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ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON

March 25, 2015

Mr. William F. Gartz
7703 West Mercer Way
Mercer Island, WA 98040

RE: CITY OF MERCER ISLAND PERMIT APPLICATION
NUMBER 1410-199, HILLSIDE GRADING AT 7703 WEST MERCER WAY,
MERCER ISLAND, WASHINGTON

Dear Mr. Gartz:

This letter describes our geological and geotechnical engineering findings regarding the grading you performed to landscape the area between your house and Lake Washington. We understand the grading you performed included constructing a patio area next to the house, and a trail to the lake.

BACKGROUND

We understand you performed minor grading to landscape the slope between your house and Lake Washington and to provide access to your shoreline. The previous shoreline access was down a steep stairway with an impervious surface which relied on timber walls that were rotted. In general, the grading included cuts and fills less than 4 feet high, segmental masonry unit (SMU) retaining walls, and steel plate frames that retain new trail surfacing aggregate. The coarse, sandy trail aggregate is less than 9 inches thick. The construction occurred during the summers of 2010 through 2013. The enclosed Sheets A1.01 and A3.01 show the site layout before and after the construction.

You commissioned two geotechnical studies for remodeling your house and to evaluate geologic and geotechnical hazards on your property. Those reports include:

- Associated Earth Sciences, Inc. (AESI), Subsurface Exploration, Geologic Hazard, and Geotechnical Engineering Report, Gartz-Holt Remodel, Mercer Island, Washington, dated April 17, 2007 (AESI report)
- Battermann Geotechnical Consulting, PLLC, Robin Holt & William Gartz, 7703 West Mercer Way, Mercer Island, Washington, dated January 11, 2013 (Battermann report)

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Those reports describe the subsurface conditions and geologic hazards at the site. The AESI report provided geotechnical design recommendations for foundations, walls, site grading, and drainage.

Our study included reviewing the previous geotechnical reports you commissioned, and other published literature, including:

- * Geologic Map of Mercer Island, Washington, by Kathy Troost and Aaron P. Wisher, October 2006
- * Environmental Critical Area maps available on the City of Mercer Island GIS Portal <http://pubmaps.mercergov.org/SilverlightViewerEssentialsExternal/Viewer.html?Viewer=ExternalWebGIS>
- * Subsurface data from the GeoMapNW database, available at <https://fortress.wa.gov/dnr/geology/?Theme=subsurf>

We made a site visit on February 3, 2014, to observe the site and the grading you performed to landscape the slope between your house and Lake Washington. During our site visit, we observed the condition of walls and walkways, soil types exposed at the ground surface, and evidence of seepage. In general, the recently constructed SMU walls and walkways appear stable. We observed evidence of active soil creep, which affected surficial features.

RESPONSES TO NOVEMBER 14, 2014 CITY OF MERCER ISLAND LETTER

The following presents the items included in the November 14, 2014, letter from the City of Mercer Island that requested additional information to meet permit requirements. Items from the letter are shown in *italic text*. A copy of the letter is enclosed.

NI. Any construction on sites designated as a critical area as defined in MICC 19.07.020 is required to provide a Geotechnical Report (MICC 19.07.060). This report shall address all of the mapped geotechnical critical areas noted for the site, and provide appropriate design and development measures.

The enclosed AESI report describes the subsurface conditions and the mapped critical areas for the site. It provides design recommendations for earthwork, deep and shallow foundations, retaining walls, and drainage. In our opinion, the AESI recommendations are appropriate and provide the information required for:

- a. Site parameters for structural design*
- b. Foundation design guidelines, and*

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c. *Rockery and/or retaining wall guidelines.*

The retaining walls constructed at the site include SMU walls with and without mechanically stabilized earth (MSE). No new rockeries were constructed. The new construction consists of:

- The four SMU walls without MSE are less than 3.5 feet high. In our opinion, this wall height should be locally stable.
- The SMU wall with MSE reinforcement is up to 5 feet high. We understand a geotextile reinforcement layer was placed between every other SMU course, and extended 8 feet back from the wall face. In our opinion, the reinforcement was conservatively designed, so the wall should be locally stable.
- The SMU walls with and without reinforcement have drainage that consists of a 4-inch-diameter perforated pipe surrounded by clean gravel. The perforated pipes connect to tightlines that convey water away from the slope.
- Imported fill was limited to drainage aggregate for the SMU walls, and pervious trail surfacing aggregate. We understand pervious surfacing for trails is a code requirement. The total volume of imported aggregate was about 15 cubic yards. You reported no soil was exported from the site. In essence, the cuts and fills at the site were balanced, so no new loads were added to the slope.

d. *Site visit by geotechnical engineer confirming scope of proposed work complies with their report.*

A Shannon & Wilson, Inc. geotechnical engineer made a site visit on February 3, 2015, to observe the grading you performed between the house and Lake Washington. In our opinion, the cuts, fills and walls we observed were constructed in general accordance with the AESI report recommendations.

N2. *This site is mapped as a geologic hazard, specifically for erosion, potential slide, seismic, and steep slope hazards. Per Section Mercer Island City Code 19.07.060.D.2, development within geologic hazard areas and critical slopes may occur if the geotechnical engineer provides a statement of risk with supporting documentation indicating that one of the following conditions can be met:*

In our opinion, the grading performed to landscape the slope between the house and Lake Washington meets two of the criteria in the City of Mercer Island November 14, 2014, letter:

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- a. *The geologic hazard area will be modified, or the development has been designed so that the risk to the lot and adjacent property is eliminated or mitigated such that the site is determined to be safe; or*

The cuts and fills are small and essentially balanced. The overall load on the slope is essentially unchanged; therefore, the global stability of the slope is about the same as before the grading occurred.

The SMU walls were constructed in accordance with the manufacturer's recommendations when less than 4 feet high. The MSE reinforcement in the SMU wall near the house is conservative, in that a minimum reinforcement length was used rather than a shorter reinforcement based on the wall height. In other words, the reinforcement supplied was 8 feet wide, whereas a 5-foot-high wall would normally require less than 4 feet of reinforcement for stability.

- d. *The alteration is so minor as not to pose a threat to the public health, safety, and welfare.*

As described above, the cuts and fills performed to landscape the slope are small, and essentially balanced. Therefore, the grading made little if any change to the slope stability.

The slope does show evidence of soil creep that was occurring before the grading was done. Evidence of the soil creep includes tilting of an old timber wall near the shoreline. We anticipate soil creep will continue. In our opinion, the new SMU walls should perform better than the old timber wall because they include subsurface drainage, and they are designed to resist the anticipated earth pressure.

- N3. *Provide a geotechnical report for this site that addresses the proposed construction within the geohazard areas.*

The enclosed AESI report provides recommendations for site grading and designing retaining walls. Because the SMU walls were constructed as landscape features, they were not designed as walls. Please see previous comments addressing stability of the cuts, fills, and walls constructed on the site.

- N4. *Land clearing, grading, filling, and foundation work are not permitted between October 1st and April 1st on lots such as this one due to the geologic hazards (erosion, potential slide, seismic, steep slope) per MICC 19.07.060. Any work that is proposed during the wet season must*

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therefore have a Waiver to the Seasonal Development Limitation approved by the Building Official, please refer to the application requirements and procedures available at the front counter or on our web site at the following address: <http://www.mercergov.org/files/B1001.pdf>

The construction was done during the summers of 2010 through 2013. Therefore, no construction was done during the wet season. We understand that areas not stabilized with permanent planting and/or mulch were covered during the intervening wet seasons. Therefore, bare soil was not exposed to erosion.

N5. *Provide structural design for any and all retaining structures in a geohazard.*

As described previously, the walls were designed as landscape features; therefore, structural designs and design calculations are not available. Please see previous comments addressing stability of the cuts, fills and walls constructed on the site.

CONCLUDING REMARKS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they presently exist, and further assume that the explorations performed by AESI are representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If there is a substantial lapse of time between the submission of this report, or if conditions have changed because of natural forces or construction operations at or adjacent to the site, we recommend that we review our report to determine the applicability of the conclusions and recommendations.

Within the limitations of scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this report was prepared. We make no other warranty, either express or implied. These conclusions and recommendations were based on our understanding of the project as described in this report and the site conditions as observed at the time of our explorations.

This report was prepared for your exclusive use to assist in acquiring a permit for the landscape grading done at the site. Our report, conclusions, and interpretations should not be construed as a warranty of subsurface conditions included in this report.

The scope of our present services did not include environmental assessments or evaluations regarding the presence or absence of wetlands, or hazardous or toxic substances in the soil,

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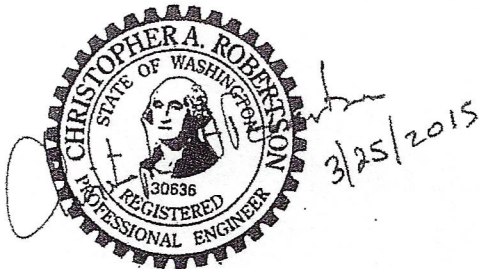
surface water, groundwater, or air on or below or around this site, or for the evaluation or disposal of contaminated soils or groundwater should any be encountered.

Shannon & Wilson, Inc. has prepared and included the enclosed, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our report.

We appreciate the opportunity to be of service to you.

Sincerely,

SHANNON & WILSON, INC.

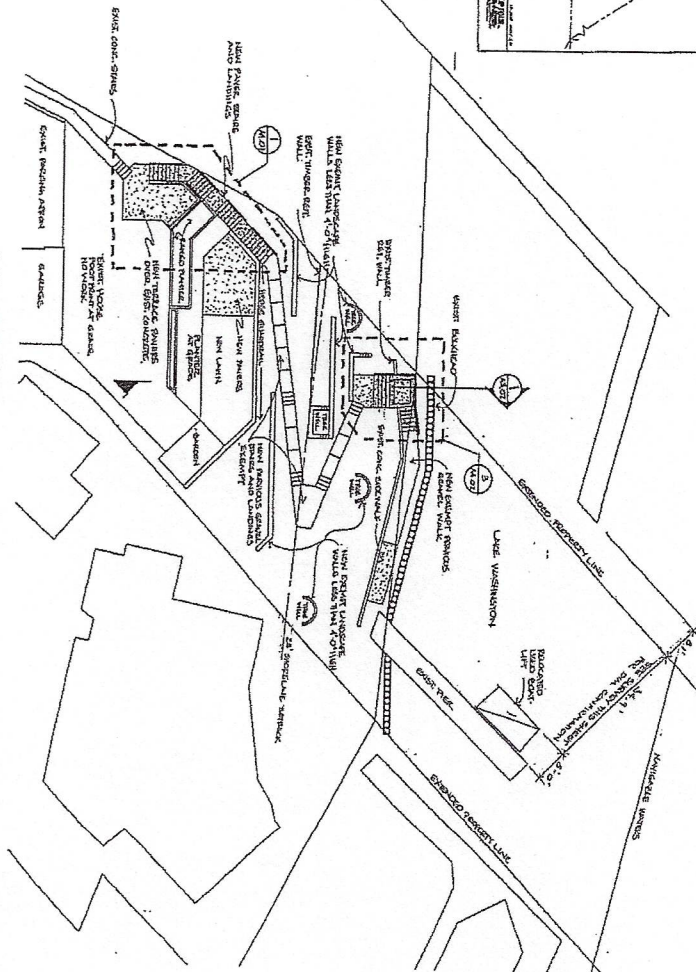
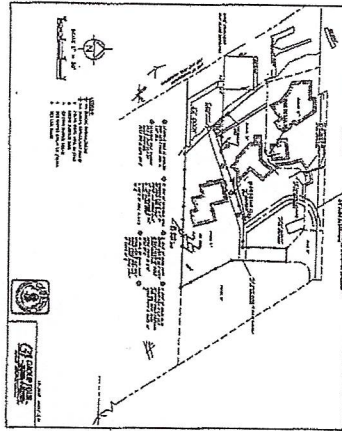


Christopher A. Robertson, P.E., L.E.G.
Vice President

CAR:WTL/car

Enc: AESI Report
Battermann Report
City of Mercer Island November 14, 2014 letter
Sheet A1.01 – Site Development Plan (BEFORE)
Sheet A3.01 – Site Improvements Plan (AFTER)
Important Information About Your Geotechnical/Environmental Report

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SITE IMPROVEMENTS PLAN
(After Construction)

GARTZ/HOLT SITE IMPROVEMENTS	
Author:	William Gartz and Associates
Client:	7703 W. Meadow Way
Project:	Liberty Island, Washoe
Date:	OCT. 10, 2014
Scale:	AS SHOWN
Sheet No.	A1.02