



May 21, 2021

G-4638

Mr. Farzad Ghazvinian
7683 SE 27th St, #178
Mercer Island, WA 98040

**Subject: ADDENDUM LETTER 7
 PROPOSED DEVELOPMENT – LOWER BUILDING
 4270 EAST MERCER WAY
 MERCER ISLAND, WA**

References: See End of Letter

Dear Mr. Ghazvinian:

We met with you at the site today, May 17, 2021, in order to view current subsurface conditions associated with the in-progress re-routing of existing stormwater piping. Based upon that site visit and review of our files we have prepared the following addendum to the conclusions and recommendations presented in the referenced reports for the project development at the lower building pad area.

Site Observations

The contractor has excavated a trench from SE 42nd Place to the approximate location where tie-in to the existing 12-inch stormwater drain is proposed. We estimated that the trench at some locations may be as deep as 14-feet below existing grade. Soils at the trench excavation appear to be primarily sandy SILT with varying amounts of gravel. The trench was dry, having no signs of groundwater seepage. We understand that the contractor has disturbed a relatively large area in their search for the existing piping thereby causing some areas around the connection point to be filled with non-compacted soils. At the area where new (re-route) piping is being installed to the east of the existing stormwater line soils at the trench walls appear to be relatively firm and stable at least below the depth of 3 to 5-feet, as these soils are standing at near vertical to 1/2H:1V inclinations.

Lower Building Subsurface Conditions

We have located our borings in relation to the property line corners on the CES Sheet C1.0 since it appears that this plan delineated the anticipated existing stormwater location and prepared the attached **Plate 3 – REV – Site Plan**. Following review of the site plan related to the stormwater re-routing we note that the existing stormwater trench (to be re-routed) is anticipated to be located in close proximity to our boring B-2. Further, on-site visual observation of the pipe direction and depth below grade indicates that the boring B-2 may have been drilled in an area where previous fills related to the existing stormwater piping are located. Soils observed at the boring B-2 (see attached **Appendix A**) consist of loose and very loose primarily very fine and fine sandy SILT overlying medium dense gray SILT at a depth of around 20-feet below ground surface.

Conclusions and Recommendations

Soils observed at boring locations B-1, B-3 and B-4 suggest that the competent medium dense to dense site soils are present at or around a depth of 5-feet below ground surface. Considering the apparent finding that B-2 may have been located in an area of previous fills related to the existing deep stormwater system it is our opinion that the boring B-2 is anomalous and may only be representative of soil conditions at the trench extents and depths from the earlier stormwater installation. We are not aware of installation records for this stormwater system, especially with regard to trench excavation slopes or construction methods.

At this time, we understand that a permit has been issued for the proposed lower building with the building being constructed on top of augered concrete piles per our earlier recommendations. The construction may proceed using this design at the owner's discretion.

Alternatively, it is our opinion that the building may be supported with pipe (pin) piles at the apparent former trench area and any area disturbed/non-compacted and not currently approved related to the recent stormwater piping removal. At locations where it can be confirmed that the soils at the foundation subgrade level consist of the native undisturbed medium dense to dense site soils and which are not fills related to the former trench or unapproved fills related to the recent stormwater piping removal the building may be supported on typical shallow spread footings which bear on the competent medium dense to dense site soils or on compacted structural fill placed on top of these competent soils. We anticipate that it may be somewhat difficult to determine the subgrades which have been impacted by the trench or the recent pipe removal due to the fact that the apparent trench backfill consists of native soils. Therefore, the owner may consider re-designing the entire foundation to be supported by pin piles. Thereby eliminating the need to determine the transition points from pin piles to spread footing foundations.

In order to determine the transition points from pin piles to spread footing foundations we can recommend implementing one of the following methods:

1. Excavate the entire building pad to the proposed building subgrade level. GEO Group Northwest may then observe the soil conditions and use a probe to determine which areas may be supported by spread footings and which areas will require piling.
2. Production pipe (pin) piles may be driven first at the presumed center of trench location and as piling extends outward from this location the results of driving to meet refusal (depth) along with probing by GEO Group Northwest may be used to determine the areas which may be supported by spread footing foundations.
3. Exploratory borings may be drilled around the apparent trench area in order to help characterize the extent of the trench and disturbed area. Boring results along with probing at the subgrade level by GEO Group Northwest may be used to delineate the areas which will require pipe pile support and the areas which may be supported on spread footing foundations.

We note that our referenced geotechnical report included design recommendations for supporting buildings on spread footings which bear on the underlying medium dense to dense site soils. We refer the designer to these recommendations with regard to re-design for the spread-footing areas. In the following section we present pipe (pin) pile design recommendations which may be implemented for the lower building.

The City of Mercer Island may require that the proposed piling change, if chosen by the owner, will require a re-issuance or approval for the building permit. We recommend that the owner verify whether or not a permit revision is required.

Pipe Pile Foundation Support

The building foundation for the proposed lower building may be revised to derive vertical (bearing) support from driven small diameter pipe (pin) piles which are driven into the underlying dense to very dense soils. We recommend that the proposed crushed rock building pad remain in order to insure resistance to lateral loads as previously discussed. Additionally, we recommend that basement wall locations are supported using two rows of pipe piles, one at the wall toe and one at the wall heel.

Pipe piles should be driven vertically into underlying competent dense to very dense soils until the refusal criteria is reached. Refusal is reached when the rate of penetration for a pile, in seconds per inch, reaches or exceeds the refusal criteria (noted below). Pile sections should be

joined with couplers, or welded together as the pile is advanced. Welding of pile sections and pile caps should be required for piles designed with a component of uplift for seismic resistance. Concrete grade beams and pile caps should be used to transfer building loads to the piles. The following are our recommendations for available pile hammers, pile sizes, recommended refusal criteria and allowable axial bearing capacities to be used by the designer/structural engineer in designing the pile plan:

<u>Pipe Pile Diameter</u>	<u>Pile Specifications</u>	<u>Hammer Size</u>	<u>Hammer Type</u>	<u>Refusal Criteria (Seconds Per Inch)</u>	<u>Allowable Capacity</u>
3-inch	Schedule 40	650 lb	TB-225 (hydraulic)	12	6 tons
4-inch	Schedule 40	850 lb	TB-325 (hydraulic)	16	10 tons

We recommend a load test (ASTM Quick Test - minimum requirement) be performed on at least 3% of the 3-inch or 4-inch piles (5 piles maximum and 1 pile minimum). We recommend that we are retained to be on-site to verify the proper installation of pipe piles including monitoring pile depths, refusal verification and pile load testing.

Provided the pipe piles are driven to the recommended refusal criteria, the estimated total post-construction settlement should be 1/4-inch or less, and the differential settlement across a pile supported structure should be 1/4-inch or less.

The depth to the underlying dense to very dense soils on which driven pipe piles will bear is not known at the lower building pad (N=50). Based upon the borings B-3 and B-1 we anticipate that driven piling depths may range from 20 to 40 feet. We recommend driving test piles or additional subsurface exploration in order to determine the refusal depth for pipe pile support.

We appreciate the opportunity to provide geotechnical consulting regarding the proposed development. Please contact us if there are any questions or concerns.

Sincerely,
GEO GROUP NORTHWEST, INC.



Adam Gaston
Project Engineer



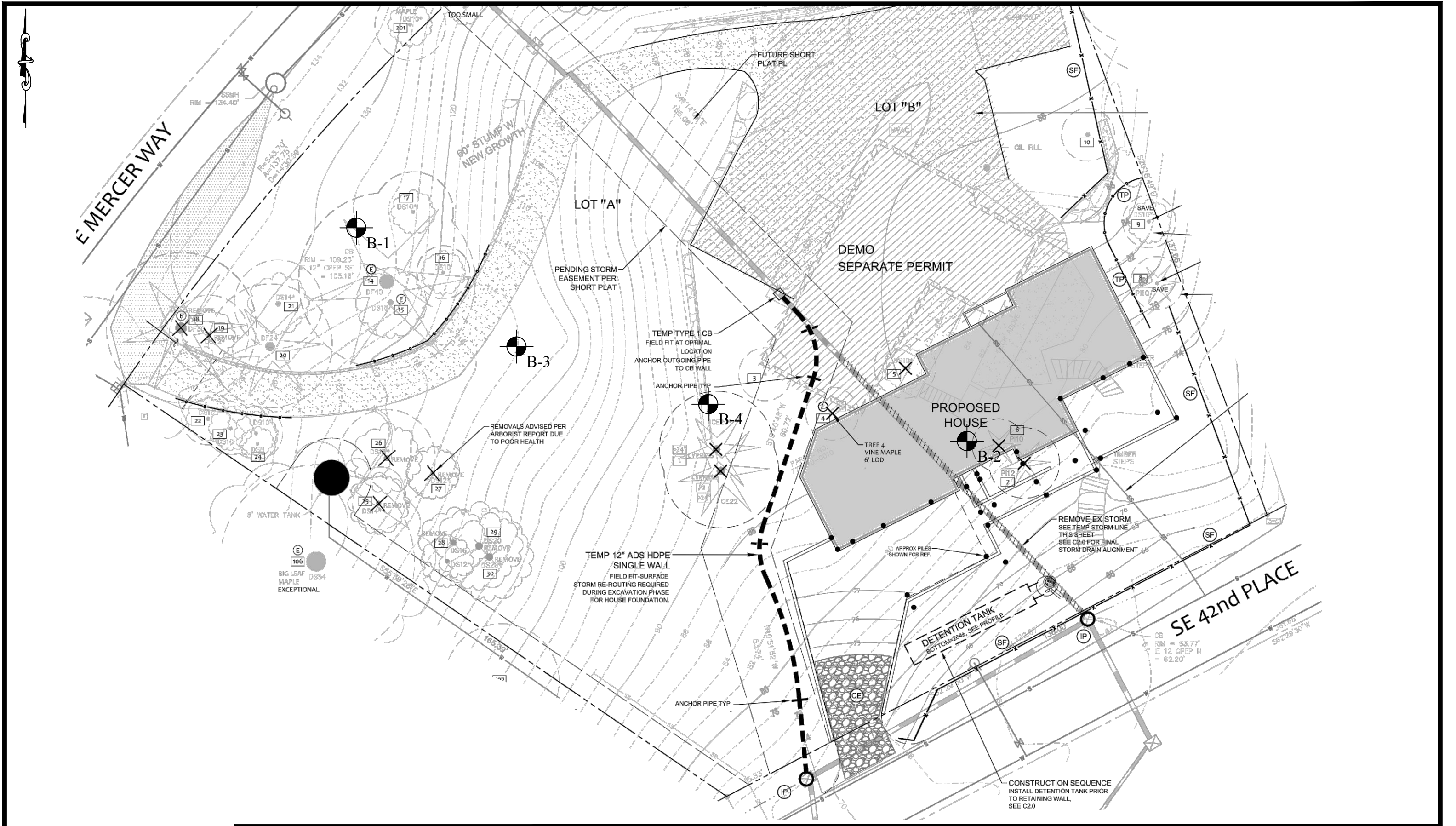
William Chang, P.E.
Principal



Attached: Plate 3-REV – Site Plan
 Appendix A – Boring Logs and USCS Soil Legend

REFERENCES

- “Addendum Letter 6 – Response to Plan Review Comments, Proposed Development – Lower Building, 4270 East Mercer Way, Mercer Island, WA”, GEO Group Northwest, Nov. 13, 2020.
- “Addendum Letter 5 - Response to Plan Review Comments, Proposed Development - Lower Building, 4270 East Mercer Way, Mercer Island, WA”, GEO Group Northwest, June 9, 2020.
- “Addendum Letter #4, Lower Building Development, 4270 East Mercer Way, Mercer Island, WA”, GEO Group Northwest, Nov. 4, 2019.
- “Addendum Letter – Response to Sept. 4, 2019 Review, Proposed Development, 4270 East Mercer Way, Mercer Island, WA”, GEO Group Northwest, Oct. 18, 2019.
- “Addendum Letter – Response to 3rd Party Review, Proposed Development, 4270 East Mercer Way, Mercer Island, WA”, GEO Group Northwest, Aug. 16, 2019.
- “Addendum Letter, Proposed Development, 4270 East Mercer Way, Mercer Island, WA”, GEO Group Northwest, December 27, 2018.
- “Geotechnical Report, Proposed Development, 4270 East Mercer Way, Mercer Island, Washington”, GEO Group Northwest, July 13, 2018.



BASED UPON THE SHEET C1.0 BY CIVIL ENGINEERING SOLUTIONS, 11-3-20.

LEGEND

= BORING NUMBER AND APPROXIMATE B-1 LOCATION



Group Northwest, Inc.

13705 Bel-Red Rd, Bellevue, WA 98005
Phone 425/649-8757 FAX 425/649-8758
Email info@geogroupnw.com

SITE PLAN
PROPOSED DEVELOPMENT
4270 E. MERCER WAY
MERCER ISLAND, WASHINGTON

PROJECT #: G-4638
DATE: 5-17-21
DRAWN: AG
CHECKED: WC
SCALE: ~ 1" = 20'
PLATE: 3-REV

APPENDIX A
BORING LOGS AND USCS SOIL LEGEND
G-4638

LEGEND OF SOIL CLASSIFICATION AND PENETRATION TEST

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)								
MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA				
COARSE-GRAINED SOILS More Than Half by Weight Larger Than No. 200 Sieve	GRAVELS (More Than Half Coarse Grains Larger Than No. 4 Sieve)	CLEAN GRAVELS <small>(little or no fines)</small>	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURE, LITTLE OR NO FINES	DETERMINE PERCENTAGES OF GRAVEL AND SAND FROM GRAIN SIZE DISTRIBUTION CURVE COARSE GRAINED SOILS ARE CLASSIFIED AS FOLLOWS: < 5% Fine Grained: GW, GP, SW, SP > 12% Fine Grained: GM, GC, SM, SC 5 to 12% Fine Grained: use dual symbols	$C_u = (D_{60} / D_{10})$ greater than 4 $C_c = (D_{30}^2) / (D_{10} * D_{60})$ between 1 and 3		
		DIRTY GRAVELS <small>(with some fines)</small>	GP	POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES LITTLE OR NO FINES		NOT MEETING ABOVE REQUIREMENTS		
		SANDS (More Than Half Coarse Grains Smaller Than No. 4 Sieve)	CLEAN SANDS <small>(little or no fines)</small>	SW		WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE. or P.I. LESS THAN 4
			DIRTY SANDS <small>(with some fines)</small>	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE. or P.I. MORE THAN 7	
	More Than Half by Weight Larger Than No. 200 Sieve	SANDS (More Than Half Coarse Grains Smaller Than No. 4 Sieve)	CLEAN SANDS <small>(little or no fines)</small>	SP		POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = (D_{60} / D_{10})$ greater than 6 $C_c = (D_{30}^2) / (D_{10} * D_{60})$ between 1 and 3	
			DIRTY SANDS <small>(with some fines)</small>	SM		SILTY SANDS, SAND-SILT MIXTURES	NOT MEETING ABOVE REQUIREMENTS	
	FINE-GRAINED SOILS More Than Half by Weight Smaller Than No. 200 Sieve	SILTS (Below A-Line on Plasticity Chart, Negligible Organic)	Liquid Limit < 50%	ML		INORGANIC SILTS, ROCK FLOUR, SANDY SILTS OF SLIGHT PLASTICITY		
			Liquid Limit > 50%	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOIL		
		CLAYS (Above A-Line on Plasticity Chart, Negligible Organic)	Liquid Limit < 30%	CL		INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, CLEAN CLAYS		
			Liquid Limit > 50%	CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
ORGANIC SILTS & CLAYS (Below A-Line on Plasticity Chart)		Liquid Limit < 50%	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY				
		Liquid Limit > 50%	OH	ORGANIC CLAYS OF HIGH PLASTICITY				
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS				

SOIL PARTICLE SIZE				
FRACTION	U.S. STANDARD SIEVE			
	Passing		Retained	
	Sieve	Size (mm)	Sieve	Size (mm)
SILT / CLAY	#200	0.075		
SAND				
FINE	#40	0.425	#200	0.075
MEDIUM	#10	2	#40	0.425
COARSE	#4	4.75	#10	2
GRAVEL				
FINE	19	#4	4.75	
COARSE	76	19	19	
COBBLES	76 mm to 203 mm			
BOULDERS	> 203 mm			
ROCK FRAGMENTS	> 76 mm			
ROCK	>0.76 cubic meter in volume			

GENERAL GUIDANCE OF SOIL ENGINEERING PROPERTIES FROM STANDARD PENETRATION TEST (SPT)						
SANDY SOILS				SILTY & CLAYEY SOILS		
Blow Counts N	Relative Density %	Friction Angle ϕ , degree	Description	Blow Counts N	Unconfined Strength Q_u , tsf	Description
0 - 4	0 - 15		Very Loose	< 2	< 0.25	Very soft
4 - 10	15 - 35	26 - 30	Loose	2 - 4	0.25 - 0.50	Soft
10 - 30	35 - 65	28 - 35	Medium Dense	4 - 8	0.50 - 1.00	Medium Stiff
30 - 50	65 - 85	35 - 42	Dense	8 - 15	1.00 - 2.00	Stiff
> 50	85 - 100	38 - 46	Very Dense	15 - 30	2.00 - 4.00	Very Stiff
				> 30	> 4.00	Hard

GEO Group Northwest, Inc.
 Geotechnical Engineers, Geologists, &
 Environmental Scientists

13240 NE 20th Street, Suite 10
 Phone (425) 649-8757

Bellevue, WA 98005
 Fax (425) 649-8758

PLATE A1

BORING NO. B - 1

Logged By: AG
 Drilled By: CN

Date Drilled: 04/23/2018

Surface Elev. 128' +/- 1'

Depth ft.	Elevation	USCS Code	Description	Sample		SPT Blow Counts	Water Content %	Other Tests/ Comments
				Loc.	No.			
		ML	Tan SILT with some fine sand, moist, very loose	I		1,1,2 (N=3)	23.2	
		ML	Tan very fine sandy SILT, moist, loose	I		1,3,5 (N=8)	17.6	
5		ML	Tan very fine sandy SILT, moist, medium dense	I		3,5,7 (N=12)	10.1	
		ML	Tan very fine sandy SILT, moist, medium dense	I		5,11,15 (N=26)	22.0	
10		ML	Tan very fine sandy SILT, moist, medium dense to dense	I		9,14,15 (N=29)	17.5	
		ML	Tan very fine sandy SILT, moist, medium dense	I		8,11,14 (N=25)	16.9	
15		ML/SP	Tan very fine sandy SILT and SAND, moist, dense	I		5,15,16 (N=31)	8.9	
		ML	Tan very fine and fine sandy SILT, moist, medium dense	I		4,9,16 (N=25)	20.6	
20		SP/SM	Gray fine SAND with some silt, moist, very dense	I		8,23,32 (N=55)	6.6	
			Depth of boring: 21.5 feet below ground surface (bgs) No groundwater seepage Drilling Method: Hollow-stem auger Sampling Method: 2-inch-O.D. standard penetration sampler driven using a 140 lb. hammer with a 30-inch drop (cathead).					
25								

LEGEND: I 2" O.D. SPT Sampler
 II 3" O.D. California Sampler

▽ Water Level noted during drilling
 ▼ Water Level estimated at later time, as noted



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BORING LOG

PROPOSED DEVELOPMENT
 4270 E MERCER WAY
 MERCER ISLAND, WA

JOB NO. G-4638

DATE 06/06/2018

PLATE A2



BORING NO. B - 2



Logged By: AG
 Drilled By: CN

Date Drilled: 04/23/2018

Surface Elev. 81' +/- 1'

Depth ft.	Elevation	USCS Code	Description	Sample		SPT Blow Counts	Water Content %	Other Tests/ Comments
				Loc.	No.			
		ML	Brown very fine sandy SILT, moist, loose	I		1,2,2 (N=4)	15.5	
		ML	Brown very fine and fine sandy SILT with occ. fine gravel, wet, very loose	I		1,1,2 (N=3)	19.1	
5		ML	Brown very fine sandy SILT with occ. fine gravel, wet, very loose	I		1,1,1 (N=2)	22.2	
		ML	Brown very fine sandy SILT with occ. fine gravel, wet, very loose	I		1,1,1 (N=2)	25.4	
10		ML	Brown and gray very fine sandy SILT, wet, loose	I		1,1,5 (N=6)	19.4	
		ML	Brown and gray very fine sandy SILT with occ. fine gravel, wet, loose, some small charcoal pieces	I		3,4,5 (N=9)	20.9	
15		ML	Brown very fine sandy SILT with occ. gravel, wet, loose	I		1,3,4 (N=7)	21.4	
		ML	Brown very fine sandy SILT becoming gray SILT, wet, loose	I		1,2,3 (N=5)	22.2	
20		ML	Gray massive SILT, moist, medium dense	I		1,6,12 (N=18)	36.7	
		ML	Gray massive SILT, moist, medium dense	I		2,6,8 (N=14)	37.5	
25			Continued on plate A4					

LEGEND:  2" O.D. SPT Sampler
 3" O.D. California Sampler

 Water Level noted during drilling
 Water Level estimated at later time, as noted



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BORING LOG

PROPOSED DEVELOPMENT
 4270 E MERCER WAY
 MERCER ISLAND, WA



JOB NO. G-4638 DATE 06/06/2018 PLATE A3



BORING NO. B - 2

Logged By: AG
 Drilled By: CN

Date Drilled: 04/23/2018

Depth ft.	Elevation	USCS Code	Description	Sample		SPT Blow Counts	Water Content %	Other Tests/ Comments
				Loc.	No.			
25		ML	continued from sheet A3 Gray massive SILT, moist, medium dense	I		3,8,13 (N=21)	35.4	
		ML	Gray massive SILT, moist, medium dense	I		6,9,14 (N=23)	33.3	
30			Depth of boring: 29.5 feet below ground surface (bgs), driller refusal No groundwater seepage measured at completed borehole - apparent wet soils beginning around 5-feet bgs suggest slight/small perched seepage zones may be present Drilling Method: Hollow-stem auger Sampling Method: 2-inch-O.D. standard penetration sampler driven using a 140 lb. hammer with a 30-inch drop (cathead).					
35								
39								

LEGEND:  2" O.D. SPT Sampler
 3" O.D. California Sampler

 Water Level noted during drilling
 Water Level estimated at later time, as noted



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BORING LOG

PROPOSED DEVELOPMENT
 4270 E MERCER WAY
 MERCER ISLAND, WA

JOB NO. G-4638 DATE 06/06/2018 PLATE A4



BORING NO. B - 3



Logged By: AG
 Drilled By: CN

Date Drilled: 06/22/2018

Surface Elev. 113' +/- 1'

Depth ft.	Elevation	USCS Code	Description	Sample		SPT Blow Counts	Water Content %	Other Tests/ Comments
				Loc.	No.			
		ML	Tan very fine sandy SILT, dry, loose	I		2,3,5 (N=8)	11.6	
		ML	Tan very fine sandy SILT, moist, loose	I		1,1,2 (N=3)	19.2	
5		ML	Tan very fine sandy SILT, moist, medium dense	I		3,8,10 (N=18)	17.0	
		ML	Tan very fine sandy SILT, moist, medium dense	I		6,5,14 (N=19)	14.7	
10		ML	Tan very fine sandy SILT, moist, dense	I		6,11,21 (N=32)	16.1	
		SP/SM	Gray fine silty SAND and fine SAND with some silt, moist, medium dense to dense	I		5,10,17 (N=27)	4.4	
15		SP/SM- ML	Interbedded gray fine SAND with some silt and SILT, moist to dry, dense	I		9,17,28 (N=45)	5.8	
20		SM/ML	Gray very fine silty SAND / sandy SILT, moist to dry, very dense	I		13,23,29 (N=52)	4.3	
25	Depth of boring: 21.5 feet below ground surface (bgs) No groundwater seepage Drilling Method: Hollow-stem auger Sampling Method: 2-inch-O.D. standard penetration sampler driven using a 140 lb. hammer with a 30-inch drop (cathead).							

LEGEND:  2" O.D. SPT Sampler
 3" O.D. California Sampler

 Water Level noted during drilling
 Water Level estimated at later time, as noted



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BORING LOG

PROPOSED DEVELOPMENT
 4270 E MERCER WAY
 MERCER ISLAND, WA

JOB NO. G-4638

DATE 06/26/2018

PLATE A5

BORING NO. B - 4

Logged By: AG
 Drilled By: CN

Date Drilled: 06/22/2018

Surface Elev. 90' +/- 1'

Depth ft.	Elevation	USCS Code	Description	Sample		SPT Blow Counts	Water Content %	Other Tests/ Comments
				Loc.	No.			
5		ML	Tan gravelly fine sandy SILT with roots, moist, medium dense	I		5,7,9 (N=16)	7.7	
		ML	Tan very fine sandy SILT, moist, medium dense	I		2,4,6 (N=10)	22.6	
		ML	Gray interbedded very fine sandy SILT and SILT, moist, medium dense	I		7,9,11 (N=20)	12.2	
		SM	Gray silty fine SAND with occasional gravel, moist, dense	I		8,17,18 (N=35)	7.7	
		SP/ML	Gray interbedded medium SAND and sandy SILT, moist to wet, dense	I		6,11,21 (N=32)	14.6	
10								
		ML	Gray sandy SILT, wet, dense	I		12,17,20 (N=37)	22.5	
15								
		ML	Gray SILT, moist, dense	I		11,16,24 (N=40)	36.4	Little Recovery
20								Driller add water
25								
			Depth of boring: 21.5 feet below ground surface (bgs) No groundwater seepage Drilling Method: Hollow-stem auger Sampling Method: 2-inch-O.D. standard penetration sampler driven using a 140 lb. hammer with a 30-inch drop (cathead).					

LEGEND: 2" O.D. SPT Sampler
 3" O.D. California Sampler

Water Level noted during drilling
 Water Level estimated at later time, as noted



Group Northwest, Inc.

Geotechnical Engineers, Geologists, &
 Environmental Scientists

BORING LOG

PROPOSED DEVELOPMENT
 4270 E MERCER WAY
 MERCER ISLAND, WA

JOB NO. G-4638

DATE 06/26/2018

PLATE A6