, 20, 25, 30; Elevation: 595, 590, 585, 580, 575, 570, 565

Refusal at 5.7'. Soft 9.5' to 12.5'. Lost water return at 13'. Dry hole before coring. Water at 18.5' after coring.

Logged by: E. Jensen

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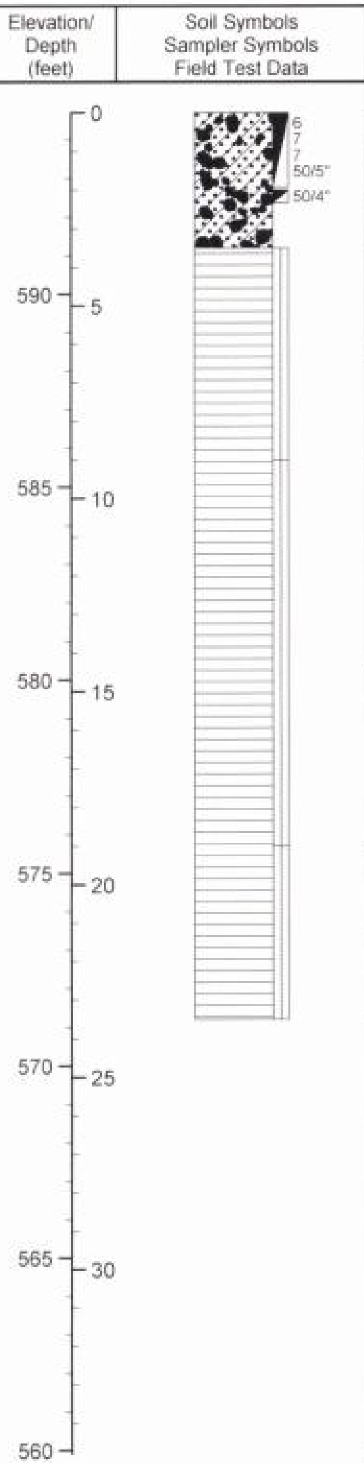
TEST BORING LOG

JOB No.: 15-573 **BORING No.:** B-8

PROJECT: Proposed 6-Story Hyatt House Hotel
1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228

DRILLER:	J. Gardner	**TYPE OF DRILL RIG:**	Diedrich D-120 (Truck)
SAMPLING METHODS:	ASTM D1586 & D2113	**SIZE AND TYPE OF BIT:**	4 1/4" H.S.A. & Nx Core
DATE STARTED:	9/2/15	**SURFACE ELEVATION (ft.):**	594.7
DATE COMPLETED:	9/3/15	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1 : 0.0'- 1.9'	14	25	Grayish brown, stiff CLAY, some Silt, little f/c Sand, little Gravel, little Shale fragments, mod. plastic, moist (CL-Till)
S-2 : 2.0'- 2.3'	50+	0	...grade: hard (No Sample)
C-1 : 3.5'- 9.0'	-	45 (18)	CAMILLUS SHALE: Dk. Gray, dense, thin bedded, SHALE with interbedded Gypsum, porous, argillaceous, sl.weathered, hard (CAMILLUS SHALE) # pieces > 1" = 6 # pieces > 4" = 2 longest piece = 7.75"
C-2 : 9.0'- 19.0'	-	66 (33)	...grade: banded # pieces > 1" = 23 # pieces > 4" = 6 longest piece = 13.5"
C-3 : 19.0'- 23.5'	-	100 (48)	Same as C-2 # pieces > 1" = 16 # pieces > 4" = 5 longest piece = 6.25"
			Depth to Bottom of Hole: 23.5 feet

Auger refusal at 3.5'. Dry hole before coring, void at 7' to 9', lost water at 10'. Water at 5.5' from ground surface after coring.

Logged by: E. Jensen

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APPENDIX B

GEOTECHNICAL REFERENCE STANDARDS

GEOTECHNICAL REFERENCE STANDARDS
SUMMARY OF LOGGING TECHNIQUES

Depth (ft.)	Blows per .5 ft.	Sample No.	N	% REC (RQD)	SOIL AND ROCK DESCRIPTION	REMARKS

Depth- The depth column provides the verticle scale of the boring log in feet below ground surface.

The number of blows obtained from each of the 0.5 ft. intervals of sampler penetration.

NOTE: WR represents the static weight of drill rods. WH represents the static weight of rods and hammer.

Sample Identification Number- Disturbed samples are identified with "S" preceding the sample number. Undisturbed samples (shelby tube) samples are identified with "U" preceding the sample number. Rock core samples are identified with "C" preceding the core run.

N-value- The Standard Penetration Test N-value, as specified by ASTM D1586 is defined as the number of blows required by a 140-pound hammer falling 30 inches each blow to drive a 2 inch outside diameter split spoon sampler 12 inches.

% Recovery- The length of sample recovered divided by the total length sampled. The result is numerically expressed as percent.

(RQD)- The "Rock Quality Designation". The total length of pieces>4 inches divided by the total length of core run.

TERMINOLOGY USED FOR SOIL DESCRIPTION

Density Description of Granular Soil

Number of Blows per ft., N.	Relative Density
0-4	Very loose
4-10	Loose
10-30	Medium
30-50	Dense
Over 50	Very dense

Consistency Description of Cohesive Soil

Number of Blows per ft., N.	Consistency
Below 2	Very soft
2-4	Soft
4-8	Medium
8-15	Stiff
15-30	Very stiff
Over 30	Hard

Grain Size

- Boulder - greater than 12 inch diameter
- Cobble - passing 12 inch, retained on 3 inch
- Gravel - passing 3 inch, retained on No. 4 sieve
- Sand - Coarse - passing No. 4 sieve, retained on No. 10 sieve
  Medium - passing No. 10 sieve, retained on No. 40 sieve
  Fine - passing No. 40 sieve, retained on No. 200 sieve
- Silt - 0.074 mm to 0.005 mm
- Clay - smaller than 0.005 mm

Description of Percentage or Proportions Used in Soil Sample Classification

Trace	0-10%
Little	10-20%
Some	20-35%
And	35-50%

Abbreviations Used In Soil Sample Classification

f - fine	v - very
m - medium	gr - gray
c - coarse	bn - brown
f/m - fine to medium	yel - yellow
f/c - fine to coarse	sl - slight
tr - trace	

Plasticity

- Non-plastic - A 1/8 inch thread cannot be rolled at any water content.
- Slight plasticity - The thread can barely be rolled.
- Moderate Plasticity - Thread is easy to roll and little time is required to reach plastic limit.
- Plastic - Considerable time is required to reach plastic limit. Thread can be re-rolled several times after reaching the plastic limit.

Moisture

- Dry - Absence of moisture, dusty, dry to the touch.
- Moist - Small quantity of moisture. Soil usually above groundwater level.
- Wet - Moisture noticeable to the touch. Soil may be below groundwater level.
- Saturated - Visible free water, usually soil is below groundwater level.

TERMINOLOGY USED FOR ROCK DESCRIPTION

Bedding

Parting	Less than 0.02 ft.
Band	0.02 to 0.2 ft.
Thin bed	0.2 to 0.5 ft.
Medium bed	0.5 to 1.0 ft.
Thick bed	1.0 to 2.0 ft.
Massive	Over 2.0 ft.

Hardness

Very Soft or Plastic	- Can be indented w/ thumb
Soft	- Can be scratched with fingernail
Moderately Hard	- Can be scratched easily with knife; cannot be scratched with fingernail
Hard	- Difficulty to scratch with knife
Very hard	- Cannot be scratched with knife

Crystallinity or Texture

- Dense - Crystals are so small they cannot be distinguished with the naked eye.
- Very Fine Crystalline - Crystals barely discernible with the naked eye.
- Crystalline - Crystals are medium size -up to 1/8 inch diameter.
- Very Coarsely Crystalline - Crystals larger than 1/8 inch diameter.

Voids

- Pourous - Smaller than a pinhead. Their presence is indicated by the degree of absorbency.
- Pitted - Pinhead size to 1/4 inch. If only thin walls separate the individual pits, the core may be described as honeycombed.
- Vug - 1/4 inch to the diameter of the core. The upper limit will vary with core size.
- Cavity - Larger than the diameter of the core.

Remarks - Denotes exact depth of recovery and general documentation of drilling efforts.

Notes - Description and classification are based on visual inspection of samples and boring operations.

The stratum lines shown on the boring logs are based upon interpretation and may not represent precise subsurface conditions.

Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the water level may occur due to other factors than those present at the time measurements taken.

SOIL CLASSIFICATION CHART
(Unified Soil Classification System)

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material larger than No. 200 sieve	GRAVELS- More than 50% of coarse fraction larger than No. 4 sieve	Clean Gravels (little or no fines)		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		Gravels with appreciable amounts of fines		GM	Silty gravels, gravel-sand-silt mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS- Less than 50% of coarse fraction larger than No. 4 sieve	Clean sands (little or no fines)		SW	Well-graded sands, gravelly sands, little or no fines
				SP	Poorly-graded sands, gravelly sands, little or no fines
		Sand with appreciable amounts of fines		SM	Silty sands, silt-sand mixtures
				SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS Less than 50% of material larger than No. 200 sieve	SILTS AND CLAYS Low plasticity Liquid Limit < 50%			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS High plasticity Liquid limit > 50%			MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils			Pt	Peat, humus, swamp soils with organic contents
	Miscellaneous Fill			FILL	Miscellaneous fill may belong in any division but is identified as FILL

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APPENDIX C

LABORATORY SOIL TEST RESULTS

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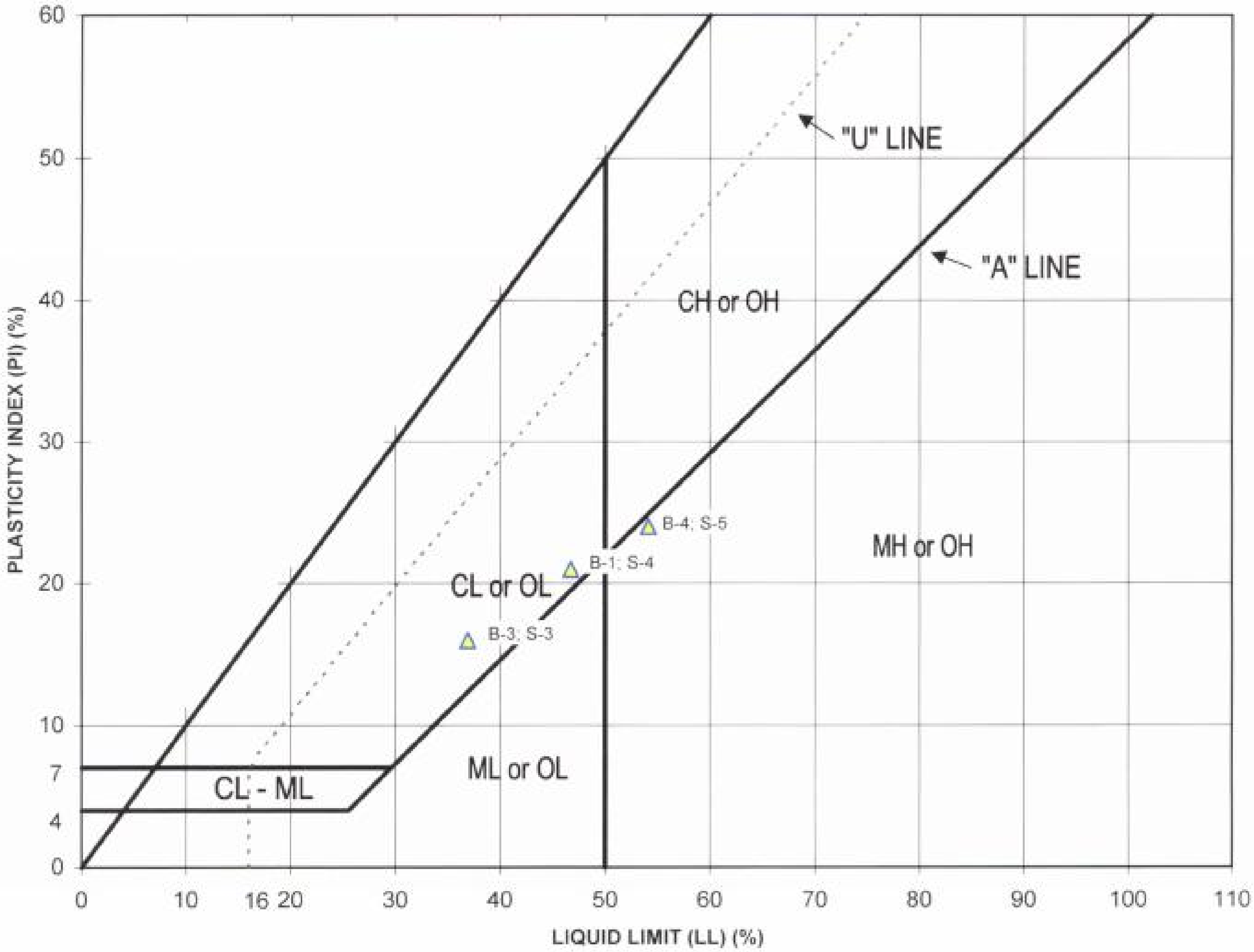
Job No: 15-573
Project: Proposed Six Story Hyatt House Hotel
1265 Sweet Home Road
Town of Amherst, Erie Co., New York 14228

Plasticity Chart
ASTM D4318 & D2487



Boring No.	Sample No.	Depth (ft.)	LL (%)	PL (%)	PI (%)
B-1	S-4	6-8	47	26	21
B-3	S-3	4-6	37	21	16
B-4	S-5	8-10	54	30	24

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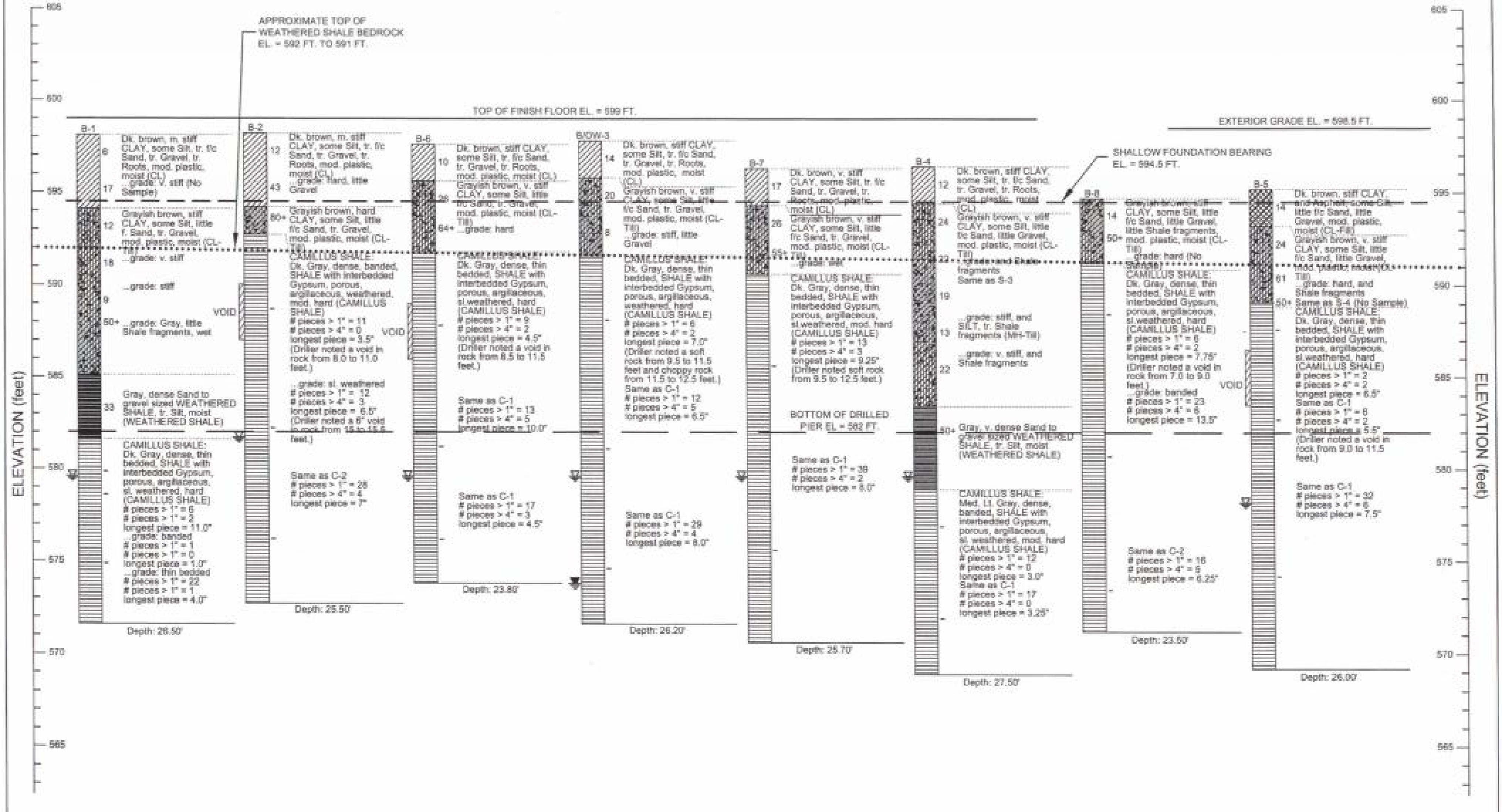
APPENDIX D

ENGINEERING COMPUTATIONS AND SCHEMATICS

"PROFILE" OF BORINGS



Low plasticity clay	Clayey glacial till	Shale	Water level reading after bailing and recharge	Water level reading after coring
	Weathered Shale	Cohesive fill		

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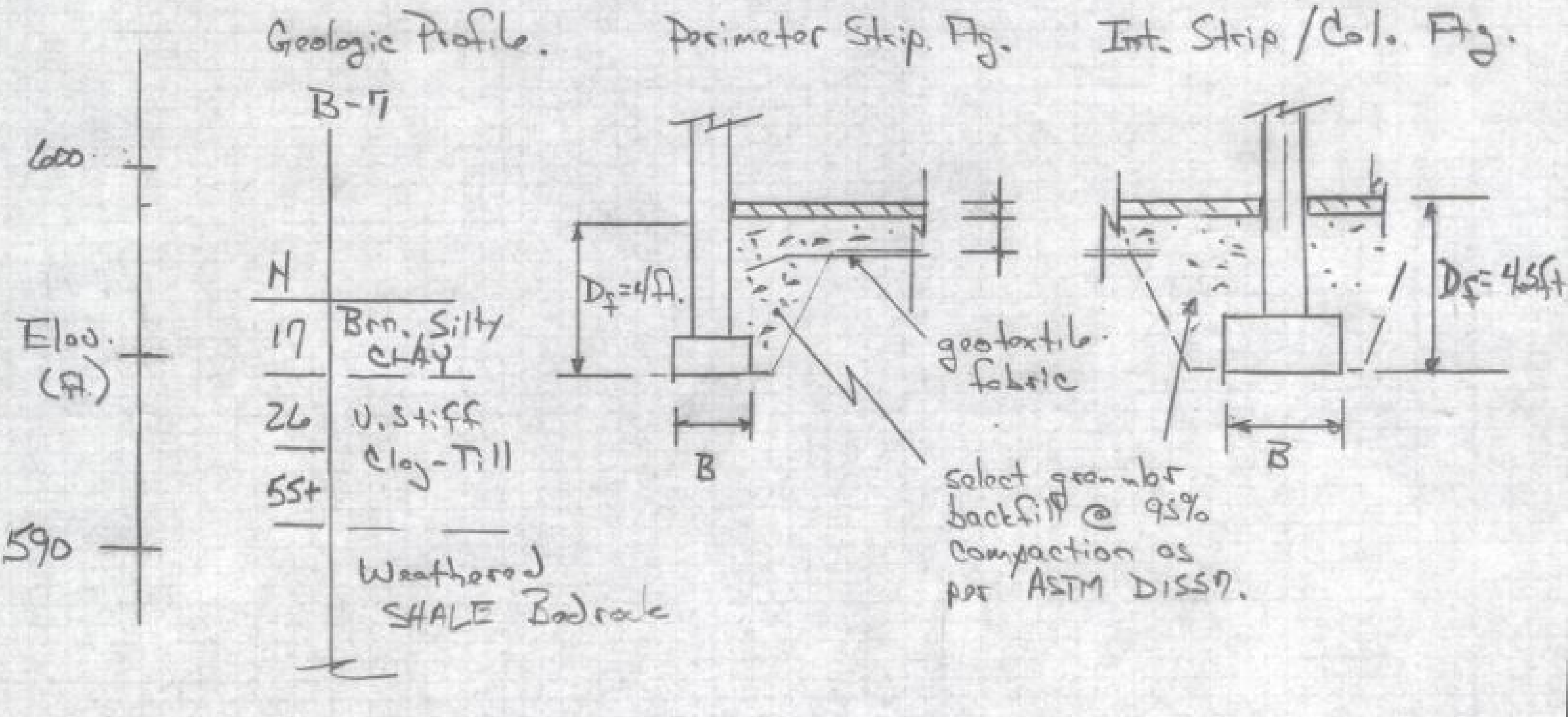
PROJECT:	Proposed 6-Story Hyatt House Hotel 1265 Sweet Home Road, Town of Amherst, Erie Co., New York 14228	Plotted: 9/24/2015	Job No.: 15-573
		Page No.: 1	Figure No.:

Evaluation of Allowable Bearing Pressure for Conventional Shallow Footing System:

Design Criteria:

- all footings must bear on natural deposited soil or approved and tested structural fill extending to natural soil
- six story hotel structure with total first floor area of about 6000 square feet.
- perimeter and interior bearing walls and a few column footings with maximum total design loads of 15 kips per lineal foot and 100 kips, respectively.
- floor to consist of min. four inch concrete slab-on-grade bearing on prepared subgrade with min. 92% compaction (as per ASTM D1557) and min. eight inch, select granular base layer with min. 95% compaction.

Schematic of Proposed Shallow Strip and Spread Ftg. Fdns.:



Evaluation of Allowable Bearing Pressure for Shallow Bearing Footings on Cohesive Soils. :

- check strip and spread footings with $B_{min} = 3$ ft. and $D_f = 4$ ft.
- SPT $N_{design} = 20$ blows / ft. ($\phi = 0$ condition)

  $\therefore C_u = 1500$ psf $\quad Q_u = 3000$ psf
- groundwater depth greater than 10 ft.
- from fig. 18.2 in Fdn. Design by PHT

  for $D_f/B = 4/3 = 1.33 \quad \therefore N_c = 6.5$
- use F.S. = 2.5

$$\therefore Q_{ALLOW} = \frac{Q_u \times N_c}{2(F.S.)} = 3900 \text{ PSF}$$

USE: $Q_{ALLOW} = 4000$ PSF

with grout holes spaced at 10 foot intervals along fdn. trench and backfilled with cement grout placed with tremie methods.

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GENERAL NOTES:

a) Bottom of exterior foundations are to bear at a minimum depth below the final exterior grade that is greater than the frost depth as defined by local or State building codes.

b) Bottom of foundation trench excavation is to be inspected by experienced geotechnical personnel and, especially, prior to any placement and compaction of crusher run stone, select granular fill, or approved general granular fill.

c) All areas of the foundation trench bottom which are concluded to be unacceptable must be overexcavated from the bottom of footing/foundation elevation or, if recommended, from the bottom of the minimum depth of the undercut for the compacted select granular fill layer, upon which the bottom of footing/foundation will bear, to:
- the top of the dense/stiff fill or natural soil, for less than a four foot depth or the footing width (whichever is greater), and backfilled with compacted granular fill.

d) Over-excavated/undercut areas must extend laterally beyond each vertically projected edge of the foundation by a minimum distance equal to one-half the total depth of the undercut or equating to a slope of two vertical to one horizontal. Side slopes of the trench excavation should be one on one (vertical to horizontal distance) or flatter in cohesive soils or one on one and one-half or flatter in the granular materials, as required by OSHA.

e) All foundations shall bear on dense/stiff natural soil, if supported by the calculations, or thoroughly compacted select granular or on-site approved granular fill, with a minimum thickness as determined by the calculations (see Note c also).

f) Water must not be allowed to accumulate or pond in foundation trench bottom. Adequate drainage is to be provided.

g) During winter construction, foundations are to be protected from freezing during the curing period and, thereafter, properly backfilled to the required compaction specifications, as specified by the architect/design engineer.

h) In the event that any shallow drilled piers, tanks, foundation walls, strip or spread footings, and/or concrete slabs-on-grade from any existing or previous unknown on-site structures are encountered during excavation, the following demolition conditions will apply, unless indicated otherwise in the schematics of the foundation system:
- complete removal in and near the proposed building/structure foundation area (except if the foundations and slab-on-grade are to be tied into any existing buildings/structures which are to remain),
- removal down to three feet below final grade in the parking lot & driveways, {unless the slab-on-grade is in structurally sound condition & is approved for use as a part of the pavement system}, (Note that complete removal is optional.) and
- removal down to three feet below final grade in green/grassed areas. (Note: complete removal is optional.)

i) In the event that tree, shrub, or other vegetative root systems or other organic deposits are encountered during excavation, the removal conditions in h) above will apply.

j) Any slag, cinder and/or ash fill shall be tested to have very low potential for expansion and/or corrosion characteristics, where applicable for direct or potential (via leachate) contact with foundation elements and buried utilities or as directed by the design structural engineer/architect..

k) In the event that boulders and/or bedrock are encountered during excavation, the following conditions will apply:
- remove boulders that are one-quarter (1/3 in drumlins) or greater of the min. footing width, at the exposed footing subgrade.
- remove boulders that are one foot or greater in size/max. dimension, at the exposed pad subgrade.
- as/if indicated/directed by engineer in schematics of the foundation system:
  - apparent top of bedrock and/or boulders that are one-half or greater of the min. footing width will not be located within a depth equal to the footing width, at a min., from the bottom of the footing.
  - apparent top of bedrock and/or boulders that are two feet or greater in size/max. dimension will not be located within a depth of four feet, at a min., from the bottom of the building/tank/other structure pad.
  - subgrade is to be adequately probed/tested, at spaced intervals, along the footing line or building/tank/other structure pad in order to confirm the absence of boulders and/or bedrock within these depths.
  - remove any suspected subsurface boulder and/or bedrock obstructions, that meet the preceding depth criteria.

l) At the locations of the demolished structures in h), vegetative/organic deposits in i), slag, cinder and/or ash fill in j) or bedrock and/or boulders in k) above, place and compact the select fill, if needed, to the elevation of the bottom of the pavement subbase stone layer or as required in c) above for the proposed building/structure foundation.

m) To the extent practical, the entire site is to be proof rolled and stabilized, as needed, prior to placement of base/subbase stone layer beneath the floor slab and asphalt paved parking areas.

n) Geotextile filter fabric is recommended beneath the base/subbase layer and atop the subgrade under the building/structure floor slab and in the heavily traveled asphalt paved areas at a minimum, if cohesive/silty soils & during wet weather/seasons.

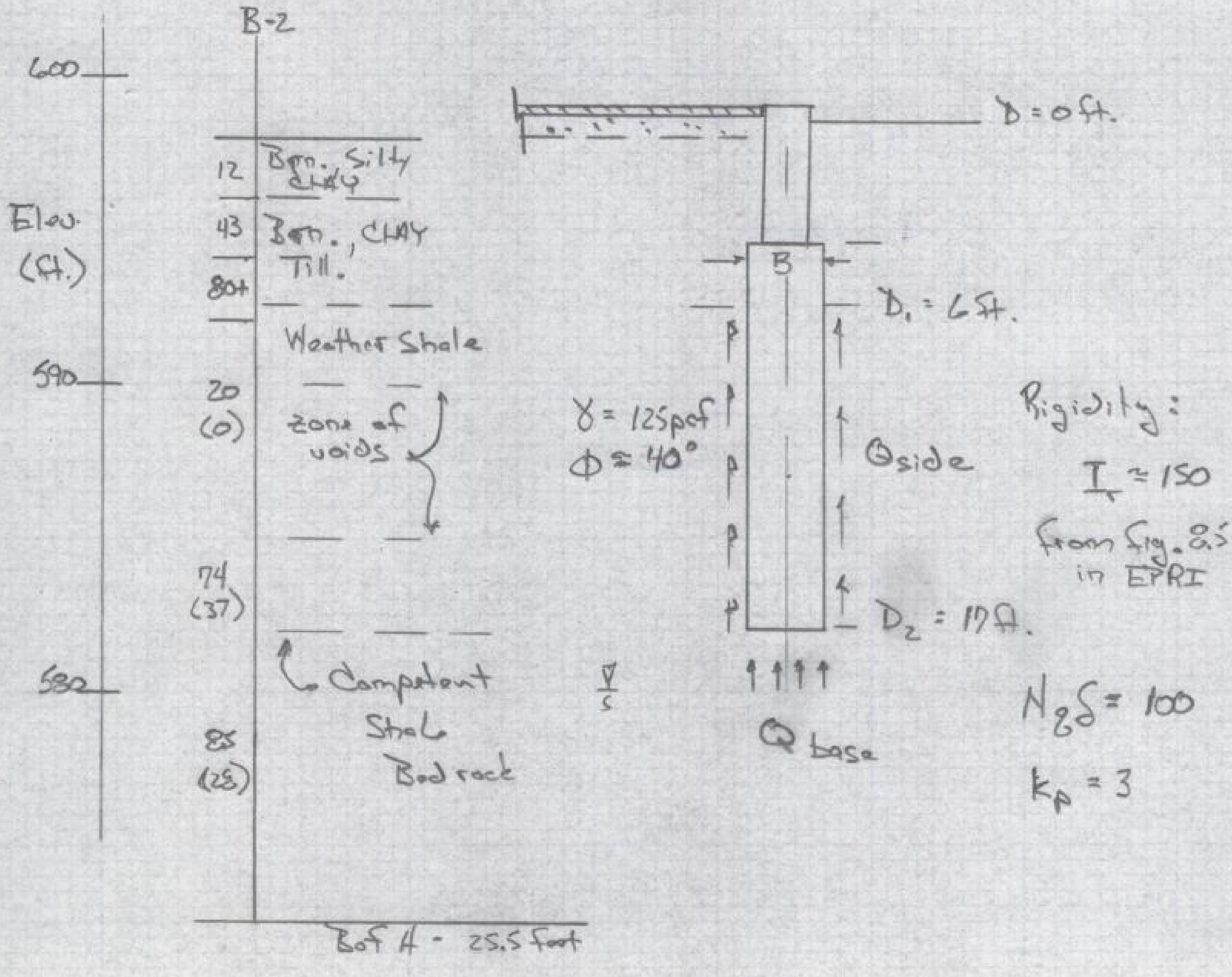
o) The top and/or walls/sides of shallow depth subsurface structures (such as, basement, tank, vault, basin, pool, pipe, culvert, conduit, etc.), which would contain air voids at times, or a trench/excavation, or retaining structure, is considered to be subject to loads from a shallow foundation system, if it is within a horizontal distance of two times the narrowest dimension/width of the foundation, and must be properly evaluated and designed.

Evaluation of Deep Fdn. (Drilled Pier) Option:

Design Criteria:

- perimeter wall load = 12 k/ft.
- drilled pier spacing ≈ 25 ft.
- design compression load = 300 kips

Geologic Profile and Details:



Allowable Vertical Compression and Uplift Loads:

$$Q_{all} = (Q_{base}/3 + Q_{side} - W_{pier}) / F.S.$$

with: $Q_{base} = (q_{ult}) A_{base}$ $\quad F.S. = 2.5$

for: $B = 3$ ft. $\quad A_{pier} = \pi B^2/4 = 7.0$ ft^2

$q_{ult} = \gamma D N_q = (120 pcf)(17 ft)(100) = 204 \frac{kips}{ft^2}$

$Q'_{base} = \frac{q_{ult} A_{pier}}{3} = 714$ kips

with: $Q_{side} = \pi B \int_{D_1=6}^{D_2=17} \gamma k \tan\delta \, z \, dz = \pi B \gamma k \tan\delta \left. \frac{z^2}{2} \right|_{D_1}^{D_2}$

with: $\delta = \phi = 40°$; $k_o = .7$; $k = 2/3 k_o = .46$

for: $B = 3$ ft. $\therefore Q_s = \pi B (.83)(120)(.46)(125 \text{ ft}^2)$

$Q_s = B (18 \text{ kip/ft}) = 54$ kips

for $B = 2.5$ ft.

with: $W_{pier} = A_p \times L_p \times \gamma_{concrete} = 12$ kips

$B = 3$ft $W_{pier} = 12$ kips

$\therefore Q_{ALLOW} = (Q'_{base} + Q_{side} - W_{pier}) / F.S.$

for $B = 3$ft $Q_{ALLOW} = 302$ kips $> P_{comp.}$

for $B = 2.5$ ft. $Q_{ALLOW} = 200$ kips

$Q_{uplift} = (Q_{side} + W_{pier}) / F.S.$ $\quad$ with: $F.S. = 2$

$Q_{uplift} = 33$ kips

for $B = 3$ft.

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LATERAL EARTH PRESSURE ON GENERIC BLOCK FOUNDATIONS FOR SIGNS, FREE-STANDING RETAINING WALLS, OR BELOW GRADE/BASEMENT/TANK/POOL RETAINING WALLS (Less Than 20 Feet High):

a) Porous filter media, in contact with the basement/below grade foundation wall or retaining walls, protects and is in contact with a minimum 4 inch diameter perforated drainage pipes at the footing/base of the foundation/structural wall (exterior backfill side and interior basement side) and/or weep pipes through the wall, as needed and as applicable. Waterproof earth side of wall, as customarily provided in practice.

b) Drainage pipes are connected to an appropriately designed collector pipe, conveyance, and/or sump pump system as is applicable for the intended purpose of the wall and as customarily provided/installed in practice.

c) For potential groundwater table conditions above the top of the basement slab-on-grade condition, install continuous waterstops (with no joints in stop) at construction joints as is customarily provided in practice. Interior intermediate drainage pipes, that are spaced on-center and in both directions, do appear to be needed.

d) Assume a uniformly graded coarse sand or sandy gravel backfill: dense state
- equivalent blow count value: N = 40 blows/foot
- friction angle: ϕ = 38 degrees {Teng, pg. 12}
- average in-place density: moist bulk γ_m = 120 pcf, saturated γ_s = 132 pcf ; submerged γ' = 70 pcf

e) Assume base of wall/footing is bearing on a minimum 6 inch thick layer of thoroughly compacted select granular fill.
- Coefficient of Friction Against Sliding (f_s) at base of wall (Refer to Teng, pg. 320-1):
  $f_s = \tan(0.5 \times \phi) = 0.35$ (O.K. compares to AREA value for silty soils.)
  $f_s = 0.60$ (for concrete on clean, rough, and sound bedrock)

f) Use equivalent fluid pressure design approach {Hough, pg. 249 and NAVFAC pg. 7-10-9}:
- at rest pressure coefficient; $K_o = 1 - \sin(\phi) = 1 - 0.62 = 0.38$
- effective lateral pressure of soil; $\gamma'_1 = K_o \times \gamma' = 0.38 \times 70$ pcf = 26.6 pcf
- hydrostatic pressure with water level at the top of the grade at the wall; γ_w = 62.4 pcf
- equivalent fluid pressure; $\gamma_{eo} = \gamma'_1 + \gamma_w$ = 26.6 pcf + 62.4 pcf = 89 pcf (say 90 pcf)
- equivalent fluid pressure without groundwater effect and with an estimate of the induced lateral stress increase that is caused by the compaction (W&F, page 409);
  $\gamma_{eo} = 2 \times K_o \times \gamma_m = 2 \times 0.38 \times 120$ pcf = 91 pcf (say 90 pcf)
- active pressure case; $K_a = [1 - \sin(\phi)] / [1 + \sin(\phi)] = 0.24$
  $\gamma_{ea} = K_a \times \gamma_m = 0.24 \times 120$ pcf = 29.1 pcf (say 30 pcf)
- passive pressure case; $K_p = [1 + \sin(\phi)] / [1 - \sin(\phi)] = 4.2$
  $\gamma_{ep} = K_p \times \gamma_m = 4.2 \times 120$ pcf = 504 pcf (with a F.S. = 1.5, say 330 pcf)

	Thoroughly Compacted		Uniformly Graded & Clean Coarse Sand or Sandy Gravel Fill	Non-Plastic Silty Sand or Sandy Silt Fill	
USE : Earth Pressure Coefficient	Active	=	0.24	0.33	
	At-Rest	=	0.76	1.0	
	Passive	=	2.8	2.0	(with a F.S. = 1.5)
	Passive	=	4.2	3.0	(with a F.S. = 1.0)

USE : Equivalent Fluid Pressure
- Static At Rest = 90 pcf (for rigid walls)
- Static Active = 30 pcf
- Static Passive = 330 pcf (with a F.S. = 1.5) {= 500 pcf (F.S. = 1.0)}

[For earthquake condition, structural engineer may elect to use the above Static Passive case, instead of the below Uniform Lateral Pressure, for Non-Yielding Wall movement into the soil backfill]

Saturated Soil During Earthquake = 132 pcf

USE: Uniform Lateral Pressure (add to Static At Rest/Active case) = 16.0 psf / foot x Foot Height of Wall
[for Moderate Earthquakes (Zone 2 or less) with Acceleration < 0.25 g in underlying Loose to Medium Dense Cohesionless or Soft to Medium Stiff, Low to Moderate Plasticity Cohesive Unsaturated Soils (Class E); FEMA NEHRP Guidelines]

{For looser/denser backfills, increase above pressures by the ratio = new density / 120 pcf or / 132 pcf for saturated case}

USE: Coefficient of Friction Against Sliding (f_s) = 0.35 (on compacted granular soil & non-plastic silt)
= 0.20 (slab-on-grade on polyethylene on granular fill)
[with a F.S. = 1.0] = 0.60 (on clean, rough, & sound bedrock)
Min. Factor of Safety Against Sliding = 1.5

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DATA INPUT BY: Andrew J. Camping
B&A JOB NO.: 15-573
CLIENT: Sweet Home Hotels, LLC
PROJECT: Proposed Six Story Hyatt House Hotel
1265 Sweet Home Road
Town of Amherst, Erie Co., New York 14228

BUILDING CODE OF NEW YORK STATE © - 2010: USGS 2008 ACCELERATIONS at 2% IN 50 YEARS CALCULATED BY LATITUDE AND LONGITUDE

Site Latitude (○) = +42.9962

Site Longitude (○) = -78.7996

Seismic Site Class = C (Shallow) | B (Deep)

Building/Structure with Shallow / Deep Foundation

S_s = 0.2 sec acceleration value for Class B (in g's)

Acceleration Values Below are S_s

LAT. = \ LONG. =	-78.8000	-78.7996	-78.7500
42.9500	0.21962		0.22027
+42.9962	0.22063	$\boxed{0.22063}$	0.22107
43.0000	0.22071		0.22114

S_1 = 1.0 sec acceleration value for Class B (in g's)

Acceleration Values Below are S_1

LAT. = \ LONG. =	-78.8000	-78.7996	-78.7500
42.9500	0.05091		0.05109
+42.9962	0.05104	$\boxed{0.05104}$	0.05121
43.0000	0.05105		0.05122

SEISMIC SITE CLASS	Site Coefficient and Design Spectral Response Acceleration Values				
	0.2 Second		1.0 Second		
	F_a	$S_{ds} = 0.6667 * F_a * S_s$	F_v	$S_{d1} = 0.6667 * F_v * S_1$	
A	0.8000	0.1177 g	0.8000	0.0272 g	
B	1.0000	0.1471 g	1.0000	0.0340 g	<<------- USE THESE VALUES FOR DEEP FOUNDATIONS
C	1.2000	0.1765 g	1.7000	0.0579 g	<<------- USE THESE VALUES FOR SHALLOW FOUNDATIONS
D	1.6000	0.2354 g	2.4000	0.0817 g	
E	2.5000	0.3677 g	3.5000	0.1191 g	
F	2.5000	0.3677 g	3.5000	0.1191 g	

Only residential buildings in Town of Amherst, Erie Co., N.Y.

Sds =	0.177	g	Seismic Design Category = B
Sds =	0.147	g	Seismic Design Category = A

NOTE: F_a and F_v values are linearly interpolated, for the above S_s and S_s values, respectively, within the appropriate range of the mapped spectral response accelerations. (Gridded data at 0.05 degree increments from: http://earthquake.usgs.gov/research/hazmaps/products_data/2008/data/)

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APPENDIX E

GENERAL EARTHWORK SPECIFICATION

Barron & Associates, P.C.
GENERAL EARTHWORK SPECIFICATION

PART 1 GENERAL

1.1 SITE AND SUBSURFACE CONDITIONS

1.1.1 Overview

This specification is included as a courtesy to the clients of Barron & Associates, P.C, and addresses earthwork site preparation. Additions and modifications are necessary to create a job-specific specification. This specification may serve as a basis for the development for a technical specification under Division 2, *Site Work*.

1.1.2 Site Conditions

The site-specific conditions are described under separate cover or may be available from the OWNER.

1.1.3 Subsurface Conditions

The site-specific subsurface conditions are described under separate cover or may be available from the OWNER.

1.2 REFERENCES

American Standard for Testing and Measurement (ASTM):

ASTM C136	Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C2922	Density for Soil and Soil-Aggregate in Place by Nuclear Methods
ASTM D422	Test Method for Particle-Size Analysis of Soils
ASTM D1140	Amount of Material in Soils Finer Than the No. 200 Sieve
ASTM D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft^3)
ASTM D2216	Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D2487	1990 Classification of Soils for Engineering Purposes
ASTM D4318	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 DEFINITIONS

1.3.1 Unacceptable Material

Soil material containing debris, wood, scrap material, vegetation, refuse, soft unsound particles, and other organic, frozen, deleterious, or objectionable materials. Contaminated soils shall be properly documented and removed or remediated on site. If necessary, remediation procedure will be defined by the OWNER.

1.3.2 Unsuitable Material

Brown, organic topsoil and underlying soft pockets of organic silt or wet, reworked silty clay.

1.3.3 Ordinary Fill

Friable soil containing no stone greater than two-thirds loose lift thickness and no unacceptable or unsuitable materials. In general, existing random fill is expected to be acceptable for reuse as ordinary fill given proper sorting, blending, drying, and controlled placement methods.

1.3.4 Granular Fill

Ordinary fill meeting the designation of ASTM D2487 classification of GW with a maximum of 10 percent by weight passing ASTM D1140, No. 200 sieve.

1.3.5 Select Granular Fill

Clean, uncoated soil which contains no unacceptable materials and conforms to the gradation requirements defined in Table A: Select Granular Fill.

Table A: Select Granular Fill	
Sieve Size	Percent Finer by Weight
2/3 of the loose lift thickness	100
No. 10	30 - 95
No. 40	10 - 70
No. 200	0 - 15

1.3.6 Sand and Gravel

Clean, hard, durable, uncoated particle of sand and gravel, free from lumps of clay, containing no unacceptable matter, and conforming to gradation requirements of *Table B : Sand and Gravel*

Table B: Sand and Gravel	
Sieve	Percent Finer by Weight
*	100
No. 4	50 - 85
No. 10	--
No. 40	10 - 35
No. 100	--
No. 200	0 - 8

* Job-Specific. To be determined by the ENGINEER

1.3.7 Crushed Stone

Clean, durable, sharp-angled fragments of rock or crushed gravel stone of uniform quality, containing no unacceptable matter, free from coatings, and conforming to gradation requirements of *Table C: Crushed Stone*

Table C: Crushed Stone		
	Percent Passing	
Sieve Size	¾-inch Stone	1 ¼-inch Stone
1 ½-inch	__	100
1 ¼-inch	__	85-100
1- inch	100	__
¾-inch	90-100	10-40
5/8-inch	__	__
½-inch	10-50	0-8
3/8-inch	0-20	__
#4	0-5	__

1.3.8 Flowable Fill

Also known as Controlled Low Strength Material – Controlled Density Fill (CLSM-CDF), this material is available under a variety of producer names (e.g., K-Krete©, M-Crete, Flash Fill©, Flowable Mortar, Unshrinkable Fill, etc.). This non-settling backfill mixture is most commonly used for its flowable characteristics, its support strength under traffic loads, and its removability at a later date. The material may be produced on-site or off-site. In either case, the producer of such materials and the product must meet certain certification criteria. Such information is beyond the scope of this specification and will be considered on a site-specific basis.

Flowable fill may be acceptable for use as a backfill for utility trenches of other low-lying areas which require a compacted granular fill. Its use and warranty of performance is left to the CONTRACTOR in such applications.

The use of flowable fill under load-bearing structural components in place of properly placed and compacted granular fill is NOT common and is questionable. The localized use of such material may have profound affects on the performance of a foundation system. Site-specific conditions and the extent of anticipated use of flowable fill must be examined by geotechnical engineer. Cost of such consultation shall be borne by the CONTRACTOR unless specifically directed by the OWNER to seek such consultation. Without such consultation, warranty of performance for such use is left to the CONTRACTOR.

1.4 SUBMITTALS

The following submittals shall be provided in accordance with approved submittals procedures.

1. Fill Source: Provide name and source locations of fill material.

2. Field Test Reports: Field tests will be performed by OWNER's Representative as needed. CONTRACTOR may be required to perform such tests on proposed off-site fill materials.
   a. Fill material grain size analyses per ASTM C136, D422, D1140, D2487
   b. Moisture/Density test results per ASTM D2216
   c. Liquid limit, plastic limit, and plasticity index per ASTM D4318
   d. Compaction/Density test results per ASTM C2922 and D1557

3. Sample: Geotextile fabric

PART 2 PRODUCTS

Geotextile Fabric: Mirafi 600X or equal. (Also referred to as synthetic fabric).

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 General

Manner of excavation shall minimize disturbance of underlying natural ground. If deemed necessary by the Engineer, alter construction procedures to reduce subgrade disturbance. Excavate areas which have been excessively disturbed to firm ground and backfill with properly compacted granular fill.

3.1.2 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.3 Trees, Shrubs, and Existing Facilities

Protect from any damage all vegetation and facilities identified to remain.

3.1.4 Utility Lines

Locate all utilities within the area of disturbance prior to the start of work. Show locations on initial plans. Protect utility lines from damage. Notify the ENGINEER immediately of damage to or an encounter with an unknown utility. Damage to utility lines are to be repaired by the CONTRACTOR at no additional cost. The CONTRACTOR shall have underground utility owners stake out utility locations prior to the start of clearing and excavation operations.

3.2 VERIFICATION OF CONDITIONS/PROOF-ROLLING

Prior to placement of the initial layer of fill over the natural ground, proof-roll the exposed natural ground above the groundwater table elevation by making two passes with a fully-loaded ten-wheel truck. Excavate unstable areas detected by this process and replace with compacted granular fill.

3.3 PREPARATION

3.3.1 Surface Preparation

Within the site limits indicated on the drawings, excavate all unsuitable material to firm natural ground in the manner specified herein. Follow a construction procedure which permits visual identification of firm natural ground. In the even that groundwater is encountered, the ENGINEER may require that the size of the open excavation be limited to that which can be handled by open pumping to allow visual inspection of the excavation bottom and the performance of backfill operations to be conducted in a dry state.

Excavation of unsuitable material shall be limited to the greater of the following:

- A distance of 5 feet beyond building lines or
- The area defined by a one-horizontal to one-vertical line sloping down from the outside bottom edge of exterior footings to firm natural ground.

3.4 PLACEMENT AND COMPACTION

3.4.1 General

Place fill in accordance with *Table D: Compaction Alternatives.* These alternatives are provided as minimum compaction standards only and in no way relieve the CONTRACTOR of his obligation to achieve any specified degree of compaction by whatever means may be necessary.

Grade to provide positive drainage and a smooth surface which will readily shed water. To the extent practicable, compact each layer to the specified density on the same day placed. Place fill in horizontal layers. Where horizontal layers meet a natural slope, key layer into slope by cutting a bench.

Fill that is too wet for proper compaction: Disc, harrow, or otherwise dry to proper moisture content for compaction to the required density.

Fill that is too dry for proper compaction: Uniformly apply water over the surface of the loose layer in sufficient quantity to allow compaction to the required density.

Table D: Compaction Alternatives						
Compaction Method	Max. Stone Size	Maximum Loose Lift Thickness (inches)		Maximum Number of Passes		
		Below Structure and Pavements	Less Critical Areas	Below Structure and Pavements	Less Critical Areas	
Hand operated vibratory plate of light roller in confined areas	3	4	4	4	4	
Hand operated vibratory drum rollers weighing at least 1,000 pounds in confined areas	4	6	8	4	4	
Loaded 10-wheel truck or D-8 crawler	6	10	12	4	2	
Light vibratory drum roller; Min. weight at drum 8,000lbs; Min. dynamic force 10,000lbs.	8	12	12	6	2	
Minimum vibratory drum; Min. weight at drum 10,000lbs; Min. dynamic force 20,000lbs.	8	18	18	6	4	

3.4.2 Dewatering

Provide adequate pumping and drainage facilities to keep excavated areas sufficiently dry of groundwater and surface run-off. Dewatering shall avoid adversely affection construction procedures or causing excessive disturbance of underlying natural ground. Drain all pumped water in such a manner as to avoid damage to adjacent property.

If requested by the ENGINEER, place a 6-inch to 12-inch layer of sand and gravel or crushed stone over the natural underlying soil to stabilize area which have been disturbed due to groundwater seepage pressures and to expedite dewatering operations. Particular attention shall be given areas under proposed foundations.

3.5 FIELD QUALITY CONTROL

3.5.1 Compaction Requirements

Allow the ENGINEER sufficient time to make necessary observations and tests. Base the degree of compaction on maximum dry density as determined by ASTM D1557. The minimum degree of compaction for placed fill shall be as indicated *in Table E: Compaction Requirements.*

Table E: Compaction Requirements	
Area	Minimum Degree of Compaction (%)
Below foundation	95
Pavement and building subbase and base courses	95
Below building slab base course and above bottom of foundation	92
Below pavement subbase and base courses	90
Trench backfill outside of building	90
Trench backfill inside of building	Refer to one of the above-listed categories
Ordinary fill within 5 feet of grade	90
Vegetated areas below 5 feet of grade	85

3.5.2 Testing

Site work should be monitored and tested by geotechnical ENGINEER or his representative and in accordance with requirements of the design team to assure compliance with earthwork and foundation construction specifications.

The owner will retain a geotechnical ENGINEER or his representative to perform on-site observations and testing during this phase of construction operations. The geotechnical ENGINEER or his representative will:

- Observe excavation and dewatering of building and controlled fill areas;
- Observe backfill and compaction within building and controlled fill areas;
- Laboratory test and analyze fill material; and
- Observe construction – and performing water content, gradation, and compaction tests.

On a timely basis, the CONTRACTOR will receive copies of test results submitted to the OWNER. In addition, during construction the geotechnical ENGINEER will advise the OWNER and CONTRACTOR in writing of conditions which fail to conform to the Contract Documents. The CONTRACTOR shall take immediate action to remedy indicated deficiencies.

The geotechnical ENGINEER or his representative will not supervise or direct the actual work of the CONTRACTOR or employees and representatives of the CONTRACTOR. The presence of, observations by, and testing performed by the geotechnical ENGINEER or his representatives shall not excuse the CONTRACTOR from defects discovered in the work.

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APPENDIX F

LIMITATIONS

LIMITATIONS

1. This report is based on the data that was obtained from the subsurface explorations and on the design of the proposed six story hotel as submitted to the geotechnical engineer. A geotechnical engineer, who is experienced in foundation construction and earthwork, should be engaged to review the final design and specifications in order to determine whether any change in concept may have any effect on the validity of the conclusions presented herein, and whether these conclusions have, in fact, been implemented in the design and specifications.

2. The subsurface conditions, including thickness, between the exploration locations are approximate and simplified representations of the strata and transitions. There is the possibility that variations in soil and rock conditions and boundaries will be encountered during construction. In order to permit correlation between the exploratory soil data and the actual soil conditions encountered during construction and so as to assess conformance with the plans and specifications as originally contemplated, it is recommended that a geotechnical engineer, who is experienced in foundation construction and earthwork monitoring, should be retained to perform continuous construction review during the site preparation and foundation construction operations.

3. The subsurface exploration logs and subsurface conditions may aid in estimating material quality and quantities, such as topsoil/organic matter, fills, natural soils, and rock, but are not to be relied upon as the exclusive means for bid preparation purposes. It is the responsibility of the contractor to perform any additional site examinations and explorations and to prepare an accurate bid.

4. Disclaimers:

   a. In the event that any changes in the nature, design or location of the structure are planned, the conclusions that are contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

   b. The geotechnical engineering report has been prepared for this project by Barron & Associates, P.C. This report is for assistance in design only and is not a sufficient basis on which to prepare an accurate bid.

   c. This report has been prepared for the exclusive use of Sweet Home Hotels, LLC of Amherst, New York, and their designated design representatives, for specific application to the construction of a six story Hyatt House hotel at 1265 Sweet Home Road, in the Town of Amherst, New York and in accordance with generally accepted geotechnical engineering practice. No other warranty, expressed or implied, is made.

EMPIRE GEO SERVICES, INC.
A SUBSIDIARY OF SJB SERVICES, INC.

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March 23, 2009
Project No. BT-08-210

Suite Home Hotels, LLC

c/o Mr. Jake Letersky
Patrick Development, Inc.
8600 Transit Road
Amherst, New York 14051

Re: Foundation Bearing Grade Conditions
Proposed Hyatt Summerfield Suites
Sweet Home Road
Amherst, New York

Dear Mr. Letersky:

This letter is in follow up to our site visit and discussions on this date, regarding the foundation bearing grade conditions for the above referenced project.

At the request of Patrick Development, Inc. (Patrick), Empire Geo-Services, Inc. (Empire), has observed the current foundation excavation conditions and reviewed the October 2006 geotechnical report prepared by Schenne & Associates (Schenne Report), with regard to helping to establish the suitable foundation bearing grades for this project. Currently, excavation has been completed within the basement area, generally to the proposed design grade.

The test borings completed as a basis for the Schenne Report, as well as our observations of the basement excavation, revealed the presence of an upper "cap" rock layer, followed by an underlying soil layer and highly weathered/voided rock, before grading to a more sound gray Shale rock. Interpreting the test boring logs, it appears the highly weathered/voided rock typically extends to depths ranging between about 10 and 14 feet below the original ground surface.

It is our understanding that the intent of the foundation design, as outlined in the Schenne Report, is that the foundations are to be carried down to solid bedrock, and that all unconsolidated soil and weathered/voided rock beneath the proposed foundations are to be removed.

Accordingly, it is anticipated that rock undercuts of several feet, below the currently designed bottom of footing, may be required in many portions of the basement area. More significantly, however, it is anticipated that rock undercuts in the range of up to 10 feet ± may be required in the non-basement areas to bear the foundations over competent bedrock. We note that the design bottom of footings in the non-basement area are typically at a depth of about 4.5 feet below the first floor grade.

Accordingly, these conditions will result in significant additional rock excavation and costs for the foundation construction, which should be understood and accepted by the design team and Suite Home Hotels, LLC. In addition, it is possible that some design changes may be warranted.

As you are aware, Empire Geo-Services, Inc. is not the "Geotechnical Engineer of Record" and assumes no design responsibility for this project. We are providing this information as a consultant to our subsidiary SJB Services, Inc. who has been retained to provide Special Inspections and testing services only. We strongly recommend that the "Design Engineer of Record" and Schenne & Associates be consulted regarding this matter.

Sincerely,

EMPIRE GEO-SERVICES, INC.

John J. Danzer, P.E.
Senior Geotechnical Engineer

Pegasus
ENVIRONMENTAL, CO.

Prepared for: DiDonato Associates

Engineering and Architecture, P.C.
689 Main Street
Buffalo, New York

By:

Pegasus Environmental Co.
P.O. Box 4
Spencerport, NY 14559
(585) 278-0103
www.PegasusEnvironmental.com

February 18, 2008

Subsurface Void Report

Pegasus
ENVIRONMENTAL, CO.

Subsurface Void Detection Report

PROPOSED SUMMERVILLE SUITES
Sweethome ROAD
Amherst, New York

Pegasus Environmental Co.

DiDonato Associates

Engineering and Architecture, P.C.

Buffalo, New York 14203

INTRODUCTION

PEGASUS ENVIRONMENTAL CO. provided Ground Penetrating Radar (GPR) services, to investigate subsurface voids at the Proposed Summerfield Suites Site, Sweethome Road, Town of Amherst, Erie County, NY.

The data acquisition was performed commencing on January29, 2008, and was completed on February 8th. Severe weather, from blizzard conditions, through sleet, mud, and then again cold, hampered the scheduled completion.

The process consisted of "line scans" of the 2.3 acres to determine the most probable areas of concern. This was followed with the resulting 4 grids surveyed, consisting of a series of parallel transects of 4' intervals, along both the "x" and "y" axis, of each.

2. EXECUTIVE SUMMARY

Changes in amplitude response of the radar signal are reflected by varying colors in the radar image. A great response typically means an anomaly such as an underground tank or void. These voids may consist of a softer, water filled material, or may be just air, between stratum.

3. DATA ACQUISITION

The area was specified by DiDonato Associates and consisted of a 2.3 acre parcel near Sweethome Road. It was covered with numerous trees, shrubs and debris, which had to be removed before the survey could commence. The attached drawings delineate the scope of the survey.

The area was "grid scanned", encompassing the areas of concern resulting from info derived from "line scans". The methodical grid scanning process consisted of 4' separated transects along the complete axis of both "x"and "y" orientation; these are perpendicular to each other, and , in this instance, have a common center data starting point. Scans were surveyed as line data collection, then compiled as 3D grids, from which the attached slides were formed.

4. DATA PROCESSING

Conditions and data gathered were typical for scanning in the surveyed area, which provided excellent results. High-and low-pass filters, horizontal smoothing, background removal, deconvolution and gain adjustments were performed as processing steps.

5. REPORT DATA

The attached report drawings outline the delineations of the referenced subsurface anomaly areas, as identified via Ground Penetrating Radar. The suspected void areas are outlined in red. Each of the 5 target areas are superimposed on o common slide, and then referenced individually.

The drawing of the proposed structure is also superimposed on a "master drawing" that is "not to scale", and placed without control points, thus, to be used as a possible orientation, only.

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PEGASUS ENVIRONMENTAL DRAWING AND SLIDE PRESENTATION

SLIDE #1: SITE DRAWING AS PROVIDED BY DIDONATO ASSOCIATES

SLIDE #2: GREEN SHADED AREAS = DELINEATED AREAS OF SUBSURFACE ANOMALIES.

SLIDE #3: GROUPED AREAS OF PROMINENT ANOMALIES.

SLIDE #4: GRID #00; TOP CENTER: ANOMALY STARTING @ 3.5' – 5.5' DEEP

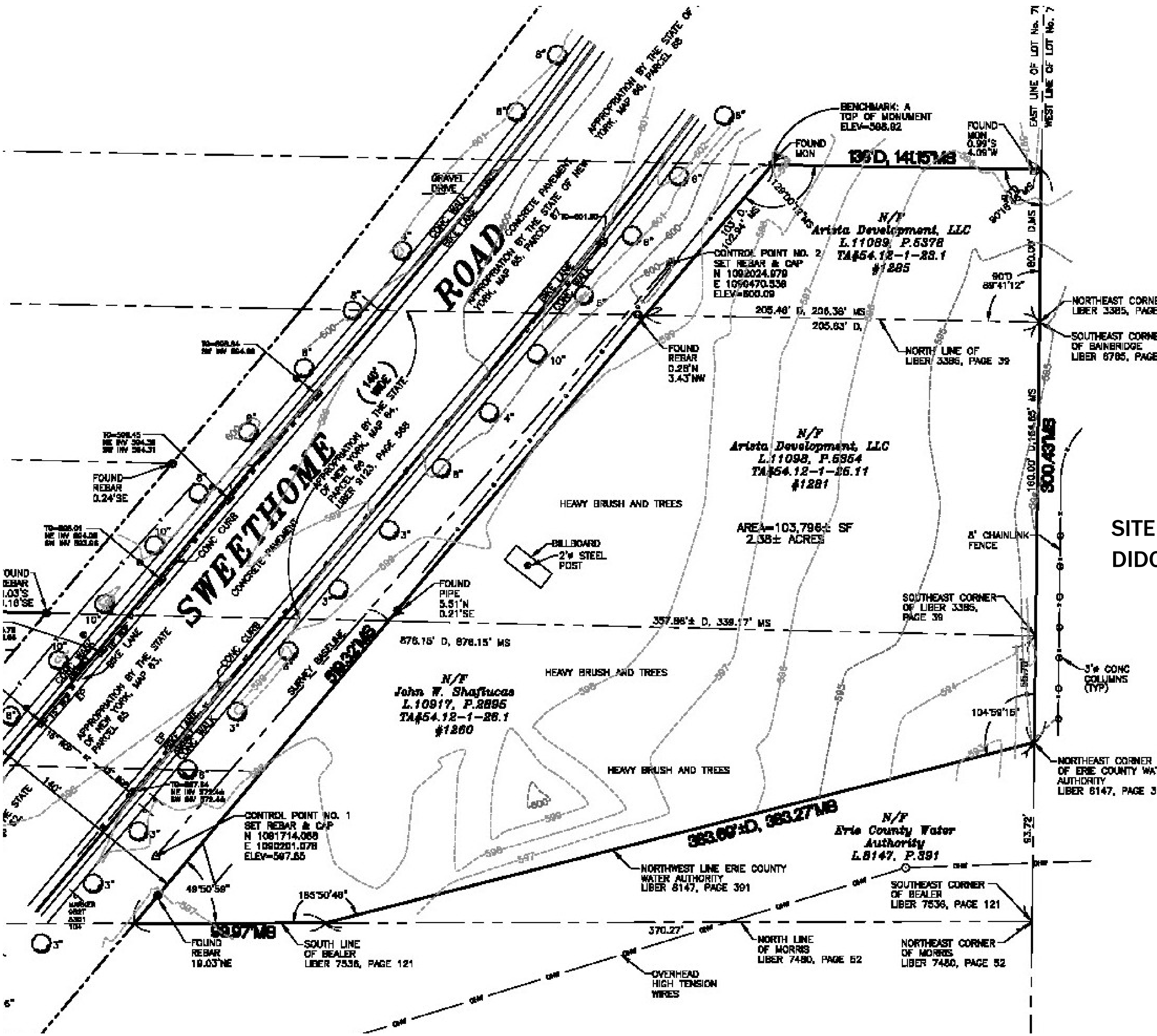
SLIDE #5: GRID #00; LOWER RIGHT: ANOMALY STARTING @ 4.0' – 7.0' DEEP

SLIDE #6: GRID #01; ANOMALY STARTING @ 3.0' – 7.75' DEEP

SLIDE #7: GRID #02; ANOMALY STARTS NEAR SURFACE – 5.0' DEEP

SLIDE #8: GRID #03; ANOMALY STARTS @ 4.0' – 5.5'

SLIDE #9; COMPOSITE VIEW, WITH PERCEIVED LOCATION OF STRUCTURE DRAWING, SUPERIMPOSED.



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Slide 1

SITE DRAWING AS PROVIDED BY DIDONATO ASSOCIATES

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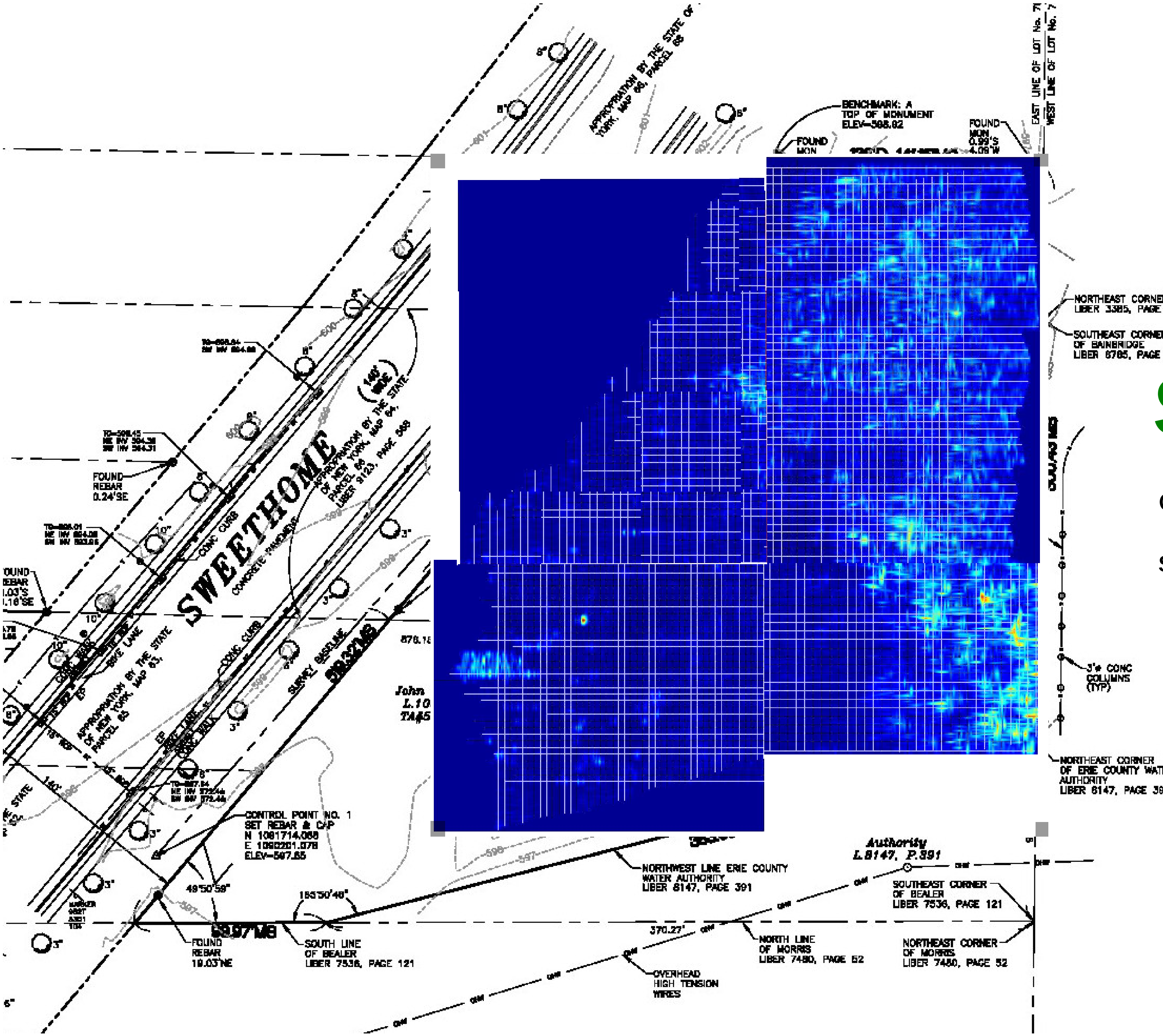

Slide 2

GREEN SHADED AREAS =
DELINEATED AREAS OF
SUBSURFACE ANOMALIES.

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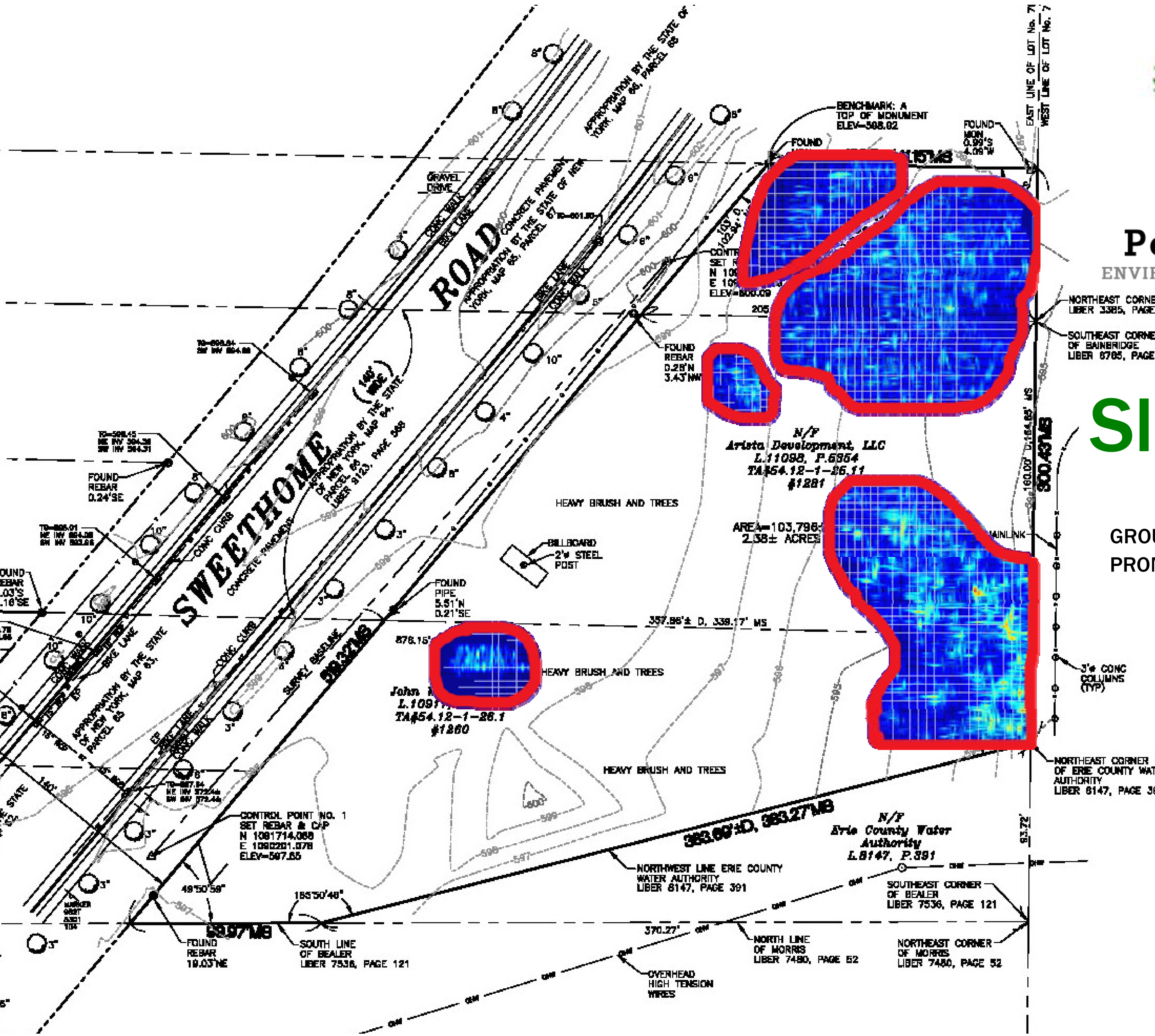
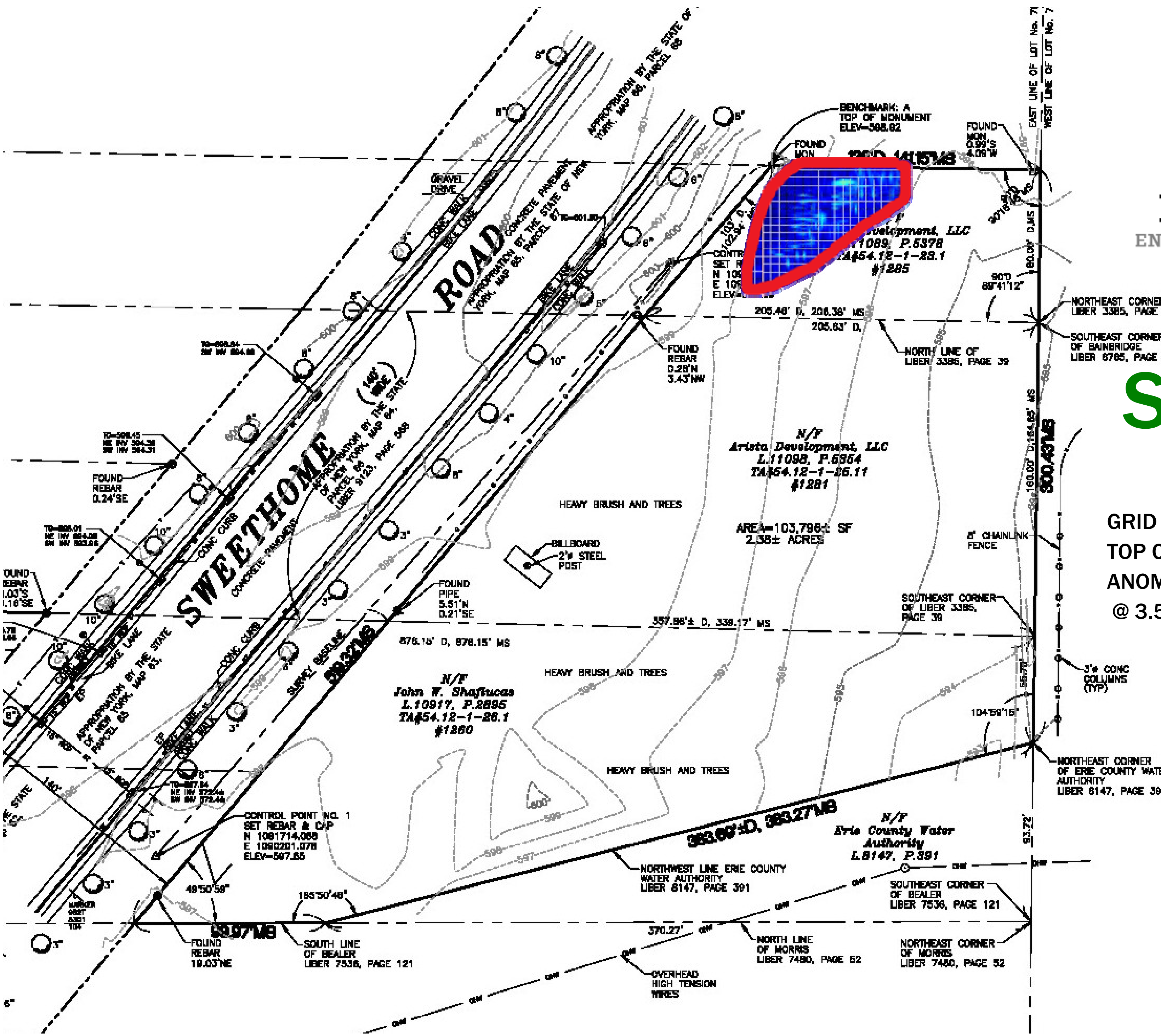
Slide 3



GROUPED AREAS OF
PROMINENT ANOMALIES



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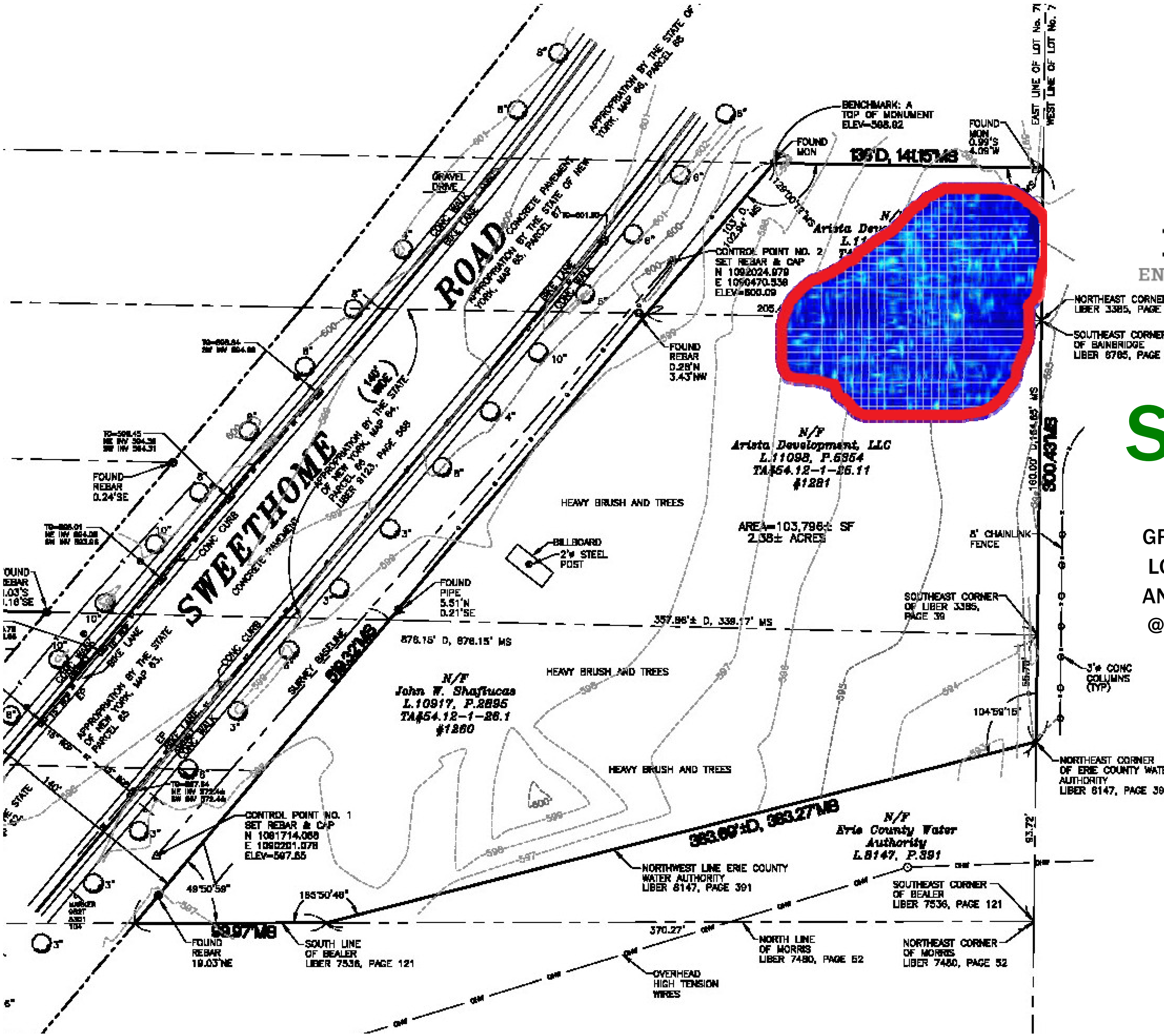
Slide 4

GRID #00;

TOP CENTER:

ANOMALY STARTING

@ 3.5' – 5.5' DEEP



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Slide 5

GRID #00;
LOWER RIGHT:
ANOMALY STARTING
@ 4.0' – 7.0' DEEP

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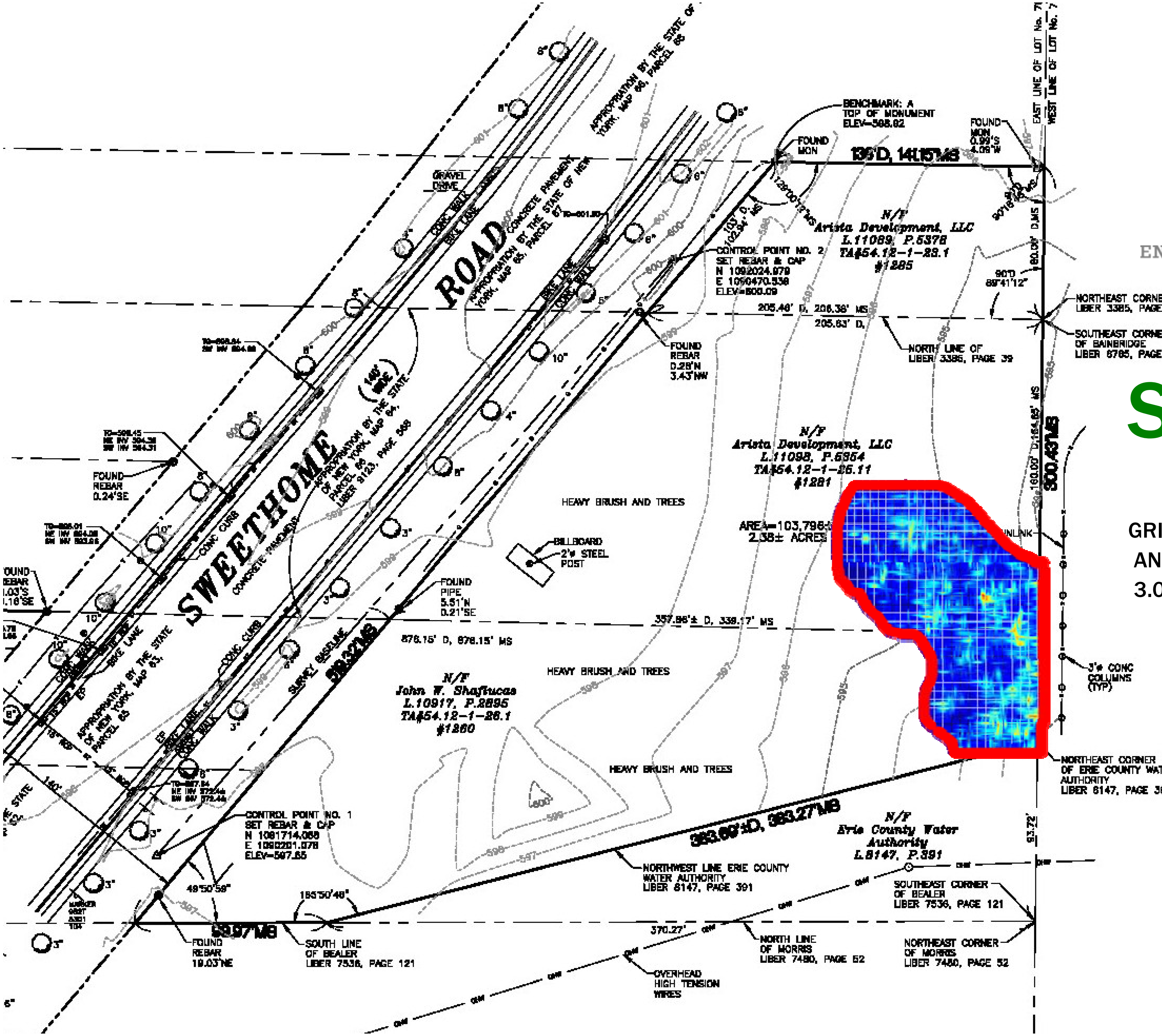
Slide 6



GRID #01:
ANOMALY STARTING @ 3.0' – 7.75' DEEP

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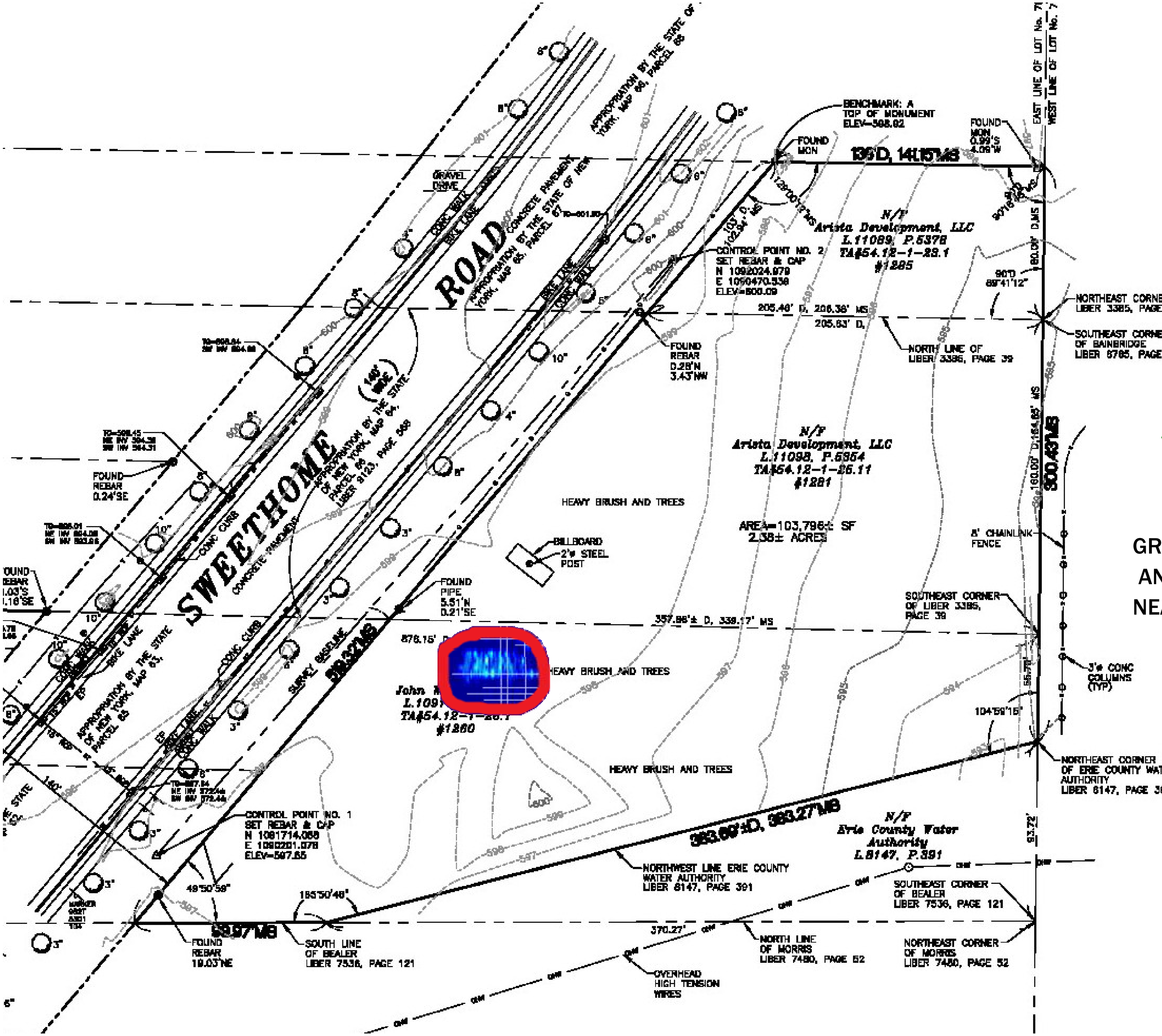
Slide 7

GRID #02;
ANOMALY STARTS
NEAR SURFACE – 5.0' DEEP



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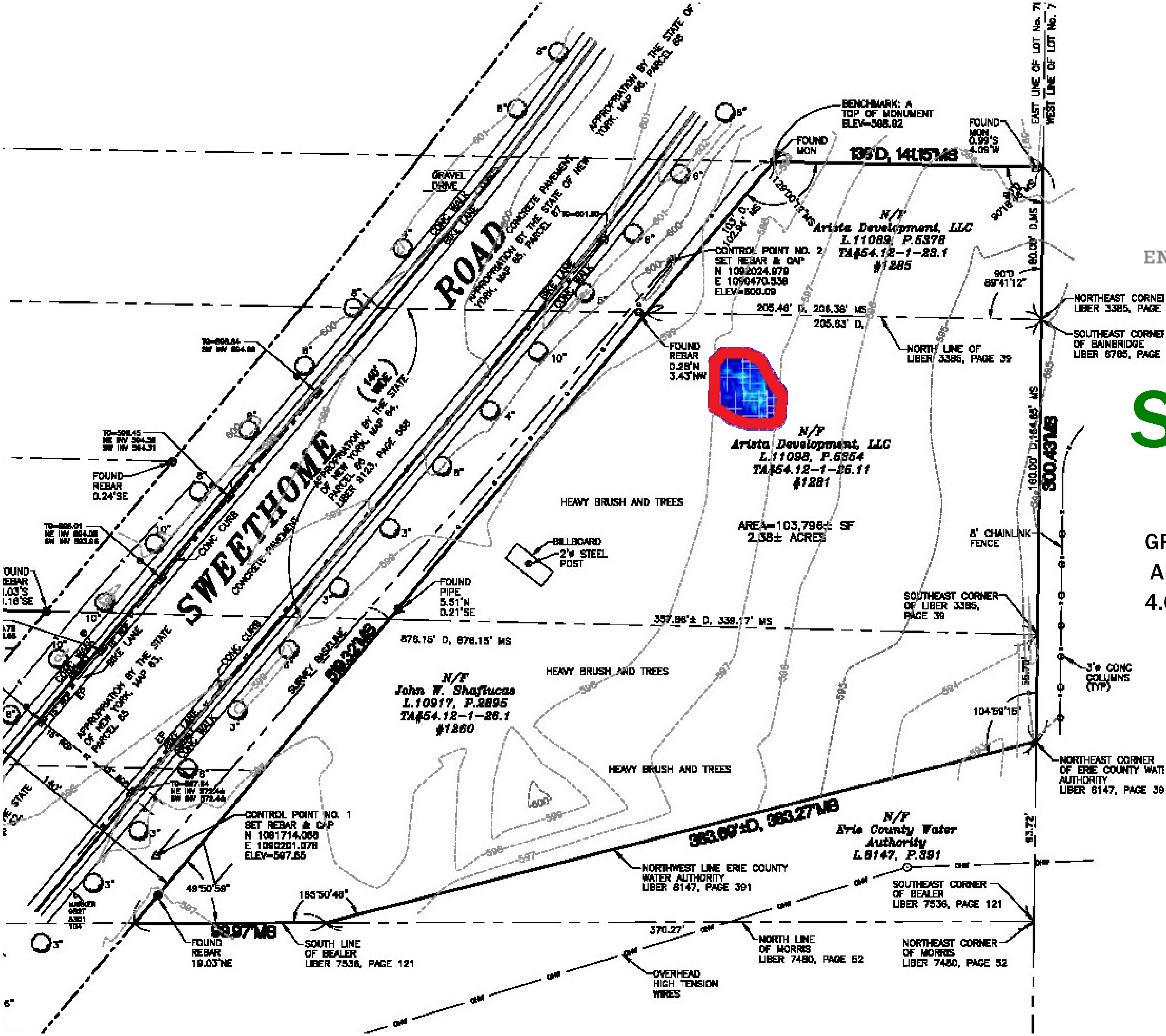
Slide 8



GRID #03;
ANOMALY STARTS @ 4.0' – 5.5'

Pegasus
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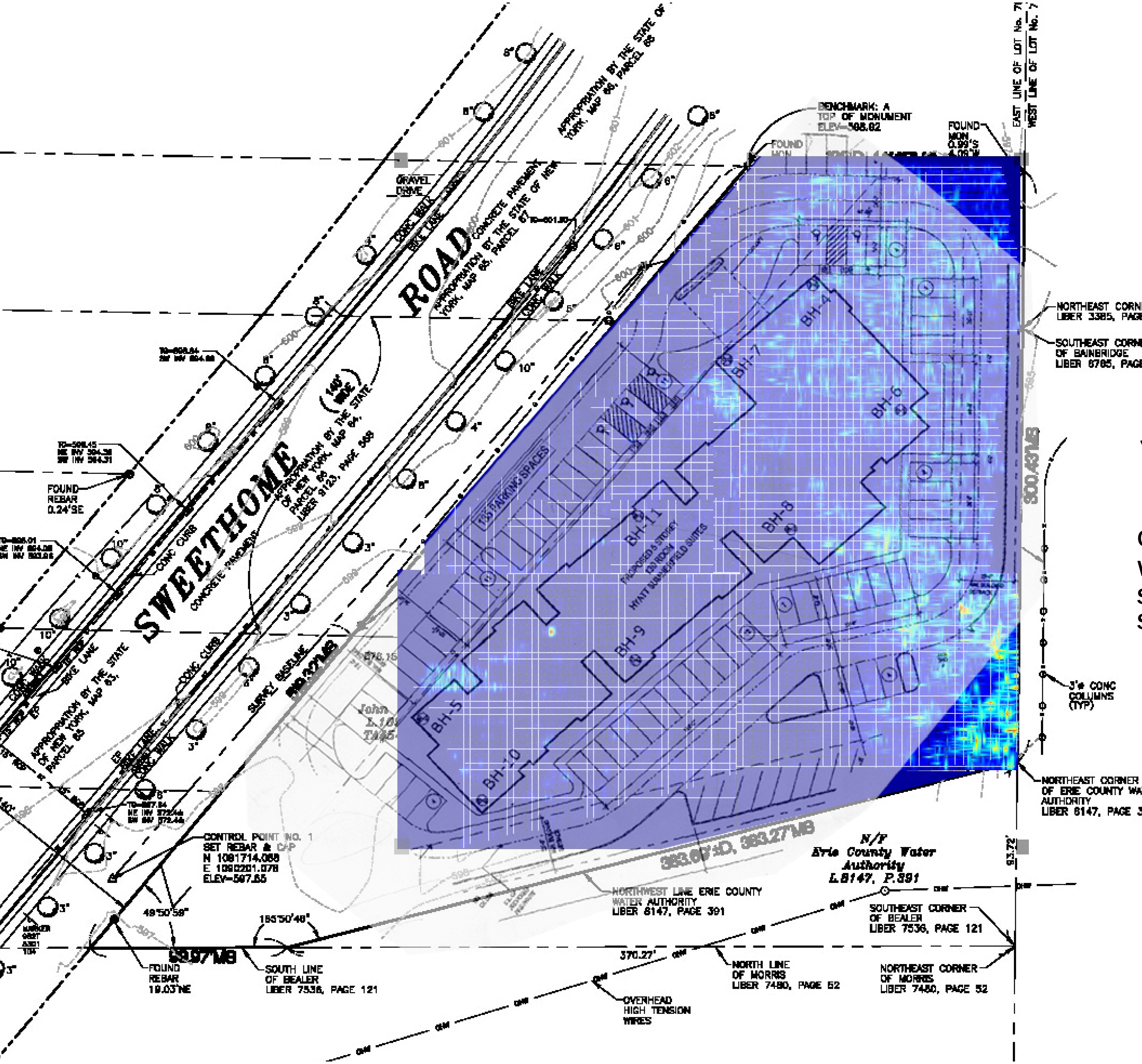
Slide 9



COMPOSITE VIEW,
WITH PERCEIVED LOCATION OF STRUCTURE DRAWING SUPERIMPOSED.

Pegasus
ENVIRONMENTAL, CO.

P.O. Box 4
Spencerport, NY 14559

Thank you for your business.

We will be happy to discuss this
report with you and assist in
any possible manner.

SCHENNE & ASSOCIATES

CONSULTING ENGINEERS and GEOLOGISTS
967 LUTHER ROAD
EAST AURORA, NEW YORK 14052

Mr. Sam Johal
4355 King St. E.
Kitchener, Ont. N2P 2E6

Re: EDI Project 19B06c
Subsurface Exploration and Geotechnical Engineering Report
Proposed Hyatt Summerfield Suites
Sweet Home Road
Town of Amherst

October 12, 2006

Dear Mr. Johal:

This report presents the findings of a subsurface investigation and geotechnical evaluation of the proposed Hyatt Summerfield Suites site. The project is located on the eastside of Sweet Home Road north of Maple Road.

Eight (8) test borings were drilled by Earth Dimensions, Inc. (EDI) to depths of 14 to 29 feet to determine the Engineering properties of the underlying soil and rock, so that recommendations for foundation designs could be made. As expected, the project site was underlain by rock at a shallow depth containing a number of large voids and solution cavities. The rock strata present were evaluated to determine the capacity to support foundation loads from a six story hotel on this site. Schenne and Associates has determined that with proper design and construction, this project can be developed without undue risk to the proposed work or to existing structures on nearby properties.

1.0 INTRODUCTION

The proposed six story Hyatt Summerfield Suites would be built on a site off Sweet Home Road adjacent to the University of Buffalo in the Town of Amherst. The proposed hotel is assumed to have a cast in place concrete basement supported by spread footings bearing on competent rock. The rock in this vicinity is known to contain numerous voids and solution cavities. Settlement problems have been reported on the adjacent Ball Pumping Station owned by the Erie County Water Authority.

This report was prepared to investigate the proposed hotel site, evaluate potential project impacts, and to make recommendations for the proposed foundation designs.

1.1 SITE DESCRIPTION

1.1.1 General

The project is located on the eastside of Sweet Home Road in the central part of Amherst, New York, (see Appendix A). The proposed project site is relatively level with ground surface elevations varying by several feet across the entire site. Currently the site is undeveloped and covered with grasses, brush and trees. Several existing foundations and demolition debris were observed onsite.

2.1 SITE GEOLOGY

The site is underlain by the Camillus Shale bedrock that is covered by thin unconsolidated deposits. The overlying unconsolidated deposits are mostly glacial or glacial lacusterine in origin and were formed during the Pleistocene, approximately 10,000 years ago. The Camillus Shale on this site is highly variable with some bore holes encountering voids up to 5' thick and apparent solution cavities filled with unconsolidated deposits. On this site, the typical thickness of unconsolidated material varied from 2 feet to 14 feet. Geologic units in descending stratigraphic order are:

1. Clays, silts, sands and gravels
2. Camillus Shale

2.1.1 Site Soils

The weathered shale bedrock with numerous voids and solution cavities present on this site shows high porosities, high permeabilities, and is associated with low strength, low bearing capacity, and high settlement characteristics. Seasonally high water tables and high permeabilities may contribute to high groundwater levels.

This site showed signs of previous occupation. It is likely that abandoned septic systems, building foundations, buried utilities and other buried structures exist on site. This subsurface investigation did not search for or locate these structures.

2.1.2 Soil Boring Data

EDI completed eight (8) test borings on the site in September 2006. The approximate locations of the borings, designated as borings B-4 through B-11 are shown in Appendix B. The test borings were drilled to depths ranging between 15 feet and 29 feet below existing grade. There was significant variability in the soils and rock on site. The test boring logs are presented in Appendix C.

Topsoil, weathered shale, weathered dolostone, sandy silts, clayey silts, silty sands and till were encountered in the top 2 to 14 feet of each boring. Apparent voids and or solution cavities up to 5 feet thick were encountered in BH 4-06, BH 5-06, BH 6-06, BH 9-06, BH 10-06 and BH 11-06. These voids were filled in some cases with unconsolidated soils. Below the weathered zone the gray shale contained was thinly bedded, highly fractured along horizontal bedding planes and was slightly fractured vertically. Numerous gypsum seams were observed from < 0.01 feet thick to 0.4 feet thick.

2.1.4 Groundwater

Ground water was encountered in the borings at depths of between 15 feet to 20 feet below grade at the completion of drilling. It is likely that an adequate amount of time was not allowed for the groundwater in the boreholes to seek steady state levels on the day the borings were completed. It should also be noted that groundwater levels vary with season, location, precipitation, and other factors. It is very likely given the observed solution cavities on site that groundwater may be found near the surface during the wet portions of the year. It is also very likely that high rates of groundwater flow may occur across this site through the existing voids and solution cavities.

2.1.5 Seismic Site Class

The Building Code of New York State, (BCNYS), requires that building sites be evaluated for seismic risk. The criteria for this is described in Tables 1615.1.1 of the Building Code of New York Site. At this site, the presence of bedrock close to the existing ground surface requires that the site be classified a Seismic Site Class B. The Seismic Design Category is B. See the IBC Earthquake Loads sheet in Appendix D.

3.0 HYDROLOGY

3.1.1 Hydrogeology

Given the gently sloping terrain of the site and pervious rock at shallow depth, lateral and/or vertical movement of groundwater thru the site is likely widespread. The fate of groundwater reaching the bedrock is unknown, but it likely follows the bedrock topography and flows to the north. Groundwater levels would be expected to fluctuate seasonally around the proposed foundations.

4.0 CONSTRUCTION VIBRATIONS

We understand the proposed building will be a six story steel or reinforced masonry building with heavy foundation loads. Some of the borings for this project indicate layers of weathered rock with voids near the surface. Given the unsuitability of some of the weathered rock, a significant volume of rock/soil excavation may be required to construct this multi-story building. The site is adjacent to the Ball Pumping Station owned and operated by the Erie County Water Authority. This pumping station contains a number of sensitive high voltage electrical transformers, electrical switchgear, and large capacity pumps that could be susceptible to vibration damage. We offer the following comments regarding construction vibrations:

- The effects of construction vibration on nearby structures is dependent upon a variety of factors and typically requires onsite vibration monitoring to draw accurate conclusions. Rock excavation will be required on this project, which could cause excessive ground vibrations. We recommend that preconstruction surveys be made of adjacent structures and that vibration monitoring be conducted during construction operations. Vibration monitoring and surveys should be performed by a firm specializing in blast monitoring. Construction operations should be designed to limit vibrations offsite.

- Typically the level of vibrations from construction traffic is too low to cause damage off site. We expect that normal construction traffic on this project would not cause any vibrational damage.

- Attenuation of construction vibrations is produced by both geometrical spreading and material damping. Given the setback distances for the proposed structures from the street right of way, it is unlikely that damaging vibrations offsite to the west will occur.

5.0 FOUNDATION DESIGN CONSIDERATIONS

5.1.1 Lateral Earth Pressure

Pressure from soil swell, hydrostatic pressure, and pressure from frost can be significantly reduced or eliminated by specifying coarse-grained backfill soils and providing a foundation drainage system. The zone of coarse-grained backfill soils placed against the wall should extend out to a line extending from the outside edge of wall footings up to the finished ground surface at a 45-degree angle. Since many of the areas adjacent to the hotel building will be paved, proper compaction of the backfill is recommended. The basement walls should be designed to resist the elevated at- rest lateral earth pressures induced by compaction. The ground surface adjacent to basement walls should be sloped away from walls at a minimum grade of 5% to minimize surface water infiltration.

5.1.2 Settlement

We recommend that the foundations for the multistory building be carried down to solid bedrock.

Foundations constructed on bedrock would typically exhibit only a small amount of settlement.

Site improvements like the parking areas, sidewalks and underground utilities may be subject to differential settlements, since they are likely to be constructed on or in the variable weathered rock present on site. Water induced movement of unconsolidated soils in voids and solution cavities in the rock could result in settlement or the formation of small sink holes.

Proof rolling of the subgrade with a heavy (>20,000 lb) vibratory roller is highly recommended and will reduce some settlement.

6.0 DESIGN AND CONSTRUCTION RECOMENDATION

Summary

The proposed building site is located in an area where the Camillus Shale occurs very close to the surface. This rock strata is known for its high hydraulic conductivity and the presence of numerous voids and solution cavities. The borings performed on this project detected significant voids and solution cavities. Given the high foundation loads of the proposed six story hotel building, either the rock should be excavated down below the weathered zone, or drilled piers could be used to support the structure. Since most multistory hotels require significant space for mechanical and utility rooms, we have assumed that the best foundation option for this project is to excavate through the unsuitable rock and unconsolidated soils, and use spread footings. Other foundation options are possible.

6.1 Design & Construction Recommendations

1. All unconsolidated soil and weathered rock should be removed from the building footing, including rock overlaying solution cavities and voids. It some areas this may require deep rock excavation.
2. Upon completion of excavation, a ground penetrating radar survey should be conducted to insure no voids exist below any of the planned building footings.
3. Spread footings may be designed for this project using a maximum 6 ksf allowable bearing pressure on solid shale bedrock. If desired, flowable fill (F_c > 100 psi) may be used to level the rock excavation.
4. A complete interior and exterior foundation drainage system should be provided as the weathered shale on site is capable of conducting large volumes of groundwater to the building foundation.
5. Depending on the design of the foundation drainage system, consideration should be given to designing the basement walls to resist a combination of lateral earth and hydrostatic pressure.
6. A geotextile filter fabric should be used between fine-grained soils and coarse-grained backfill soils to prevent migration of fine-grained soils into coarse-grained backfill. The geotextile filter fabric should have permittivity sufficient to ensure cross-plane flow of groundwater
7. Many site improvements outside the building foot print will likely be built on the rock and unconsolidated soils overlaying voids and solution cavities. Removal of the voids and solution cavities on the entire site is likely cost prohibitive. Proof rolling these areas with a heavy vibratory roller is a cost effective means of reducing settlements. This method will not protect against formation of small sink holes or long term settlement induced by groundwater movement.
8. As previously mentioned the porous weathered rock is capable of conducting large quantities of groundwater into excavations during wet portions of the year. The contractor should be prepared to properly dewater and maintain the site.

These design recommendations were prepared based on Schenne and Associates' understanding of this project, the borings completed by Earth Dimensions Inc., and generally accepted geotechnical engineering practice. No guarantees or warranties of any kind are expressed or implied.

Should any unusual conditions be encountered during excavation of the basement, or if the soils encountered during the work differ from those described by the boring logs referenced above, please notify me. If you have any questions or require additional information please contact me.

Sincerely;

John A. Schenne, PE

WARNING: IT IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NYS EDUCATION LAW FOR ANY PERSON UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER IN ANY WAY PLANS, SPECIFICATIONS, OR REPORTS TO WHICH THE SEAL OF AN ENGINEER HAS BEEN APPLIED.