GEOTECH
CONSULTANTS, INC.

2401 10th Ave E
Seattle, Washington 98102
(425) 747-5618

October 5, 2023

JN 23323

Mike and Anne Seifert
3261 – 67th Avenue S.E.
Mercer Island, WA 98040
via email: mseifert@apple.com; annebseifert@yahoo.com

Subject: **Foundation and Critical Area Considerations**
Proposed Additions to Existing Residence
3261 – 67th Avenue S.E.
Mercer Island, Washington

Greetings:

This report presents our geotechnical engineering report related to the planned additions to the upper floor of your existing home. The scope of our services consisted of assessing the site surface and subsurface conditions, and then developing this summary report.

Planning for the plans prepared by Gelotte Hommas Drivdahl Architecture, we understand that the upper floor will be expanded on the north and south sides of the western portion of the house, in order to create new bedrooms. These additions to the structure will be supported on the existing foundations. Depending on the findings of the structural engineer, it is possible that new interior foundations will have to be added to address new loading or changes related to the remodel of the house. No deep excavations, or expansions outside of the existing footprint, are expected.

The City of Mercer Island GIS maps the entire site as being within a Potential Landslide Hazard area, and the western half of the lot is mapped as a Potential Seismic Hazard area. The site is not mapped as an Erosion Hazard area, and there are no steep slopes mapped on, or around, your property. There is no history of large-scale slope movement in this area. This is confirmed by our review of the *Mercer Island Landslide Hazard Assessment* (Troost and Wisher, 2009). Lidar imagery on Washington Department of Natural Resources' *Geologic Information Portal* does not show indications of historic large-scale landslide features in the site vicinity.

We visited the subject property on September 20, 2023 to observe the existing site conditions and to conduct test holes alongside the north and south perimeter footings in the area of the proposed second story additions. The garage extends eastward from the main body of the residence. The eastern approximately one-fourth of the house is underlain by a crawl space. The remainder of the house is underlain by a shallow basement that daylights toward the west. The additions will be constructed above this shallow basement portion of the structure. To the west of the house is a deck and elevated terrace. The ground surface on the lot slopes gently downward toward Lake Washington on the west side of the lot. There are no steep slopes on, or near, the site.

We are familiar with the native subsurface conditions on the property from review of published geologic maps. During our visit to the site, we also conducted test holes alongside the north and south foundations of the western basement, portion of the house that will support the loads from the new upper floor addition. The geologic mapping for the area is glacial till, a glacially-compressed, gravelly, silty sand. This soil has a high internal strength. The test holes that we excavated found dense, silty sand or sandy silt immediately beneath the existing footings. It is apparent that the

shallow basement was excavated below the original grade, extending into the competent, glacially-compressed soil. No groundwater seepage was observed in the test holes.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

THIS SECTION CONTAINS A SUMMARY OF OUR STUDY AND FINDINGS FOR THE PURPOSES OF A GENERAL OVERVIEW ONLY. MORE SPECIFIC RECOMMENDATIONS AND CONCLUSIONS ARE CONTAINED IN THE REMAINDER OF THIS REPORT. ANY PARTY RELYING ON THIS REPORT SHOULD READ THE ENTIRE DOCUMENT.

Based on published geologic maps and our explorations the site and surrounding area are underlain by competent, glacially-compressed native soils. The test holes confirmed that the foundations in the western, basement portion of the existing house were placed on glacially-compressed soils. These soils: 1) are not susceptible to seismic liquefaction, and 2) are suitable to carry loads from the new upper floor addition.

Any new foundations constructed for the remodel/additions should bear on the dense, glacially-compressed soils.

As with any structure, the soil beneath the existing foundations will compress slightly under new loads. This may result in some cosmetic cracking in existing interior finishes, but should not present a structural concern.

Potential Landslide Hazard Areas: The site and surrounding area have been mapped as a Potential Landslide Hazard area. No recent large-scale movement has been documented in this area. As previously discussed, the core of the subject site consists of dense, glacially compressed, silty sand that has a negligible potential for instability on the gentle to moderately-sloped ground. The proposed new additions will be supported on foundations bearing directly on these dense, glacially-compressed soils.

It is our opinion that no buffers or setbacks, or other landslide hazard mitigation measures are required for the planned construction.

Potential Seismic Hazard Area: The soils that underlie the existing foundations, and which would support any new foundations, are not prone to seismic liquefaction under the ground motions of the Maximum Considered Earthquake (MCE).

We provide the following “statement of risk” to satisfy City of Mercer Island conditions:

> “It is our professional opinion that the development practices proposed in this report for the planned alteration would render the development as safe as if it were not located in a geologic hazard area.”

We recommend including this report, in its entirety, in the project contract documents. This report should also be provided to any future property owners so they will be aware of our findings and recommendations.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site class within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Soil).

The IBC and ASCE 7 require that the potential for liquefaction (soil strength loss) during an earthquake be evaluated for the peak ground acceleration of the Maximum Considered Earthquake (MCE), which has a probability of occurring once in 2,475 years (2 percent probability of occurring in a 50-year period). The dense soils that will support the new construction are not susceptible to seismic liquefaction under the ground motions of the MCE because of the absence of near-surface groundwater.

CONVENTIONAL FOUNDATIONS

We recommend that new continuous and individual spread footings have minimum widths of 12 and 16 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be reviewed to determine if different footing widths or embedment depths are required.

Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand. In wet conditions, the prepared footing subgrades should be protected with several inches of clean crushed rock, in order to prevent softening or disturbance during the placement of forms and rebar.

An allowable bearing pressure of 2,500 pounds per square foot (psf) is appropriate for new or existing footings supported on competent native soil. A one-third increase in this design bearing pressure can be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil will be less than one inch, with differential settlements on the order of one-quarter-inch in a distance of 25 feet along a continuous footing with a uniform load.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.40
Passive Earth Pressure	300 pcf

Where: pcf is Pounds per Cubic Foot, and Passive Earth Pressure is computed using the Equivalent Fluid Density.

The above ultimate values for passive earth pressure and coefficient of friction do not include a safety factor.

LIMITATIONS

This report has been prepared for the exclusive use of Mike and Anne Seifert for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of practice, and within the scope of our services. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and 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. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew and fungi in either the existing or proposed site development.

We appreciate the opportunity to be of service on this project. Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

10/5/2023

Marc R. McGinnis, P.E.
Principal

cc: **Gelotte Hommas Drivdahl Architecture** – David Grubb
via email: davidg@ghdarch.com

MRM:kg