PERRONE CONSULTING, INC., P.S.

Geotechnical & Underground Engineering

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June 12, 2015

Mr. Travis Saunders
City of Mercer Island Development Services
9611 SE 36th St.
Mercer Island, Washington 98040-3732

Subject: Geotechnical Third Party Review
5637 E. Mercer Way
Mercer Island, Washington
Perrone Consulting Project #15124

Dear Mr. Saunders:

This letter summarizes our third party review of the proposed residential project at 5637 East Mercer Way, Mercer Island, Washington. We visited the site on June 9, 2015 and reviewed the following project documents:

- GEO Group Northwest, Inc., 2015. "Geotechnical Engineering Study, Proposed Residence 5637 E. Mercer Way, Mercer Island, Washington," March 13, 2015.
- Sewall Wetland Consulting, Inc., 2015. "5637 Mercer Way – Revised Critical Areas Report," SWC Job# 14-207, March 5, 2015.

The purpose of our review was to evaluate whether the proposed project and geotechnical report complies with requirements detailed in Mercer Island City Code (MICC) 19.07.050 Critical Area Study, and 19.07.060 Geologic Hazard Areas. The review was requested due to the location of the site in a geologically hazardous area as defined by MICC 19.16.010.

SITE AND PROJECT DESCRIPTION

The undeveloped site is located west of East Mercer Way on a hillside that slopes down to the north and northeast. An active stream flows in an easterly direction along the north side of the property and includes a significant area of wetlands (Sewall, 2015). Site elevations vary from about 226 ft at the south side of the property to about 158 ft at the stream. The topography is hummocky with active springs and wet ground conditions on much of the site. The slopes vary from about 70 percent at the south side to about 30 percent in the central portions of the property.

We understand that the project consists of constructing a single family residence in the central portion of the property. The building footprint will be about 2500 square ft with the a basement floor at elevation 180 ft and the first floor at elevation 190 ft. Temporary excavations will be required to construct the basement level in addition to general site grading for the first floor construction. The owner is requesting a reasonable use exemption.

Based on two borings drilled at this site to depths of 17 and 27 ft., the geotechnical report (Geo Group Northwest, 2015) indicates that the site is underlain by about 20 ft of loose to medium dense, wet, silty sand and sand underlain by medium dense moist silt with occasional lenses of silty fine sand. The report states that no evidence of landsliding such as exposed scarps, or freshly exposed soils were observed on the site since their previous investigations in 1999. Geo Group NW concludes that the proposed project is feasible from a geotechnical engineering perspective and will require pile

foundations due to the presence of loose wet soils and the high likelihood of soil liquefaction during an earthquake.

REVIEW COMMENTS

The City's geologic hazard maps indicate that the site is a landslide hazard due to a known landslide on the property, a high seismic hazard, and an erosion hazard. In our opinion this mapping is consistent with the subsurface conditions described in the borings drilled at this site and the hummocky terrain and groundwater springs on the slope.

We generally concur with Geo Group NW design approach to minimizing site disturbance including limiting site cuts and fills and supporting the structures on pile foundations. However additional information should be provided as discussed in the following sections.

Landslide Hazard

Geo Group NW has incorrectly classified the site as a "potential" landslide area. The site includes a headscarp on the southerly portion of the property and landslide deposits cover all of the site, which classifies this site as a *known* landslide area. As such, it is our opinion that the site is marginally stable and could pose a threat to public health, safety and welfare of the owner and adjoining property owners if appropriate measures are not taken to mitigate construction impacts.

While Geo Group NW indicates that there has been no landsliding since 1999, the geotechnical report does not discuss the known landslide on the property or provide an analysis of the impacts of the proposed construction on slope stability both during and after construction. No subsurface profiles, groundwater measurements or computations were provided as a basis for assessing and quantifying the risk.

We recommend that the geotechnical engineer provide additional information and slope stability analyses to address the following issues: (a) whether temporary shoring will be required for the basement excavations to preclude instability of the hillside and adjoining properties; (b) whether additional mitigation measures such as ground improvement will be required to provide adequate long term slope stability factors of safety for static and seismic conditions; (c) if additional protections such as a debris catchment wall will be required to protect the proposed structure.

Seismic Hazard

We concur with Geo Group NW assessment that liquefaction is likely to occur during the design earthquake event so that the proposed pile foundations are appropriate. Additional information should be provided to address liquefaction impacts to pile foundation design including lateral load resistance and downdrag, and liquefaction effects on lateral earth pressures on basement walls.

Erosion Hazard

In our opinion the Geo Group NW report provides appropriate recommendations for temporary erosion and sediment control but does not address long term measures to mitigate erosion. Additional information should be provided regarding vegetation removal and restoration, and stormwater runoff control.

CLOSURE

The scope of our review was limited to the documents provided to us and a site visit. We did not perform additional investigations to confirm subsurface conditions. Therefore our review of the referenced documents should not imply that we are verifying the accuracy of the boring logs or the geotechnical analysis results presented in the report.

We trust that this information suits your current needs. If you or Geo Group NW have questions, please contact us.

Very Truly Yours,
PERRONE CONSULTING, INC., P.S.

06/12/2015

Vincent J. Perrone, Ph.D., P.E.
Principal Engineer