BARRON & ASSOCIATES, P.C.
10440 Main Street
Clarence, New York 14031

Tel: (716) 759-7821 www.barronandassociatespc.com Fax: (716) 759-7823

October 30, 2007 Job No: 07-641

Benderson Development Company LLC
570 Delaware Avenue
Buffalo, New York 14202

RE: Preliminary Geotechnical Engineering Report
Proposed Retail Complex and Hotel
5220 Camp Road and Commerce Place
Hamburg, Erie Co., New York 14075

ATTN: Mr. William Rae

Gentlemen:

This report presents the findings of the subsurface investigation program and preliminary 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 detailed in Figure No. 2, which includes: approximate location of six test borings by Buffalo Drilling Company, Inc. (BDC); relative ground surface elevations; and additional site details.

EXPLORATION METHODS

Sampling Method: An ATV mounted CME 550 drill rig was used to drill test borings to depths ranging from about ten to 14 feet below ground surface by using 2-1/4 inch inside diameter (ID), continuous flight hollow stem augers. Soil 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 (ASTM D1586). The number of blows from six to 18 inches of penetration is defined as the Standard Penetration Test (SPT) N-value.

Classification: The soil samples were initially logged in the field by the driller, and a portion of each soil sample was placed and sealed in a glass jar. The boring logs, which are included as Appendix A, were prepared based upon the field log and a second visual classification of recovered soil samples in the laboratory by a geologist. Classification of soil samples, as noted on the boring logs, is based on the Unified Soil Classification System (USCS). Refer to Appendix B entitled, "Geotechnical Reference Standards", for an explanation of the terminology that is used for soil and rock descriptions.

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

- Liquid Limit, Plastic Limit, and Plasticity Index of Soils ASTM D4318
- Water (Moisture) Content of Soil ASTM D2216

Summarized results are included in Table No.1 and Appendix C.

SITE AND SUBSURFACE CONDITIONS:

General: The northern portion of the project site is addressed as 5220 Camp Road in Hamburg, New York, and remaining property is unaddressed and probably zoned agriculture. Proposed site development is expected to include standing retail structures with an approximate total floor area of 652,823 square feet, and multi-story hotel, and several parking and roadway areas. The 80 acre site is partially occupied with a bus garage and vacant motel/gas station with asphalt paved and stone parking areas and roadways occupying the northern portion of the site. A perennial stream runs along the southern boundary of the project site and flows to the northwest. Topographically, the majority of the site is relatively flat with ground surface elevations varying approximately 15 feet. The overall site slopes downward from southeast to northwest.

Subsurface Soil Conditions: Beneath the asphalt and base course, surficial granular fill, or topsoil, subsurface soil conditions generally consist of naturally deposited cohesive soil which mantles weathered shale atop competent shale bedrock.

Surficial granular fill was encountered at boring location B-1. The medium dense fill unit extends to two feet below ground surface and consists of fine to coarse grain sand with appreciable amounts of gravel, little silt and trace amounts of shale fragments and slag. Moisture content is noted as moist.

Well graded sand exists beneath the surficial granular fill at boring location B-1. This loose, fine to coarse sand is intermixed with appreciable amounts of gravel and lesser amounts of shale and silt. The sand layer is approximately two feet thick, and the recovered sample was noted to be moist.

Moderately plastic, naturally deposited cohesive soil was encountered beneath a variable thick topsoil layer at boring locations B-2, B-4, B-5, and B-6. Cohesive soils at boring location B-2, B-4, and B-5 consist of clay with appreciable amounts of silt intermixed with variable amounts of sand, gravel, and shale. Soil consistency generally increases with depth from stiff to hard conditions, with very stiff conditions being typical. Moisture content of retrieved soil was noted to be moist.

Slightly plastic, cohesive soil, encountered at boring location B-6, consist of silt with appreciable amounts of clay intermixed with variable amounts of sand, gravel, and shale fragments. Soil consistency generally increases with depth from stiff to hard conditions. Moisture content of retrieved soil was noted to be moist.

A relatively thick layer of weathered shale intermixed with varying amounts of clay, silt, sand and gravel was encountered beneath the naturally deposited topsoil and cohesive units at all boring locations. The weathered shale is generally described as gravel sized and dense to very dense with SPT N-values exceeding 50 blows per foot. For the most part, the upper weathered shale can be dug with a medium sized track excavator.

Bedrock Conditions: Auger refusal was encountered at all boring locations ten to 14 feet below ground surface. Based upon regional geology, bedrock is expected to consist of Angola or Rhinestreet Shale from the West Falls Group.

Groundwater Conditions: Groundwater was not encountered during subsurface exploration of the site. Readings were taken at completion of drilling efforts and, therefore, an adequate amount of time for groundwater level to recharge to static conditions was probably not allowed. Fluctuations in the ground water level may occur due to other factors than those present during field operations. Perched water may be encountered within upper sections of weathered shale.

EARTHQUAKE/SEISMIC CONSIDERATIONS

Site Definition: For the given site conditions, the most applicable site definition is Site Class C, as noted in Table 1615.1.1 of the Building Code of New York State. This site class is characterized by a shear wave velocity of greater than 1,200 and less than or equal to 2,500 feet per second.

Design Acceleration Parameters: For the project site, the design spectral response acceleration parameters (i.e.: S_{Ds} and S_{D1}) at 0.2 seconds and one second are 0.23 g and 0.08 g (g = 32.2 feet/sec^2), respectively, for this part of Erie County, New York.

Liquefaction Potential: Based upon the above conditions and an approximate magnitude VI earthquake on the Richter Scale, the potential for liquefaction and surface settlement is considered low.

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, paved parking and roadway areas.

As shown in Figure No. 2, the proposed project site is expected to be occupied by a multi-story hotel and four large retail structures accompanied by an additional 13 smaller single-story, slab-on-grade structures. Based on existing site grades, some cuts and fills will be required to balance the proposed building pads.

Detailed design drawings were not provided for this evaluation. For this report, top of finish first floor for each structure is expected to closely mimic existing grade. The final adjacent exterior grade will most likely be at a relative elevation that is one-half foot or lower below finished floor. Maximum wall loads are not expected to exceed ten kips per lineal foot, column loads should not exceed 150 kips, and the live floor load is taken as less than 100 pounds per square foot.

Site Preparation and Earthwork: General site preparation will include the removal of any unsuitable surficial material, (i.e., asphalt pavement, concrete, brick, expansive slag, organic topsoil, and construction and demolition-like fill), if identified, to a depth where relatively stable and clean fill or naturally occurring soils are encountered.

Prior to controlled fill placement, prepared subgrades within the proposed building and asphalt paved areas should be proofrolled with a fully loaded ten-wheel dump truck. All soft and disturbed zones identified during proofrolling must be undercut and stabilized with granular fill placed in controlled and thoroughly compacted lifts prior to subsequent fill placement above. Refer to Appendix E entitled "General Earthwork Specification" for definition of fill types and gradation, recommended minimum compaction requirements for various site developments, and placement and compaction methods.

As shown in Figure No. 2, the proposed development site is currently occupied a bus garagae and vacant motel, which are proposed to be demolished. It is unknown, however, if any additional former structures existed on the project site. If structural remnants, such as foundation, basements, tanks, buried construction/demolition material, abandoned utilities, or other appurtenances are encountered during site development, it is recommended that these features be properly removed under the applicable local and state regulations. The resulting cavities should be backfilled with granular fill or an approved alternate ordinary structural fill that is placed in controlled loose lifts of no more than 12 inches in thickness and compacted to a minimum 95 percent of the maximum dry density, as determined by ASTM D-1557.

Cuts and fills may be necessary to balance the site to design grade. On-site soils may be difficult to compact in a controlled manner considering the varying silt content and moisture sensitive nature of these materials. Caution should be given to re-use of these materials for raising site grades and backfilling foundations outside of a summer construction schedule (i.e.: June to September).

Excavated or cut soils may require some drying and blending prior to placement as controlled fill. All excavated on site soil or approved imported fills that are utilized for raising site grades must be placed in controlled loose lifts of not more than 12 inches in thickness and compacted to at least 92 percent of the maximum dry density, as determined by ASTM D-1557.

For the building and heavy duty pavement areas, a geotextile fabric (such as, Mirafi 500X or 600X, Amoco 2002 or 2006, or equal) that separates the existing or raised subgrades and the design select granular base course layer is recommended. This approach will stabilize and provide workable site conditions with minimal required repairs.

Shallow Foundation: The recommended foundation type is shallow footings. For adequate frost protection, all exterior footings are recommended to bear at an elevation of at least four feet below the design finished exterior grades adjacent to the structure or as required by local code. All footings should either bear directly upon stable natural soil or on a variably thick section of thoroughly compacted (minimum of 95 percent of the maximum dry density by ASTM D 1557) select granular fill that is placed on approved natural soil.

Foundation bearing surfaces that are soft, or in any manner unacceptable, must be undercut to stable natural soil conditions. Any undercut areas beneath proposed shallow 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. 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. Undercuts shall be backfilled with granular fill that is placed in loose lifts not exceeding 12 inches deep and compacted to a minimum 95 percent of maximum dry density as determined by ASTM D1557.

Wall footings should have a minimum two-foot width and column footings, if applicable, should have a minimum three-foot width. Based on the above described conditions, the recommended maximum net allowable foundation bearing pressure on natural soil or an engineered fill section extending to an approved subgrade is 3,000 pounds per square foot (psf) of bearing area. All footings 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 cohesionless soil conditions. Based on the 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 3/4's inch, respectively. Refer to the engineering notes and schematics, which are included as Appendix D, for additional foundation design and construction 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) 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.

d) Water must not be allowed to accumulate or pond on exposed foundation bearing grades. Surface water and groundwater from within the excavation must be pumped, diverted, or channelized by gravity flow to effectuate the construction of the proposed foundation.

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.

Floor Slabs: Above an approved subgrade, a minimum eight inch select granular fill (i.e., number two crusher run stone or equal) layer is recommended as the base course for the concrete floor slab. The floor slab is recommended to be at least four-inches thick and reinforced with wire mesh or plastic fibers. As previously stated, geotextile fabric is recommended at the subgrade/base course interface to enhance stability of the pad during construction. Use of a vapor barrier and the actual thickness and reinforcement schedule for the slab is, however, exclusively at the discretion of the design architect/engineer.

The subgrade modulus on an eight inch thick compacted base layer (i.e., minimum 95 percent compaction) over an approved subgrade (i.e., minimum 92 percent compaction) should not exceed 150 pounds per cubic inch (pci) with a Poisson Ratio of 0.40. The floor slab should be isolated from foundation elements.

Parking and Roadway Facilities: The characteristics of surficial silty sand and the known frost penetration in western New York requires that specific attention be provided to the design and construction of paved roadway and parking areas.

It is recommended that the subgrade surface is adequately graded and/or underdrains are installed to prevent water accumulation. Above the approved subgrade surface, a minimum eight-inch thick select granular layer is recommended as the base course for lightly traveled roadway and parking areas

(standard duty section). Geotextile filter and strength fabric and a minimum 12-inch thick base course are recommended for all truck routes and heavily traveled roadways (heavy duty section).

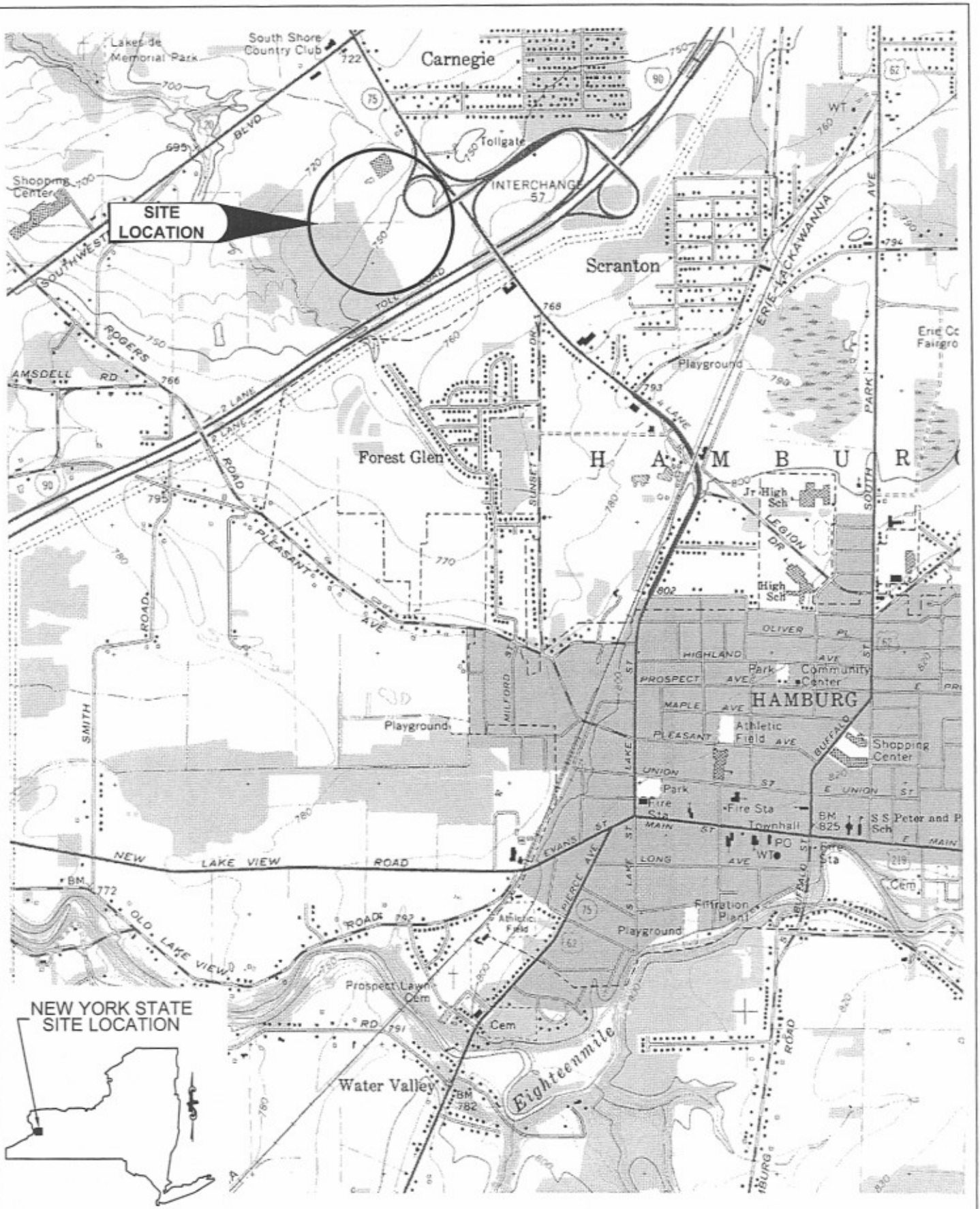
The thickness of top and binder course layers should be determined in accordance with AASHTO methods. The minimum recommended asphalt thicknesses for heavy duty section and standard duty section is four inches and three inches, respectively. The top and binder course layers are recommended to be designed and constructed in accordance with New York State Department of Transportation Standard Specification.

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.

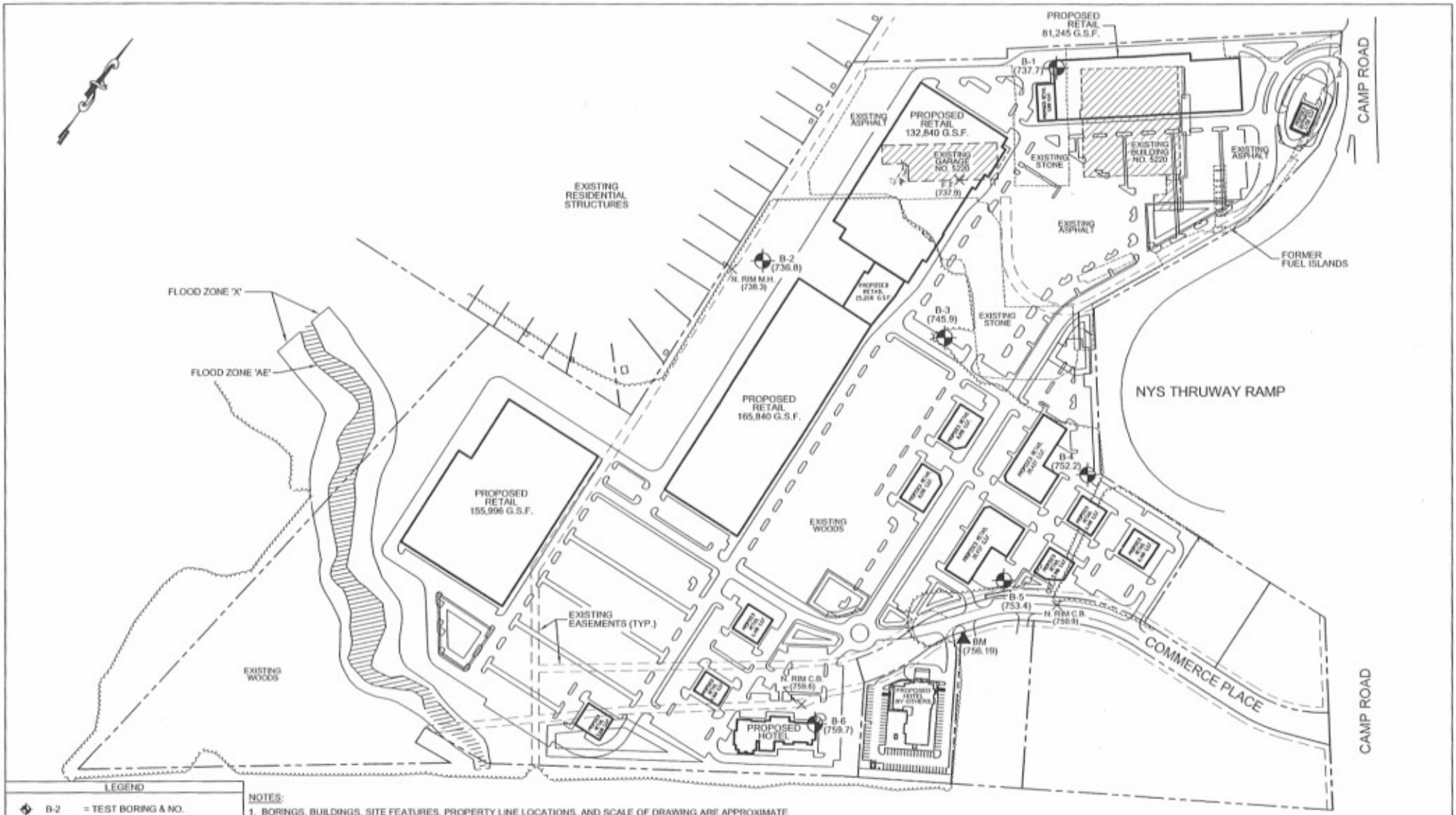
Thank you for the opportunity to assist on this project. If questions should arise, please call the undersigned at your earliest convenience.

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

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



BARRON & ASSOCIATES, P.C. & BUFFALO DRILLING COMPANY 10440 MAIN ST. CLARENCE, NY 14031 (716)759-7821 FAX (716)759-7823 INFO@BUFFALODRILLING.COM INFO@BARRONANDASSOCIATESPC.COM	CLIENT: BENDERSON DEVELOPMENT COMPANY, LLC 570 DELAWARE AVENUE BUFFALO, NEW YORK 14202	USGS SITE LOCATION PLAN HAMBURG, N.Y. QUAD 1965
DRAWN: DAN KASPROWICZ	PROJECT: PROPOSED RETAIL COMPLEX WITH HOTEL 5220 CAMP ROAD AND UNADDRESSED PARCELS ON COMMERCE PLACE HAMBURG, ERIE CO., NEW YORK 14075	JOB NO.: 07-641 / SCALE: 1" = 2000' ± DATE: 10/25/2007 / FIGURE NO. 1



LEGEND

B-2	=	TEST BORING & NO.
(736.8)	=	GROUND SURFACE ELEVATION (FT.)
×	=	SPOT ELEVATION
BM	=	BENCH MARK (NORTH RIM OF MAN HOLE)

NOTES:

1. BORINGS, BUILDINGS, SITE FEATURES, PROPERTY LINE LOCATIONS, AND SCALE OF DRAWING ARE APPROXIMATE.
2. BASE MAP REFERENCE AND BENCH MARK ELEVATION PROVIDED BY CARMINA & WOOD, P.C., TITLED "OVERALL SITE PLAN - HAMBURG CROSSING", CW PROJECT NO. 07.021, DWG. NO. C-4, DATED 7/2007.

BARBER & KISSOCKITES, P.C.
BUFFALO DRILLING COMPANY, INC.
CLARENCE, NY 14031
(716)759-7810
FAX (716)759-7823

DRAWN: DAN KASPROWICZ

CLIENT: BENDERSON DEVELOPMENT COMPANY, LLC
570 DELAWARE AVENUE
BUFFALO, NEW YORK 14202

PROJECT: PROPOSED RETAIL COMPLEX WITH HOTEL
5220 CAMP ROAD AND
UNADDRESSED PARCELS ON COMMERCE PLACE
HAMBURG, ERIE CO., NEW YORK 14075

TEST BORING LOCATION PLAN

0 125 250 500

JOB NO.: 07-641	SCALE: 1" = 250' ±
DATE: 10/25/2007	FIGURE NO. 2

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN ST.
CLARENCE, NY 14031
(716)759-7821
FAX (716)759-7823
e-mail: info@buffalodrilling.com
info@barronandassociatespc.com

B&A JOB NO: 07-641
CLIENT: Benderson Development LLC
PROJECT: Proposed Commercial Development
Camp Road, Hamburg, NY

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	3.1	-	-	-	-	-	-	-	-	-	-	SW-Fill
	S-2	2-4	6.9	-	-	-	-	-	-	-	-	-	-	SW
	S-3	4-6	12.2	-	-	-	-	-	-	-	28	19	9	CL
	S-4	6-8	10.2	-	-	-	-	-	-	-	-	-	-	CL
	S-5	8-9.3	9.9	-	-	-	-	-	-	-	-	-	-	Weathered Shale
B-2	S-1	0-2	6.4	-	-	-	-	-	-	-	-	-	-	CL-ML
	S-2	2-4	9.1	-	-	-	-	-	-	-	-	-	-	CL-ML
	S-3	4-6	12.1	-	-	-	-	-	-	-	-	-	-	CL-ML
	S-4	6-8	12.0	-	-	-	-	-	-	-	22	16	6	CL-ML
	S-5	8-10	3.3	-	-	-	-	-	-	-	-	-	-	Weathered Shale
	S-6	10-10.3	3.0	-	-	-	-	-	-	-	-	-	-	Weathered Shale
S-6	S-1	0-2	14.7	-	-	-	-	-	-	-	-	-	-	ML
	S-2	2-4	21.0	-	-	-	-	-	-	-	-	-	-	ML
	S-3	4-6	7.6	-	-	-	-	-	-	-	-	-	-	ML
	S-4	6-8	10.0	-	-	-	-	-	-	-	32	24	8	ML
	S-5	8-10	4.1	-	-	-	-	-	-	-	-	-	-	Weathered Shale
	S-6	10-11.3	4.3	-	-	-	-	-	-	-	-	-	-	Weathered Shale

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

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

APPENDIX A

TEST BORING LOGS

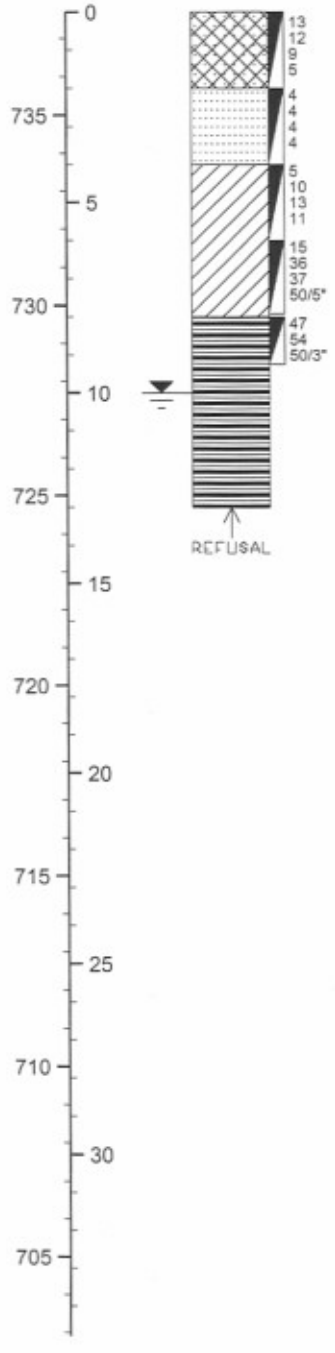
BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, NEW YORK 14031
(716) 759-7821 FAX: (716) 759-7823

TEST BORING LOG

JOB No.: 07-641 **BORING No.:** B-1

PROJECT: Preliminary Subsurface Investigation
Camp Road, Hamburg, New York

DRILLER:	L. Schroeder	**TYPE OF DRILL RIG:**	CME 550
SAMPLING METHODS:	ASTM D1586	**SIZE AND TYPE OF BIT:**	2 1/4" Hollow Stem Auger
DATE STARTED:	10/18/2007	**SURFACE ELEVATION (ft.):**	737.7
DATE COMPLETED:	10/18/2007	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	10



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
S-1 : 0.0'- 2.0'	21	50	Brown, m. dense f/c Sand, some Gravel, little, Silt, tr. Shale, tr. Slag, moist (SW-Fill)
S-2 : 2.0'- 4.0'	8	40	Brown, loose f/c SAND, some Gravel, little Shale, little Silt, moist (SW)
S-3 : 4.0'- 6.0'	23	45	Brown, v. stiff CLAY, some Silt, little Gravel, tr. f/c Sand, tr. Shale, mod. plastic, moist (CL)
S-4 : 6.0'- 7.9'	73	60	...grade: Dk. brown, hard, and Shale, little Silt
S-5 : 8.0'- 9.3'	104+	75	Dk. brown, v. dense sand to gravel sized WEATHERED SHALE, little Clay, little Silt, wet (WEATHERED SHALE)
			Depth to Bottom of Hole: 13.0 feet

Logged by: B. Smith

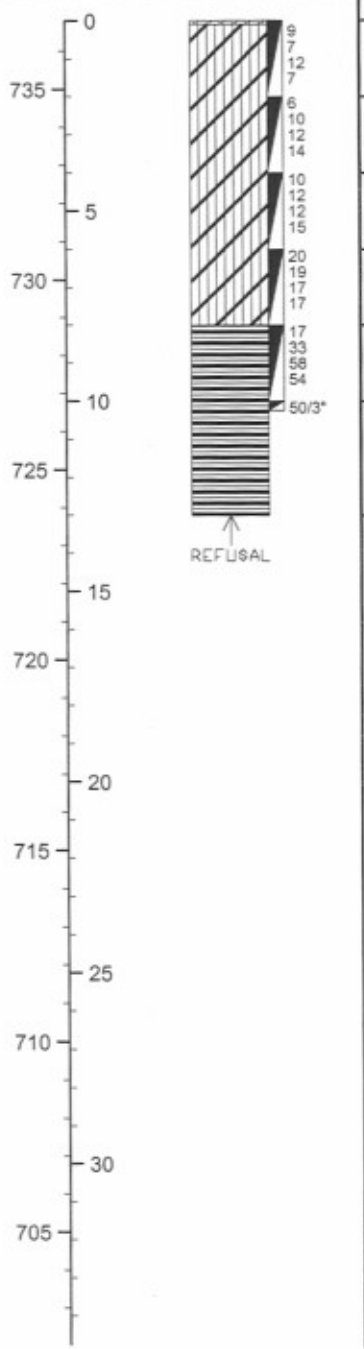
BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, NEW YORK 14031
(716) 759-7821 FAX: (716) 759-7823

TEST BORING LOG

JOB No.: 07-641 **BORING No.:** B-2

PROJECT: Preliminary Subsurface Investigation
Camp Road, Hamburg, New York

DRILLER:	L. Schroeder	**TYPE OF DRILL RIG:**	CME 550
SAMPLING METHODS:	ASTM D1586	**SIZE AND TYPE OF BIT:**	2 1/4" Hollow Stem Auger
DATE STARTED:	10/18/2007	**SURFACE ELEVATION (ft.):**	736.8
DATE COMPLETED:	10/18/2007	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
			Topsoil (1")
S-1 : 0.0'- 2.0'	19	50	Brown, v. stiff CLAY and Silt, little Gravel, little Shale, little f/c Sand, mod. plastic, moist (CL-ML)
S-2 : 2.0'- 4.0'	22	70	Same as S-1
S-3 : 4.0'- 6.0'	24	90	Same as S-1
S-4 : 6.0'- 8.0'	36	50	...grade: Dk. brown, hard, some Shale
S-5 : 8.0'- 10.0'	91	17	Dk. brown, v. dense sand to gravel sized WEATHERED SHALE, little Clay, little Silt, moist (WEATHERED SHALE)
S-6 : 10.0'- 10.3'	50+	25	...grade: tr. Clay, tr. Silt
			Depth to Bottom of Hole: 13.0 feet

Logged by: B. Smith

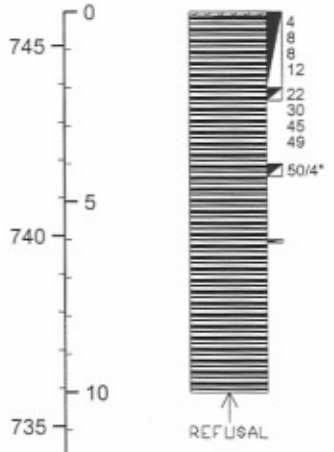
BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, NEW YORK 14031
(716) 759-7821 FAX: (716) 759-7823

TEST BORING LOG

JOB No.: 07-641 **BORING No.:** B-3

PROJECT: Preliminary Subsurface Investigation
Camp Road, Hamburg, New York

DRILLER:	L. Schroeder	**TYPE OF DRILL RIG:**	CME 550
SAMPLING METHODS:	ASTM D1586	**SIZE AND TYPE OF BIT:**	2 1/4" Hollow Stem Auger
DATE STARTED:	10/18/2007	**SURFACE ELEVATION (ft.):**	745.9
DATE COMPLETED:	10/18/2007	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
			Topsoil (1")
S-1 : 0.0'- 2.0'	16	40	Dk. brown, m. dense sand to gravel sized WEATHERED SHALE, little Clay, li ttle Silt, moist (WEATHERED SHALE)
S-3 : 2.0'- 2.3'	75	60	...grade: v. dense
S-4 : 4.0'- 4.3'	50+	50	...grade: v. dense, tr. Clay, tr. Silt
S-5 : 6.0'- 6.1'		5	Same as S-3
			Depth to Bottom of Hole: 10.0 feet

Logged by: B. Smith

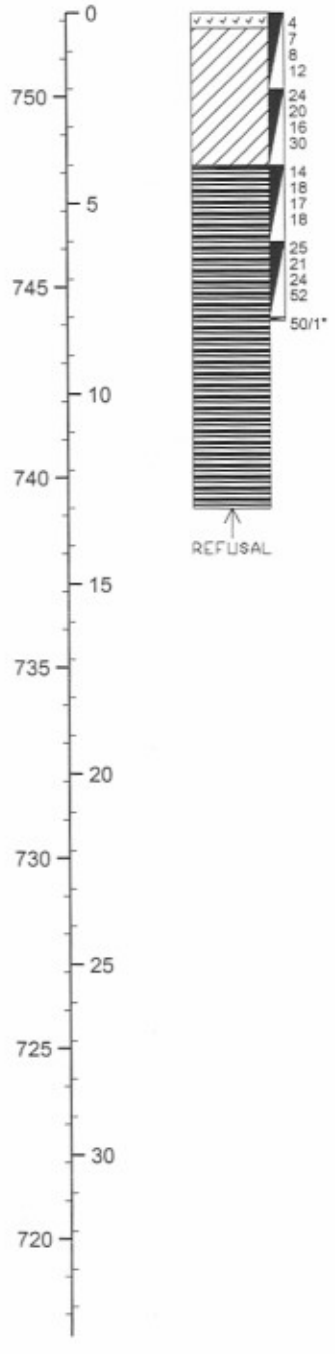
BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, NEW YORK 14031
(716) 759-7821 FAX: (716) 759-7823

TEST BORING LOG

JOB No.: 07-641 **BORING No.:** B-4

PROJECT: Preliminary Subsurface Investigation
Camp Road, Hamburg, New York

DRILLER:	L. Schroeder	**TYPE OF DRILL RIG:**	CME 550
SAMPLING METHODS:	ASTM D1586	**SIZE AND TYPE OF BIT:**	2 1/4" Hollow Stem Auger
DATE STARTED:	10/18/2007	**SURFACE ELEVATION (ft.):**	752.2
DATE COMPLETED:	10/18/2007	**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'- 2.0'	15	70	Topsoil (5") Brown, v. stiff CLAY, some Silt, little Gravel, tr. f/c Sand, tr. Shale, tr. Roots, mod. plastic, moist (CL)
S-2 : 2.0'- 4.0'	36	25	
S-3 : 4.0'- 6.0'	35	50	Dk. brown, dense sand to gravel sized WEATHERED SHALE, and Clay, some Silt, moist (WEATERED SHALE)
S-4 : 6.0'- 8.0'	45	60	...grade: little Clay, little Silt
S-5 : 8.0'- 8.1'	50+	0	No Recovery
			Depth to Bottom of Hole: 13.0 feet

Logged by: B. Smith

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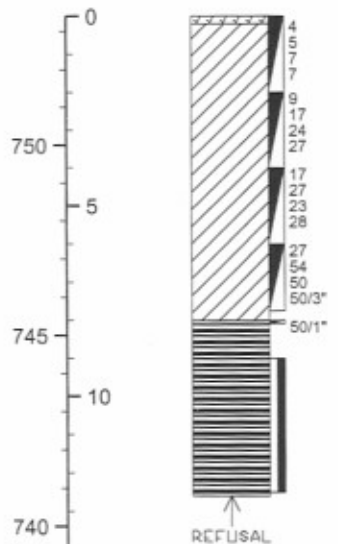
CLARENCE, NEW YORK 14031
(716) 759-7821 FAX: (716) 759-7823

TEST BORING LOG

JOB No.: 07-641 **BORING No.:** B-5

PROJECT: Preliminary Subsurface Investigation
Camp Road, Hamburg, New York

DRILLER:	L. Schroeder	**TYPE OF DRILL RIG:**	CME 550
SAMPLING METHODS:	ASTM D1586	**SIZE AND TYPE OF BIT:**	2 1/4" Hollow Stem Auger
DATE STARTED:	10/18/2007	**SURFACE ELEVATION (ft.):**	753.4
DATE COMPLETED:	10/18/2007	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
			Topsoil (2")
S-1 : 0.0'- 2.0'	12	75	Brown, stiff CLAY, some Silt, little Gravel, little f/c Sand, tr. Shale, tr. Roots, mod. plastic, moist (CL)
S-2 : 2.0'- 4.0'	41	20	...grade: hard
S-3 : 4.0'- 6.0'	50	60	...grade: tr. Gravel, tr. f/c Sand
S-4 : 6.0'- 7.8'	104	75	...grade: Dk. brown, and Shale, little Gravel, little f/c Sand
S-5 : 8.0'- 8.1'	50+	20	Dk. brown, v. dense and to gravel sized WEATHERED SHALE, tr. Clay, tr. Silt, moist (WEATERED SHALE)
			Depth to Bottom of Hole: 12.6 feet

Logged by: B. Smith

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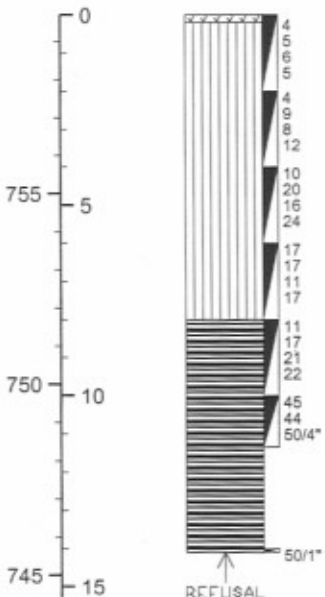
TEST BORING LOG

JOB No.: 07-641 **BORING No.:** B-6

PROJECT: Preliminary Subsurface Investigation
Camp Road, Hamburg, New York

DRILLER:	L. Schroeder	**TYPE OF DRILL RIG:**	CME 550
SAMPLING METHODS:	ASTM D1586	**SIZE AND TYPE OF BIT:**	2 1/4" Hollow Stem Auger
DATE STARTED:	10/18/2007	**SURFACE ELEVATION (ft.):**	759.7
DATE COMPLETED:	10/18/2007	**GROUNDWATER DEPTH (ft.):** (measured at completion unless indicated below)	None



Sample No. : Range	N-Value	% REC (RQD)	Soil and Rock Description / Remarks
			Topsoil (2")
S-1 : 0.0'- 2.0'	11	75	Brown, stiff SILT, some Clay, little Gravel, tr. f/c Sand, tr. Shale, Sl. plastic, moist (CL)
S-2 : 2.0'- 4.0'	17	60	...grade: v. stiff
S-3 : 4.0'- 6.0'	36	90	...grade: little Shale
S-4 : 6.0'- 8.0'	28	40	...grade: Dk. brown, some Shale
S-5 : 8.0'- 10.0'	38	60	Dk. brown, dense sand to gravel sized WEATHERED SHALE, tr. Clay, tr. Silt, moist (WEATERED SHALE)
S-6 : 10.0'- 11.3'	94	50	...grade: v. dense
S-7 : 14.0'- 14.1'	50+	0	No Recovery

Depth to Bottom of Hole: 14.1 feet

Logged by: B. Smith

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10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

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.

% 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.

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.

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.

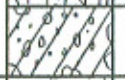
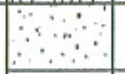
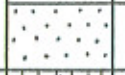
Remarks - Denotes exact depth of recovery and general documentation of drilling efforts.

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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BUFFALO DRILLING COMPANY. INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

APPENDIX C

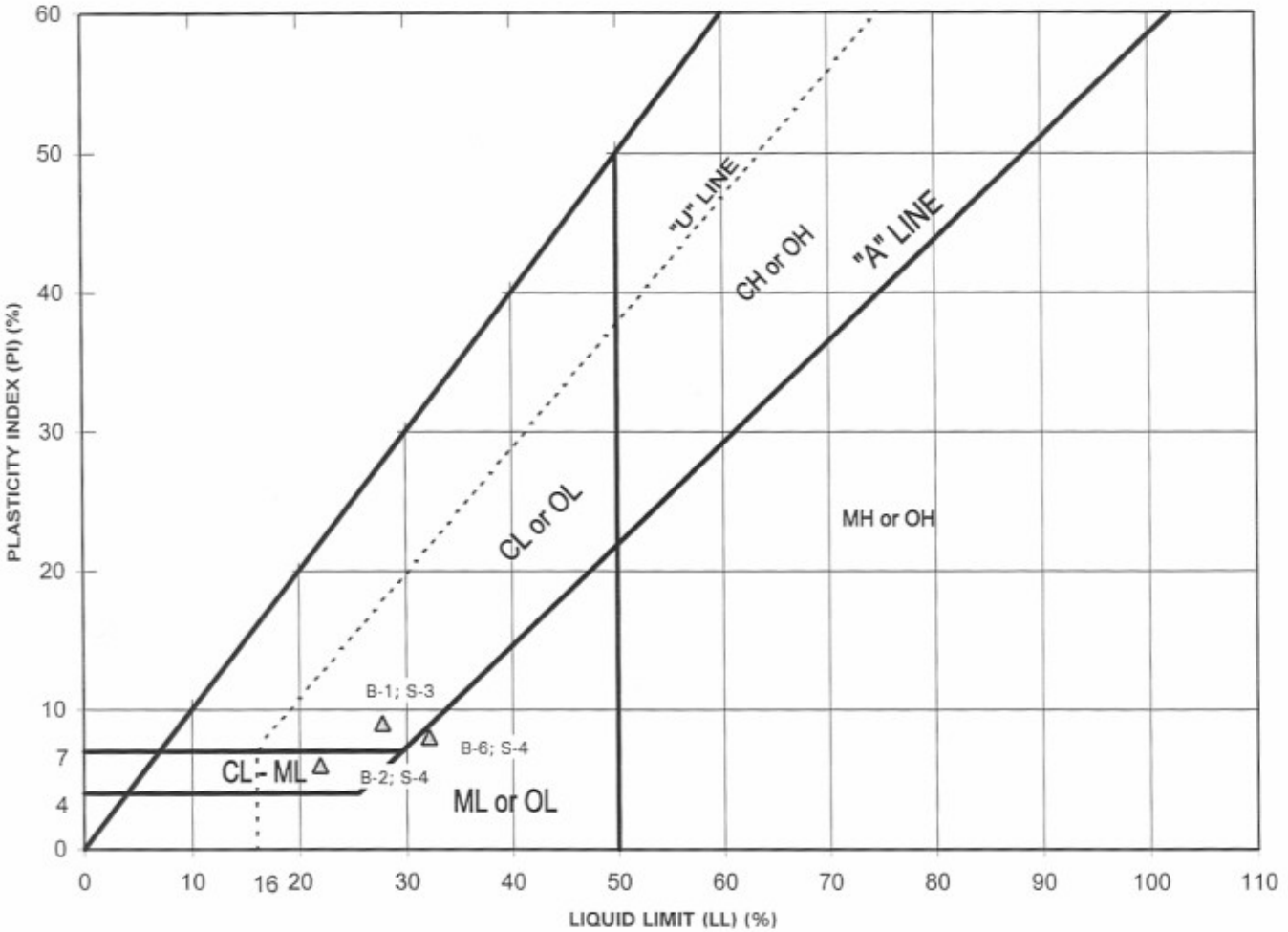
LABORATORY SOIL TEST RESULTS

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY, INC.
10440 MAIN ST.
CLARENCE, NY 14031
(716)759-7821
FAX (716)759-7823
e-mail: info@buffalodrilling.com
info@barronandassociatespc.com

Job No: 07-641
Project: Proposed Commercial Development
Camp Road, Hamburg, New York

Plasticity Chart

ASTM D4318 & D2487



Boring No.	Sample No.	Depth (ft.)	LL (%)	PL (%)	PI (%)
B-1	S-3	4-6	28	19	9
B-2	S-4	6-8	22	16	6
B-6	S-4	6-8	32	24	8

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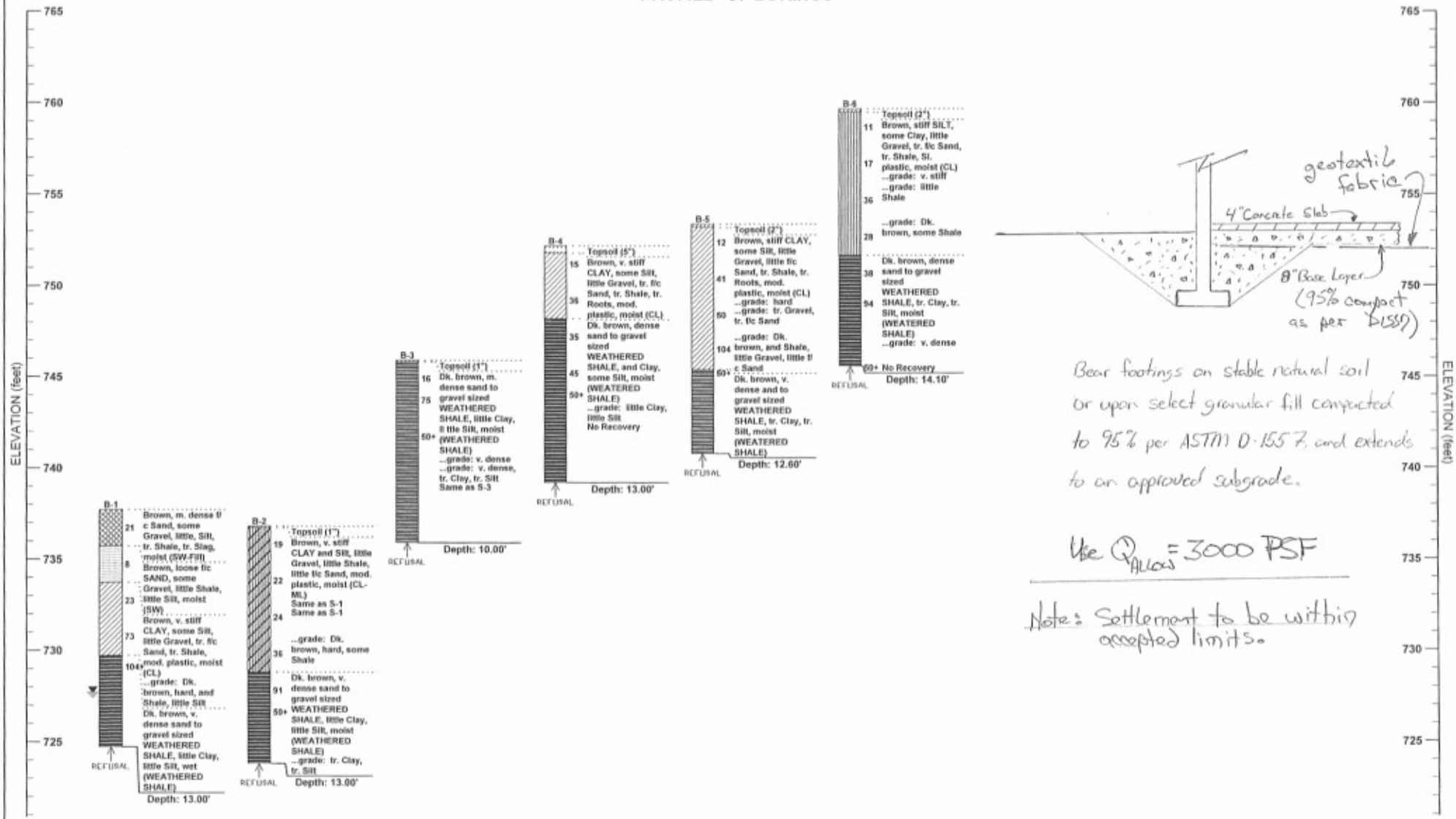
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

APPENDIX D

ENGINEERING NOTES AND SCHEMATICS

"PROFILE" OF BORINGS



Bear footings on stable natural soil or upon select granular fill compacted to 95% per ASTM D-1557, and extends to an approved subgrade.

Use Q_{ALLOW} = 3000 PSF

Note: Settlement to be within accepted limits.

Sandy fill | Well graded sand | Low plasticity clay | Weathered Shale | Topsoil | Silty low plasticity clay | Silt | Water table at boring completion | Drill rejection

BARRON & ASSOCIATES, P.C. & BUFFALO DRILLING COMPANY, INC. 10440 MAIN STREET, CLARENCE, NEW YORK 14031	Plotted: 10/30/2007 By: A. Camping	Job No.: 07-641
PROJECT: Preliminary Subsurface Investigation Camp Road, Hamburg, New York	Page 1 of 3	Figure No.: P-1

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BUFFALO DRILLING COMPANY, INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7621
FAX (716) 759-7623
e-mail: info@buffalodrilling.com
info@barronandassociatespc.com

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; $\gamma'_l = K_o \times \gamma' = 0.38 \times 70$ pcf $= 26.6$ pcf
- hydrostatic pressure with water level at the top of the grade at the wall; $\gamma_w = 62.4$ pcf
- equivalent fluid pressure; $\gamma_{eo} = \gamma'_l + \gamma_w = 26.6$ 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 = (12.0 psf / foot) x Foot Height of Wall (NYS, $S_{MS} \leq 0.25$ g)
(add to Static At Rest/Active = (16.0 psf / foot) x Foot Height of Wall (NYS, 0.25 g < S_{MS} < 0.5 g)
for unsaturated backfill case) = (17.5 psf / foot) x Foot Height of Wall (Northeastern NYS, 0.5 g < S_{MS} < 0.75 g)
[for underlying Loose to Medium Dense Cohesionless and/or Soft to Medium Stiff, Low to Moderate Plasticity Cohesive Soils (Site Class E); NYS Building Code c-2002/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] = 0.60/0.50 (on clean, rough, & sound bedrock/smooth bedrock)
Min. Factor of Safety Against Sliding = 1.5

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10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7621
FAX (716) 759-7623

B&A Job No.: 07-641
Client: Benderson Development LLC
Project: Proposed Retail Complex w/ Hotel
5220 Camp Rd. and Commerce Pl.
Hamburg, New York 14075

Pg. 3 of 3

Seismic Design Values For Soils In Hamburg, New York
(Zip Code = 14075)

Site Classification

n	8							
d_i	2	2	2	2	2	4	2	85
N_i	11	17	21	35	41	81	50	100

$$N_{ch} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{N_i}}$$; N_{ch} = 70.10 ⟶ Use Site Class C

Maximum Considered Earthquake Ground Motion

S_S = 0.29 *From USGS Probabilistic Hazard Lookup by Zipcode, 1996*
S_1 = 0.07 **analogous to Building Code of New York State Figs. 1615(1) and 1615(2)*

Values of Site Coefficients Fa and Fv

F_a = 1.20 *From Building Code of New York State Tables 1615.1.2(1) and 1615.1.2(2)*
F_v = 1.70

Maximum Considered Earthquake Spectral Response

S_{MS} = 0.35 $S_{MS} = F_a(S_s)$ *(Equation 16-16)*
S_{M1} = 0.11 $S_{M1} = F_v(S_1)$ *(Equation 16-17)*

Design Spectral Response Acceleration

S_{DS} = 0.23 $S_{DS} = \frac{2}{3}(S_{MS})$ *(Equation 16-18)*

S_{D1} = 0.08 $S_{D1} = \frac{2}{3}(S_{M1})$ *(Equation 16-19)*

Site Design Category

From Building Code of New York State Table 1616.3(1)

Seismic Use Group (SUG)	Seismic Design Category (SDC)
I	B
II	B
III	C

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BUFFALO DRILLING COMPANY. INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

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.

BARRON & ASSOCIATES, P.C. &
BUFFALO DRILLING COMPANY. INC.
10440 MAIN STREET
CLARENCE, N.Y. 14031
(716) 759-7821
FAX (716) 759-7823

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 commercial structures 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 preliminary report has been prepared for the exclusive use of Benderson Development Company LLC, their client and their designated design representatives, for specific application to the construction of retail complex and hotel on at 5220 Camp Road and unaddressed parcels on Commerce Place in the Town of Hamburg, New York and in accordance with generally accepted geotechnical engineering practice. No other warranty, expressed or implied, is made.