

September 1, 2023
File No. 23-242

Ms. Natasha Garcia
4327 Forest Avenue Southeast
Mercer Island, WA 98040

**Subject: Critical Area 1 Review – Geotechnical Evaluation
Proposed Deck Replacement
4327 Forest Avenue Southeast, Mercer Island, WA 98040**

Dear Ms. Garcia,

PanGEO Inc. has prepared the following letter and attached site plan to assist you with your application for a Critical Area 1 Review. We understand that the City of Mercer Island has requested that a geotechnical engineer provide an assessment of the mapped geologically hazardous areas and the potential impacts of the proposed work on the critical areas. In preparing this letter we conducted a site reconnaissance and reviewed readily available geotechnical information. The following presents our observations and recommendations.

SITE AND PROJECT DESCRIPTION

The project site is located at 4327 Forest Avenue Southeast on Mercer Island, Washington. The property is occupied by an existing house with a partially daylight basement situated generally at the top of a west-facing steep slope. The west slope is generally covered with ivy, shrubs and small trees. A site-specific topographic survey was not available at the time of this letter. According to the elevation contours shown on the Mercer Island GIS Map, the steep portion of the slope has a vertical relief of about 22 to 26 feet and steepness near 1:1.

There was an existing deck along the west side of the existing house that has since been demolished. We also understand that the previous deck consisted of about 4 inches of concrete slab surfacing over timber beams. The beams were supported by timber posts connected to concrete spread footings. The spread footings have not been demolished. Based on our review of old photographs of the previous deck, the timber beams and posts were in poor condition with signs of rot and collapse under the weight of the concrete slab surfacing (see Plate 1).

We understand that you planned to replace the previous deck with new beams, posts, and a lighter-weight surfacing, bearing on the existing spread footings. In addition, you planned to install an

egress window for the partial basement to meet the current building codes for egress. The installation of the egress window would result in the removal of two of the old deck footings and replacement with posts bearing on a retaining wall continuous footing (see Plate 2). The excavation for the egress retaining wall would result in an excavation of about 3 feet below the existing grade.



Plate 1. View of the previous deck with rotted beams and posts. Deck has since been demolished.



Plate 2. View of the exposed soils over the replacement deck area, existing footings left in place.

MAPPED GEOLOGIC HAZARDOUS AREAS

Based on our review of the Mercer Island GIS Portal, the subject property is mapped as having Potential Slide, Steel Slope, Seismic, and Erosion Critical Areas. As such, any development or construction activities on the property are subject to land use regulations associated with Critical Area Reviews, per the Mercer Island City Code (MICC) Chapter 19.07.090.

The proposed developments may be consistent with a Critical Area Review 1, which does not require a geotechnical study. The purpose of a Critical Area Review 1 is to review activities listed as modifications in Section 19.07.131, verification of the presence or absence of critical areas, or verification of the delineation and/or type of wetland or watercourse.

According to MICC 19.07.130, modification activities within a critical area may be authorized with approval of an application for a Critical Area Review 1 and may be exempt from the

development standards in subsequent sections within the code (such as a critical area geotechnical study), provided that additional measures to protect life and property or to protect environmental quality are required. Based on our understanding of the proposed development, the proposed activities meet the City's definition as a modification per MICC 19.07.130. The following sections provide our assessment of the modifications and our recommendations to mitigate the impacts of the mapped geologically hazardous areas.

SLOPE STABILITY

During our site reconnaissance, we did not observe any signs of tension cracks in the ground, scarps, gaps in the vegetation coverage, or leaning trees that would indicate signs of active slope movement within the steep slope area west of the existing house. Based on our observations, the west slope is stable in its current condition.

Based on our understanding of the previous deck and proposed replacement, the new deck will be a lighter weight structure with the removal of the 4-inch concrete slab surface, resulting in a reduction in surcharge pressures from the deck on the existing spread footings to be reused for the new deck.

In addition, the proposed egress retaining wall is located over previous deck footing subgrade. We understand that there will be vertical posts attached to the egress retaining wall to support the overlying deck, reinstating the previous deck support. As such, there are no new surcharges related to the addition of the egress walls below the deck.

Based on our review of the structural plans for the new deck, the applied bearing pressures will be about 1,400 psf or less.

Based on our understanding of the proposed plans and onsite observations, it is our opinion that the replacement of the deck will have little to no impact the existing site condition and that the global stability of the property will improve due to the reduction in surcharge pressures with a lighter-weight deck.

EROSION CONTROL CONSIDERATIONS

TEMPORARY EROSION CONTROL

It is our opinion that erosion hazard can be effectively mitigated during construction using appropriate best management practices (BMPs). At a minimum, this should include a silt fence along the west side of the construction area to collect runoff and prevent water from leaving the immediate work site over the west slope. All collected water should be directed under control to a positive and permanent discharge system.

PERMANENT EROSION CONTROL

Permanent control of surface water should be incorporated in the final grading design. We recommend the following permanent erosion control measures be incorporated in the final design:

- Maximum site grades in the disturbed area shall be 2H:1V or less;
- No new fill soil should be placed on site;
- Cover all disturbed ground surfaces under the deck with 6 inches of topsoil, 4 inches of mulch/wood chips, or hydroseed;
- All disturbed ground outside the deck footprint should be replanted with vegetation.

ADDITIONAL SITE CONSIDERATIONS

- No trees or vegetation shall be removed without approval from the City of Mercer Island;
- PanGEO is available to perform site visits to monitor the effectiveness of the temporary erosion control measures and verify adequate installation of permanent erosion control measures at the end of the project, if needed.

STATEMENT OF RISK

Per Mercer Island City Code, construction activities 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:

- 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
- b. Development practices are proposed for the alteration that would render the development as safe as if it were not located in a geologic hazard area; or
- c. The alteration is so minor as not to pose a threat to the public health, safety, and welfare; or
- d. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a geologic hazard area.

It is our opinion that Criteria B, and C can be met provided that the demolition activities will be performed as currently planned.

Should you have any questions regarding this letter, please do not hesitate to contact us at (206) 262-0370.

Sincerely,

PanGEO Inc.



Bryce Townsend, P.E.
Senior Geotechnical Engineer