



September 10, 2021

Kyle DeHaven
3206 74th Place SE
Mercer Island, Washington

RE: Geotechnical Letter
Proposed Footing
3206 74th Place SE
Mercer Island, Washington

In accordance with your authorization, Cobalt Geosciences, LLC has prepared this letter to discuss a new foundation element in the garage area. We previously prepared an evaluation as part of foundation mitigation work (pier placement).

This letter re-iterates the discussion of steep slope hazards and limited risk information and also presents recommendations for strip foundation parameters for a new footing in the garage area.

Steep Slope Hazard

Most critical area ordinances designate slopes with magnitudes greater than about 40 percent and vertical relief of at least 10 feet as potentially geologically hazardous (steep slope/landslide hazards).

The site and adjacent areas contain slopes with magnitudes of up to 40 percent locally with topographic relief of 10 to 20 feet (steeper areas).

Overall, the site appears stable at this time with no evidence of severe erosion or landslide activity. The proposed foundation mitigation work will require minimal excavation work located at least 15 feet from the top of any steeper slope areas.

Minimum Risk Statement

It is our opinion that there is minimal risk of erosion or soil movements related to the foundation mitigation provided the work takes place according to our recommendations and with periodic geotechnical oversight.

The proposed construction will not increase the potential for soil movement on the property or adjacent areas and the risk of damage to the property and adjacent properties due to soil instability will be minimal.

In accordance with MICC 19.07.060.D2, it is our opinion that the project has been designed so that alteration does not pose a threat to the public health, safety and welfare of the property and adjacent areas.

3. Alteration of landslide hazard areas, seismic hazard areas and associated buffers may occur if the conditions listed in subsection (B)(2) of this section are satisfied and the geotechnical professional provides a statement of risk matching one of the following:

a. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area;

- b. The landslide hazard area or seismic hazard area will be modified or the development has been designed so that the risk to the site and adjacent property is eliminated or mitigated such that the site is determined to be safe;
- c. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties; or
- d. The development is so minor as not to pose a threat to the public health, safety and welfare.

Foundation Design

The proposed strip footing may be supported on medium dense native soils or on clean angular rock placed on medium dense native soils. Any undocumented fill and/or loose native soils should be removed and replaced with structural fill below foundation elements. Structural fill below footings should consist of clean angular rock 5/8 to 4 inches in size. We should verify soil conditions during foundation excavation work.

For shallow foundation support, we recommend widths of at least 16 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 2,500 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings, should be less than 1/2 inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.40 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 225 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas). The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.

Closure

The information presented herein is based upon professional interpretation utilizing standard practices and a degree of conservatism deemed proper for this project. We emphasize that this report is valid for this project as outlined above and for the current site conditions and should not be used for any other site.

Sincerely,

Cobalt Geosciences, LLC



9/10/2021

Phil Haberman, PE, LG, LEG
Principal