

---

May 10, 2023

JN 23141

City of Mercer Island – Public Works Department  
9601 S.E. 36<sup>th</sup> Street  
Mercer Island, Washington 98040

Attention: Alaine Sommargren & Sarah Bluvas  
via email: [alaine.sommargren@mercerisland.gov](mailto:alaine.sommargren@mercerisland.gov) & [Sarah.bluvas@mercerisland.gov](mailto:Sarah.bluvas@mercerisland.gov)

Subject: **Geotechnical Report and Critical Area Study**  
Proposed Mercer Island Bike Skills Area  
Deane's Childrens Park  
5650 Island Crest Way  
Mercer Island, Washington

Greetings:

This report presents our geotechnical engineering report related to the construction of the Mercer Island Bike Skills Area in the Deane's Childrens Park section of Island Crest Park. The scope of our services consisted of assessing the site surface and subsurface conditions, and then developing this summary report.

Based on the conceptual plan you have provided, as well as our discussions with you, we understand that a new bike skills area will be constructed in the northern portion of the Deane's Childrens Park, which occupies the northeastern corner of Island Crest Park. The alteration will be located primarily in an area currently covered with small- to medium-sized trees, having sparse to non-existent groundcover. Entrance to the Bike Skills Area will be from Island Crest Way near the northeastern corner of the park, and from the southwest, around the existing tennis courts. These access paths are intended to be multi-user, with lanes for both pedestrians and bikes. The Bike Skills Area itself will contain several features typical for current beginner to intermediate mountain bike parks. Paths looping or winding through the area will be interspersed with wood structures, such as table top jumps, rollers and ramps, and elevated berm turns. These low timber structures will likely be supported primarily on metal frames, the feet of which may be sunk into small pockets of concrete. No retaining walls or large concrete features, such as bowls or jumps, are planned. As a result, the amount of earthwork related to the development of the Skills Area will be relatively limited. We expect that the paths themselves will generally be bare, compacted soil, with vegetation promoted between the paths for effective permanent vegetated buffers. The paths and timber features are to be located in such a way as to minimize impacts to the existing trees. The majority of the paths and wood structures will be located on essentially flat ground. The exception to this is a small section of bike path that will swoop into, and out of, the small depression located on the western side of the Skills Area. This section of path may have small ramps located at the top of the short sloped section.

The City of Mercer Island GIS maps much of the planned development area to lie within a potential Seismic Hazard area. Also, the small depression on the western edge of the Bike Skills Park is mapped as both a Potential Landslide Hazard and an Erosion Hazard. There are no steep slopes mapped on, or near, the development area. Our review of *the Mercer Island Landslide Hazard Assessment* (Troost and Wisher, 2009) shows no documented landslides within at least 600 feet of

the development area. These previous episodes of slope movement have occurred on the steeper slopes on the flanks of Mercer Island, upslope of both West Mercer Way and East Mercer Way.

We visited the subject property on May 1, 2023 to observe the existing site conditions and to evaluate subsurface conditions in shallow test holes and soil exposures. As noted above, the majority of the planned Bike Skills Area is relatively flat. The only topography in, or near, the development area is a shallow, west-trending depression extending from the western side of the Skills Area to a larger ravine running through the northwest portion of Island Crest Park. This shallow depression has only moderately-sloped sides inclined at 25 to 30 percent that are only up to 10 to 12 feet in height within the planned footprint of the Skills Area. There were no signs of erosion or slope instability in this shallow depression, which appears to be the remains of an erosion channel likely resulting from heavy runoff from the uplands of Mercer Island following the last glaciation over 10,000 years ago. There was no water present in the base of the depression at the time of our site visit. Small to medium-sized trees of varying types and health cover the majority of the development area. Much of the ground surface is bare, or is covered with very sparse vegetation.

The Bike Skills Area is surrounded by a cyclone fence. Immediately to the west, on the outside of the fence, is a well-worn footpath running through the shallow depression. This path appears to be used by pedestrians walking through Island Crest Park. The path's surface is bare soil, with low-growing vegetation on either side. We saw no erosion or instability problems associated with this bare path.

We are familiar with the native subsurface conditions on the property from projects that we have previously completed in this area. We also reviewed published geologic maps, and obtained soil logs from the City of Mercer Island's GIS for previous projects located to the north and south of the Deane's Childrens Park. These previous soil explorations had been conducted for the Island Park Elementary School to the north, and the cellular phone tower that has been installed to the south. During our site visit, we completed shallow test holes and assessed soil exposures within the planned development area. Based on all of this information, we know that the development area is underlain by a thin layer of topsoil and weathered, slightly gravelly, silty sand, below which is dense, gravelly, silty sand. This dense soil is referred to either as glacial till or glacial drift. It has been glacially-compressed. We saw no signs of oversteepened slopes that would be indicative of previous grading and/or fill placement. No evidence of groundwater seepage was present within the expected Skills Area. The glacial till/glacial drift soils are essentially impervious, which can result in localized perched groundwater conditions following extended wet weather. This is most likely to occur in areas where the ground is not covered by trees or established evergreen vegetation that can assist with precipitation interception.

### **CONCLUSIONS AND RECOMMENDATIONS**

The planned Bike Skills Area is underlain by competent, glacially-compressed soils that are typical for this part of Mercer Island. There is no potential for future slope instability in these competent soils, particularly on the gentle to moderate slopes located within, and around, the planned development area. Considering this, and the fact that no significant earthwork or foundation excavation will be required, the planned alteration will not 1) adversely impact the stability of the site or neighboring properties, or 2) be at risk of damage due to potential future slope movement on the taller steep slopes distant from the site.

**Seismic Hazard Area:** The glacially-compressed soils beneath the site are not susceptible to seismic liquefaction. The site does not meet the criteria for a Seismic Hazard. No mitigation measures are required to address the Seismic Hazard area mapping.

**Potential Landslide Hazard Area:** As discussed above, the short slopes of the west-trending depression on the western portion of the site have been mapped as a Potential Landslide Hazard area. This is primarily due to the fact that the ground is sloped at more than 15 percent. However, as discussed above, the underlying glacially-compressed soils are not susceptible to instability on the site, even under the large ground motions of the Maximum Considered Earthquake (2 percent probability of occurring in 50 years).

Under 19.16.010 of the Mercer Island City Code, a Landslide Hazard is defined as: Those areas subject to landslides based on a combination of geologic, topographic, and hydrologic factors, including:

1. Areas of historic failures;
2. Areas with all three of the following characteristics:
  - a. Slopes steeper than 15 percent; and
  - b. Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and
  - c. Springs or ground water seepage;
3. Areas that have shown evidence of past movement or that are underlain or covered by mass wastage debris from past movements;
4. Areas potentially unstable because of rapid stream incision and stream bank erosion; or
5. Steep slope. Any slope of 40 percent or greater calculated by measuring the vertical rise over any 30-foot horizontal run.

Of the above criteria, the only one that applies to the site is 2.a. (ground surface in the western depression inclined steeper than 15 percent), but 2.b. and 2.c. do not apply. None of the other criteria apply to the site. There is no evidence of historic or past movements, or rapid stream incision or stream bank erosion. Also, there are no steep slopes on, or near, the site.

Based on the observed site conditions, the development area does not meet the definition of a Landslide Hazard.

It is our opinion that no buffers or setbacks are required for the planned construction, provided the recommendations presented in this report are followed.

**Erosion Hazard Areas:** The gentle to moderate western portion of the site meets the City of Mercer Island's criteria for an Erosion Hazard Area, due to the ground inclination and the soil type. It is important to remember that this designation of a potential erosion hazard is based on old criteria developed by the Soil Conservation Service (SCS) for conditions that could result in erosion problems when ground is cleared and tilled for agricultural and forestry uses. Unfortunately, this very conservative criteria was subsequently included in critical areas ordinances throughout western Washington, including Mercer Island.

The clearing associated with the development will be limited, and the uppermost soil will not be loosened by tilling. We saw no indications of existing erosion issues on the largely-bare site, or on the developed footpaths located adjacent to the development area. The bike paths that will be created for the Bike Skills Area will be bare, compacted soil. However, the ground around the paths will be vegetated, or be covered with non-erosive materials (mulch, wood chips, etc.). As a result, the area of bare soil will be substantially reduced from the

existing condition by the planned development. This will minimize the potential for future erosion problems. By covering the ground adjacent to the paths, the potential for silty runoff from the trails leaving the site is negligible.

For both temporary and permanent erosion control, the area of primary focus should be the portion of the path that will extend through the western depression. Here, it will be important to install a straw or mulch wattle along the western side of the path, until the ground to the west is covered with vegetation or permanent erosion control materials. Soil stockpiles should be minimized, and should be covered in wet weather. Following rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or a permanent erosion protection material.

As with any development project, especially one that is subjected to varying amounts of use in all weather conditions, future maintenance of revegetation and erosion protection measures may be needed to address localized erosion control issues.

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 new development would render the alteration 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.

### **LIMITATIONS**

This report has been prepared for the exclusive use of the City of Mercer Island, and its representatives, 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.

Marc R. McGinnis, P.E.  
Principal



5/10/2023

MRM:kg