GES **Geotechnical Engineering Services, P.C.**

April 22, 2019

Mr. Brian Tierney
AMS Acquisitions, Development and Construction
595 Madison Avenue, Suite 1101
New York, NY 10022

Re: Preliminary Geotechnical Letter Report
North Broadway Assemblage
Yonkers, New York

Dear Brian:

In accordance with our April 5, 2019 proposal, this letter report presents the results of our preliminary field investigation and preliminary foundation recommendations for the proposed construction.

Based on recent discussions between you and Mr. Ziad H. Maad, P.E. of Geotechnical Engineering Services, P.C. (GES), we understand the project site occupies several lots spanning the western ends of Baldwin Place, Overlook Terrace, extending down a steep tree-covered slope, through select lots to North Broadway in the City of Yonkers, New York. We understand the lots/addresses proposed to be part of the new development include the following addresses. Our preliminary geotechnical investigation was performed at the addresses noted in **bold** below. The outline of the proposed site is shown on the attached Site Location Plan:

- 2 Baldwin Place – Open lot covered by trees and debris
- **10 Baldwin Place – Two-story house and surrounding yard and trees**
- **23 Overlook Terrace – Five-story building and trees**
- 14 Overlook Terrace – Tree-covered open lot
- 30-32 North Broadway – Two-story (plus cellar) building and rear yard.
- 28 North Broadway – Two-story building plus rear yard
- 20-24 North Broadway – Four-story building (24 North Broadway) and three-story building (plus cellar) (20-22 North Broadway)
- 18 North Broadway – Two-story building

Based on the architectural renderings provided to us, we understand the proposed development includes the construction of several new buildings of varying height across most of the combined footprint of the above-mentioned lots, which is over 50,000-square-feet in footprint area. In the area of 10 Baldwin Place, the eastern half of an about eleven-story residential building will be constructed with up to three levels of parking, and a first-floor slab about 65 feet above the ground level on North Broadway to the west. The building is proposed to extend to the western property

6 Bayberry Road
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line of 2 Baldwin Place, with three parking levels in the western half, and mechanical space in the eastern half. One podium level is expected to extend to fully cover 23 Overlook Terrace. All existing structures on these two lots will be fully demolished for the proposed construction.

Geotechnical Engineering Services, P.C. (GES) did not perform any surveying and solely relied on our information as measured in the field from fixed locations, as well as two December 19, 2018 dated topographic surveys by Kulhanek & Plan Land Surveyors, P.C. covering 23 Overlook Terrace and 10 Baldwin Place. No elevations were provided on the surveys. Therefore, all depths in this letter report, unless otherwise noted, are from surrounding grade.

The objectives of this initial investigation were to evaluate the subsurface conditions beneath the proposed construction at the two above-mentioned lots, and to provide preliminary foundation recommendations for the proposed new development.

METHODOLOGY

A total of two (2) geotechnical borings, referred to as B-1 and B-2 were performed at the locations shown in the attached Site Location Plan and Boring Location Plans. Both borings were drilled by Municipal Testing Laboratory of Hauppauge, NY (MTL), utilizing a GeoProbe track-mounted drill rig from April 8 to April 10, 2019. The borings were continuously inspected by Messrs. Haykel Melaouhia, Ph.D., and Michael Torino, P.E. of GES.

The GES borings were drilled utilizing the mud-rotary drilling technique with a 2-7/8-inch and 3-7/8-inch diameter tri-cone roller bit and 3-inch and 4-inch diameter steel casing to stabilize each boring, respectively. The use of 3-inch diameter steel casing for Boring B-2 became necessary due to the presence of boulders and cobbles. Soil samples were obtained using techniques and equipment in general accordance with the American Society for Testing and Materials (ASTM) Standard Specification D1586-Standard Penetration Test (SPT). The SPT consists of driving a 2-inch O.D. split-spoon sampler typically to 24-inches of penetration, using repeated blows of a 140-lb hammer, free-falling a height of 30-inches. The standard penetration value, or N-value, is determined as the number of blows required to advance the sampler the sum of the second and third 6-inch intervals of a typical 24-inch penetration. MTL used an automatic trip hammer. This hammer operates with a 90% efficiency whereas the manual (cathead and rope) hammer operates at a 60% efficiency. This means that the blow counts are reported on the boring logs, where the automatic hammer was used, are about 2/3 of the values that would be reported if a conventional donut-type hammer was used. A correction factor of 1.3 is generally used to convert N-values from the automatic hammer to the normalized N-value (N_{60}).

Where the split-spoon sampler could not be advanced through a rock or an obstruction, the sampler was driven for 50 blows, and depth of actual penetration less than 6 inches was recorded. Soil samples were placed in jars following completion of sampler advance. Boring logs showing N-Values and stratigraphy are attached to this letter report.

When the borings encountered top of rock, core drilling was performed using an NX-size core barrel with a diamond bit. Approximately 5 to 15 feet of rock was cored in Borings B-2 and B-1, respectively. The length of recovery and Rock Quality Designation (RQD) was measured and calculated for each rock core run, and denoted as a percent recovery and percent RQD, respectively. RQD refers to the sum of the lengths of rock core pieces four inches or longer,

neglecting mechanical breaks, expressed as a percentage of the total length of the core run. Percentage recovery and RQD, and rock sample descriptions are included on the boring logs.

Similarly, wherever the split-spoon sampler could not penetrate a boulder or cobble within the overburden material, core drilling was performed, also using an NX-Size core barrel with a diamond bit. Recovery length was measured for the depths cored and is reported on each boring log in terms of percent recovery. RQD is not applicable to boulders and is reported as 0 percent on the boring logs.

The recovered split-spoon soil samples were labeled with the project name, boring number, sample number, depth of sample, SPT blow counts and length of recovery. Cores through boulders and rock core samples were arranged and organized in wooden five-foot-long core boxes, labeled with project name and number, boring number, sample number, depth of sample, and core recovery and RQD percentages. All samples were transported to MTL's shop for storage.

- Boring B-1 was drilled within the open yard of 10 Baldwin Place, just east of the existing building, to a depth of 17 feet, encountering bedrock at a depth of about 4 feet.
- Boring B-2 was drilled from the concrete pathway, outside the southeast corner of the building at 23 Overlook Terrace to a depth of 30 feet, encountering bedrock at a depth of about 25 feet.

The recovered split-spoon soil samples were labeled with the project name, boring number, sample number, depth of sample, SPT blow counts and length of recovery. Cores through boulders and rock core samples were arranged and organized in wooden five-foot-long core boxes, labeled with project name and number, boring number, sample number, depth of sample, and core recovery and RQD percentages. Photos of rock core samples are shown on the attached rock core photo plates. All samples were transported to MTL's shop for storage.

SUBSURFACE CONDITIONS

The following general descriptions of the subsurface strata are based on our interpretations of the results of the field investigation. As noted above, all depths are relative to surrounding ground level. Elevations were not available for this investigation:

Stratum 1 – Fill: This stratum was encountered in both borings to depths of 4 and 11 feet in Borings B-1 and B-2, respectively. Fill was present at grade in Boring B-1 and just below the sidewalk slab in Boring B-2. The Fill consists of loose to medium dense, brown, black and gray medium to fine Sand with varying amounts of Gravel, Silt, and Concrete and Brick fragments, and roots. SPT N-Values ranged from 10 to 64-blows/ft (bpf), with an average of 19 bpf.

Stratum 2 – Glacial Till: Stratum 2 consists of loose to very dense brown gravelly coarse to fine Sand with varying amounts of Silt, and Cobbles and Boulders. This stratum was found directly beneath the Fill in Boring B-2, extending from about 11 to 25 feet below grade, just above the rock, and not encountered in Boring B-1. Only two SPT N-Values were recorded within this stratum, which were 6 blows for 6 inches and 9 bpf, in Boring B-1. Stratum 2 was cored where a boulder was encountered from 18 to 23 feet, with a recovery of an about 10-inch-long boulder.

Stratum 3 – Rock: This stratum was encountered in both borings, beginning at a depth of about 4 feet in Boring B-1 and about 25 feet in Boring B-2 to the completion depth of both borings. This stratum is comprised of intermediate to medium hard, slightly weathered, gray mica schist, closely jointed to broken, with weathered joints and occasional quartz and garnet inclusions. An about one-foot-thick layer of decomposed rock was encountered at a depth of about 4 feet in Boring B-1, with spoon refusal after advancing about 3 inches, just above more competent rock. Rock core recovery for Stratum 3 ranged from 83 to 100 percent, with an average of 95 percent. The RQD for Stratum 3 ranged from 43 to 58 percent, with an average of 51 percent. Our supplemental geotechnical investigation will map the top of rock contour, and parse the strata of rock to delineate where weaker and more competent is present.

Groundwater Conditions

Perceived sample moisture content of the split-spoon soil samples was also recorded on the logs. Based on the position of the preliminary borings on a hill, above North Broadway, it is highly unlikely that groundwater is present within 30 feet of the ground surface at the boring locations. Therefore, groundwater should not be a concern at the site at the above-mentioned lots. However, groundwater levels will be further investigated during our supplemental geotechnical investigation, which will include the installation of groundwater monitoring wells, and the installation of an electronic piezometer. A design groundwater level as well as ambient groundwater level, a discussion of potential flood hazards to the site, and recommendations for temporary and permanent groundwater control measures will be further discussed at that time.

PRELIMINARY RECOMMENDATIONS

As stated above, the purpose of this letter report is to provide preliminary foundation recommendations for the proposed new development. A more detailed supplemental geotechnical report will be provided after the completion of the remaining borings and test pits, which will contain seismic considerations, temporary and permanent groundwater control recommendations, more specific foundation recommendations, recommendations for support of excavation and underpinning, subgrade preparation and excavation recommendations, construction monitoring recommendations, and controlled inspection recommendations, among other aspects of this complex project.

The exact footprint and building loads, as well as excavation depth and top of rock contour is unknown at this time. However, as a preliminary recommendation for foundation support, we recommend that the proposed new building wall and column foundations can be designed as shallow footings or mat foundations, to bear on either Stratum 2 (Glacial Till), with an allowable bearing pressure of 3 tons per square foot (tsf), or Stratum 3 (Rock), if encountered. Areas with higher, more concentrated loads, where greater than 3 tsf is required for foundation support can be designed to bear on Stratum 3 (Rock), with a minimum allowable bearing pressure of 8 tsf for decomposed rock, and 20 tsf for competent rock. Recommended bearing pressures are contingent upon GES being retained to provide controlled inspection of the subgrade.

Soil subgrades must be proof-rolled using a minimum of six (6) passes with a dual-drum vibratory roller, under continuous inspection by a licensed NYS Professional Engineer (PE). A minimum of

6 inches of ¾" crushed stone should be placed under the footings or mat foundation and compacted under continuous inspection. We recommend the rock subgrade be cleaned by the use of hand-held equipment, then any remaining mud or rock debris and surface water removed using compressed air. The rock subgrade should be free of loose rock, mud, trash, fill, or other debris, prior to inspection by the PE, and solicited by the Owner. Concrete for a mud slab or footing/mat foundation should be poured within the same day as it is prepared and inspected, to ensure the allowable bearing capacity of the footing/mat foundation subgrade. Excavation within two feet of the design bearing level of new foundation should proceed with flat-plated excavator buckets for soil and hand-held jackhammers for rock. In either case, all fill must be removed prior to concrete placement, as fill is not a suitable bearing material for new foundations.

Support of excavation and underpinning requirements are unknown at this time. Drilled caissons, founded by rock sockets, may be required wherever proposed new building foundations are above adjacent building foundations to extend new building loads below adjacent foundations, as to not impose lateral load on adjacent buildings. Drilled caissons may also be required if the soil/rock encountered is not sufficient to support the proposed new building loads.

We recommend a supplemental geotechnical investigation be performed, including additional borings for foundation and support of excavation design, as well as a rock mapping investigation, to document the elevation/depth and rock quality across the site, and test pits to document the type/dimensions of adjacent foundations along the edges of the site. We reserve the right to revise our recommendations provided herein, following completion of supplemental investigations.

We also request the opportunity to provide proposals for inspection of any soil/rock subgrade preparation, drilled caisson design and installation, support of excavation design/installation, and monitoring of rock excavation for rock bolting, or as required by our supplemental investigation.

If you have any questions or would like to discuss the contents of this letter report, please don't hesitate to call me in the office at 914-592-4616 or on my mobile at 973-727-7329.

Very truly yours,
Geotechnical Engineering Services, P.C.

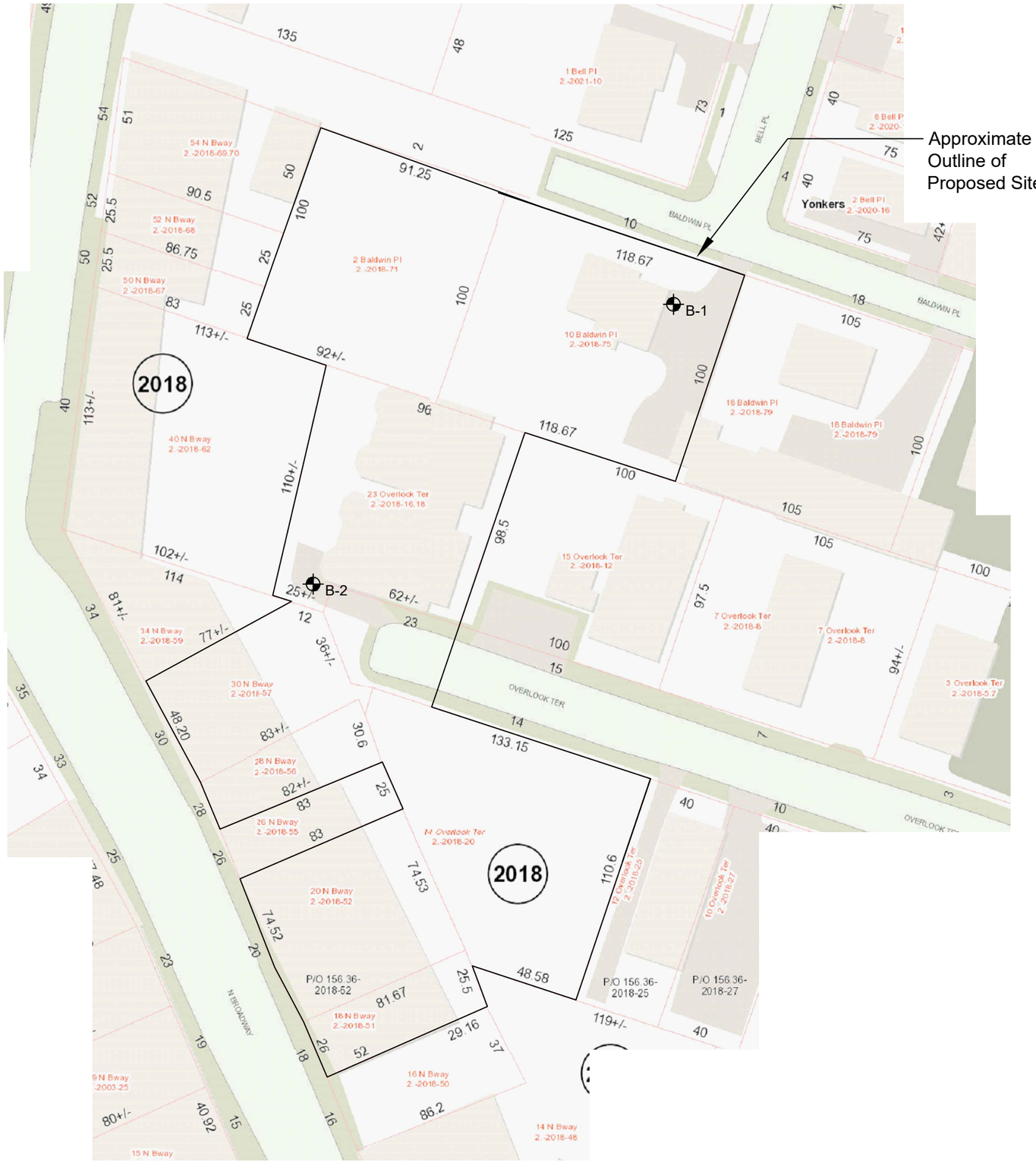
Daniel George, P.E.

Digitally signed by Daniel George, P.E.
DN: cn=Daniel George, P.E., o=GES, P.C., ou=Senior Project Engineer, email=dgeorge@ges-pc.com, c=US
Date: 2019.04.22 15:43:51 -04'00'

Daniel George, P.E. for Ziad H. Maad, P.E., D. GE.

ATTACHMENTS

Site Location Plan
10 Baldwin Place Boring Location Plan
23 Overlook Terrace Boring Location Plan
Boring Logs
Rock Core Photo Plates



LEGEND

B-1 — 2019 GES Boring

N

SOURCE:

- 2018 Westchester County Tax Lot Maps

No.	DESCRIPTION	DATE	BY

GES
GEOTECHNICAL ENGINEERING SERVICES, P.C.
6 BAYBERRY ROAD
ELMSFORD, NEW YORK 10523
PHONE 914-592-4616 FAX 914-592-0416

NORTH BROADWAY
ASSEMBLAGE
YONKERS, NY

BLOCK: LOT: ZONE: MAP:

SITE
LOCATION PLAN

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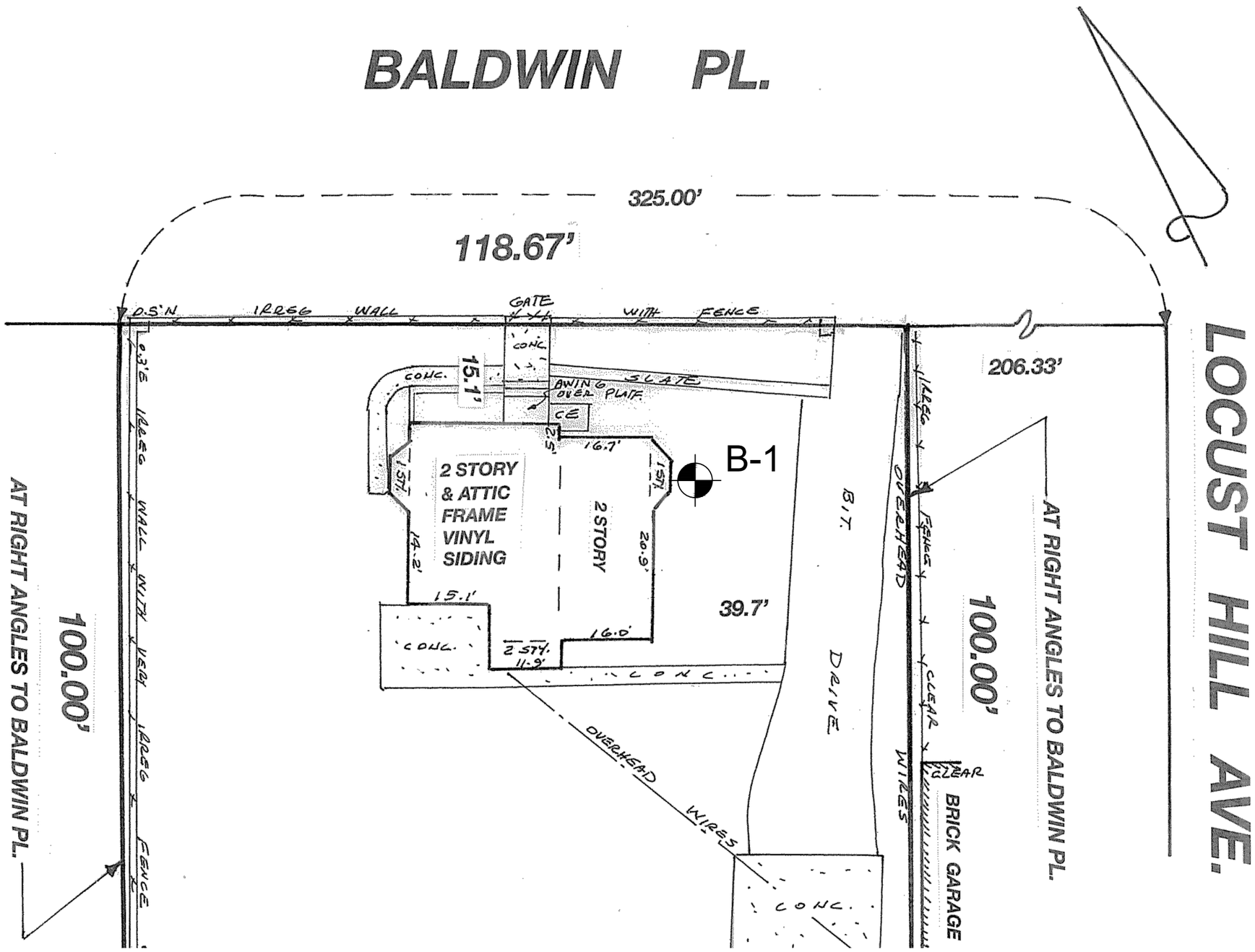
PROFESSIONAL ENGINEER

PROJECT #:	2019038
SCALE:	NTS
DATE:	4/22/2019
DRAWING NO:	B-101.00
SHEET NO:	1 OF 1



LEGEND

B-1 — 2019 GES Boring

No.	DESCRIPTION	DATE	BY

GES
GEOTECHNICAL ENGINEERING SERVICES, P.C.
6 BAYBERRY ROAD
ELMSFORD, NEW YORK 10523
PHONE 914-592-4616 FAX 914-592-0416

10 BALDWIN PLACE
YONKERS, NY

BLOCK: 2018 LOT: 75 ZONE: MAP:

BORING
LOCATION PLAN

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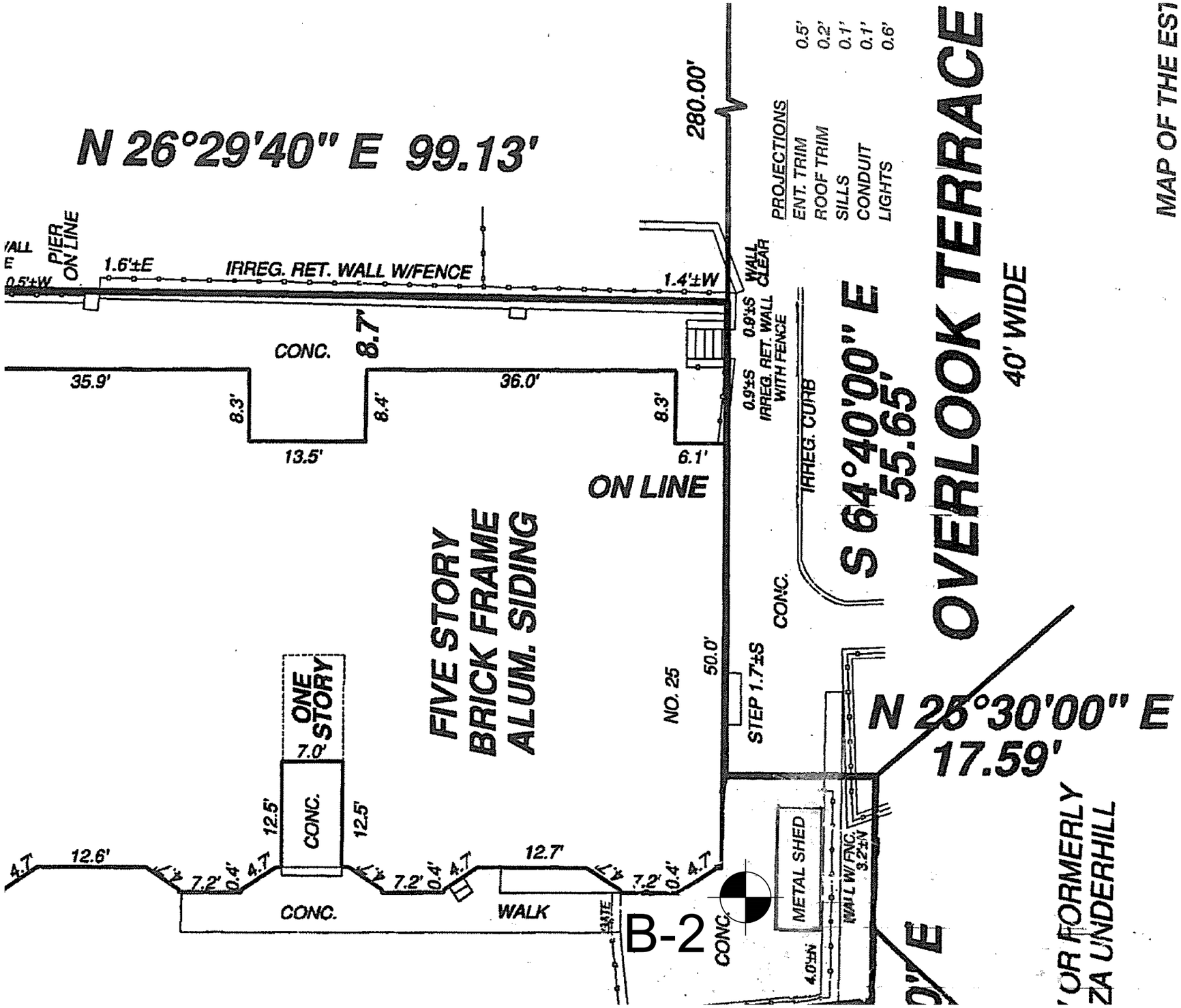
PROFESSIONAL ENGINEER

PROJECT #:	2019038
SCALE:	NTS
DATE:	4/16/2019
DRAWING NO:	B-100.00
SHEET NO:	1 OF 2



LEGEND

B-2 — 2019 GES Boring

No.	DESCRIPTION	DATE	BY

GES
GEOTECHNICAL ENGINEERING SERVICES, P.C.
6 BAYBERRY ROAD
ELMSFORD, NEW YORK 10523
PHONE 914-592-4616 FAX 914-592-0416

23 OVERLOOK TERRACE
YONKERS, NY

BLOCK: 2018 LOT: 75 ZONE: MAP:

BORING
LOCATION PLAN

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PROFESSIONAL ENGINEER

PROJECT #:	2019038
SCALE:	NTS
DATE:	4/16/2019
DRAWING NO:	B-100.00
SHEET NO:	2 OF 2

Log of Boring B-1

Project: North Broadway Assemblage			**Project Number: 2019038**
Location: 10 Baldwin Place, Yonkers, NY			
Date(s) Drilled: **4/8/19 - 4/9/19**	Inspector: **H. Melaouhia, Ph.D.**		Coordinates: **North: East:**
Drilling Agency: **Municipal Testing Laboratory**	Foreman: **Mike Saltz / Anthony Kappel**		Approximate Surface Elevation (feet): **NA**
Drilling Equipment: **Geoprobe Track Rig**	Drilling Method: **Mud Rotary**		Completion Depth (feet): **17.0** Rock Depth (feet): **4.0**
Casing Size/Type: **4" Steel**	Size/Type of Bit: **3-7/8" Roller Bit**		Sampler Type(s): **2" Split Spoon**
Groundwater Level and Date Measured: **NA NA**	Hammer Wt/Drop: **140/30" (Auto)**	Casing Hammer Wt/Drop: **140/30" (Auto)**	Size/Type of Core Barrel: **NX**
Boring Location: **See Boring Location Plan (Figure 1)**			No. of Samples: **Dist.: 2 Undist.: 0 Core (ft): 13**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS
0	S-1	1.5	3 2 16 28					FILL: Brown & black medium to fine Sand, some Gravel, some Silt					S-1: Dry.
	S-2	0.7	32 100/3"					Gray medium to fine gravelly Sand					S-2: Dry. Cased to 4 ft. Decomposed rock at tip of spoon sampler.
								Gray Decomposed Rock fragments (GP)					
5				C-1	92	43		Intermediate gray Slightly weathered Mica Schist, closely jointed to broken, weathered and iron stained joints					Losing water.
								Same as Above.					Barrel clogged at 8 ft. Losing water
10				C-2	100	50							
								Same as Above.					Barrel clogged at 12.5 ft. Losing water
15				C-3	95	54							Barrel clogged at 17 ft.
								Boring Completed at 17 ft. Backfilled with soil cuttings upon completion.					
20													

Template: GENERAL GES LOGO Proj ID: NORTH BROADWAY ASSEMBLAGE.GPJ

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Printed: 4/17/19

Log of Boring B-2

Project: North Broadway Assemblage			**Project Number: 2019038**
Location: 23 Overlook Terrace, Yonkers, NY			
Date(s) Drilled: **4/9/19 - 4/10/19**	Inspector: **H. Melaouhia, Ph.D. / Mike Torino, P.E.**		Coordinates: **North: East:**
Drilling Agency: **Municipal Testing Laboratory**	Foreman: **Anthony Kappel**		Approximate Surface Elevation (feet): **NA**
Drilling Equipment: **Geoprobe Track Rig**	Drilling Method: **Mud Rotary**		Completion Depth (feet): **30.0** Rock Depth (feet): **25.0**
Casing Size/Type: **3" & 4" Steel**	Size/Type of Bit: **2-7/8" & 3-7/8" Roller Bit**		Sampler Type(s): **2" Split Spoon**
Groundwater Level and Date Measured: **NA / NA**	Hammer Wt/Drop: **140/30" (Auto)**	Casing Hammer Wt/Drop: **140/30" (Auto)**	Size/Type of Core Barrel: **NX**
Boring Location: **See Boring Location Plan (Figure 2)**			No. of Samples: **Dist.: 7 Undist.: 0 Core (ft): 10**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS
0								3" Concrete Slab					Cored through concrete slab
	S-1	1.0	4 6 7 9					FILL: Brown and dark gray coarse to fine Sand, some Gravel, concrete fragments, trace Silt					S-1: Moist
	S-2	0.7	3 4 9 13					Brown medium to fine Sand, some Gravel, some Silt, trace Concrete fragments					S-2: Moist
5	S-3	0.9	7 6 9 9					Brown medium to fine Sand, some Gravel, Silt, trace Brick fragments, roots					S-3: Moist
	S-4	0.9	9 13 9 8					Same as above.					S-4: Moist
	S-5	1.0	7 7 8 9					Gray and brown medium to fine Sand, some Gravel, Silt					S-5: Moist
10	S-6A	0.5	5 5					Same as above.					S-6: Moist. Cased to 15 ft. with 4" casing.
	S-6B	0.5	6 8					NATURAL: Brown medium to fine silty Sand (SM)					
													Rig chatter from 13 to 15 ft.
15	S-7	0.5	8 6 3 7					Brown coarse to fine gravelly Sand (SP-SW)					
													Rig chatter from 17 to 18 ft.
								Cored through Boulders					Cased to 18 ft. with 4" casing
20													

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Printed: 4/22/19

Log of Boring B-2

Project: North Broadway Assemblage | **Project Number: 2019038**

Location: 23 Overlook Terrace, Yonkers, NY

Depth, feet	Soil Samples: Type, Number	Soil Samples: Recov. (ft)	Soil Samples: Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Rock Coring: Recov. (%)	Rock Coring: RQD (%)	Graphic Log	DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS
20				C-1	16	0							
								Presumed same as above.					Cased to 23.5 ft. with 3" casing Advanced to 25 ft with roller bit.
25								Medium hard gray Mica Schist, slight to moderate weathering at joints, trace Quartz and Garnet intrusion					Top 1 foot of rock core is likely decomposed rock
				C-2	83	58							
30								Boring Completed at 30 ft. Backfilled with soil cuttings and patched with concrete upon completion.					
35													
40													

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Printed: 4/22/19

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6 Bayberry Road
Elmsford, NY 10523

ROCK CORE PHOTOGRAPHIC PLATE

Boring No.	Core No.	Depth (ft)	Rec %	RQD %
B-1	C-1	4-8	92	42
B-1	C-2	8-12.5	100	50
B-1	C-3	12.5-17	95	54
B-2	C-1	25-30	83	58

Project Name:	**North Broadway Assemblage**		
Project Location:	10 Baldwin Place and 25 Overlook Terrace, Yonkers, NY		
Dwg No.	Appendix B, Plate 1		
Drawn By:	DJG	**Project No:**	2019038
Ch'ked By:	ZM	**Date:**	4/19/2019