



Cobalt Geosciences, LLC
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August 12, 2020

Vance Rehder
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RE: Geotechnical Evaluation
Proposed Residence
Parcel No. 02240210052007
Bainbridge Island, Washington

In accordance with your authorization, Cobalt Geosciences, LLC has prepared this letter to discuss the results of our limited evaluation of the shallow soil conditions at the site. We visited the site on August 9, 2020.

The site consists of one rectangular parcel that is heavily vegetated with trees and understory. The site is nearly level to gently sloping downward from east to west with relief of about 10 feet.

We understand that the proposed development includes a new residence within the parcel. We also understand that portions of the property are likely or known wetland areas.

The site is mapped as being underlain by Vashon Glacial Till and Blakely Formation. These deposits are typically medium dense to very dense or hard below a weathered zone. There are mapped wetland or bog deposits relatively close to the subject property. Wetland areas can include variable-thick zones of peat and organic debris.

We advanced several hand borings and used a steel probe to penetrate through forest duff at numerous locations within the parcel. In general, topsoil thicknesses were 6 to 18 inches and silty-sand with gravel were encountered below this zone. Probe penetrations were generally less than 2.5 feet below existing site grades. In upland portions of the property, we did not encounter large wetland areas or peat.

Conclusions and Recommendations

We observed variable thicknesses of topsoil and vegetation underlain by weathered glacial till and possibly weathered Blakely Formation in some locations. In general, the depth to bearing soils in non-wetland areas should vary between 2 and 4 feet below grade. Local overexcavation or re-compaction of loose soils may be required, depending on the final location and planned elevations of the building and other features.

The geotechnical engineer should verify soil bearing conditions in foundation areas when they have been excavated. We should be provided with the final plans when they become available so that we may confirm the location and elevation of the new residence.

Foundation Design

The proposed residence may be supported on a shallow spread footing foundation system bearing on undisturbed medium dense or firmer native soils or on properly compacted structural fill placed on the suitable native soils. If structural fill is used to support foundations, then the zone of structural fill should extend beyond the faces of the footing a lateral distance at least equal to the thickness of the structural fill.

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 2,000 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 0.35 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 allowable friction factor and allowable equivalent fluid passive pressure values include a factor of safety of 1.5. 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



8/12/2020

Phil Haberman, PE, LG, LEG
Principal