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November 16, 2018

Fat Boy Construction
319 Martin Street
Steilacoom, Washington 98388
(206) 769-7664

Attn: Mr. Mike Boyle

Geotechnical Report Addendum
Proposed Residential Development
3603 West Mercer Way
Mercer Island, Washington
Parcel No: 3623500260
Doc ID: FatBoyCon.WMercerWay.RGA(2)

INTRODUCTION

This second geotechnical report addendum summarizes our recent subsurface explorations requested by the City of Mercer Island (the City) geotechnical third-party reviewer, addresses plan review comments from the geotechnical review and the building review and updates our previous geotechnical report. We have previously competed a *Preliminary Geotechnical Engineering Report* dated March 3, 2016 and a *Geotechnical Report Addendum* dated October 6, 2017. Our understanding of the project is based on our discussions with you, a review of the preliminary plans provided by you, our subsurface explorations, our May 20, 2016, December 30, 2016 and September 5, 2018 site visits, and our experience in the area.

Our previous documents assumed the project consisted of constructing a new garage at the top of the slope above the residence, off the driveway that provides access for an adjacent neighbor. The garage was to be connected to the existing house through an elevator constructed into the slope with shoring and a new covered path between the elevator base and the house. We now understand that the garage and elevator design remains the same, but the existing residence will also be replaced with a new structure. This addendum provides additional recommendations for the new structure requested in the comments from the third-party reviewer and the building reviewer from the interactive pdf used by the City for its permit process.

SUBSURFACE CONDITIONS

Recent Subsurface Explorations

On September 5, 2018, a geologist from GeoResources, LLC (GeoResources) visited the site and monitored the drilling of two borings, B-101 and B-102 to depths of about 51.5 and 21.5 feet, respectively, below the existing ground surface, logged the subsurface conditions encountered, and obtained representative soil samples. The borings were drilled by a licensed driller operating a small track-mounted drill rig and an Acker drill, both using hollow-stem auger. We previously drilled the site but were requested to return by the third-party reviewer retained by the City.

The specific numbers, locations, and depths of our explorations were based on the configuration of the proposed development and were adjusted in the field based on consideration for underground utilities, existing site conditions, site access limitations, the direction of the reviewers, and encountered stratigraphy. Drilling in these locations was difficult and required effort well above what would be considered usual for this type of project. Representative soil samples obtained from the boring and hand augers were placed in sealed plastic bags and then taken to a laboratory for further examination and testing as deemed necessary. The borings were then backfilled with bentonite chips and abandoned.

During drilling, soil samples were obtained at 2.5 and 5-foot depth intervals in accordance with Standard Penetration Test (SPT) per the test method outlined by ASTM: D-1586. The SPT method consists of driving a standard 2-inch-diameter split-spoon sampler 18-inches into the soil with a 140-pound hammer. The number of blows required to drive the sampler through each 6-inch interval is counted, and the total number of blows struck during the final 12 inches is recorded as the Standard Penetration Resistance, or “SPT blow count”. The resulting Standard Penetration Resistance values indicate the relative density of granular soils and the relative consistency of cohesive soils.

The subsurface explorations performed as part of this evaluation indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. Furthermore, the nature and extent of such variation would not become evident until additional explorations are performed or until construction activities have begun. Based on our experience in the area and extent of prior explorations in the area, it is our opinion that the soils encountered in the exploration are generally representative of the soils at the site.

Subsurface Conditions

Our recent borings encountered subsurface conditions that generally confirmed the mapped geology at the site and were consistent with subsurface conditions encountered in our pervious borings drilled on the site. In boring B-101, at the garage location, we encountered approximately 7.5 feet of grey silty sand/sandy silt in a medium dense and moist condition overlying varying layers of silty sand and sandy silt in a dense and moist condition to the full depth explored. We interpret these soils to be fine grained deposits, glacially consolidated lacustrine deposits typically locally referred to as the Lawton Clay.

Boring B-102 was completed adjacent to the existing residence near the proposed footprint of the new structure, in the lower portion of the site. We observed about 5 feet of medium dense silty sand in a moist condition overlying dense silty sand and sandy silt layers to the full depth explore. In our opinion these soils appear to consist of weathered soils overlying glacially consolidate lacustrine deposits.

The soils encountered were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM D: 2488. The USCS is included in Appendix A as Figure A-1. The approximate locations and numbers of our explorations are shown on the attached Site and Exploration Map, included as Figure 1, while the descriptive logs of our explorations are included as Figures A-2 through A-3.

Laboratory Testing

Geotechnical laboratory tests were performed on select samples retrieved from the borings to determine soil index and engineering properties encountered. Laboratory testing included visual soil classification per ASTM D: 2488, moisture content determinations per ASTM D: 2216, and grain size analyses per ASTM D: 422 standard procedures. The results of the laboratory tests are included in Appendix B.

Groundwater Conditions

Evidence of groundwater was observed in boring B-101, 30 feet below the existing ground surface at the time of drilling. We interpret the groundwater observed to be indicative of the local groundwater elevation at the site and corresponds with seeps observed off site to the south along the lower portion of driveway. The groundwater is likely perched on a layer of dense/stiff silt. Perched groundwater typically develops when the vertical infiltration of precipitation through a more permeable soil is slowed at depth by a deeper, less permeable soil type. We anticipate fluctuations in the local groundwater levels will occur in response to precipitation patterns, off-site construction activities, and site utilization. No groundwater was observed in boring B-102 and no groundwater was observed on the slope on the site during our site visits.

ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our data review, site reconnaissance, recent subsurface explorations and our experience in the area, it is our opinion that the site is suitable for the proposed development, provided our recommendations in this and our previous reports are followed.

Based on the location of the proposed garage, we anticipate deep foundations will be required to satisfy the structural setback for all the foundation element not tied into the elevator shaft. The new residence will be at the toe of the slope and will likely require the wall at the toe to include a catchment wall. Applicable earth pressures were included in our first addendum.

Per Mercer Island City Code 19.07.060.D.2, the development *"has been designed so that the risk to the lot and adjacent property is mitigated such that the site is determined to be safe*." All risk cannot be eliminated, and appropriate construction practices will be extremely important for the successful completion of this project. Pertinent conclusions and additional geotechnical recommendations for the design and construction of the proposed development as we currently understand it are presented below.

Liquefaction

The City third party reviewer asked for an assessment of the liquefaction potential of the soils underlying the foundations of the new residence in the lower portion of the site. Based on the density of the soils and the lack of groundwater encountered in boring B-102, it is our opinion that the risk for liquefaction to occur at the site is low.

Shallow Foundation Support

Based on the encountered subsurface soil conditions observed in boring B-102, we recommend that spread footings be founded on the medium dense native soils encountered at depth, or on structural fill that extends to suitable native soils. We understand the existing residence is similarly founded and has not had bearing capacity or settlement issues.

The soil at the base of the excavations should be disturbed as little as possible. All loose, soft or unsuitable material should be removed. If material is over excavated below a footing it should be replaced with structural fill, controlled density fill (CDF) or structural concrete. A rat slab of CDF could be placed after excavation to prevent disturbance of the subgrade. A representative from our firm should observe the foundation excavations to determine if suitable bearing surfaces have been prepared. Structural fill should be selected and placed in accordance with our original geotechnical report.

We recommend a minimum width of 2 feet for isolated footings and at least 16 inches for continuous wall footings. All footing elements should be embedded at least 18 inches below grade for frost protection. Footings founded on the medium dense native soils can be designed for a capacity of 2,500 psf. For structural fill a 1H:1V prism outside the footing down to the outwash should be maintained. For CDF a 0.5H:1V prism should be maintained.

Lateral loads may be resisted by friction on the base of footings and floor slabs and as passive pressure on the sides of footings. We recommend that an allowable coefficient of friction of 0.30 be used to calculate friction between the concrete and the underlying soil. Passive pressure may be determined using an allowable equivalent fluid density of 300 pcf (pounds per cubic foot). Factors of safety have been applied to these values. We have included a typical wall drainage and backfilling detail as Figure 2.

We estimate that settlements of footings designed and constructed as recommended will be less than 1-inch, for the anticipated load conditions, with differential settlements between comparably loaded footings of 1/2 inch or less. Most of the settlements should occur essentially as loads are being applied. However, disturbance of the foundation subgrade during construction could result in larger settlements than predicted.

Floor Slab Support

If slabs-on-grade floors are used, they should be supported on the medium dense native soils or on structural fill prepared as described in our geotechnical report. Areas of old fill material should be evaluated during grading activity for suitability of structural support. Areas of significant organic debris should be removed.

We recommend that floor slabs be directly underlain by a minimum 4-inch thick pea gravel or clean 5/8-inch crushed rock. This layer should be placed and compacted to an unyielding condition and should contain less than 2 percent fines. A synthetic vapor retarder is recommended to control moisture migration through the slabs. This is of particular importance where the slabs are underlain by the lake sediments, or where moisture migration through the slab is an issue, such as where adhesives are used to anchor carpet or tile to the slab.

A subgrade modulus of 350 kcf (kips per cubic foot) may be used for floor slab design. We estimate that settlement of the floor slabs designed and constructed as recommended, will be 1/2 inch or less over a span of 50 feet.

Temporary Excavations

All job site safety issues and precautions are the responsibility of the contractor providing services/work. The following cut/fill slope guidelines are provided for planning purposes only. Temporary cut slopes will likely be necessary during grading operations or utility installation.

All excavations at the site associated with confined spaces, such as utility trenches and retaining walls, must be completed in accordance with local, state, or federal requirements. Based on current Washington State Safety and Health Administration (WSHA) regulations, the upper soils on the site would be classified as Type C soils, whereas the deeper, glacially consolidated soils would be classified as Type B soils because of their dense nature.

According to WSHA, for temporary excavations of less than 20 feet in depth, the side slopes in Type C soils should be laid back at a slope inclination of 1.5H:1V (Horizontal: Vertical) or flatter from the toe to the crest of the slope whereas the lower type B soils should be sloped at a maximum inclination of 1H:1V. All exposed slope faces should be covered with a durable reinforced plastic membrane during construction to prevent slope raveling and rutting during periods of precipitation. These guidelines assume that all surface loads are kept at a minimum distance of at least one half the depth of the cut away from the top of the slope and that significant seepage is not present on the slope face. Flatter cut slopes will be necessary where significant raveling or seepage occurs, or if construction materials will be stockpiled along the slope crest.

Where it is not feasible to slope the site soils back at these inclinations, a retaining structure/shoring should be considered. Where retaining structures are greater than 4-feet in height (bottom of footing to top of structure) or have slopes of greater than 15 percent above them, they should be engineered per Washington Administrative Code (WAC 51-16-080 item 5). This information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that GeoResources assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

Catchment Wall

We anticipate that the rear wall of the residence will be constructed close enough to the toe of the slope that the standard IBC setback criteria we provided will not be met. In order to mitigate this, the rear wall could be constructed as a catchment wall. If designed as such, no openings should be constructed in the wall and it should be designed to support an equivalent fluid pressure of 100 psf for a height of 6 feet above the final proposed grades. This loading is temporary because the wall should be maintained throughout the year and any buildup of material behind the wall should be removed.

Geofoam Backfill and Drainage

At the garage location we recommend that lightweight fill, like Geofoam be used to lower the earth pressures on the structural walls. Geofoam consists of expanded polystyrene with a unit weight ranging from 1 to 3 pounds per cubic foot. Typically the equivalent fluid weight from the geofoam would also be assumed to be 3 psf where the slope behind it is stable or typically about a 1H:1V inclination. For the area around the garage adjacent to the property line the temporary cut slope will likely be steeper and we recommend an equivalent fluid weight of 35 pcf be used in this area. For this project we recommend geofoam meeting the minimum requirements of ASTM D:6817 Type EPS22, based on the deformation properties, but this should be confirmed by the structural engineer. In addition, if carpenter ants are likely to be present on site we recommend using geofoam that has been treated to prevent insect infestation.

We recommend the geofoam blocks extend horizontally a distance equal to the slope height and vertically at least 1 foot below the finish grades, assuming 1 foot is required for the slab and capillary break. The geofoam blocks should be placed in a staggered pattern so that the joints between the blocks do not align with the underlying or overlying rows. Gaps of about 1/2 -inch between the geofoam blocks should be completely filled as the blocks are placed with a free draining, granular material, such as pea gravel. The gaps must be large enough to allow the drainage materiel to completely fill the gaps.

A minimum of 6-inches of drainage material should be placed on the slope behind the geofoam and below the lowest row of geofoam. The drainage material below the bottom row of geofoam blocks should be graded so that the blocks sit level and a perforated or slotted drain pipe could be placed at the bottom of the excavation if groundwater is encountered. If a drain is required it should be conveyed to the same point as the other drains at the site. Where the perforated/slotted pipe connects to a tightline, a structure or check-dam should be utilized.

Geofoam is subject to deterioration if exposed to petroleum products, such as gasoline or diesel fuel. We recommend that landscape maintenance equipment using these fuels not be allowed near areas of geofoam. During construction special care must be taken to avoid spilling fuel on the geofoam. A geotextile separator per WSDOT specification 9-33.2 could be placed over the geofoam to reduce the risk from spills, particularly if a gravel driveway is to be constructed. A minimum of 1-foot of separation should be maintained over the geofoam to the final grades where the blocks are below the garage or driveway.

LIMITATIONS

We have prepared this report for use by Mr. Mike Boyle of Fat Boy Construction and other members of the design team, for use in the design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on our subsurface explorations, data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

◆ ◆ ◆

We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

Respectfully submitted,
GeoResources, LLC

DANA CHRISTOPHER BIGGERSTAFF
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11/16/2018

Engineering Geologist
925
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11/16/2018

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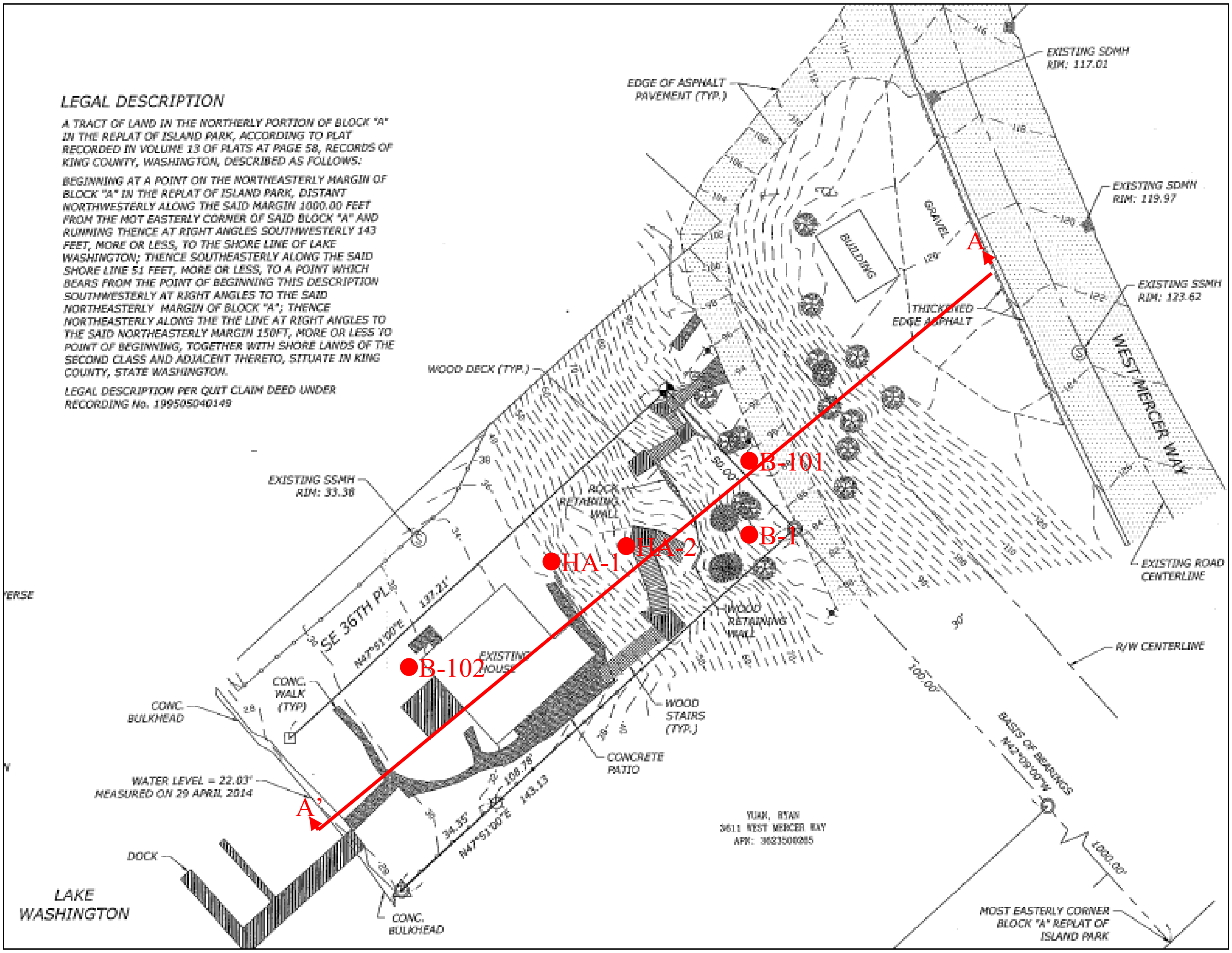
Principal

KSS:DCB/dcb
DocID: FatBoyCon.WMercerWay.RGA(2)
Attachments:
- Figure 1: Site & Exploration Plan
- Figure 2: Typical Wall Drainage and Backfilling
- Appendix "A" – Recent Subsurface Explorations
- Appendix "B" – Recent Laboratory Test results



LEGAL DESCRIPTION

A TRACT OF LAND IN THE NORTHERLY PORTION OF BLOCK "A" IN THE REPLAT OF ISLAND PARK, ACCORDING TO PLAT RECORDED IN VOLUME 13 OF PLATS AT PAGE 58, RECORDS OF KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE NORTHEASTERLY MARGIN OF BLOCK "A" IN THE REPLAT OF ISLAND PARK, DISTANT NORTHWESTERLY ALONG THE SAID MARGIN 1000.00 FEET FROM THE MOT EASTERLY CORNER OF SAID BLOCK "A" AND RUNNING THENCE AT RIGHT ANGLES SOUTHWESTERLY 143 FEET, MORE OR LESS, TO THE SHORE LINE OF LAKE WASHINGTON; THENCE SOUTHEASTERLY ALONG THE SAID SHORE LINE 51 FEET, MORE OR LESS, TO A POINT WHICH BEARS FROM THE POINT OF BEGINNING THIS DESCRIPTION SOUTHWESTERLY AT RIGHT ANGLES TO THE SAID NORTHEASTERLY MARGIN OF BLOCK "A"; THENCE NORTHEASTERLY ALONG THE THE LINE AT RIGHT ANGLES TO THE SAID NORTHEASTERLY MARGIN 150FT, MORE OR LESS TO POINT OF BEGINNING, TOGETHER WITH SHORE LANDS OF THE SECOND CLASS AND ADJACENT THERETO, SITUATE IN KING COUNTY, STATE WASHINGTON.

LEGAL DESCRIPTION PER QUIT CLAIM DEED UNDER RECORDING No. 199505040149

Approximate Site Location

(site plan by Beyler Consulting,9/11/2014)

Not to Scale

● B-1 Approximate location and number of boring

Geologic Cross Section

N
W E
S

Not to Scale

GeoResources, LLC

5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
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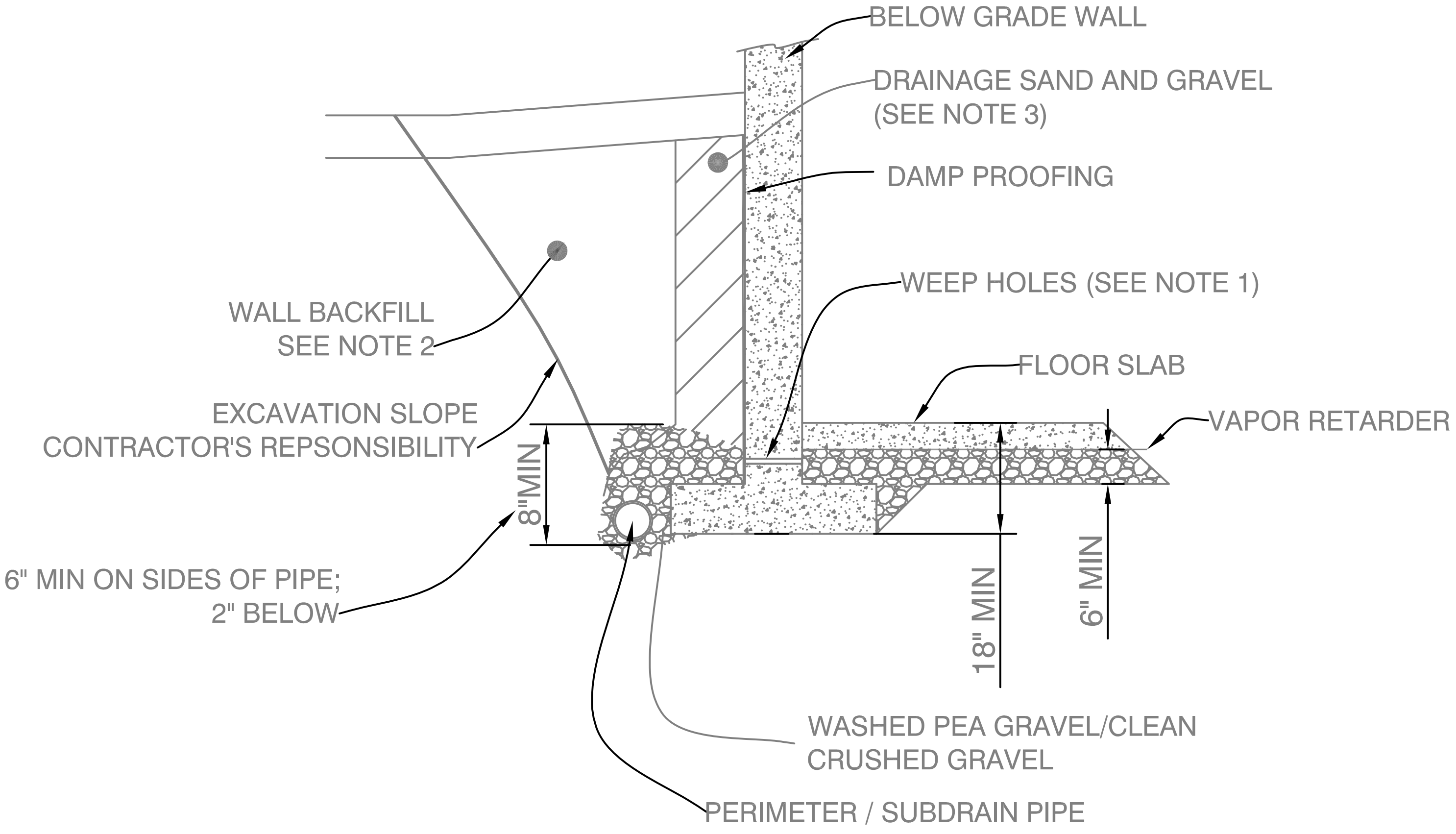
Site and Exploration Plan

Proposed Detached Garage
3603 W Mercer Way
Mercer Island, Washington

Job: FatBoyConstruction.WMercerWay.F	October 2018	Figure 1



NOTES

1. Washed pea gravel/crushed rock beneath floor slab could be hydraulically connected to perimeter/subdrain pipe. Use of 1" diameter weep holes as shown is one applicable method. Crushed gravel should consist of 3/4" minus. Washed pea gravel should consist of 3/8" to No. 8 standard sieve.

2. Wall backfill should meet WSDOT Gravel Backfill for walls Specification 9-03-12(2).

3. Drainage sand and gravel backfill within 18" of wall should be compacted with hand-operated equipment. Heavy equipment should not be used for backfill, as such equipment operated near the wall could increase lateral earth pressures and possibly damage the wall. The table below presents the drainage sand and gravel gradation.

4. All wall backfill should be placed in layers not exceeding 4" loose thickness for light equipment and 8" for heavy equipment and should be densely compacted. Beneath paved or sidewalk areas, compact to at least 95% Modified Proctor maximum density (ASTM: 01557-70 Method C). In landscaping areas, compact to 90% minimum.

5. Drainage sand and gravel may be replaced with a geocomposite core sheet drain placed against the wall and connected to the subdrain pipe. The geocomposite core sheet should have a minimum transmissivity of 3.0 gallons/minute/foot when tested under a gradient of 1.0 according to ASTM 04716.

6 The subdrain should consist of 4" diameter (minimum), slotted or perforated plastic pipe meeting the requirements of AASHTO M 304; 1/8-inch maximum slot width; 3/16- to 3/8-inch perforated pipe holes in the lower half of pipe, with lower third segment unperforated for water flow; tight joints; sloped at a minimum of 6"/100' to drain; cleanouts to be provided at regular intervals.

7. Surround subdrain pipe with 8 inches (minimum) of washed pea gravel (2" below pipe) or 5/8" minus clean crushed gravel. Washed pea gravel to be graded from 3/8-inch to No.8 standard sieve.

8. See text for floor slab subgrade preparation.

Materials

Drainage Sand and Gravel

Sieve Size	% Passing by Weight
3/4 "	100
No 4	28-56
No 8	20-50
No 50	3-12
No 100	0-2

3/4" Minus Crushed Gravel

Sieve Size	% Passing by Weight
3/4 "	100
1/2"	75 - 100
1/4"	0 - 25
No 100	0 - 2
(by wet sieving)	(non-plastic)

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Wall Drainage and Backfilling Detail

Doc ID:

Figure 2

Appendix “A”

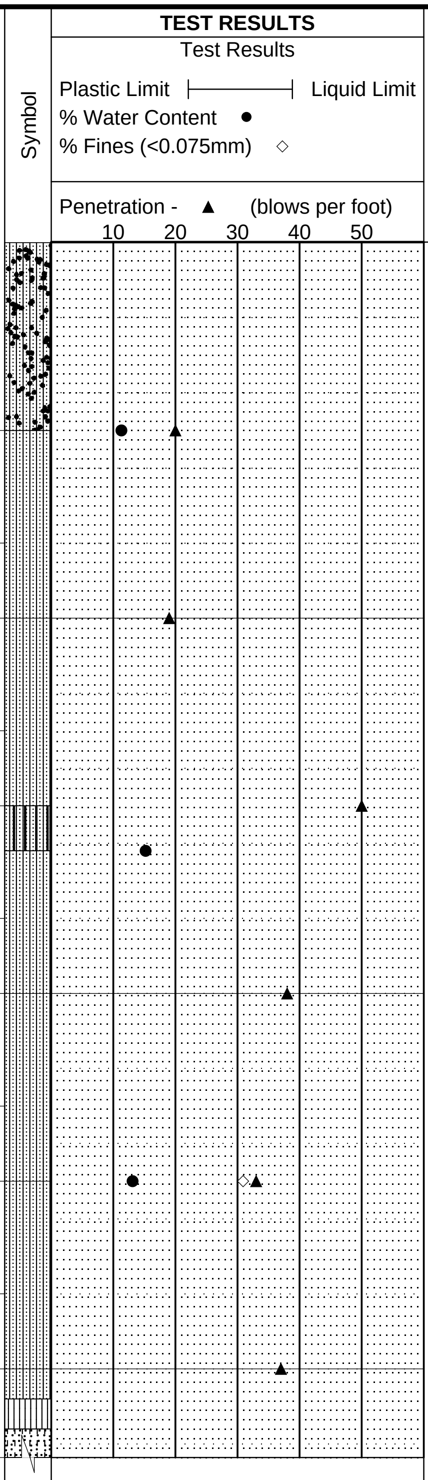
Subsurface Explorations

TOTAL DEPTH: 51.5
TOP ELEVATION: 85
LATITUDE:
LONGITUDE:

DRILLING METHOD: HSA
DRILLING COMPANY: Boretec 1, Inc
DRILL RIG: RCT 60 Track Drill
NOTES:

LOGGED BY: JLK
HAMMER TYPE: cathead
HAMMER WEIGHT: 140 lbs

Depth	Elevation	SOIL DESCRIPTION	DRILLING NOTES	Sample	Blow Count	Ground Water
0	85	Light brown silty SAND with gravel, roots (moist) (SM)				
2.5	82.5	Light grey silty SAND with minor organics (moist) (SM)		1	6 9 11	
5	80	Dark grey to grey silty SAND, minor organics (moist to damp) (SM)	Drilling on root at 3ft	2	8 8 11	
7.5	77.5	Dark grey brown silty SAND/sandy SILT, minor organics (damp) (SM/ML)		3a	11 25 25	
		Slightly mottled grey silty SAND, minor organics (moist) (SM)		3b		
10	75	(moist to damp)		4	15 17 21	
12.5	72.5	Slightly mottled grey brown silty SAND (moist to damp) (SM)		5	15 15 18	
15	70	(damp)		6a	7 14 23	
		Grey SILT (damp) (ML)		6b		
		Grey SAND with silt (moist to damp) (SP-SM)		6c		



NOTES
1. Refer to log key for definition of symbols, abbreviations and codes
2. USCS designation is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. N.E. = Not Encountered
5. ATD = At the Time of Drilling

Proposed Garage and Single Family Residence
3603 West Mercer Way
Mercer Island, Washington

LOG OF BORING B-101

JOB: FatboyCon.WMercerWay *Sheet 1 of 4*

GeoResources, LLC **FIG.A-2**

TOTAL DEPTH: 51.5
TOP ELEVATION: 85
LATITUDE:
LONGITUDE:
DRILLING METHOD: HSA
DRILLING COMPANY: Boretec 1, Inc
DRILL RIG: RCT 60 Track Drill
NOTES:
LOGGED BY: JLK
HAMMER TYPE: cathead
HAMMER WEIGHT: 140 lbs

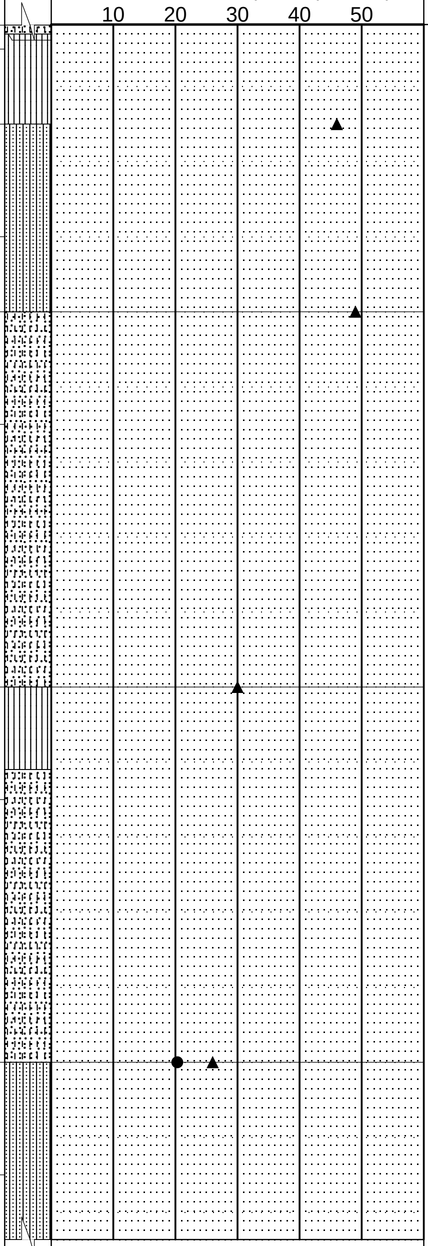
Depth	Elevation	SOIL DESCRIPTION	DRILLING NOTES	Sample	Blow Count	Ground Water
		Grey SILT (damp) (ML)		6d		
17.5	67.5	Grey silty SAND (moist to damp) (SM)		7	17 23 23	
20	65	Grey silty SAND/SAND (moist to damp) (SP-SM)		8	16 17 32	
22.5	62.5					
25	60	Mottled grey brown SILT, fractured (moist to damp) (ML)		9a	6 14 16	
		Grey brown SAND with silt (moist to damp) (SP-SM)		9b		
27.5	57.5					
30	55	Dark grey silty SAND, minor mottling (damp to wet) (SM)	Drilling faster at 30ft	10	8 10 16	ATD

TEST RESULTS

Test Results

Plastic Limit ├──┤ Liquid Limit
% Water Content ●
% Fines (<0.075mm) ◇

Penetration - ▲ (blows per foot)



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3603 West Mercer Way
Mercer Island, Washington

LOG OF BORING B-101

JOB: FatboyCon.WMercerWay *Sheet 2 of 4*

GeoResources, LLC **FIG.A-2**

TOTAL DEPTH: 51.5
TOP ELEVATION: 85
LATITUDE:
LONGITUDE:
DRILLING METHOD: HSA
DRILLING COMPANY: Boretec 1, Inc
DRILL RIG: RCT 60 Track Drill
NOTES:
LOGGED BY: JLK
HAMMER TYPE: cathead
HAMMER WEIGHT: 140 lbs

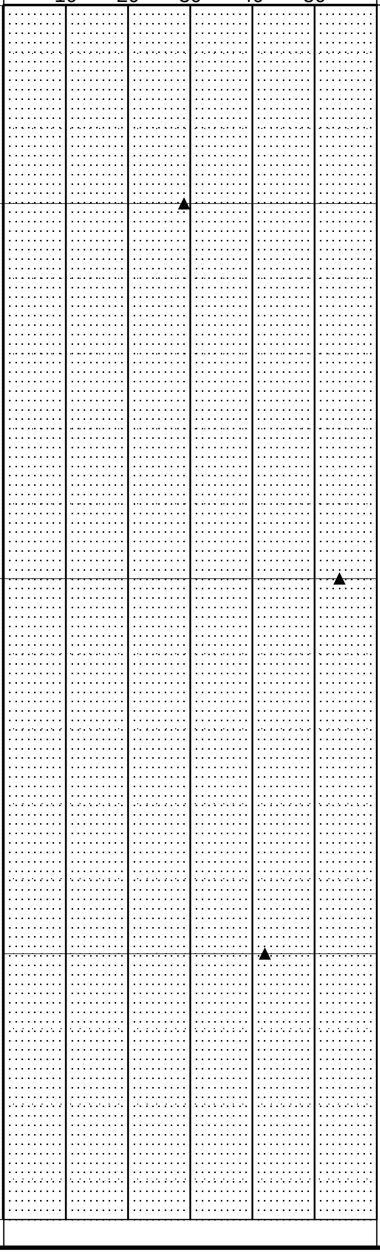
Depth	Elevation	SOIL DESCRIPTION	DRILLING NOTES	Sample	Sampler	Symbol	TEST RESULTS	Blow Count	Ground Water
32.5	52.5								
35	50	(wet)		11				11 14 15	
37.5	47.5								
40	45	(damp to wet)		12				19 22 32	
42.5	42.5								
45	40		Slow drilling at 45ft	13				16 20 22	
47.5	37.5								

TEST RESULTS

Test Results

Plastic Limit ├──┤ Liquid Limit
% Water Content ●
% Fines (<0.075mm) ◇

Penetration - ▲ (blows per foot)



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LOG OF BORING B-101

JOB: FatboyCon.WMercerWay *Sheet 3 of 4*

GeoResources, LLC **FIG.A-2**

TOTAL DEPTH: 51.5
TOP ELEVATION: 85
LATITUDE:
LONGITUDE:

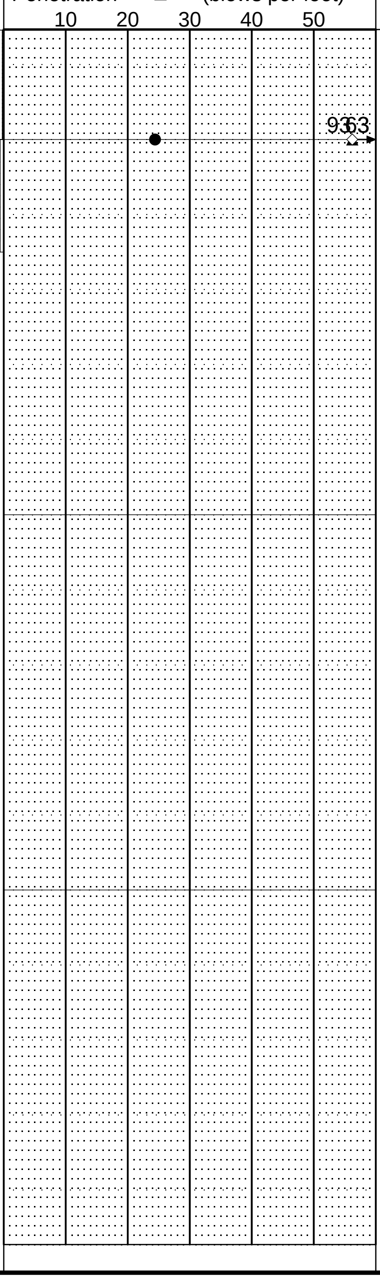
DRILLING METHOD: HSA
DRILLING COMPANY: Boretec 1, Inc
DRILL RIG: RCT 60 Track Drill
NOTES:

LOGGED BY: JLK
HAMMER TYPE: cathead
HAMMER WEIGHT: 140 lbs

Depth	Elevation	SOIL DESCRIPTION	DRILLING NOTES	Sample	Sampler	Symbol	TEST RESULTS	Blow Count	Ground Water
50	35	Grey SILT (damp to wet) (ML)		14				23 30 33	
		Bottom of Boring Completed9/5/2018							
52.5	32.5								
55	30								
57.5	27.5								
60	25								
62.5	22.5								

TEST RESULTS
Test Results
Plastic Limit ├──┤ Liquid Limit
% Water Content ●
% Fines (<0.075mm) ◇

Penetration - ▲ (blows per foot)



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LOG OF BORING B-101

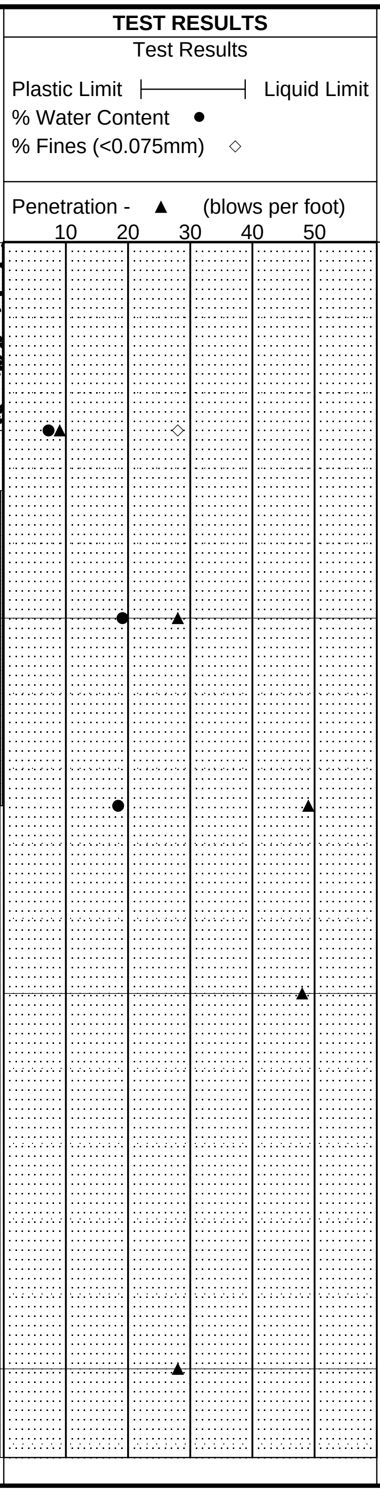
JOB: FatboyCon.WMercerWay *Sheet 4 of 4*

GeoResources, LLC **FIG.A-2**

TOTAL DEPTH: 21.5
TOP ELEVATION: 31
LATITUDE:
LONGITUDE:
DRILLING METHOD: HSA
DRILLING COMPANY: Boretec 1, Inc
DRILL RIG: Acker
NOTES:
LOGGED BY: JLK
HAMMER TYPE: Cathead
HAMMER WEIGHT: 140 lbs

Depth	Elevation	SOIL DESCRIPTION	DRILLING NOTES	Sample	Blow Count	Ground Water
0		Light brown silty SAND with gravel (moist) (SM)				
	30					
2.5		Brown silty SAND (moist to damp) (SM)		1a	7 5 4	
	27.5	Grey brown sandy SILT, minor organics (moist to damp) (ML)		1b		
5		Grey brown sandy SILT/silty SAND (moist to damp) (ML)		2	12 13 15	
	25					
7.5		Grey brown sandy SILT (moist) (ML)		3	18 23 26	
	22.5					
10			Added water at 11ft	4	30 31 17	
	20					
12.5						
	17.5					
15		(moist to damp)	Added water at 16 and 17ft	5	13 13 15	
	15					

TEST RESULTS



NOTES
1. Refer to log key for definition of symbols, abbreviations and codes
2. USCS designation is based on visual manual classification
and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. N.E. = Not Encountered
5. ATD = At the Time of Drilling

Proposed Garage and Single Family Residence
3603 West Mercer Way
Mercer Island, Washington

LOG OF BORING B-102

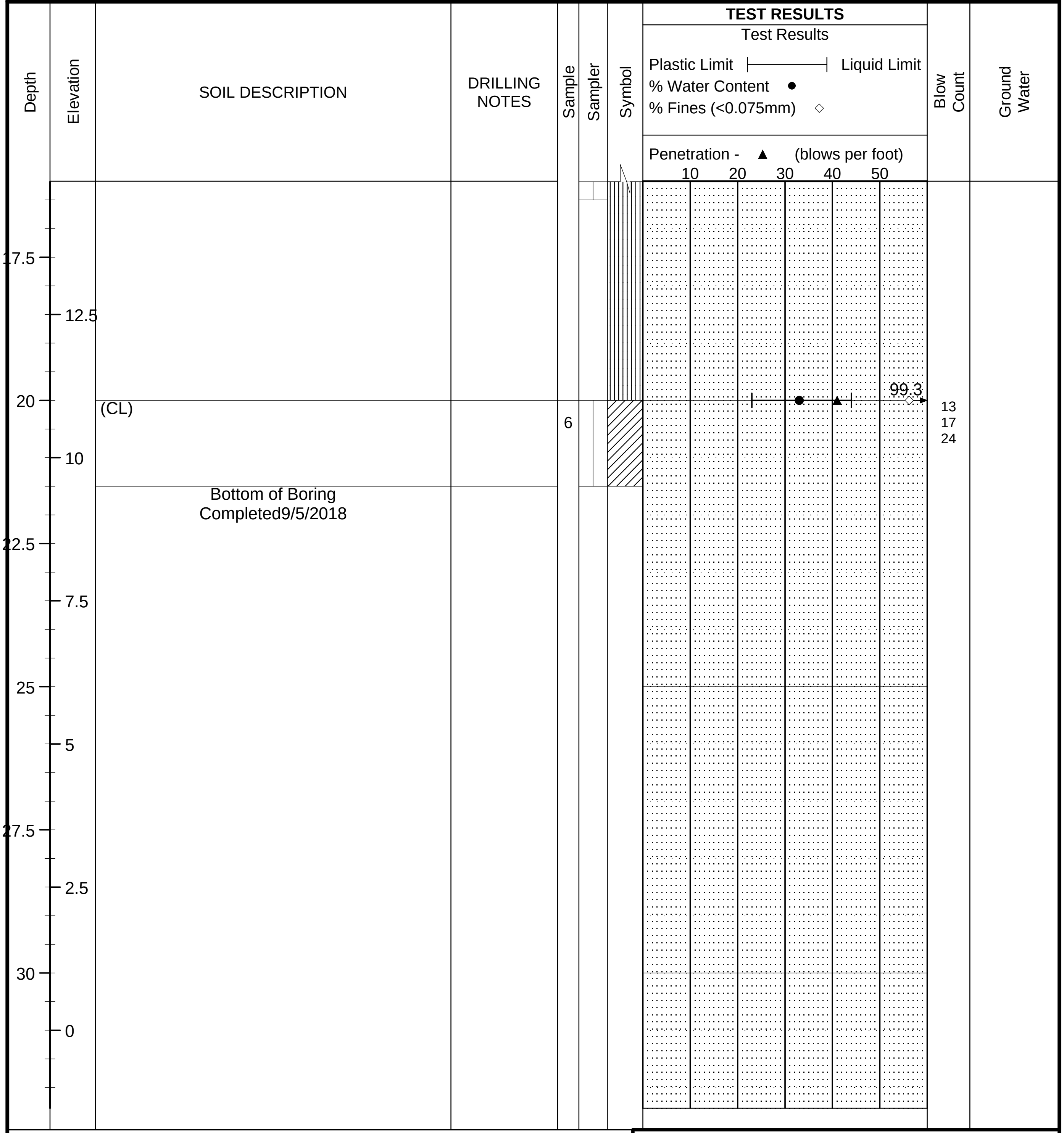
JOB: FatboyCon.WMercerWay *Sheet 1 of 2*

GeoResources, LLC **FIG.A-3**

TOTAL DEPTH: 21.5
TOP ELEVATION: 31
LATITUDE:
LONGITUDE:

DRILLING METHOD: HSA
DRILLING COMPANY: Boretec 1, Inc
DRILL RIG: Acker
NOTES:

LOGGED BY: JLK
HAMMER TYPE: Cathead
HAMMER WEIGHT: 140 lbs



NOTES
1. Refer to log key for definition of symbols, abbreviations and codes
2. USCS designation is based on visual manual classification
and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. N.E. = Not Encountered
5. ATD = At the Time of Drilling

Proposed Garage and Single Family Residence
3603 West Mercer Way
Mercer Island, Washington

LOG OF BORING B-102

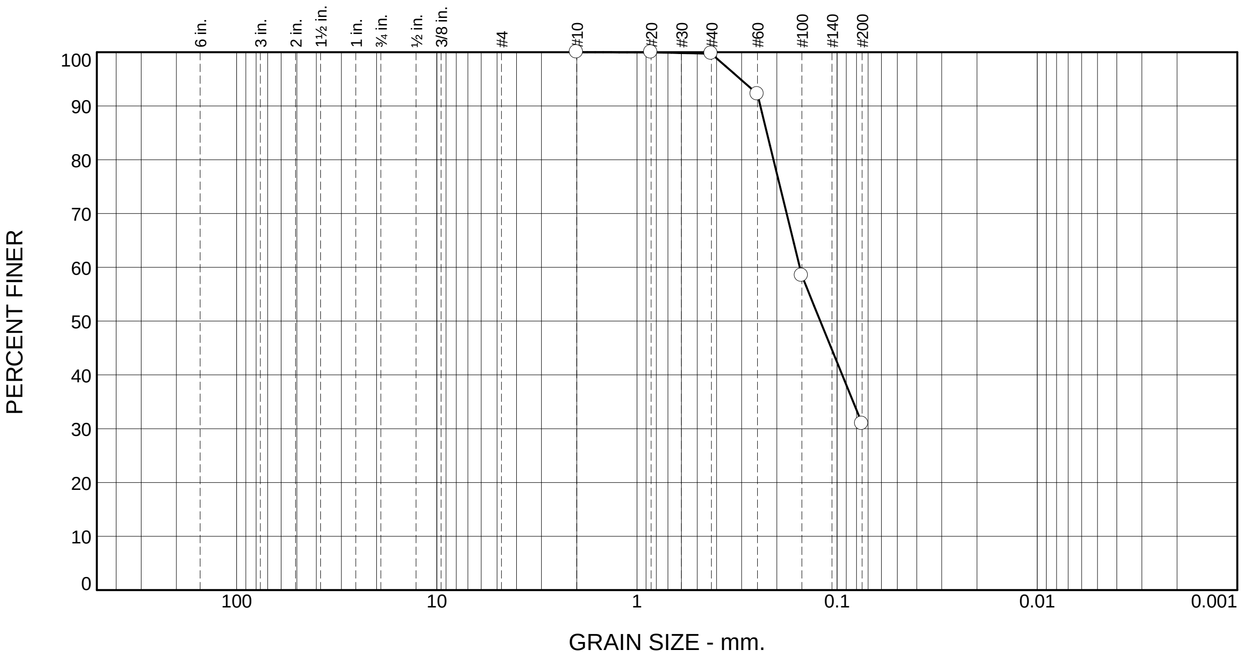
JOB: FatboyCon.WMercerWay *Sheet 2 of 2*

GeoResources, LLC **FIG.A-3**

Appendix “B”

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	68.8	30.9	

Test Results (ASTM D 422 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#10	100.0		
#20	100.0		
#40	99.7		
#60	92.2		
#100	58.4		
#200	30.9		

* (no specification provided)

Material Description

Slightly mottled grey brown silty SAND (moist to damp)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.2418 D_{85}= 0.2241 D_{60}= 0.1536
D_{50}= 0.1212 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

NM: 13.1%

Date Received: 9/5/2018 **Date Tested:** 9/10/2018
Tested By: JLK
Checked By: DCB
Title: PM

Source of Sample: B-101 **Depth:** 12.5 **Date Sampled:** 9/5/2018
Sample Number: 5

GeoResources, LLC

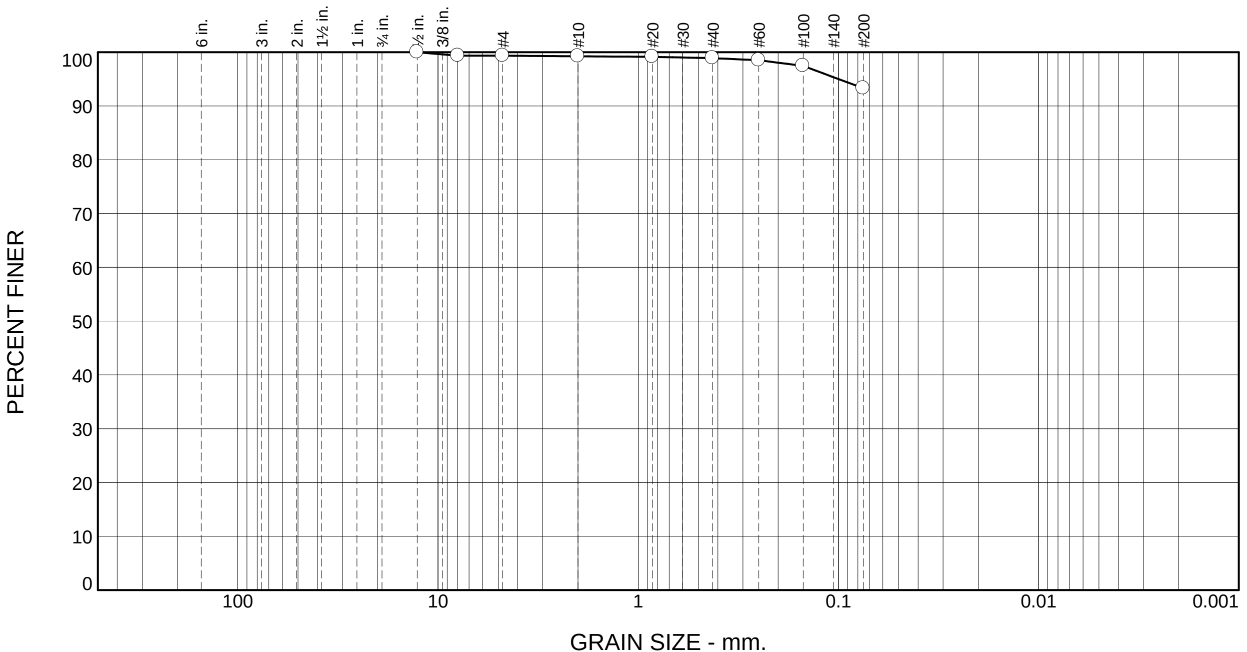
Fife, WA

Client: Mr. Mike Boyle
Project: Proposed Garage and Single Family Residence
Project No: FatboyCon.WMercerWay **Figure** B-1

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: ____________________________ **Checked By:** ____________________________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.1	0.3	5.6	93.3	

Test Results (ASTM D 422 & ASTM D 1140)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.5	100.0		
.3125	99.3		
#4	99.3		
#10	99.2		
#20	99.1		
#40	98.9		
#60	98.5		
#100	97.5		
#200	93.3		

* (no specification provided)

Material Description

Grey SILT (damp to wet)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

NM: 24.4%

Date Received: 9/5/2018 **Date Tested:** 9/10/2018

Tested By: JLK

Checked By: DCB

Title: PM

Source of Sample: B-101 **Depth:** 50 **Date Sampled:** 9/5/2018
Sample Number: 14

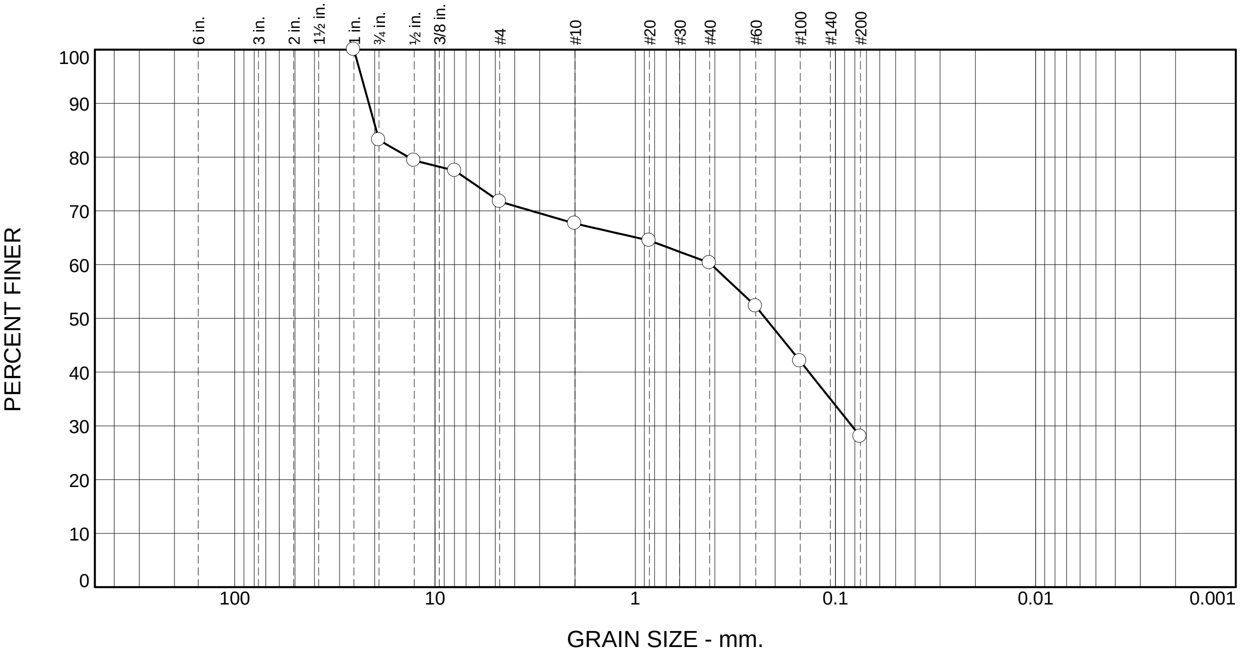
GeoResources, LLC

Fife, WA

Client: Mr. Mike Boyle
Project: Proposed Garage and Single Family Residence
Project No: FatboyCon.WMercerWay **Figure** B-2

Tested By: __________________________ **Checked By:** __________________________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.8	11.5	4.1	7.3	32.3	28.0	

Test Results (ASTM D 422 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
.75	83.2		
.5	79.4		
.3125	77.5		
#4	71.7		
#10	67.6		
#20	64.5		
#40	60.3		
#60	52.3		
#100	42.0		
#200	28.0		

* (no specification provided)

Material Description

Brown silty SAND (moist to damp) (SM)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 21.4025	D_{85}= 19.6463	D_{60}= 0.4164
D_{50}= 0.2232	D_{30}= 0.0828	D_{15}=
D_{10}=	C_u=	C_c=

Remarks

NM: 7.2%

Date Received: 9/5/2018 **Date Tested:** 9/10/2018

Tested By: JLK

Checked By: DCB

Title: PM

Source of Sample: B-102 **Depth:** 2.5 **Date Sampled:** 9/5/2018

Sample Number: 1a

GeoResources, LLC

Fife, WA

Client: Mr. Mike Boyle

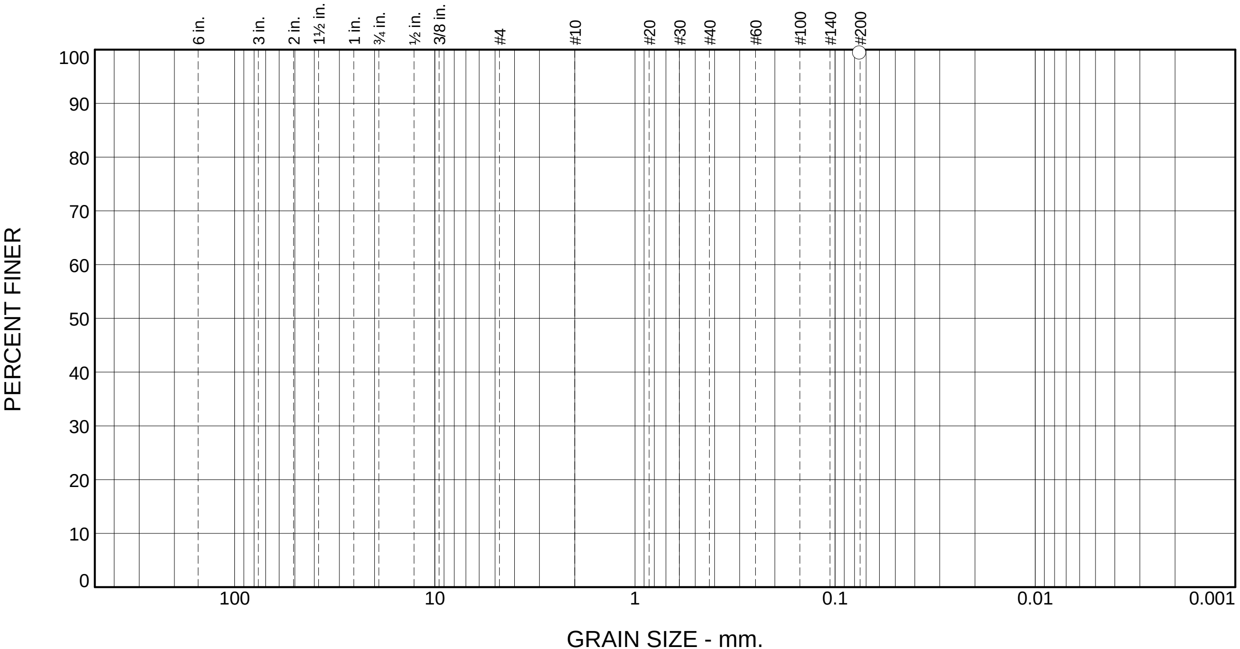
Project: Proposed Garage and Single Family Residence

Project No: FatboyCon.WMercerWay **Figure** B-3

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: ____________________ **Checked By:** ____________________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						99.3	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	99.3		

* (no specification provided)

Material Description

(CL)

Atterberg Limits (ASTM D 4318)

PL= 23 **LL=** 44 **PI=** 21

Classification

USCS (D 2487)= CL **AASHTO (M 145)=**

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

NM: 33%

Date Received: 9/5/2018 **Date Tested:** 9/10/2018

Tested By: JLK

Checked By: DCB

Title: PM

Source of Sample: B-102 **Depth:** 20 **Date Sampled:** 9/5/2018
Sample Number: 6

GeoResources, LLC

Fife, WA

Client: Mr. Mike Boyle
Project: Proposed Garage and Single Family Residence
Project No: FatboyCon.WMercerWay **Figure** B-4

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: ____________________ **Checked By:** ____________________