GLYNN GROUP
ENGINEERING & ARCHITECTURE, PLLC

Civil • Geotechnical
Structural • Architecture
Material Testing • Consulting

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

Prepared for:
Elizabeth Buscaglia, RA
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Buffalo, New York 14202

Prepared by:
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August 4, 2020

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1.0 INTRODUCTION

1.1 SCOPE

This report provides subsurface exploration data, geotechnical recommendations and foundation design recommendations for the proposed construction of the 18 Mile Creek Apartments in the Town of Hamburg, New York. A geotechnical report was previously issued by Empire Geo-Services, Inc. (Empire) in 2017, which recommended supporting the apartments on deep foundations due to the high volume of existing fill materials encountered throughout the site. This report has been prepared to provide a shallow foundation alternative. Specifically, Glynn Group Engineering & Architecture, PLLC (GGEA) has provided the following scope of services:

1. Reviewed 2016 SJB soil borings and associated 2017 Empire Geotechnical Evaluation Report.
2. Hosted project meeting with owner and client to discuss subsurface conditions and recommended foundation scheme.
3. Performed site visit to examine existing conditions, assess the potential impact on foundation construction and stake three (3) supplemental soil boring locations.
4. Mobilized drilling subcontractor, Earth Dimensions, Inc. (EDI) with truck mounted drill rig and support crew to perform supplemental SPT soil sampling at three (3) locations in accordance with ASTM D1586 "Standard method for Penetration Test and Split-Barrel Sampling of Soils"
5. Provided supplemental soil boring logs, prepared by EDI, to include SPT data, N values, soil classification, refusal depth and groundwater conditions.
6. Performed laboratory review of recovered soil samples.
7. Prepared a geotechnical engineering/foundation concept report to address shallow foundation design recommendations including allowable bearing capacity, overexcavation, Engineered Fill specifications, subsurface profiles and cross-sections, construction recommendations, slab on grade recommendations, pavement recommendations, quality assurance specifications and foundation design geometry.

1.2 CONTRACT

GGEA performed this study in accordance with an initial written proposal to Ms. Beth Buscaglia, RA dated April 29, 2020 and a secondary proposal for additional exploration dated June 8, 2020. GGEA received signed contracts on May 4, 2020 and June 10, 2020, respectively. All services provided by GGEA are subject to the Standard Terms and Conditions included in the April 29, 2020 geotechnical proposal.

1.3 EXCLUSIONS

The project efforts exercised by GGEA include geotechnical analysis, design recommendations and the preparation of this report. The scope of this report specifically excludes review of historical site use, in particular, environmental or pollution related concerns.

2.0 PROJECT BACKGROUND

The project site is located on the west side of South Buffalo Street at the intersection with Eighteen Mile Creek. Currently owned by the Town of Hamburg, the site encompasses approximately 1.3 acres and is identified on Erie County GIS as SBL #196.09-5-31 (refer to the Project Location Plan included in Appendix C). The site is bound by an unnamed roadway/driveway to the north, South Buffalo Street to the east and Eighteen Mile Creek to the south. Formerly used as a construction and demolition dump by the Town, a significant quantity of existing fill is located throughout the site, for which the topography has been graded to generally follow to contours of the unnamed roadway/driveway to the north. The site decreases in elevation east to west from approximately 804 feet to 780 feet.

The proposed construction is to consist of a multi-unit two to three story apartment building with staggered first floor elevations ranging from 797.0 feet at the east end to 785.7 feet at the west end (refer to the subsurface exploration plan included in Appendix C). Considering the substantial depth of existing fill material encountered throughout the site, the 2017 Empire report focused on the use of a deep foundation system to support the proposed building, along with a pile supported structural slab. However, it is GGEA's opinion the proposed building can be supported on a reinforced thickened concrete slab shallow foundation system, pending subgrade preparation is performed in accordance with the recommendations of this report.

3.0 FIELD INVESTIGATION

3.1 METHODOLOGY

The subsurface exploration consisted of eight (8) SPT soil borings performed by SJB in 2016 and three (3) SPT soil borings performed by EDI in 2020. In the 2016 subsurface exploration, SJB boring B-7 encountered approximately 10.5 feet of what was described as peat from a depth of approximately 14.0 feet to 24.5 feet. Considering the SJB samples were no longer available for review and laboratory testing was not included in the 2017 Empire report, a supplemental subsurface exploration was performed by EDI in 2020 to further assess the extent of the peat material in the vicinity of boring B-7.

Both the 2016 and 2020 soil boring and sampling operations were performed using hollow stem augers to advance through overburden materials in accordance with the Standard Penetration Test Method ASTM D1586. Resistance values, or blow counts, were recorded for each six-inch advancement of a twenty-four inch long, two inch diameter split spoon sampler. "N" values were calculated by totaling the resistance values for the 6/12 and 12/18 inch intervals. All data recorded during drilling operations can be found on the subsurface exploration logs included in Appendix A.

Retrieved soil samples were logged and visually classified by geologists at SJB and EDI in accordance with the ASEE System of Definition for Visual Identification of Soils (Burmister Classification System) and ASTM D-2488 "Standard Practice for Description and Identification of Soils (Visual – Manual Procedure)". Soil samples recovered from the EDI subsurface exploration were visually examined by GGEA to verify USCS classifications in accordance with ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)", examine the composition of existing fill materials and assess the organic content of the encountered peat. Soil samples recovered from the SJB subsurface exploration were discarded by others and are no longer available for review.

3.2 SUBSURFACE CONDITIONS

The soil borings encountered existing fill materials at all locations ranging in depth from a minimum of 10.0 feet at boring B-3 to a maximum of 24.8 feet at boring B-8. The existing fill materials were found to be highly variable in composition and range from soft silty clay (CL-ML, N = 3) to concrete rubble (N > 50). The heterogeneous composition of the fill materials is indicative of placement in an uncontrolled fashion, as expected given the former site use as a construction and demolition dump.

Beneath the existing fill materials, native soils composed primarily of firm (N=5) to stiff (N = 12) lean clay (CL) were encountered at borings B-2, B-3, B-5, B-6, B-8, B-7A, B-7B and B-7C. As previously discussed, boring B-7 encountered a significant deposit of peat extending from a depth of 14.0 feet to bedrock at a depth of 24.5 feet. The peat is described by SJB as "black organic material, moist-wet, loose, PT, possible fill". It is unknown if this peat material is indigenous or an extension of the buried fill material.

However, supplemental subsurface exploration in the vicinity of B-7 yielded minimum quantities of peat, with only a 1.0 foot thick deposit encountered at boring B-7B from 15.5 to 16.5 feet and a 1.0 foot thick deposit encountered at boring B-7C from 15.0 – 16.0 feet. Boring B-7A was drilled within +/- 3 feet of boring B-7 and encountered no peat. While the organic material/peat encountered at boring B-7 during the SJB exploration is believed to be valid, the as drilled location may have varied somewhat from the location identified on the boring plan. Nonetheless, considering the minimal peat encountered at the EDI supplemental exploration locations, the lateral extent of the 10.5 foot thick organic/peat deposit encountered by SJB at B-7 is presumed to be minimal. Also, considering the boring plan identifies B-7 at the eastern edge of Unit #1, it may be possible that the organic material/peat encountered at B-7 is actually located outside of the building footprint, pending the as-drilled location has varied from the plan location. Regardless, it is known for certain from EDI borings B-7B and B-7C that a small deposit of peat, on the order of 1.0 foot thick, exists beneath Unit #1 and Unit #2 at a depth of approximately 15 feet.

Beneath the native soils, weathered shale rock was encountered at most of the boring locations followed by siltstone bedrock of the Upper Devonian West Falls Group.

It is GGEA's opinion the extent of the explorations were sufficient to accurately characterize the subsurface conditions and provide information necessary for the preparation of this report. The soil borings portray the subsurface conditions encountered at the soil boring locations at the time of the exploration. The stratification lines shown on the soil boring logs are approximate, whereas in-situ the changes between strata may be more gradual. Specific subsurface conditions can be found on the soil boring logs included in Appendix A and a geologic cross-section of existing conditions has been provided in Appendix D.

3.3 GROUNDWATER

Upon the completion of drilling efforts, groundwater was measured in the augers at a depth of 5.0 feet below existing grade at SJB boring B-5, 18.0 feet below existing grade at EDI boring B-7A and 17.0 feet below existing grade at EDI boring B-7B. Groundwater was not encountered upon the completion of overburden soil sampling at the remaining boring locations. Groundwater monitoring wells or piezometers were not included in the SJB or EDI subsurface exploration scope, therefore accurate groundwater elevation data was not obtained. However, considering the southern portion of the site is bound by

Eighteen Mile Creek and the elevation difference between existing grade and the creek bed of +/- 25 feet, the stabilized groundwater elevation is estimated to be well below the proposed construction depth and likely within a few feet of the rock surface. Notwithstanding, perched groundwater should be anticipated within the existing fill materials, which likely accounts for the measured groundwater depth of 5.0 feet at SJB boring B-5. The cohesive native soil below and adjacent to the existing fill material exhibits a low permeability and acts as an aquitard, likely resulting in the accumulation of perched groundwater within existing granular fill materials after storm events and during seasonally wet periods.

4.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

4.1 MONOLITHIC THICKEND SLAB FOUNDATION

Given the expanse of existing fill materials encountered throughout the site, conventional foundation construction would dictate the complete removal of existing fill materials and subsequent replacement with Engineered Fill to allow for shallow foundation construction, or the construction of a deep foundation system installed through the existing fill to provide for end bearing within the siltstone bedrock. However, based on past experience, a shallow foundation system can be installed with only minimal surficial removal of existing fill materials, resulting in a foundation system that is economically feasible and structurally competent. While this can be accomplished using spread footings and frost walls, considering the proposed apartments will not have basements, GGEA recommends using a monolithic slab foundation design, such that the floor slab serves as the foundation for the building with integrated thickened perimeter haunches and interior footings at load bearing areas. GGEA provides design and construction recommendations as follows:

1. Remove existing fill materials as necessary to provide for a minimum 2.0 feet of overexcavation beneath the thickened haunch/footing portion of the slab. Overexcavation shall be performed to a uniform depth throughout the entirety of the foundation footprint plus 2.0 feet beyond, such that the elevation achieved by the 2.0 foot overexcavation depth is held consistent throughout the entirety of the building footprint. This will result in a significantly greater thickness of Engineered Fill (Select Structural Fill), on the order of 3.5 feet, beneath general interior slab areas. Refer to the Proposed Subsurface Cross-Section included in Appendix E and the Foundation Details included in Appendix F (note the thickened haunch/footing is depicted as 2.0 feet thick x 3.0 feet wide – dimensions will likely change once loads are established and the design is finalized).
2. Remove any encountered perched groundwater to a minimum depth of 2.0 feet below the exposed subgrade using sumps and suction pumps.
3. Thoroughly compact the exposed existing fill subgrade using a reversible vibratory plate tamper (Bomag BPR 50/55 D or equivalent), boom operated hydraulic compactor (Ho-Pac or equivalent), or a smooth drum vibratory roller having an effective force of at least 600 pounds per linear inch of roller width. Any area that responds poorly or exhibits significant settlement should be overexcavated and replaced with Structural Fill. This process should be observed and directed by a qualified geotechnical engineer or representative.
4. Note that separation geotextile between existing fill subgrade soils and overlying Select Structural Fill is not required for design, but is suggested if the granular base is to be used as a working surface during construction. When granular base is placed directly over fine grained

soils, repeated construction traffic may result in rutting and the migration of fines into the stone over time. Any granular base that becomes contaminated with soil during construction should be removed and replaced prior to pouring concrete. GGEA recommends using a separation geotextile such as US Fabrics US 250 or equivalent to limit the potential for soil contamination of the granular base.

5. Install Select Structural Fill granular base as necessary to achieve the design concrete base elevation. The Select Structural Fill should comply with the specifications provided in Appendix G. Compaction to 95 % of modified proctor within 2 % of optimum moisture content is required for individual lifts, each of which should not exceed 9 inches in thickness. Skill will be required on the part of the contractor to construct and shape the granular base as necessary to allow for a monolithic concrete slab pour.
6. Install subsurface utilities.
7. Install reinforcing steel and concrete. The slab on grade should be designed for a subgrade reaction modulus (k) not to exceed 200 pci.
8. Install perimeter insulation to provide frost protection in accordance with Section 6.1 of ASCE-32.
9. Specification of the concrete finish technique and the installation of a vapor barrier are at the discretion of the architect.
10. Proper joint spacing and reinforcing steel spacing/placement is critical to the long term performance of slab. The Portland Cement Association recommends joint spacing in feet should be two to three times the slab thickness in inches.

Upon proper installation of the Select Structural Fill granular base, the haunch/footing portion of the thickened slab should be designed for an allowable bearing capacity not to exceed 2,000 psf. As identified by the Boussinesq pressure distribution calculations included in Appendix H and presented on the Foundation Detail included in Appendix F, a foundation contact pressure of 2,000 psf will be reduced to 800 psf at a depth of approximately 4.2 feet below the foundation bearing elevation and 400 psf at a depth of 7.7 feet below the foundation bearing elevation.

Based on encountered N values, USCS classification, pocket penetrometer analysis of recovered samples and standard bearing capacity equations, GGEA has estimated the allowable bearing capacity of existing fill materials at 2.0 foot intervals throughout the full depth of select soil boring locations. The results, which are presented in both table and graph form in Appendix I, identify a minimum allowable bearing capacity of 800 psf at a depth of approximately 14 feet in the vicinity of borings B-7B and B-7C. However, this is well below the influence depth of the thickened slab foundation system. As identified by Boussinesq pressure diagrams, the majority of the influence zone for the pressure bulb imparted from the proposed foundation extends to a depth of only 8.0 feet. The allowable bearing capacity calculated within 8.0 feet of existing grade at each boring location exceeds the vertical pressure distributed from a 2,000 psf footing contact pressure, as determined by Boussinesq analysis, therefore providing minimal potential settlement. The pressure increase at a depth of 14 feet will be well below 800 psf. Furthermore, the existing peat has been buried for several years under an overburden load of greater than 1,000 psf. Loading from a new structure at the surface will have minimal impact on a deep organic deposit such as the encountered peat.

4.2 FLEXIBLE PAVEMENT

Flexible asphalt pavement parking areas should be designed and constructed in accordance with the following recommendations:

1. Remove topsoil and any poor quality existing fill or subsoil.
2. Compact the exposed subgrade (existing fill) thoroughly with a smooth drum vibratory roller to produce a uniform density throughout.
3. After the exposed subgrade is thoroughly densified, proof roll with a fully loaded 10-wheel dump truck weighing at least 30 tons or a smooth drum roller having an effective force of at least 600 pounds per linear inch of roller width. Any area exhibiting weaving, yielding, rutting or boiling should be reworked and compacted to produce an acceptable response *or* over excavated and replaced with Structural Fill. The depth of the undercut and type of soil fill will depend on the soil material encountered, weather conditions and the bearing conditions at the base of the undercut. The top surface of the subgrade should be pitched to drain to prevent ponding of stormwater.
4. Install a granular base layer composed of properly placed and compacted Select Structural Fill. Compact the Select Structural Fill to 95 % of modified proctor (ASTM D-1557).
5. Special attention should be directed at the compaction of Select Structural Fill around catch basins and associated piping. Failure to properly compact the stone will likely result in pavement settlement around the catch basins and ponding of water.
6. Construct a flexible pavement system consisting of asphalt binder followed by asphalt top. GGEA provides recommended pavement sections as follows:

Light Duty (primarily car traffic)

10 inches Select Structural Fill – Compacted to 95 % Modified Proctor
2.5 inches of asphalt concrete binder (2008 NYSDOT item number 403.138902)
1.0 inch of asphalt concrete top (2008 NYSDOT item number 403.178902 or 403.198902)

Heavy Duty (mixed truck and car traffic)

12 inches Select Structural Fill – Compacted to 95 % Modified Proctor
3.0 inches of asphalt concrete binder (2008 NYSDOT item number 403.138902)
1.5 inch of asphalt concrete top (2008 NYSDOT item number 403.178902 or 403.198902)

The soil borings typically identify compact to dense granular fill materials within a few feet of the existing ground surface. However, although not anticipated, in the event cohesive fill soils are encountered at the pavement subgrade elevation, they may become soft if exposed to moisture, which may result in contamination of the Select Structural Fill granular base over time through repeated loading. The installation of separation and stabilization geotextile should be considered to improve the pavement service life in the event cohesive fill soil is encountered at the pavement subgrade elevation. GGEA recommends a woven geotextile such as US Fabrics US 250 (or equivalent).

In the event there is a prolonged time period between binder and top placement, such that daily activities occur over the binder surface, the surface must be power washed, not just swept, and a tack coat should be applied prior to installation of the top course. In addition, any yielding area of pavement binder should be removed and replaced prior to application of the top course.

4.3 EXCAVATION and BACKFILL

The subsurface materials encountered within the construction depth of this project consist primarily of compact existing granular fill. Excavation through this material can be accomplished with moderate effort from standard excavation equipment.

The soils encountered at this site should be classified by an OSHA competent person in accordance with 29 CFR, Part 1926, OSHA Subpart P, "Excavations and Trenches" prior to and during excavation. From the testing and exploration program, GGEA estimates the site soils within the construction depth of this project can be classified as Type C under the OSHA classification guidelines. However, this classification may change depending on other site criteria and moisture conditions at the time of construction. An OSHA competent person should judge the potential need for excavation bracing and excavation geometry in the field.

Utility excavations can be accomplished with minimal effort, however a trench box will be required for excavations that cannot maintain OSHA Type C geometry (1.0 vertical : 1.5 horizontal). The trench box shall extend a minimum of 18 inches above the vertical sidewall portion of the excavation. Perched groundwater should be anticipated for excavations below a depth of 5.0 feet, which if necessary can be mitigated using suction pumps.

Foundations should be backfilled with properly placed and compacted Select Structural Fill in structurally loaded areas. Excavated existing fill material may be repurposed as common fill and used in non-structural lawn areas. Backfill should be placed prior to applying load.

In place density testing should be performed at a rate of one test per 30 feet of footing, 50 feet of trench or 900 square feet of area per lift beneath the interior slab, one test per 50 feet of trench or 2500 square feet of area per lift within new parking areas, and at a minimum of one test per day of placement. Specifications regarding placement of Select Structural Fill are included in Appendix G. Compacted Select Structural Fill will provide for the following design properties:

moist unit weight = 145 pcf

friction angle = 40 degrees

Rankine theory
- at rest pressure coefficient (Ko) = 0.36
- active pressure coefficient (Ka) = 0.22
- passive pressure coefficient (Kp) = 4.60

2015 IBC Table 1610.1 Lateral Soil Load
- at rest pressure = 60 psf/ft of depth
- active pressure = 30 psf/ft of depth

4.4 EXPANSIVE SOIL MITIGATION

Some cohesive soils undergo volumetric change (shrinkage and swelling) with changes in moisture content and degree of saturation, which are commonly referred to as expansive soils. This condition primarily occurs with fat clay (CH) soil, which is a cohesive soil that exhibits a liquid limit of 50 or greater. The liquid limit is the water content, in percent, of a soil that defines the boundary between the plastic and viscous fluid states.

Although laboratory testing was not performed on recovered soil samples, expansive clay is typically not a concern in the Hamburg area. The expansion potential of cohesive soil encountered within the existing fill materials is anticipated to be minimal based on visual review of recovered EDI boring samples.

4.5 LIQUEFACTION MITIGATION

Liquefaction is the process where saturated cohesionless (granular) soils, specifically, loose sands and silts, transform from a solid into a liquid as a result of an increase in the pore water pressure caused by repeated disturbance such as experienced during seismic events. Liquefaction results in an immediate loss of shear strength and bearing capacity, causing total and differential settling of the overlying structure.

Although low N values were recorded at some depths within the existing fill material, the heterogeneous composition of concrete debris, cohesive soil, sand, gravel and silt provides a low potential for liquefaction. Furthermore, the soils were typically found to have a low moisture content and lack the saturation necessary to facilitate liquefaction.

4.6 SETTLEMENT

Foundations designed and constructed in accordance with the recommendations of this report will provide for estimated total settlement of less than 1.0 inch. Differential settlement is estimated to be less than 0.5 inches. Settlement within the existing fill materials is estimated to be immediate and will correspond to the application of load, whereas settlement within the existing peat strata will result from long term consolidation. However, proper construction of the Select Structural Fill granular base and overlying monolithic slab foundation in accordance with the recommendations of this report should serve to bridge any peat related consolidation settlement.

4.7 SEISMIC SITE CLASS AND DESIGN CATEGORY

In accordance with Section 1613 (Earthquake Loads) of the 2020 NYS Building Code, GGEA has classified the site as Seismic **Site Class D.** The site classification is based on the summation of N values for the upper 100 feet of soil in accordance with ASCE 7.

The design spectral response accelerations have been calculated as 0.208 g for short period design spectral response acceleration (S_{DS}) and 0.093 g for one second design spectral response acceleration (S_{D1}). In accordance with tables 1613.2.5(1) and 1613.2.5(2), using Risk Category II, the site is classified as Seismic **Design Category B.** See Appendix E for reference.

4.8 GENERAL CONSTRUCTION RECOMMENDATIONS

GGEA provides general construction recommendations as follows:

1. No fill material or concrete shall be placed in water, over saturated subgrade or over frozen subgrade. The foundation subgrade should be pitched to drain and provided with a small sump, located outside of the building footprint, to prevent the accumulation of stormwater in the footing excavation and subsequent deterioration of the foundation subgrade during construction.
2. Upon the completion of overexcavation within the proposed areas of development, the subgrade shall be shaped with a dozer and sealed with a smooth drum roller to promote positive drainage and minimize rutting, erosion and loss of bearing at the surface.
3. Upon the completion of overexcavation bearing grades shall be compacted as previously discussed. Proper construction practice will assure development of the anticipated bearing strength and reduce settlement potential. A qualified geotechnical engineer should be retained to examine the exposed subgrade.
4. Backfill foundations prior to applying load.
5. Foundation drains are not required for thickened slab foundations.
6. If additional undercut is necessary beyond the prescribed depth, the excavation bottom should be graded to a uniform elevation and gradually sloped or stepped back to design elevation. Undercut "pockets" should be avoided.
7. Conformance to OSHA standards is mandatory during excavation and trench work.
8. Topsoil and exposed organic soils should be removed from all load bearing areas.
9. Footing sizes should be proportioned to create nearly equal contact pressures under all foundations, which will serve to minimize differential settlement.
10. Foundation bearing grades should not be allowed to freeze prior to or after placement of concrete. Insulating blankets should be used to cover bearing grades plus a one foot perimeter outside of the forms or completed footings until backfill is placed.
11. If construction occurs during winter months, care should be exercised not to place or compact frozen Select Structural Fill.
12. The fill placed at grade elevation should be sloped to drain away from the foundation walls to eliminate the potential for standing water to accumulate along the foundation.
13. During the excavation process, if encountered soils or moisture contents are found to be different than those identified on the soil boring logs and represented within this report, the allowable bearing capacity and associated design recommendations may need to be reevaluated by a qualified geotechnical engineer to account for varying bearing capacity.

4.9 CONCLUSION

This completes the geotechnical report for the proposed development of the 18 Mile Creek Apartments site in the Town of Hamburg, New York. This report has been prepared based on the encountered subsurface conditions at the soil boring locations and pertinent data supplied by Beth Buscaglia, RA. Alteration of the plans, including relocation of the proposed building may serve to invalidate this report. Please contact GGEA if major project changes are made or if encountered soils differ from conditions noted herein.

Sincerely,

STATE OF NEW YORK
MARK W. GLYNN
LICENSE NO. 057491
PROFESSIONAL ENGINEER

G. Edward Lover, P.G.
Senior Geologist

Mark W. Glynn, P.E.
Consulting Engineer, Principal

/gel

Appendix A

Subsurface Exploration Logs

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

EARTH DIMENSIONS, INC.

Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • EDI@earthdimensions.com

9F20 HOLE NO. B-7A-20 SURF. ELEVATION _

PROJECT 18 Mile Creek Apartments LOCATION Northwest Quadrant of

Village of Hamburg, Erie County, NY South Buffalo Street and 18 Mile Creek

CLIENT Glynn Group Eningeering & Architecture, PLLC DATE STARTED 06/26/20 COMPLETED 06/26/20

DEPTH IN FT | BLOWS ON SAMPLER

SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WATER TABLE AND REMARKS
1	8						Mostly asphalt pavement, brick fragment, and gravel fill.	Mostly asphalt pavement, brick fragment, and gravel fill to 1.0 feet over mostly brick fragment fill to 2.5 feet over mostly asphalt remnant fill to 4.2 feet over slity soil fill with little to some silt, trace to little sand and gravel to 9.6 feet over clayey soil fill with trace to little sand and gravel, trace brick fragments to 13.5 feet over sandy soil fill with little silt, trace clay to 16.0 feet over silty soil fill with little to some gravel, little sand, trace clay, slag, ash, brick fragments, and organic matter to 16.6 feet over reinforced concrete to 17.8 feet over clayey slack water sediment with trace sand and organic matter to 25.0 feet over clayey slack water sediment with trace sand to 25.4 feet over apparent shale bedrock to end of boring.
12		16						
			50/3				1.0	
							Mostly brick fragment fill.	
2	20						2.5	
8		14			21		Mostly asphalt remnant fill.	
			7				4.2	
				12				
3	5						Moist brownish gray (SAND-SILT-CLAY) fill with 5 to 15% gravel, little to some clay, trace to little sand, trace organic matter, stiff, massive soil structure, (ML-CL) tending toward (CL).	
5 21		5			10			
			5					
				7				
4	4							
18		6			12			
			6					
				8				
5	2							
10		2			9			
			7				9.6	
				3				
10 6	2						Wet to extremely moist grayish brown (SAND-SILT-CLAY) fill with 5 to 15% gravel, some clay, trace to little sand, trace brick fragments and organic matter, soft, massive soil structure, (CL).	
10		1			3			
			2					
				3				
7	2							
22		2			5			
			3				13.5	
				4				
8	10						Extremely moist grayish brown (SILTY-SAND) fill with little silt, trace clay, loose, massive soil structure, (SM).	
15 20		15			35			
			20				16.0	
				12				
9	6						Moist brown, gray, dark brown, and brownish gray mixed gravelly (SANDY-SILT) fill with 15 to 25% gravel, little sand, trace clay, slag, ash, brick fragments, and organic matter, dense, massive soil structure, (SM).	
4		50/2						
10	3							
22		3			8			
			5					
20				9			16.6	

▼ Water level at 18.0 feet below ground surface at completion.

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Brian Bartron, (cns)

EARTH DIMENSIONS, INC.

Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

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9F20 HOLE NO. B-7A-20 SURF. ELEVATION –

PROJECT 18 Mile Creek Apartments LOCATION Northwest Quadrant of

Village of Hamburg, Erie County, NY South Buffalo Street and 18 Mile Creek

CLIENT Glynn Group Engineering & Architecture, PLLC DATE STARTED 06/26/20 COMPLETED 06/26/20

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WATER TABLE AND REMARKS
	11	2				7		Reinforced concrete. 17.8	
	24		3					Extremely moist brownish gray (CLAYEY-SILT) with some clay, trace sand and organic matter, stiff to firm, weakly thinly laminated with very thin coarse silt lenses, (CL).	
				4					
					6				
								grades downward to 25.0	
25	12	16						Extremely moist distinctly mottled olive gray (SAND-SILT-CLAY) with trace sand, very stiff, very weakly thinly laminated, (CL). 25.4	
	6		100/3					Gray shale stone fragments, very soft to soft. 25.8	
								Boring completed at 25.8 feet.	
30									
35									
40									

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Brian Bartron, (cns)

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CLIENT Glynn Group Eningeering & Architecture, PLLC DATE STARTED 06/26/20 COMPLETED 06/26/20

DEPTH IN FT	SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WATER TABLE AND REMARKS
	1	18						Mostly asphalt with trace concrete and brick fragment fill.	Mostly asphalt with trace concrete and brick fragments to 2.0 feet over mostly brick fragment and concrete debris fill to 4.0 feet over silty soil fill with little sand, clay, and gravel, trace brick fragments to 6.0 feet over clayey soil fill with trace sand and asphalt remnants to 8.0 feet over clayey soil fill with trace to little sand, trace gravel to 10.0 feet over clayey soil fill with little organic matter, trace gravel and fabric to 13.5 feet over silty soil fill with little gravel and brick fragments, trace ash, cinders, slag, and wood fiber to 14.0 feet over cobble fill to 14.5 feet over mostly ash and cinder fill with trace brick fragments to 15.5 feet over peat to 16.5 feet over silty slack water sediment with trace to little clay, trace sand and organic matter to 19.5 feet over clayey slack water sediment with trace sand to 20.0 feet over silty slack water sediment with little to some clay, trace to little sand to 22.0 feet over water sorted and deposited sand with some gravel, little silt, trace clay to 23.3 feet over apparent shale bedrock to spoon refusal. Note: Advanced bore hole with 2 1/4" ID x 6" OD hollow stem auger casing with continuous split spoon sampling to spoon refusal at 23.8 feet. Bore hole was backfilled with cuttings to ground surface upon completion.
	16		17			28			
				11					
					13				
	2	22							
	8		100/5						
	3	3							
5	20		4			10			
				6					
					6				
	4	4							
	22		6			17			
				11					
					9				
	5	2							
	17		2			5			
				3					
					3				
10	6	2							
	20		2			4			
				2					
					4				
	7	2							
	13		3			6			
				3					
					8				
	8	38							
15	15		12			22			
				10					
					11				
	9	2							
	21		3			6			
				3					
					4				
	10	1							
	24		2			6			
				4					
20					7			See next sheet	

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Brian Bartron, (cns)

EARTH DIMENSIONS, INC.

Soil and Hydrogeologic Investigations • Wetland Delineations

1091 Jamison Road • Elma, NY 14059

(716) 655-1717 • EDI@earthdimensions.com

9F20 HOLE NO. B-7B-20 SURF. ELEVATION –

PROJECT 18 Mile Creek Apartments LOCATION Northwest Quadrant of

Village of Hamburg, Erie County, NY South Buffalo Street and 18 Mile Creek

CLIENT Glynn Group Eningeering & Architecture, PLLC DATE STARTED 06/26/20 COMPLETED 06/26/20

DEPTH IN FT	SN / REC	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WATER TABLE AND REMARKS
	11	2						Mostly ash and cinders fill with trace brick fragments.	Note: No water in boring until taking sample number 12. Water at 17.0 feet below ground surface upon completion.
	24		4			9		15.5	
				5				Peat.	
					5			16.5	
	12	6						Moist olive gray (CLAYEY-SILT) with trace to little clay, trace sand and organic matter, firm, weakly thinly laminated (ML-CL) tending toward (CL).	
	20		5			34		19.5	
				29				Moist distinctly mottled gray (SILTY-CLAY) with trace gravel, stiff, weakly thinly laminated, (CL).	
					50/4			grades downward to 20.0	
25								Extremely moist faintly mottled gray (SAND-SILT-CLAY) with little to some clay, trace to little gravel, stiff, weakly thinly laminated, (ML-CL).	
								22.0	
30								Wet grayish brown gravelly (SILTY-SAND) with 20 to 40% gravel and flat sided shale stone fragments, little silt, trace clay, compact, stratified, (SM) tending toward (SM), (GM).	
								clear transition to 23.3	
								Gray shale stone fragments, very soft to soft.	
35								23.8	
								Boring completed at 23.8 feet.	
40									

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Brian Bartron, (cns)

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1091 Jamison Road • Elma, NY 14059

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9F20 HOLE NO. B-7C-20 SURF. ELEVATION –

PROJECT 18 Mile Creek Apartments LOCATION Northwest Quadrant of

Village of Hamburg, Erie County, NY South Buffalo Street and 18 Mile Creek

CLIENT Glynn Group Eningeering & Architecture, PLLC DATE STARTED 06/26/20 COMPLETED 06/26/20

DEPTH IN FT | BLOWS ON SAMPLER

SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WATER TABLE AND REMARKS
1	11							
20		23			47		Mostly asphalt remnant fill with trace concrete debris and brick fragments.	
			24				1.8	
				5/50			Mostly brick fragment fill.	
2	16						2.4	
18		9			20		Moist grayish brown (SAND-SILT-CLAY) fill with 5 to 10% gravel, little to some clay, trace brick fragments, concrete debris, and asphalt remnants, very stiff, massive soil structure, (ML-CL).	
			11				3.5	
				13			Mostly slag and cinder fill.	
3	5						4.0	
10		6			11		Gravel, brick fragment, silt, sand, and clay fill.	
5			5				6.4	
				6			Moist grayish brown (CLAYEY-SILT) with 3 to 7% gravel, some clay, trace sand and brick fragments, stiff, massive soil structure, (CL).	
4	4						8.0	
20		3			8		Moist to extremely moist grayish brown, brownish gray, and brown mixed (CLAYEY-SILT) fill with 3 to 7% gravel, some clay, trace sand and brick fragments, soft, massive soil structure, (CL).	
			5				11.8	
				7			Reinforced concrete fill.	
5	2						13.5	
12		1			3		Extremely moist faintly mottled olive gray (SAND-SILT-CLAY) with trace to little mostly fine size sand and clay, stiff, weakly blocky soil structure, (ML-CL).	
			2				15.0	
				1			See next sheet	
6	1							
19		2			4			
			2					
				50/4				
7	100/4							
0								
8	3							
14		5			9			
			4					
				4				
9	2							
22		2			5			
			3					
				3				
10	2							
24		3			8			
			5					
				9				

Mostly asphalt remnant fill with trace concrete debris and brick fragments to 1.8 feet over mostly brick fragment fill to 2.4 feet over silty soil fill with little to some clay, trace brick fragments, concrete debris, and asphalt remnants to 3.5 feet over mostly slag and cinder fill to 4.0 feet over gravel, brick fragment, silt, sand, and clay fill to 6.4 feet over clayey soil fill with trace sand, gravel, and brick fragments to 11.8 feet over reinforced concrete to 13.5 feet over silty slack water sediment with trace to little sand and clay to 15.0 feet over mostly muck with occasional thin layers of peat to 16.0 feet over clayey slack water sediment with trace sand and organic matter to 19.5 feet over clayey slack water sediment with trace to little sand to 22.5 feet over apparent shale bedrock to spoon refusal.

Note: Advanced bore hole with 2 1/4" ID x 6" OD hollow stem auger casing with continuous split spoon sampling to 20.0 feet and 5.0-foot interval sampling to auger refusal at 24.2 feet. Bore hole was backfilled with cuttings to ground surface upon completion.

No water at completion.

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Brian Bartron, (cns)

EARTH DIMENSIONS, INC.

Soil and Hydrogeologic Investigations • Wetland Delineations

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9F20 HOLE NO. B-7C-20 SURF. ELEVATION _

PROJECT 18 Mile Creek Apartments LOCATION Northwest Quadrant of

Village of Hamburg, Erie County, NY South Buffalo Street and 18 Mile Creek

CLIENT Glynn Group Eningeering & Architecture, PLLC DATE STARTED 06/26/20 COMPLETED 06/26/20

DEPTH IN FT | BLOWS ON SAMPLER

SN REC	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	WATER TABLE AND REMARKS
							Extremely moist dark brown to black muck with occasional thin layers of peat. 16.0	
							Moist grayish brown (CLAYEY-SILT) with some clay, trace sand and organic matter, firm, weakly thinly laminated (CL). 19.5	
11 2	50/3						Moist distinctly mottled olive brown (SAND-SILT-CLAY) with some clay, trace to little mostly fine size sand, stiff, very weakly thinly laminated, (CL). 22.5	
							Gray shale stone fragments, very soft to soft. 24.2	
							Advanced augers to refusal at 24.2 feet.	

25 30 35 40

N=NUMBER OF BLOWS TO DRIVE 2 " SPOON 12 " WITH 140 lb. WT. FALLING 30 " PER BLOW

LOGGED BY Brian Bartron, (cns)

DATE

STARTED _____

FINISHED _____

SHEET _____ OF _____

SJB SERVICES, INC.
SUBSURFACE LOG

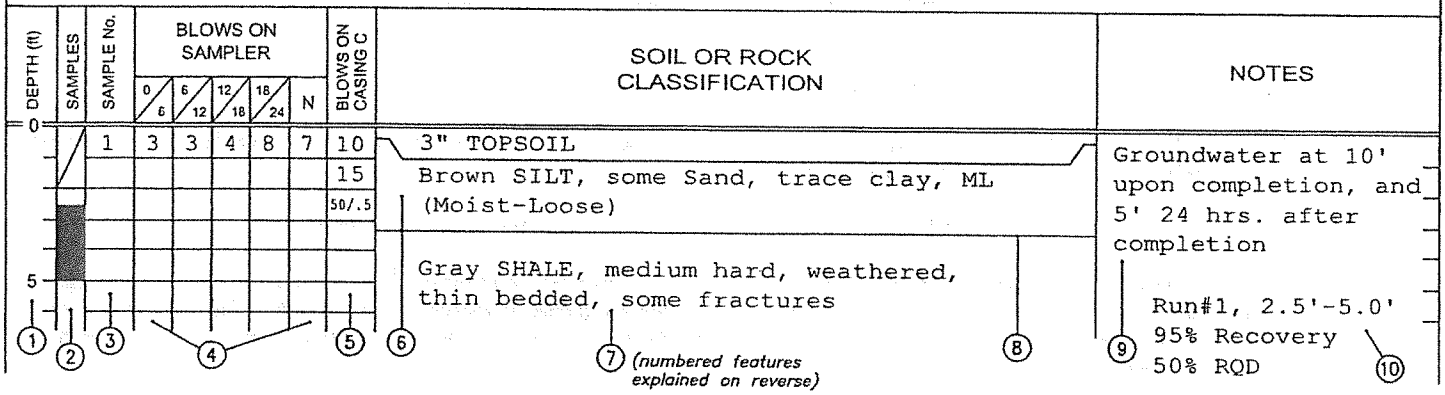
PROJ. No. _____

HOLE No. _____

SURF. ELEV. _____

G.W. DEPTH _____

PROJECT _____ LOCATION _____



(numbered features explained on reverse)

TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Geoprobe Macro-Core
- Auger or Test Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	Coarse Grained (Granular)
Cobble	3" - 12"	
Gravel - Coarse	3" - 3/4"	
- Fine	3/4" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt - Non Plastic (Granular) Clay - Plastic (Cohesive)	<#200	Fine Grained

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35 - 50
"some"	20 - 35
"little"	10 - 20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accordance with the following terms:

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Firm	10 - 30	Medium	4 - 8
Compact	30 - 50	Stiff	8 - 15
Very Compact	>50	Very Stiff	15 - 30
		Hard	>30

(Large particles in the soils will often significantly influence the blows per foot recorded during the penetration test)

TABLE V

Varved	Horizontal uniform layers or seams of soil(s).
Layer	Soil deposit more than 6" thick.
Seam	Soil deposit less than 6" thick.
Parting	Soil deposit less than 1/8" thick.
Laminated	Irregular, horizontal and angled seams and partings of soil(s).

TABLE VI

Rock Classification Term		Meaning
Hardness	- Soft	Scratched by fingernail
	- Medium Hard	Scratched easily by penknife
	- Hard	Scratched with difficulty by penknife
	- Very Hard	Cannot be scratched by penknife
Weathering	- Very Weathered	Judged from the relative amounts of disintegration, iron staining, core recovery, clay seams, etc.
	- Weathered	
	- Sound	

Rock Classification Term		Meaning	
Bedding	- Laminated	(<1")	Natural breaks in Rock Layers
	- Thin Bedded	(1" - 4")	
	- Bedded	(4" - 12")	
	- Thick Bedded	(12" - 36")	
	- Massive	(>36")	

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers)

DATE:
START 12/28/2016
FINISH 12/28/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV 784.9'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	7	18			Brown and Gray f-c GRAVEL and f-c Sand, little Silty	
		24	16		42	Clay, tr.asphalt (moist, FILL)	
	2	9	8				
		15	22		23		
5	3	22	7			Contains tr.concrete	
		7	15		14		
	4	6	6			Dark Brown Silty CLAY, some f-c Sand, tr.gravel	
		5	12		11	(moist, FILL)	
	5	8	15			Gray f-c GRAVEL, little f-c Sand, little Concrete,	
10		7	8		22	little Silty Clay (moist, FILL)	
	6	18	15			Red BRICK and f-c Gravel, little f-c Sand, tr.silty clay	
		10	10		25	(moist, FILL)	
							NQ '2' Size Rock Core
						Gray LIMESTONE Cobble	
15							RUN #1: 13.0' - 18.0'
						Dark Gray Shale Rock, medium hard, sound,	REC = 35%
						thinly bedded to bedded	RQD = 10%
20						Boring Complete at 18.0'	No Free Standing Water encountered before Coring
							Free Standing Water recorded at 5.0' after Coring
25							
							Driller completed rock core on 12/30/16
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/28/2016
FINISH 12/28/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV 786.5'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	8	9			Dark Brown f-c SAND, some Silty Clay, little fine	
		12	10		21	Gravel (moist, FILL)	
	2	6	50/0.4		REF		REF = Sample Spoon Refusal
5	3	4	4				
		4	6		8		No Recovery Sample #3
	4	7	5				
		8	4		13	Contains little Silty Clay, little Concrete	
	5	3	4				
10		4	3		8		
	6	4	4			Brown f-c SAND and Silty Clay, tr.organics	
		5	7		9	(moist, FILL)	
15						Gray f-c GRAVEL, little f-c Sand, tr.silty clay	
	7	30	50/0.3		REF	(moist, GW-GP)	
						Boring Complete with Auger Refusal at 16.5'	No Free Standing Water encountered at Boring Completion
20							
25							
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/28/2016
FINISH 12/28/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-3
SURF. ELEV 787.2'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	4	30			Brown f-c GRAVEL and f-c Sand, little Silty Clay	
		31	30		61	(moist, FILL)	
	2	32	50			Brown and Dark Brown f-c SAND, some Silty Clay,	
		23	20		73	little fine Gravel, tr.organics (moist, FILL)	
5	3	4	6				
		5	8		11	Becomes Gray, Contains some f-c Gravel	
	4	6	7			Gray Silty CLAY, little f-c Sand, little Shale	
		5	5		12	(moist, FILL)	
	5	2	2			Contains tr.organics	
10		3	4		5		
	6	4	5			Gray Silty CLAY, tr.sand, tr.organics	
		7	7		12	(moist-wet, stiff, CL)	
15							REF = Sample Spoon
	7	12	50/0.4		REF	Dark Gray highly Weathered SHALE (moist-wet)	Refusal
						Boring Complete with Auger Refusal at 16.5'	No Free Standing Water encountered at Boring Completion
20							
25							
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/28/2016
FINISH 12/28/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-4
SURF. ELEV 789.9'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	12	10			Brown f-c SAND, some f-c Gravel, little Silty Clay,	
		9	10		19	little Concrete (moist, FILL)	
	2	10	11			Brown f-c GRAVEL, some f-c Sand, little Slag, little	
		10	7		21	Silty Clay (moist, FILL)	
5	3	6	6			Black ASPHALT (moist, FILL)	
		9	6		15	Brown Silty CLAY, little f-c Sand (moist, FILL)	
	4	7	7			Gray Silty CLAY, tr.sand (moist, FILL)	
		9	7		16		
	5	4	6			Gray f-c SAND and Silty Clay, tr.concrete	
10		6	50/0.4		12	(moist, FILL)	
	6	50/0.4			REF	Becomes Brown, Contains little Concrete	REF = Sample Spoon Refusal
15							
	7	4	4				No Recovery Sample #7
		4	4		8		
20							
	8	50/0.2			REF	Dark Gray Weathered SHALE (moist-wet)	
						Boring Complete with Auger Refusal at 21.0'	No Free Standing Water encountered at Boring Completion
25							
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/28/2016
FINISH 12/28/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV 793.5'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	21	33			Dark Brown f-c GRAVEL and f-c Sand, tr.concrete,	
		25	21		58	tr.silty clay (moist, FILL)	
	2	29	24			Contains tr.slag	
		21	19		45		
5	3	5	9			Brown Silty CLAY, some f-c Sand, tr.gravel	
		8	8		17	(moist, FILL)	
	4	9	9			Contains little f-c Gravel	
		8	6		17		
	5	5	3			Contains tr.shale (moist-wet)	
10		4	3		7		
	6	6	5				
		5	6		10	Dark Brown f-c SAND, little Silty Clay, tr.organics,	
						tr.gravel (moist, FILL)	
15							
	7	WOH	2			Gray Silty CLAY, tr.sand, tr.organics	WOH = Weight of
		3	4		5	(moist, medium, CL)	Hammer and Rods
20							
	8	7	6			Gray highly Weathered SHALE (moist-wet)	
		8	12		14		NQ '2' Size Rock Core
25						Dark Gray SHALE Rock, medium hard, sound, laminated to bedded	RUN #1: 23.0' - 28.0' REC = 74% RQD = 53%
30						Boring Complete at 28.0'	Free Standing Water recorded at 5.0' before and after Coring
35							Driller completed rock core on 12/30/16
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/29/2016
FINISH 12/29/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV 795.4'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	6	8			Brown and Dark Brown f-c SAND and Silty Clay, little fine Gravel (moist, FILL)	
		9	7		17		
	2	6	6				
		50/0.3			REF		REF = Sample Spoon Refusal
5	3	5	4			Brown Silty CLAY, some f-c Sand, some f-c Gravel (moist, FILL)	
		6	9		10		
	4	6	7				
		6	6		13	Contains little f-c Sand, little Slag	
	5	2	3			Becomes Gray	
10		4	3		7		
	6	3	3			Gray Silty CLAY, little f-c Sand, tr.shale, tr.organics (moist, FILL)	
		4	5		7		
15							
	7	2	2			Gray Silty CLAY, tr.sand (moist, medium, CL)	
		3	3		5		
20							
	8	1	2				
		3	4		5		
25						Boring Complete with Auger Refusal at 23.5'	No Free Standing Water encountered at Boring Completion
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/29/2016
FINISH 12/29/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-7
SURF. ELEV 797.8'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	8	10			Brown f-c SAND and Silty Clay, little fine Gravel	
		9	13		19	(moist, FILL)	
	2	4	6				
		7	8		13		
5	3	2	5			Gray Silty CLAY, some f-c Sand, little fine Gravel	
		6	9		11	(moist, FILL)	
	4	9	9				
		7	7		16	Contains tr.organics (moist-wet)	
	5	5	4			Contains "and" f-c Sand, tr.shale	
10		3	3		7		
	6	2	3				
		5	5		8	Contains some f-c Sand, little Slag	
15							
	7	3	2			Black Organic Material	Possible Fill Samples
		4	3		6	(moist-wet, loose, PT / Possible FILL)	#7 and #8
20							
	8	1	3				
		2	3		5		
25						Boring Complete with Auger Refusal at 24.5'	No Free Standing Water encountered at Boring Completion
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 12/29/2016
FINISH 12/29/2016
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-8
SURF. ELEV 800.5'
G.W. DEPTH See Notes

PROJECT: PROPOSED HOUSING PROJECT
PROJ. NO.: BE-16-264
LOCATION: SOUTH BUFFALO STREET
HAMBURG, NEW YORK

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	7	15			Brown and Gray SLAG, some f-c Sand, some Brick,	
		18	33		33	tr.silty clay (moist, FILL)	
	2	28	18			Brown Silty CLAY, little f-c Sand, little Brick	
		17	12		35	(moist-wet, FILL)	
5	3	10	11			Contains some f-c Sand (moist)	
		9	7		20		
	4	10	8			Gray Silty CLAY, tr.sand (moist, FILL)	
		7	7		15		
	5	6	6			Contains tr.gravel	
10		6	6		12		
	6	5	4			(moist-wet)	
		4	5		8		
15							
	7	9	8			Contains little Brick	
		7	10		15		
20							
	8	5	12			Gray f-c GRAVEL, little f-c Sand, little Brick, little	
		11	9		23	Silty Clay, tr.shale (wet, FILL)	
25							
						Boring Complete with Auger Refusal at 24.8'	No Free Standing Water encountered at Boring Completion
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: N. HINTZ

DRILL RIG TYPE : CME-550X

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

Appendix B

Project Location Plan

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

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415 S. TRANSIT STREET
LOCKPORT, NEW YORK 14094
VOICE (716) 625 - 6933 / FAX (716) 625-6983
www.glynngroup.com

PROJECT: 18 MILE CREEK APARTMENTS			SHEET NO.: S1
SUBJECT: PROJECT LOCATION PLAN			
CLIENT: ELIZABETH BUSCAGLIA, R.A.			
PROJ. NO.: 17-1011 A	SCALE: 1" = 300'	DATE: 06.16.20	BY: GEL

Appendix C

Subsurface Exploration Plan

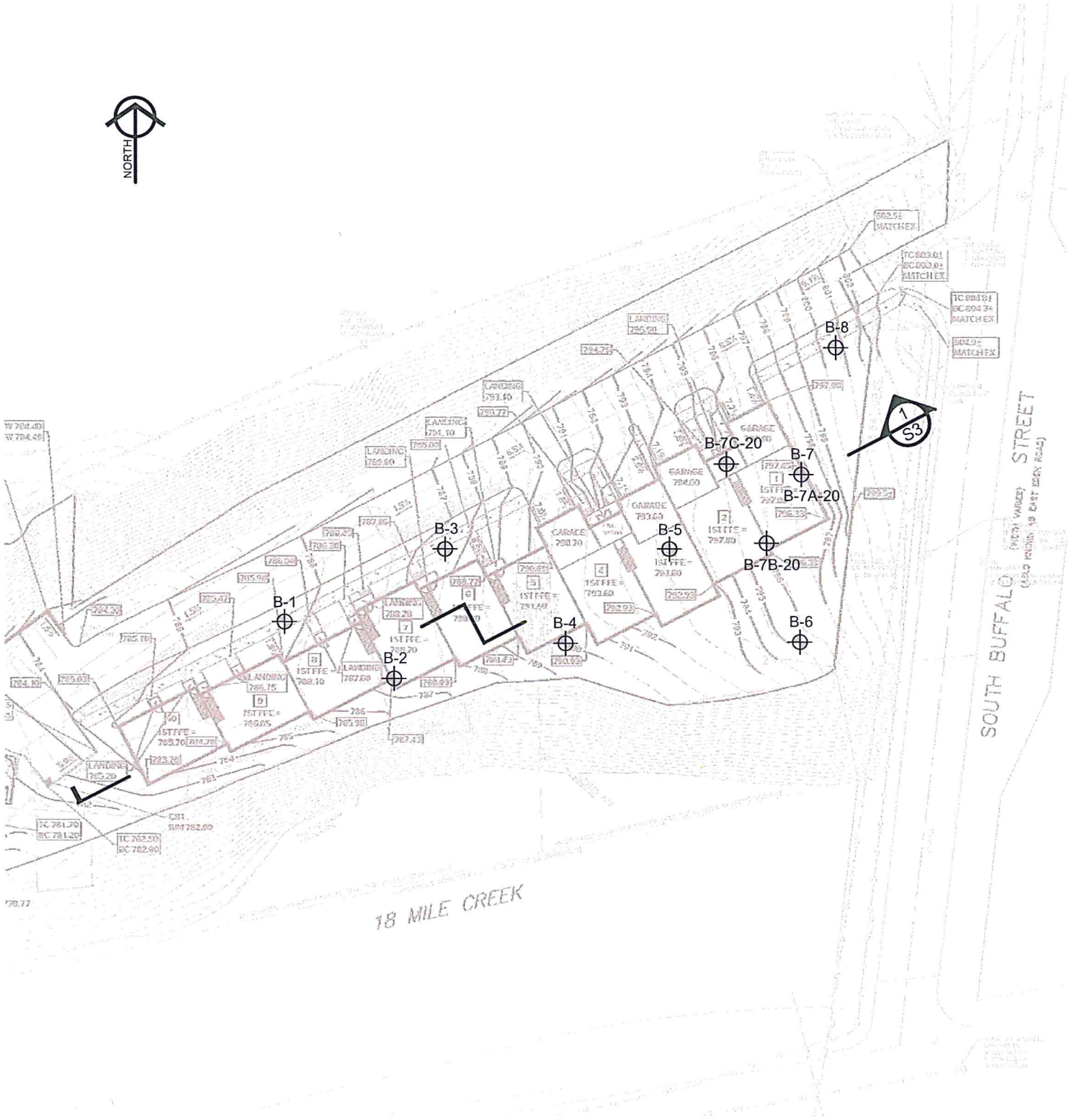
18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

GLYNN GROUP
ENGINEERING & ARCHITECTURE, PLLC



GGE ENGINEERING · DESIGN GLYNN GEOTECHNICAL ENGINEERING 415 S. TRANSIT STREET LOCKPORT, NEW YORK 14094 VOICE (716) 625 - 6933 / FAX (716) 625-6983 www.glynngroup.com	PROJECT: 18 MILE CREEK APARTMENTS				SHEET NO.: S2
	SUBJECT: BORING LOCATION PLAN				
	CLIENT: EILIZABETH BUSCAGLIA, R.A.				
	PROJ. NO.: 17-1011 A	SCALE: 1"= 60'-0"	DATE: 05.13.20	BY: GEL	

Appendix D

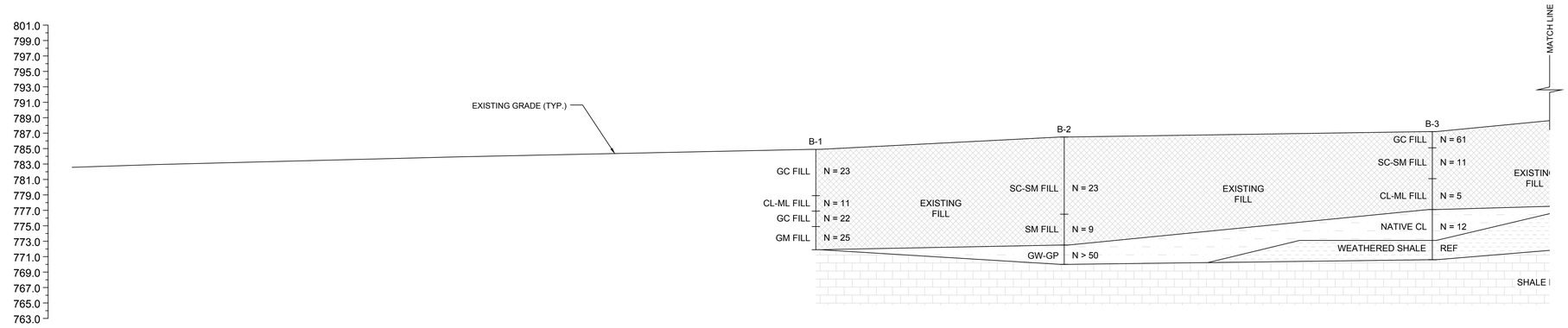
Existing Subsurface Cross-section

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

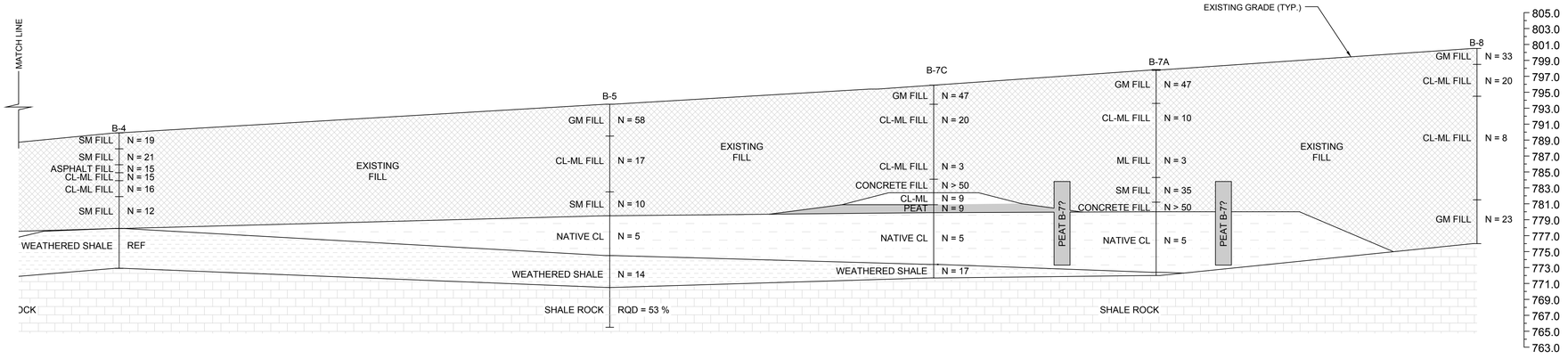
GGEA 17-1011 A

August 4, 2020



1 S3 FOUNDATION SECTION - WEST

SCALE: 1/8" = 1'-0"



1 S3 FOUNDATION SECTION - EAST

SCALE: 1/8" = 1'-0"

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WWW.GLYNNGROUP.COM
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ITEM:	DATE:	REVISION:
1	08.03.20	ISSUED FOR GEOTECHNICAL REPORT

CLIENT:
ELIZABETH BUSCAGLIA
82 PEARL STREET
BUFFALO, NY

PROJECT:
18 MILE CREEK APARTMENTS
HAMBURG, NEW YORK

TITLE:
EXISTING SITE SECTION

GGE PROJ #: 17-1011 A
GGE FILE: site plans.dwg
DRAWN BY: GEL
CHECKED BY: MWG

DWG: S3
SHEET 1 OF 1

Appendix E

Proposed Subsurface Cross-section

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

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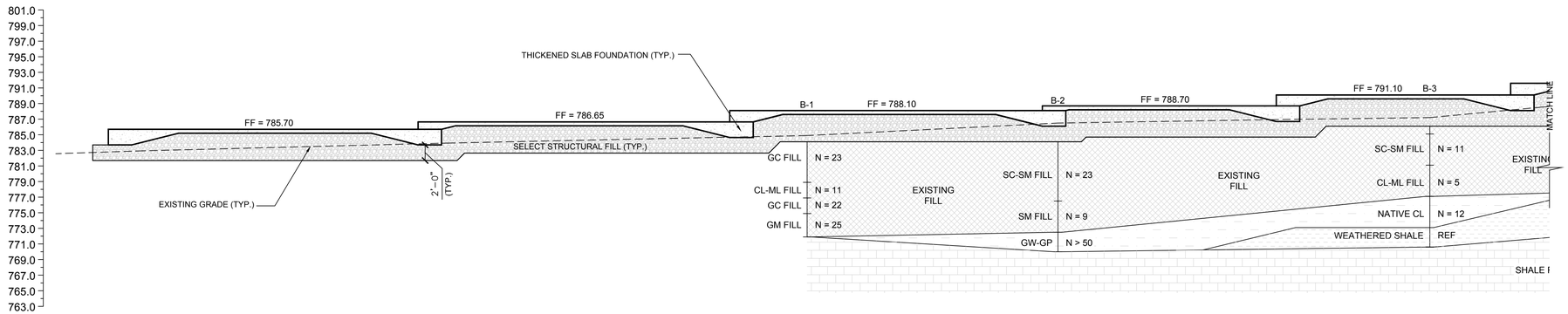
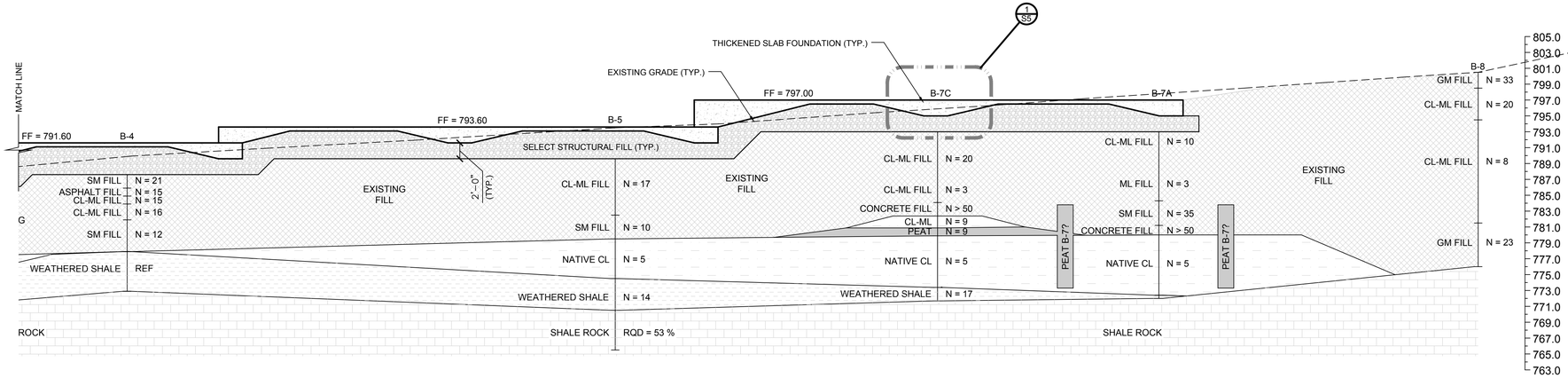


1 S3 FOUNDATION SECTION - WEST

SCALE: 1/8" = 1'-0"



1 S3 FOUNDATION SECTION - EAST

SCALE: 1/8" = 1'-0"

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415 S. TRANSIT STREET LOCKPORT, NEW YORK 14094
VOICE (716) 625 - 6935 / FAX (716) 625 - 6983

ITEM:	DATE:	REVISION:
1	08.04.20	ISSUED FOR GEOTECHNICAL REPORT

CLIENT:
ELIZABETH BUSCAGLIA
82 PEARL STREET
BUFFALO, NY

PROJECT:
18 MILE CREEK APARTMENTS
HAMBURG, NEW YORK

TITLE:
PROPOSED SITE SECTION

GGE PROJ #: 17-1011 A
GGE FILE: site plans.dwg
DRAWN BY: GEL
CHECKED BY: MWG

DWG: S4
SHEET 1 OF 1

Appendix F

Foundation Detail

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

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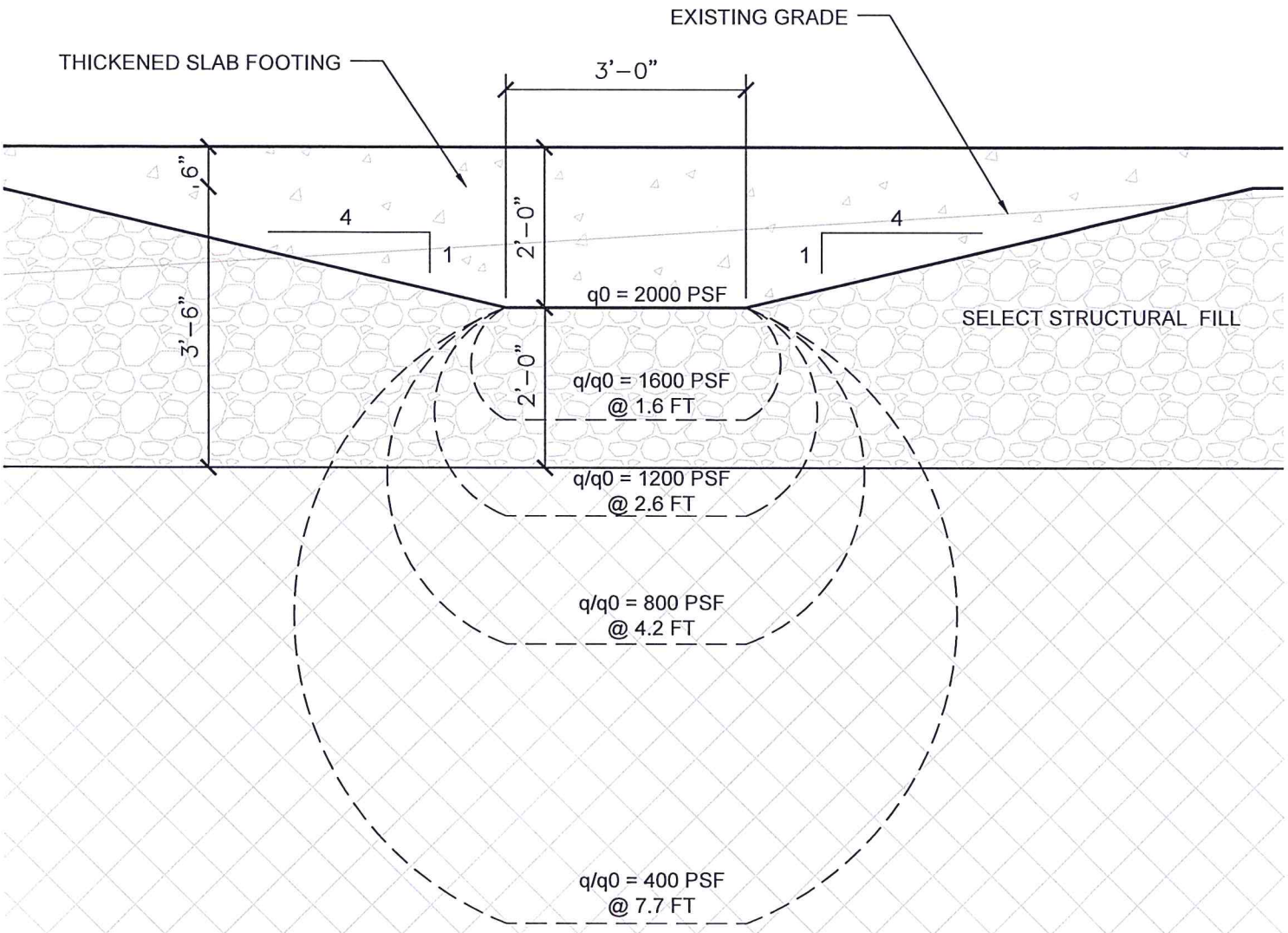

NOTE: FOUNDATION REINFORCING STEEL REQUIREMENTS TO BE DETERMINED

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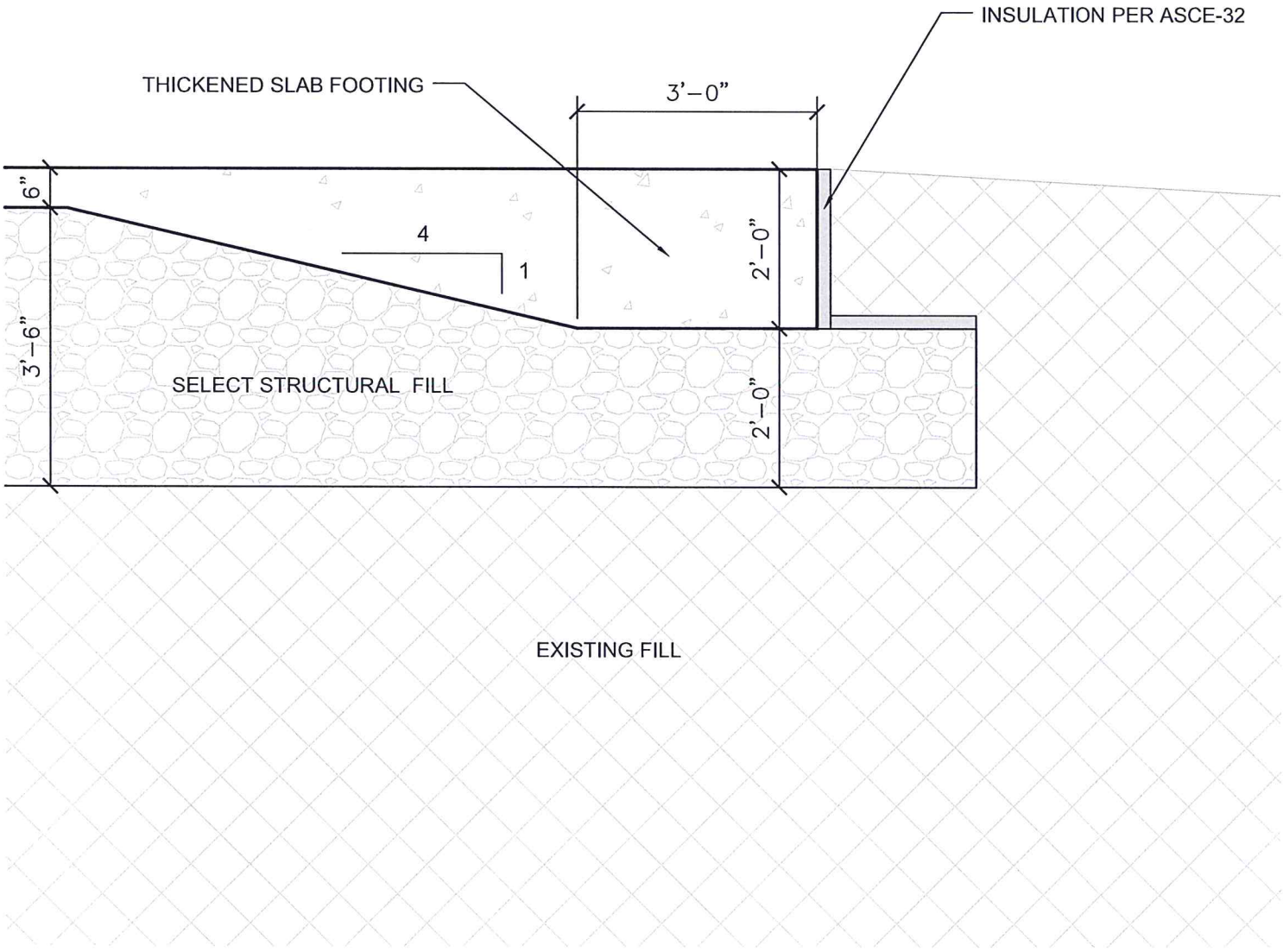
PROJECT: 18 MILE CREEK APARTMENTS				SHEET NO.: S5
SUBJECT: FOUNDATION DETAIL				
CLIENT: EILIZABETH BUSCAGLIA, R.A.				
PROJ. NO.: 17-1011 A	SCALE: 1/2"= 1'-0"	DATE: 08.04.20	BY: GEL	



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PROJECT: 18 MILE CREEK APARTMENTS				SHEET NO.: S6
SUBJECT: FOUNDATION DETAIL				
CLIENT: EILIZABETH BUSCAGLIA, R.A.				
PROJ. NO.: 17-1011 A	SCALE: 1/2"= 1'-0"	DATE: 08.04.20	BY: GEL	

Appendix G

Fill Specifications

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

Common Fill

All soil and/or crushed rock material with the exception
of those with USCS classifications of
CH, MH, OH, and OL.

Place material in 12 inch lifts (loose) and compact to 90 % of modified proctor (ASTM D-1557) maximum dry density within 2 % of optimum moisture content.

The material should be compacted using a smooth drum vibratory roller (for large applications) or a reversible vibratory plate tamper (for smaller applications) such as a Bomag BPR 35/60 or similar (weight > 400 lbs).

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Structural Fill

All soil and/or crushed rock material with the exception
of those with USCS classifications of
CH, MH, OH, OL, ML and CL-ML.

Place material in 9 inch lifts (loose) and compact to 95 % of modified proctor (ASTM D-1557) maximum dry density within 2 % of optimum moisture content.

The material should be compacted using a smooth drum vibratory roller (for large applications) or a reversible vibratory plate tamper (for smaller applications) such as a Bomag BPR 35/60 or similar (weight > 400 lbs).

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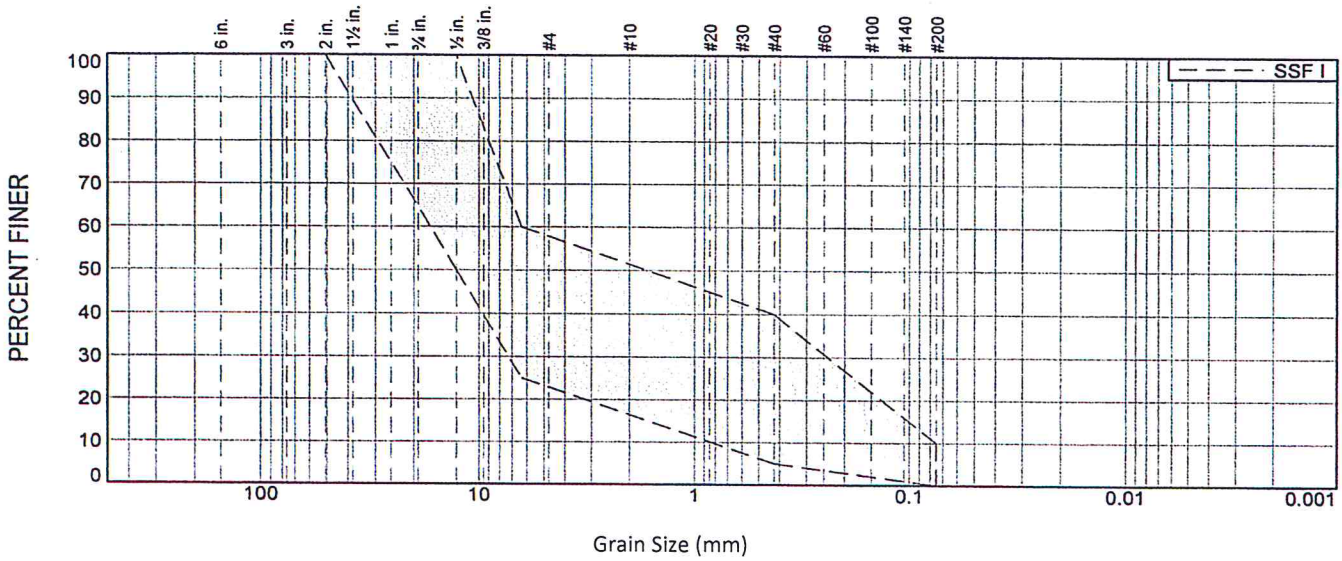
Select Structural Fill

NYSDOT Item No. 304.12 Subbase Course, Type 2

Sieve Size	Required % Passing
2 inch	100
1/4 inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10



In addition to the above specification, material shall also meet the well graded qualifications of ASTM D-2487, such that USCS classification = GW, GW-GM, SW or SW-SM.

Place material in 9 inch lifts (loose) and compact to 95 % of modified proctor (ASTM D-1557) maximum dry density within 2 % of optimum moisture content.

The material should be compacted using a smooth drum vibratory roller (for large applications) or a reversible vibratory plate tamper (for smaller applications) such as a Bomag BPR 35/60 or similar (weight > 400 lbs).

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Appendix H

Pressure Distribution Calculations

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

Project: 18 Mile Creek Apartments

Client: Buscaglia

Proejct No.: 17-1011 A

Date: 07.27.20

Boussinesq Pressure for Continuous Footing

Footing Width (B) = 2 ft

Foundation Contact Pressure (q_0) = 2000 psf

q/q_0	Depth (ft)	Pressure (psf)
0.9	0.4	1800
0.8	0.9	1600
0.7	1.4	1400
0.6	1.7	1200
0.5	2.2	1000
0.4	2.8	800
0.3	3.8	600
0.2	5.1	400
0.1	7.8	200

Project: 18 Mile Creek Apartments

Client: Buscaglia

Proejct No.: 17-1011 A

Date: 07.27.20

Boussinesq Pressure for Continuous Footing

Footing Width (B) = 3 ft

Foundation Contact Pressure (q_0) = 2000 psf

q/q_0	Depth (ft)	Pressure (psf)
0.9	0.6	1800
0.8	1.4	1600
0.7	2.1	1400
0.6	2.6	1200
0.5	3.3	1000
0.4	4.2	800
0.3	5.7	600
0.2	7.7	400
0.1	11.7	200

Appendix I

Bearing Capacity Analysis

18 Mile Creek Apartments
Town of Hamburg, New York

Geotechnical Engineering Report

GGEA 17-1011 A

August 4, 2020

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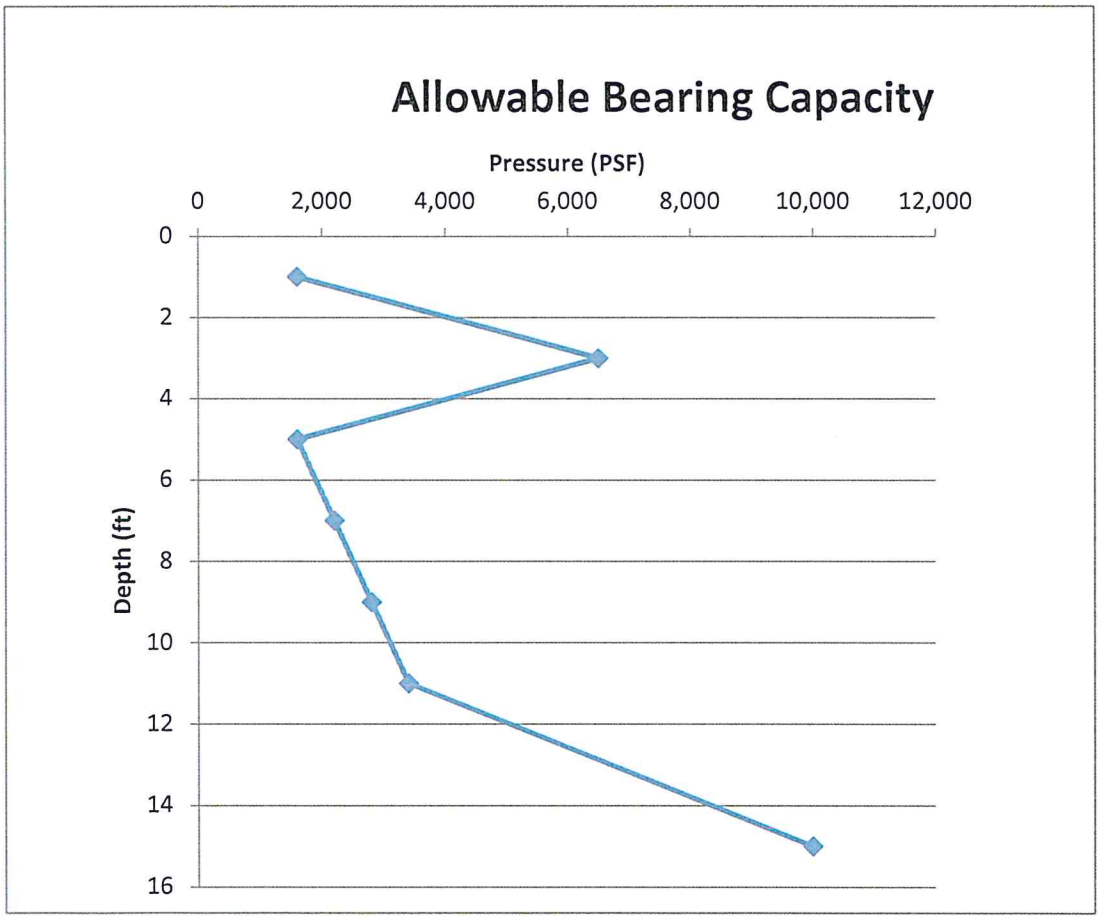
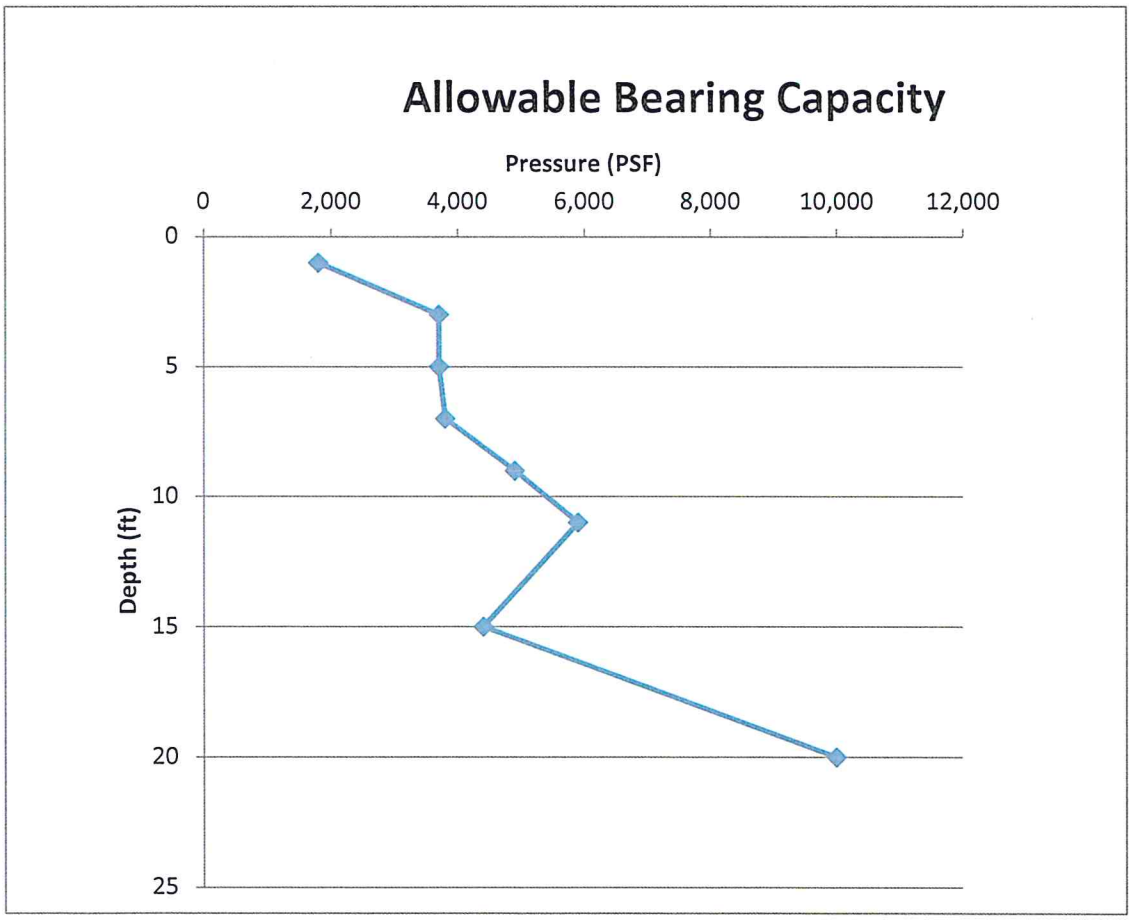
B-2

Sample No.	Depth (ft)	q All (psf)
1	0 - 2	1,600
2	2 - 4	6,500
3	4 - 6	1,600
4	6 - 8	2,200
5	8 - 10	2,800
6	10 - 12	3,400
7	15.0 - 16.5	10,000



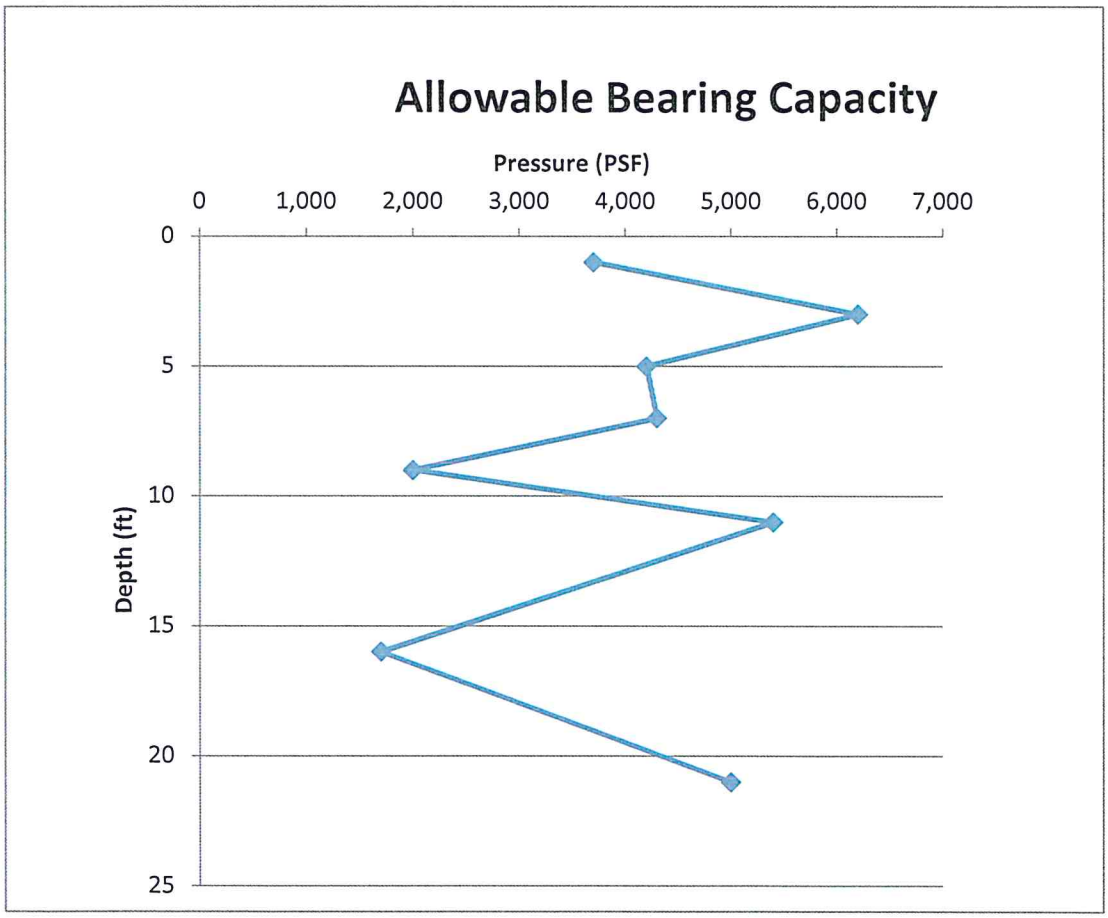
B-4

Sample No.	Depth (ft)	q All (psf)
1	0 - 2	1,800
2	2 - 4	3,700
3	4 - 6	3,700
4	6 - 8	3,800
5	8 - 10	4,900
6	10 - 12	5,900
7	15.0 - 17.0	4,400
8	20.0 - 21.0	10,000



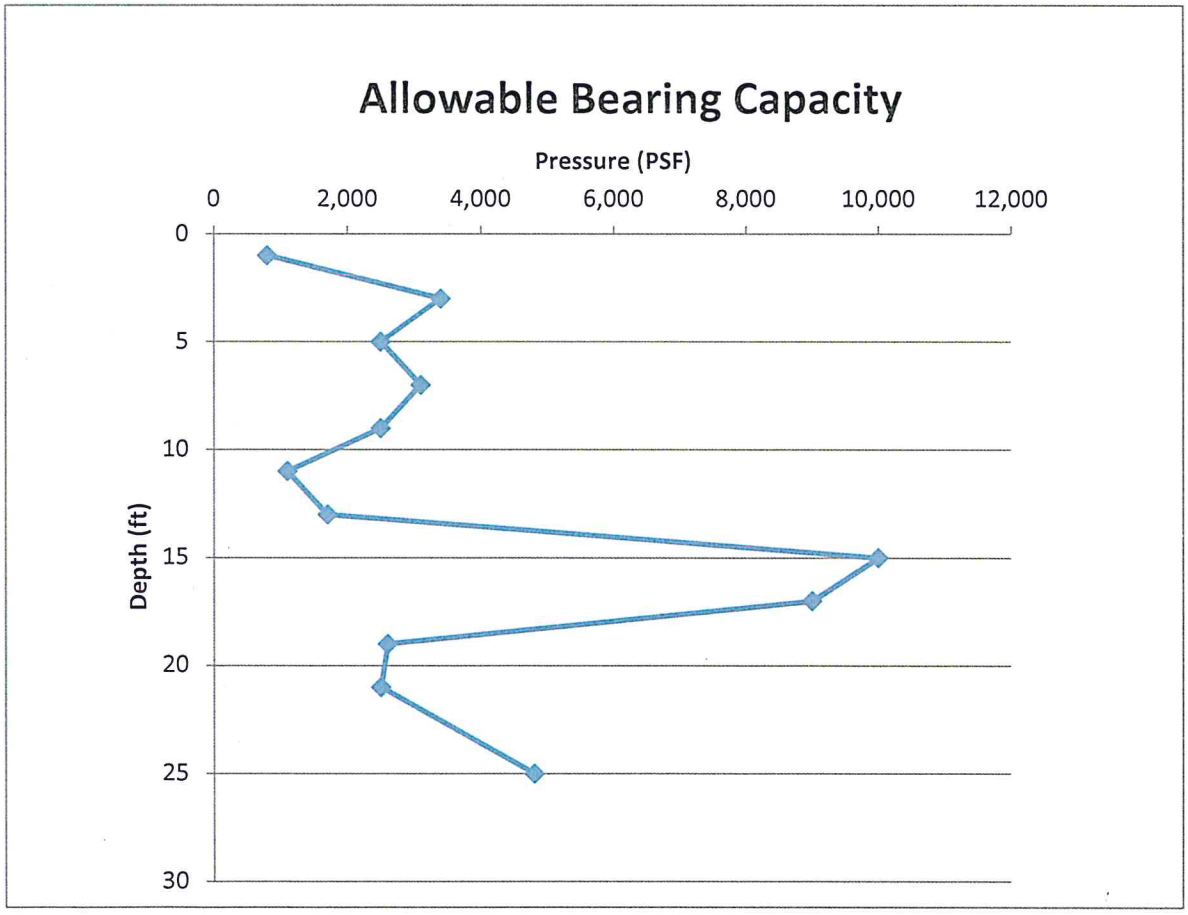
B-5

Sample No.	Depth (ft)	q All (psf)
1	0 - 2	3,700
2	2 - 4	6,200
3	4 - 6	4,200
4	6 - 8	4,300
5	8 - 10	2,000
6	10 - 12	5,400
7	15.0 - 17.0	1,700
8	20.0 - 22.0	5,000



B-7A

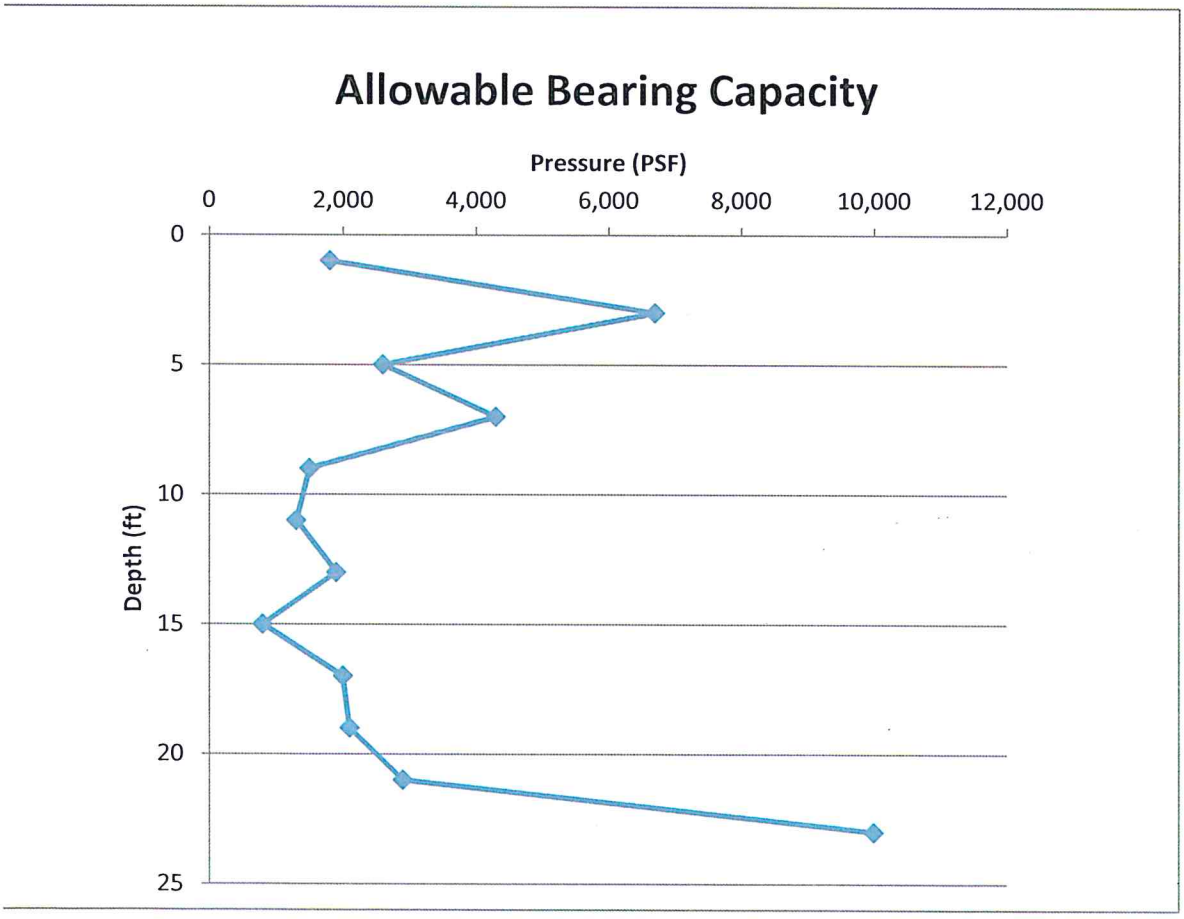
Sample No.	Depth (ft)	UCS (tsf)	UCS (psf)	Cohesion (psf)	q All (psf)
1	0 - 2	NA	NA	NA	800
2	2 - 4	NA	NA	NA	3,400
3	4 - 6	4.50	9,000	4,500	2,500
4	6 - 8	4.50	9,000	4,500	3,100
5	8 - 10	1.00	2,000	1,000	2,500
6	10 - 12	NA	NA	NA	1,100
7	12 - 14	0.50	1,000	500	1,700
8	14 - 16	2.25	4,500	2,250	10,000
9	16 - 18	3.50	7,000	3,500	9,000
10	18 - 20	2.75	5,500	2,750	2,600
11	20 - 22	2.00	4,000	2,000	2,500
12	25 - 26	4.50	9,000	4,500	4,800



GGEA 17-1011 18 Mile Creek Apartments 07.23.20

B-7B

Sample No.	Depth (ft)	UCS (tsf)	UCS (psf)	Cohesion (psf)	q All (psf)
1	0 - 2	NA	NA	NA	1,800
2	2 - 4	NA	NA	NA	6,700
3	4 - 6	3.75	7,500	3,750	2,600
4	6 - 8	4.50	9,000	4,500	4,300
5	8 - 10	1.50	3,000	1,500	1,500
6	10 - 12	1.8	3,500	1,750	1,300
7	12 - 14	1.00	2,000	1,000	1,900
8	14 - 16	NA	NA	NA	800
9	16 - 18	1.75	3,500	1,750	2,000
10	18 - 20	1.50	3,000	1,500	2,100
11	20 - 22	1.25	2,500	1,250	2,900
12	22 - 24	NA	NA	NA	10,000



B-7C

Sample No.	Depth (ft)	UCS (tsf)	UCS (psf)	Cohesion (psf)	q All (psf)
1	0 - 2	NA	NA	NA	3,600
2	2 - 4	4.50	9,000	4,500	4,300
3	4 - 6	1.50	3,000	1,500	2,800
4	6 - 8	3.50	7,000	3,500	2,100
5	8 - 10	0.75	1,500	750	1,000
6	10 - 12	2.75	5,500	2,750	10,000
7	12 - 14	NA	NA	NA	2,600
8	14 - 16	3.50	7,000	3,500	800
9	16 - 18	1.75	3,500	1,750	1,700
10	18 - 20	2.75	5,500	2,750	2,500
11	23 - 25	NA	NA	NA	10,000