MBGS
Mud Bay Geotechnical Services, LLC
1001 Cooper Point Road SW, Suite 140, PMB #108 | Olympia, WA 98502 | 360.481.9784 | CHeathman@MudBayGeotech.com

December 7th, 2025

Subject: Seismic ECA – Geotechnical Report
4433 86th Ave SE
Mercer Island, WA 98040
Parcel #759810-0733

Dear Xiao Zhou,

Per your request, Mud Bay Geotechnical Services, LLC is providing a geotechnical report for the construction of an addition to the existing single-family residence (SFR) with a 500-700 square foot, 2-car attached garage located at the situs address of 4433 86th Ave SE, Mercer Island, Washington. The scope for this project was to perform a site reconnaissance and subsurface investigation of the parcel and prepare a geotechnical report providing subsurface conditions and geotechnical recommendations for the proposed development. The proposed work is located within an area mapped as a Seismic Hazard Area (ECA 1) as indicated on the attached Figure 1, ECA Map. As such, the proposed development requires a geotechnical report according to MICC Chapter 19.07.160 and requires a report due to the location within a seismic hazard area. This report provides our assessment of the geologic hazards on-site and recommendations to construct the proposed garage addition.

The analyses, conclusions, and recommendations in this report are based on the information available. These informational resources include: two (2) hand auger borings completed specifically for the subject project, down hole dynamic cone penetrometer testing, published geologic information for the site, remote data analysis, and our experience with similar soil conditions. The exploratory boring is assumed to be representative of the subsurface conditions where the work will occur. If during construction, subsurface conditions differ from those described in this report, we should be advised immediately so we may reevaluate our recommendations.

SITE LOCATION AND PROJECT DESCRIPTION

Parcel #759810-0733, designated situs address of 4433 86th Ave SE, consists of approximately 0.26 acres in Mercer Island, Washington. Presently, the parcel features a single-family residence with a daylight basement. The property is accessible from either 86th Ave SE or SE 44th Place where a paved driving pad allows access to the backyard and the location of the proposed addition. The parcel has a well-manicured lawn with garden beds along the eastern and northern sides of the SFR. A garden bed accommodating a shallow slope separates two sections of the eastern half of the parcel. Several fruit and decorative trees are located across the parcel. The approximate site location and parcel boundaries are shown in Figure 2, Site Map.

The proposed garage addition to the single-family residence is located near the northwestern corner of the SFR as shown in Figure 3, Job Details Schematic. As mentioned above, the site location is positioned within a mapped steep slope area, and as such requires a geotechnical report in pursuit of relief from seismic hazard area prohibition.

SITE GEOLOGY AND SOILS

As part of this project, available geologic data from the Washington Department of Natural Resources (DNR) available at the 1:100,000-scale was reviewed, and a site-specific geologic map was prepared. The project vicinity geologic map is attached as Figure 4, WA DNR Geologic Map. Figure 4 indicates that the parcel is underlain by *Pleistocene continental glacial till* across the entire parcel. The Pleistocene sedimentary deposits mapped on site are generally described by the DNR as: *unsorted, unsaturated, highly compacted mixture of clay, silt, sand, and gravel with interbedded stratification.* The conditions observed on-site are generally consistent with the mapped geology at the site.

Along with the site geology, soil data available from the United States Department of Agriculture, Natural Resources Conservation Service was also reviewed. This information is presented in the attached Figure 5, USDA Soil Map. The soils across the project area are mapped as *AmC – Arents, Alderwood material, 6 to 15 percent slopes.* The Arents Alderwood series are generally described by the USDA as glacial drift and/or recessional deposits overtop glaciomarine deposits and subsequently reworked through urban development. Conditions observed at the site are generally consistent with the mapped soils at the site. It should be noted that the slope percentages and composition associated with the mapped soil units are estimates and do not necessarily reflect the true on-site topography or soil characteristics.

SUBSURFACE EXPLORATION

As part of the geotechnical investigation, a site visit was performed on November 13th, 2025, to observe the soil conditions within and adjacent to the proposed developments. Two (2) hand-augured borings in conjunction with downhole dynamic cone penetrometer testing were completed specifically for the subject development. The approximate locations of these borings are shown in the attached Figure 6, Site Exploration Map.

Each boring was completed using a Humboldt Manufacturing model H-4414QC hand auger with a 4-inch diameter bucket tube sampler. In situ testing was performed at selected depths using a Humboldt Manufacturing model H-4202A dynamic cone penetrometer to estimate the density of the soil. The dynamic cone penetrometer uses a 15-lbs steel mass falling from a height of 20-inches onto an anvil to penetrate a 1.5-inch diameter 45-degree cone tip seated into the bottom of the hole. Upon excavating to the test depth, to be sure the cone is completely embedded, the cone point is seated 2-inches into the undisturbed bottom of the hole using the dynamic cone penetrometer. The cone point is further driven 1 3⁄4 inches using the ring weight hammer falling 20-inches. The blows for each interval are counted and recorded until one of the following occurs:

- A total of 50 blows occurs in less than 1 3⁄4 inches of penetration in any increment.
- The rod is advanced the complete test increment for a total of 3 3⁄4 inches (2-inch embedment, and 1 3⁄4 inch completed test increment).

The soil samples were classified visually in the field in general accordance with ASTM D2488, The Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Once transported back to the office, the samples were re-examined, and the field classifications were modified accordingly. Summary logs of the borings are included in Appendix A. Note the soil descriptions and interfaces shown on the log are interpretive, and actual changes may be gradual. Upon completion, each boring was backfilled to the original ground surface using excavated material from the spoil piles.

SUBSURFACE AND GROUNDWATER CONDITIONS

BH-1-25

The boring, designated BH-1-25 was completed to a final depth of 72 inches below ground surface elevation. BH-1-25 was performed at the southwestern edge of the paved parking pad. The conditions encountered within BH-1-25 were as follows:

0-6 inches: (TOPSOIL)

6-36 inches: Medium dense, dry, light brown, sandy silt **(ML)**

36-72 inches: Dense, moist, well graded sand with trace silt **(SW-SM)**

Groundwater was not encountered within BH-1-25.

BH-2-25

The boring, designated BH-2-25 was completed to a final depth of 48 inches below ground surface elevation. BH-2-25 was performed in the lower yard. The conditions encountered within BH-2-25 were as follows:

0-6 inches: **(TOPSOIL)**

6-24 inches: Medium dense, dry, light brown, sandy silt **(ML)**

24-48 inches: Dense, moist, well graded sand with trace silt **(SW-SM)**

Groundwater was not encountered within BH-2-25.

Department of Ecology Well Logs

To supplement our subsurface explorations of the site, we reviewed regional well logs made available by the Washington State Department of Ecology (WA DOE). The nearest available well log is situated roughly 1000 feet northeast of the parcel. Based on this log, the static water level is approximately 371 feet below ground surface elevation as measured on May 11th, 2007. Based on this information, and the lack of groundwater seepage within our subsurface explorations, we anticipate that the groundwater table is below the limits of excavation associated with the proposed developments with the possible exception of perched groundwater atop fine-grained or hardpan sedimentary units.

GEOLOGIC HAZARD ASSESSMENT

Liquefaction Hazard

The attached Figure 7, Liquefaction Hazard Map, displays liquefaction susceptibility data available from the Washington State Department of Natural Resources. Soil liquefaction is a phenomenon whereby saturated soil deposits temporarily lose strength and behave as a viscous fluid in response to cyclic loading. This phenomenon is most significant in loose, saturated sandy soils with lesser effects experienced in other soil types. Figure 7 indicates the project vicinity is mapped as Very Low risk of liquefaction. Based on the subsurface conditions observed onsite, Mud Bay Geotechnical Services LLC concurs with the DNR mapping.

Landslide Hazard

As part of the investigation of the site, we reviewed landslide hazard mapping and LiDAR imagery, available from the Washington Department of Natural Resources. The DNR landslide data is attached to this report as Figure 8, WA DNR Landslide Map. The current landslide hazard mapping inventory available from the Washington State Department of Natural Resources (WA-DNR) indicates the presence of landslide deposit approximately 0.3 miles southeast of the existing home, along the steep slopes of Mercer Island as the topography dips in a southeastern direction towards Lake Washington. This landslide deposit has also been mapped by Seattle Department of Construction and Inspections as a known slide affected property. The WA DNR landslide database indicates that this feature is a historic earth or debris flow with an age of less than or equal to 150 years.

In addition to WA-DNR landslide hazard mapping, the geomorphology (shape of the land) was analyzed during the site evaluation and compared to the Light Detection and Ranging images (LiDAR) from the Washington State LiDAR portal. LiDAR is a remote sensing method where light is pulsed down to the surface of the Earth and back to a sensor. This methodology enables bare earth images of the surface to be analyzed for the presence of geologic landforms. The most recent LiDAR imagery displaying the topography of the region is from 2021 and can be found attached to this report as Figure 9, QGIS LiDAR & Contour Map. Quantum Geographic Information Systems software (QGIS) was used to extract topographic data for the parcel based on calculations using elevation data extracted from the most recent WA DNR LiDAR data. Two-foot and ten-foot contour lines were superimposed onto the LiDAR slope imagery to assist in visualizing the topography of the parcel. Figure 9 highlights the relatively flat topography of central Mercer Island and the consistent western downslope grade towards Lake Washington.

Slope values for the site can be seen in Figure 10, QGIS Slope & Contour Map. The slope percentage values are calculated using elevation data from the most recent LiDAR data available (2021). The slope calculations are expressed as a percentage, where the difference of two elevation points (rise) is divided by the distance between them (run) and then multiplied by 100. For reference, a slope percentage of 100% is equal to a 45° slope angle, where the *rise* is equal to the *run*. Figure 10 highlights the generally flat topography of the parcel ranging from 0 to 15 percent slopes and the slope accommodating the daylight basement ranges from 15 to 40 percent. In the western half of the parcel some slopes have been mapped to range between 40 to 60 percent and 60 too 100 percent. These slopes span a total elevation difference of less than 20-feet vertical height and as such do not trigger the need for an ECA buffer zone. In order to better exhibit the site surface geometry and highlight the elevation loss of the onsite steep slopes,

a slope profile transect was extracted from the LiDAR elevation data and included in Figure 11, attached to this report. The slope lacks indicators of retrogression or slope instability and appears stable in its current state.

GEOTECHNICAL RECOMMENDATIONS

Slope Stability and Landslide Hazards

Based on site reconnaissance, subsurface exploration, and a review of all the site geology and other readily available information presented previously, in the opinion of Mud Bay Geotechnical Services, LLC the potential for deep seated landslide is low throughout the property. It is our opinion that there are no geologic indicators indicating past or present slope instability directly on-site. Though there are known landslide deposits mapped within the surrounding vicinity, it is our opinion that the subject property is situated away from these areas of increased landslide risk and are unlikely to impact these and other environmentally critical areas.

In our opinion, the site is positioned greater than 50 feet from slopes fitting the definitions of steep slope hazard area per MICC Chapter 19.07.160 C.2(a). Provided that the geotechnical recommendations in this report are followed, we interpret that the proposed developments will not serve to increase the risk of geologic hazard on-site, specifically the seismic hazard area per MICC Chapter 19.07.160 D.1, nor within the surrounding area.

Should the recommendations contained in this geotechnical report be implemented, the proposed garage development will not have adverse impact on slope stability of the subject or neighboring lots.

Foundation Support

Shallow strip footings and shallow pier pads can be used to support the new structure. Based on the observed soil conditions, we recommend locating the bottom of the new footings on the native soil deposits at a minimum depth of approximately 1.5 feet below the existing ground surface. Footings can be stepped into the existing topography to achieve the minimum embedment criteria. However, the footings should be stepped at a maximum equivalent slope angle of 10 percent across the profile of the structure in the downslope direction.

Prior to placement of concrete, the footing subgrade should be cleared and grubbed, and the exposed native subgrade soils should be compacted in place. The subgrade should be inspected for any pockets of loose material. Loose material should be compacted in place to a firm and unyielding condition or removed and replaced with a minimum of 6-inches of CSBC. The CSBC

should be placed in layers no greater than 6-inches and compacted to at least 95 percent of the maximum dry density.

Footings bearing on a subgrade prepared as described above can be designed using a maximum allowable bearing pressure of 1,500 psf. We recommend a minimum footing width of 16 inches be used in the design. The maximum allowable bearing pressure may be increased by up to one-third for short-term transient loading conditions such as wind and seismic loading. We anticipate that total settlement will not exceed one inch, and differential settlement along an equivalent 50-foot length of footing will not exceed half of the total settlement. The settlement is expected to be elastic and will occur as the footings are loaded.

We recommend footing subgrade preparation be evaluated by Mud Bay Geotechnical Services, LLC prior to placement of concrete. Foundation subgrade preparation should not be performed during periods of wet weather. We recommend staging the foundation subgrade excavation, compaction of native subgrade soils, and placement of CSBC to limit the time the foundation subgrade is exposed to weather.

Material Backfill

We recommend all material used as backfill for footings and stem walls be placed in horizontal layers no more than 6 inches thick with each layer compacted to 95 percent of the maximum density. The backfill material should be comprised of Gravel Backfill for Walls material meeting the requirements of Section 9-03.12(2) of the WSDOT Standard Specifications, or an equivalent free-draining material.

Prior to backfilling, a perimeter footing drain system, consisting of a 4-inch diameter, perforated, or slotted, rigid plastic pipe placed at the base of the structure excavations wherever existing footings are exposed as part of the work. The drain should be embedded in a clean, free-draining sand and gravel meeting the requirements of Section 9-03.12(4) of the WSDOT Standard Specifications for Gravel Backfill for Drains. The drains should be sloped slightly to drain to an appropriate discharge area.

Seismic Design

Based on the explorations performed and included in the geotechnical report for the project, we recommend using the adjustment factors for Site Class D soils to determine the site class adjusted seismic design accelerations at the site location.

Slabs-On-Grade

All interior slabs-on-grade should be underlain by a capillary break at least 6 inches thick consisting of free-draining, clean, course sand and fine gravel with a maximum particle size of ¾-inch, no more than 50 percent passing the U.S. No. 4 sieve, and less than 5 percent passing the U.S. No. 200 sieve.

Prior to placement of the capillary break layer, topsoil, mud, debris, and root masses should be cleared and grubbed and the native subgrade soils should be compacted in-place to a dense and relatively unyielding condition. The six-inch capillary break layer should be compacted to at least 95 percent of the maximum dry density of the material. We recommend considering placement of a suitable vapor barrier to further retard moisture at the slab-on-grade.

Similar to footing construction, it will be helpful to stage the excavation and subgrade preparation of slab-on-grade areas to limit the exposure to wet weather during the placement of the capillary break layer. Once in place and compacted, the low-fines-content capillary break layer will reduce the likelihood that the subgrade is disturbed.

We recommend using a vertical modulus (K_{v1}) of 85 pounds per cubic inch (pci) for slab-on- grade bearing on a subgrade prepared as described above. Note that K_{v1} is appropriate for a 1-foot by 1-foot surface and the initial subgrade modulus used for design (K_s) will need to be adjusted based on the width of the footing or slab considered using the following equation:

$$K_s = K_{v1}(B+1)^2/(4B^2)$$

where B = foundation or slab width in feet.

Utilities

We anticipate buried utilities will need to be constructed as part of the project. The utility subgrade (base of trench excavation) should be relatively firm prior to placing bedding materials. Subgrade observed to be soft, pumping, or containing abundant organics or refuse should be sub-excavated to firm subgrade soil or a maximum depth of 2 feet. Sub-excavated areas should be backfilled with structural fill.

Material placed directly below, around, and above utility pipes should consist of Gravel Backfill for Pipe Zone Bedding as described in Section 9-03.12(3) of the WSDOT Standard Specifications (WSDOT, 2018). The pipe bedding materials should be placed and compacted to a relatively firm condition in accordance with the manufacturer's specifications. Bedding and cover should be a minimum of 6-inches thick.

Excavations

Temporary cuts will be stable at a vertical angle up to 4 feet in height and may be used in the design where temporary excavations are less than or equal to 4 feet will be necessary to construct the project.

We anticipate that temporary excavation cuts greater than 4 feet in height will be stable at a maximum slope angle of 1H:1V. The ground surface at the top of the temporary cuts should be periodically monitored for vertical movement, cracks, and other signs of instability. If signs of instability are observed, we should be contacted immediately so that we can assist and provide additional geotechnical recommendations.

Site Grading and Earthwork Considerations

Permanent cuts and fills should be stable at slopes of 2H:1V. Soils placed as fill within the footprint of structures should be considered structural fill. Structural fill should consist of material meeting the requirements of Select Borrow as described in Section 9-03.14(2) of the WSDOT Standard Specifications, 5/8-minus, or similar borrow as approved.

Structural fill should be placed and compacted in lifts no greater than 6 inches with a plate compactor or jumping jack compactor. Structural fill should be placed and compacted to a minimum of 95 percent of the maximum dry density. All other fill material should be placed and compacted as recommended. Fill placed in softscape, landscape, or common areas that can accommodate some settlement should be compacted to a relatively firm and unyielding condition.

Temporary stockpiles of excavated material and borrow material for construction should be limited to 8 feet in height. Structure excavation to construct footings should be limited to the extent possible. This is primarily because the native soils are expected to be more resistant to erosion than any compacted material that is used as backfill.

Erosion Control

The erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered. Onsite materials are erodible when exposed to weathering elements such as heavy precipitation. We anticipate silt fences will be needed around the downslope sides of any cleared areas. Jute, coir, or turf reinforcement mat should be placed on the surface of all exposed slopes during and following construction, pinned using 9-inch landscaping staples at a 16-inch spacing. Vegetation should be maintained where it currently exists where disturbance is not necessary as part of construction.

Rocked staging areas and construction access roads should be provided to reduce the amount of soil or mud carried off the property by the trucks and equipment. Trucks should not be allowed to drive off the rock-covered areas. Cut slopes and solid stockpiles should be covered with plastic during wet weather. Onsite stormwater containment may be needed to collect any water that may accumulate within the excavation. Following clearing and rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface. The erosion condition adjacent to the structures should be monitored periodically for any signs of surface erosion and degradation. If significant erosion is observed, it should be mitigated as soon as possible. On most construction projects, it is necessary to periodically maintain or modify temporary erosion control measures to address specific site and weather conditions.

RECOMMENDED ADDITIONAL SERVICES

Before construction begins, we recommend a copy of the draft plans and specifications prepared for the project be made available for review so that we can ensure that the geotechnical recommendations in this report are included in the Contract. Mud Bay Geotechnical Services, LLC is also available to provide geotechnical engineering and construction monitoring services throughout the remainder of the design and construction of the project. The integrity of the geotechnical elements of a project depends on proper site preparation and construction procedures. In addition, engineering decisions may need to be made in the field if conditions are encountered that differ from those described in this report. During the construction phase of the project, we recommend that Mud Bay Geotechnical Services, LLC be retained to review construction proposals and submittals, perform inspections of foundation subgrade, excavations, backfill placement and compaction, drainage installation, slope conditions, and provide recommendations for any other geotechnical considerations that may arise during construction.

INTENDED USE AND LIMITATIONS

This report has been prepared to assist the client and their consultants in the engineering design and construction of the subject project. It should not be used, in part or in whole for other purposes without contacting Mud Bay Geotechnical Services, LLC for a review of the applicability of such reuse. This report should be made available to prospective contractors for their information only and not as a warranty of ground conditions.

The conclusions and recommendations contained in this report are based on Mud Bay Geotechnical Services, LLC understanding of the project at the time that the report was written and on-site conditions that existed at time of the field exploration. If significant changes to the

nature, configuration, or scope of the project occur during the design process, we should be consulted to determine the impact of such changes on the recommendations and conclusions presented in this report.

Parcel boundaries reflected in this report and attached maps are interpreted from public Geographic Information Systems portals from your local jurisdiction, and do not reflect surveyed property boundaries. Digitized parcel boundaries reflected in this report are intended to assist in visualization and report comprehension and are not for legal interpretation.

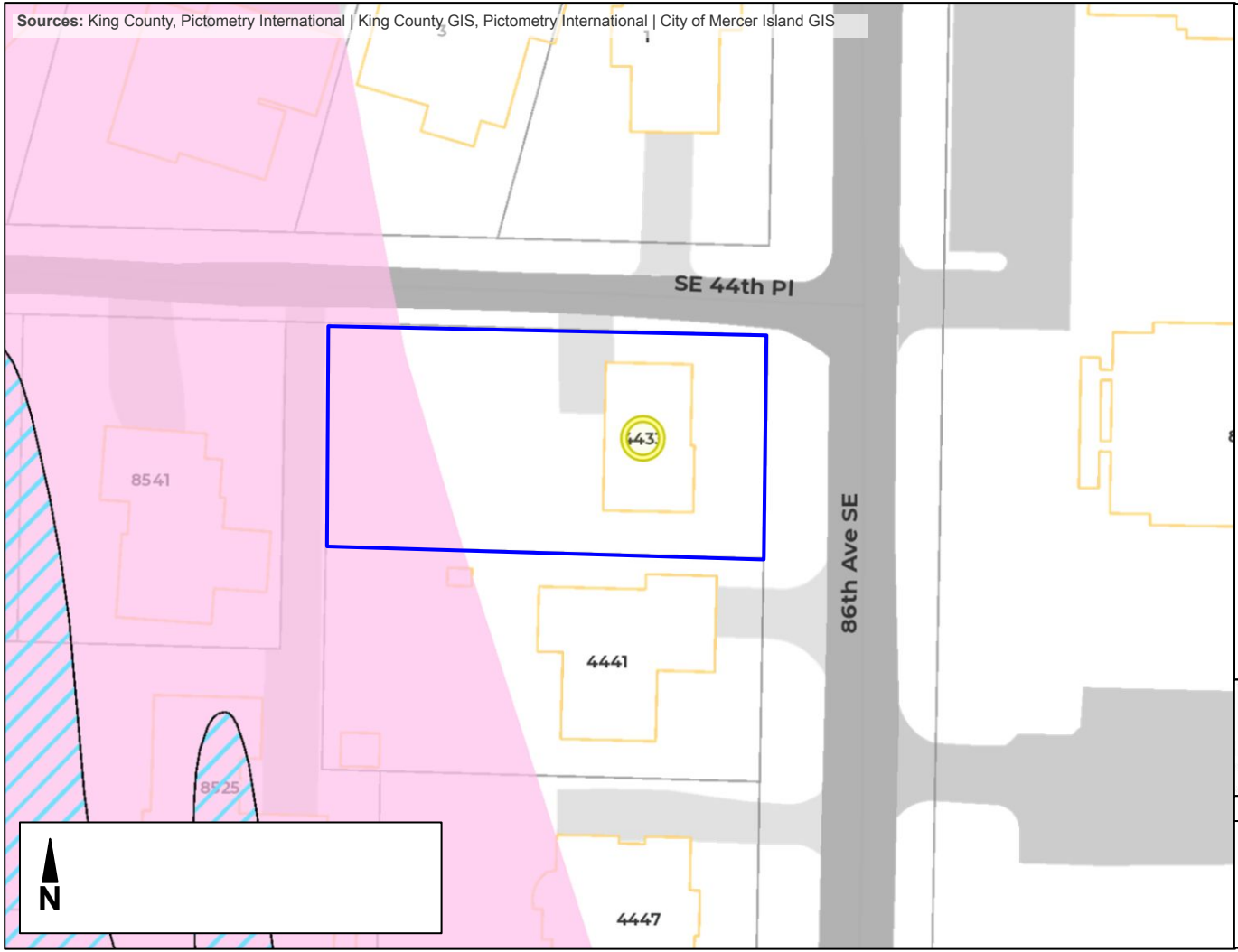
Site exploration and testing describes subsurface conditions only at the sites of subsurface exploration and at the intervals where samples are collected. These data are interpreted by Mud Bay Geotechnical Services, LLC rendering an opinion regarding the general subsurface conditions. Actual subsurface conditions can be discovered only during earthwork and construction operations. The distribution, continuity, thickness, and characteristics of identified (and unidentified) subsurface materials may vary considerably from that indicated by the subsurface data. While nothing can be done to prevent such variability, Mud Bay Geotechnical Services, LLC is prepared to work with the project team to reduce the impacts of variability on project design, construction, and performance.

We appreciate the opportunity to serve your geotechnical needs on this project and look forward to working with you in the future. Please contact us at your earliest convenience if you have any questions or would like to discuss any of the contents of this report.

Sincerely,

Chris Heathman, P.E.
Mud Bay Geotechnical Services, LLC

12/7/2025



Legend

- Approximate Parcel Boundary

Environmentally Critical Areas (ECA)

- Identified Landslide Location: Documented
- Identified Landslide Location: Not Documented
- Ancient Slide (Test Pit)
- Landslide/Potential Slide Area
- Steep Slope
- Seismic
- Erosion

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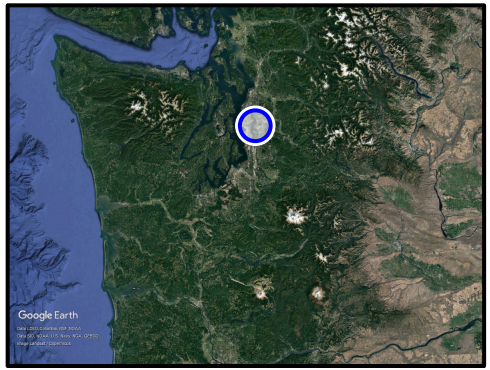
Mud Bay Geotechnical Services, LLC

Job #:2921-KIN	Date:Nov., 2025

Figure 1: ECA Map

4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report



Legend

Approximate Site Location

Approximate Parcel Boundary*

*Parcel boundaries derived from King County iMap

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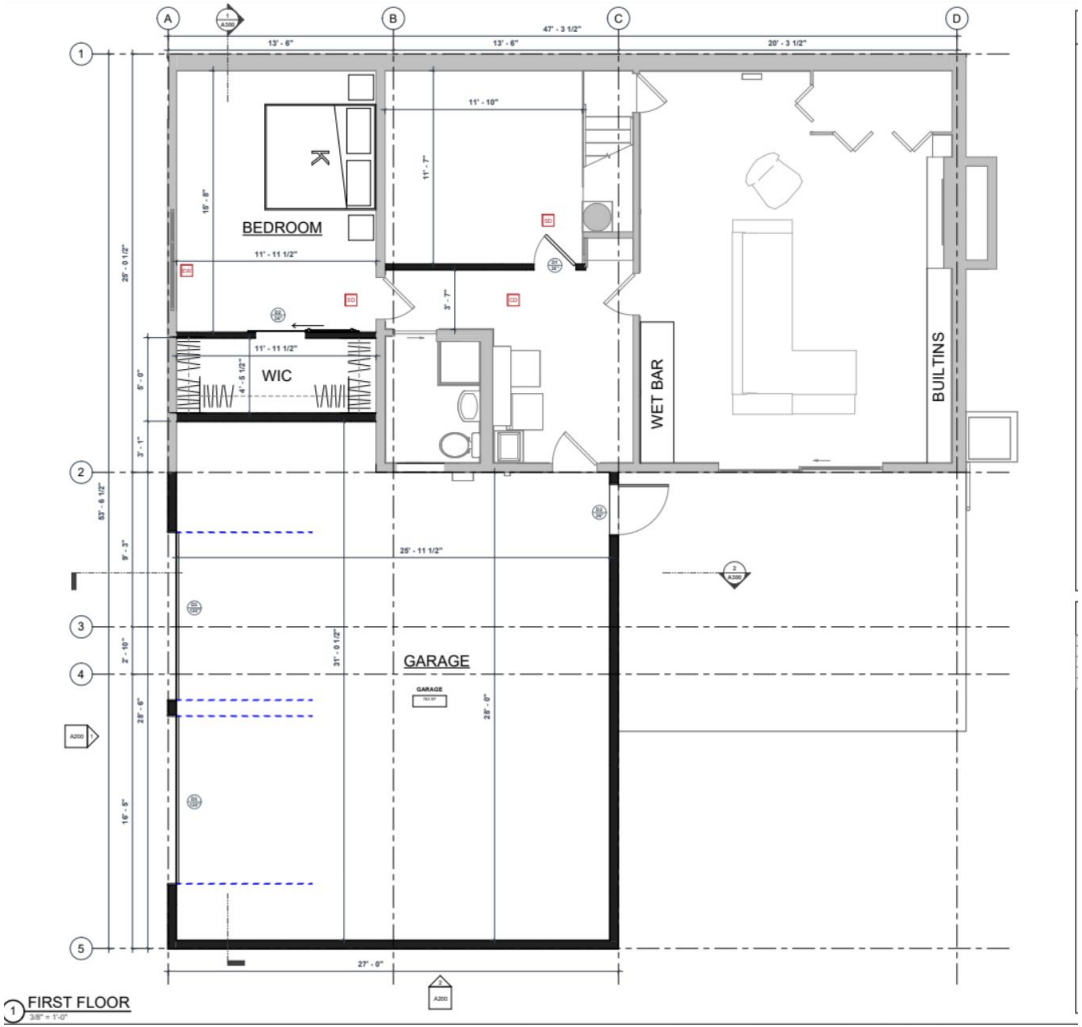
Job #:2921-KIN	Date:Nov., 2025

Figure 2: Site Map

4433 86th Ave SE

Mercer Island, WA 98040

Geotechnical Report



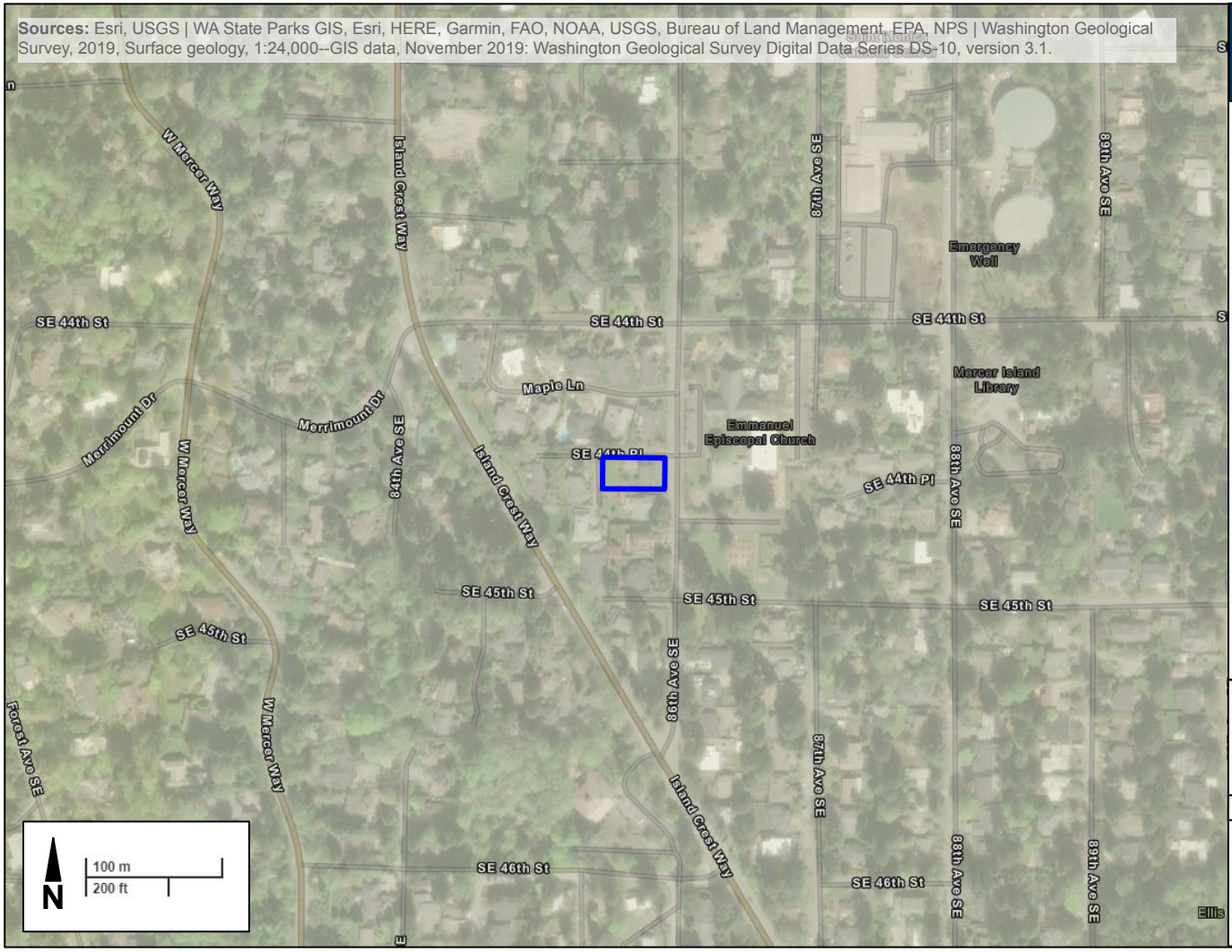
Mud Bay Geotechnical Services, LLC	
Job #:2921-KIN	Date: Nov, 2025

Figure 3: Job Details Schematic

4433 86th Ave SE

Mercer Island, WA 98040

Geotechnical Report



WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
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Legend

Approximate Parcel Boundary

Geologic Units 100k

- Pleistocene glacial and non glacial deposits
- Pleistocene continental glacial till

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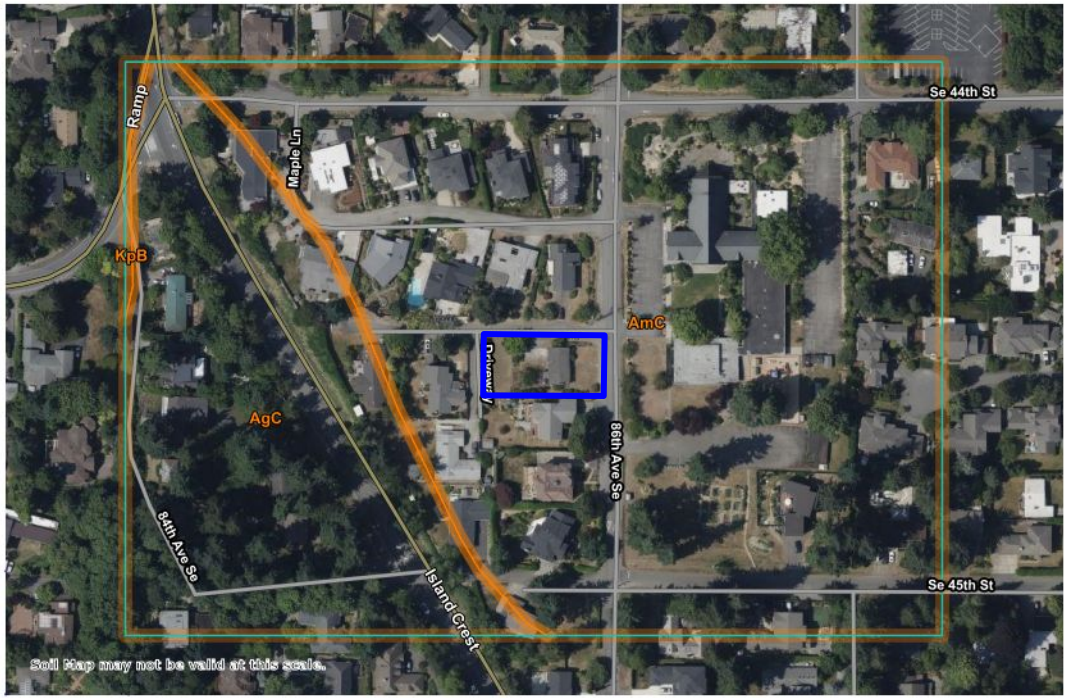
Figure 4: WA DNR Geologic Map
4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report

Soil Map—King County Area, Washington



Map Scale: 1:2,030 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

USDA Natural Resources Conservation Service

Legend

Approximate Parcel Boundary

Map Unit Symbol	Map Unit Name
AgC	Alderwood gravelly sandy loam, 8 to 15 percent slopes
AmC	Arents, Alderwood material, 6 to 15 percent slopes
KpB	Kitsap silt loam, 2 to 8 percent slopes

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Figure 5: USDA Soil Map

4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report

Legend

Approximate Parcel Boundary

Approximate Boring Location

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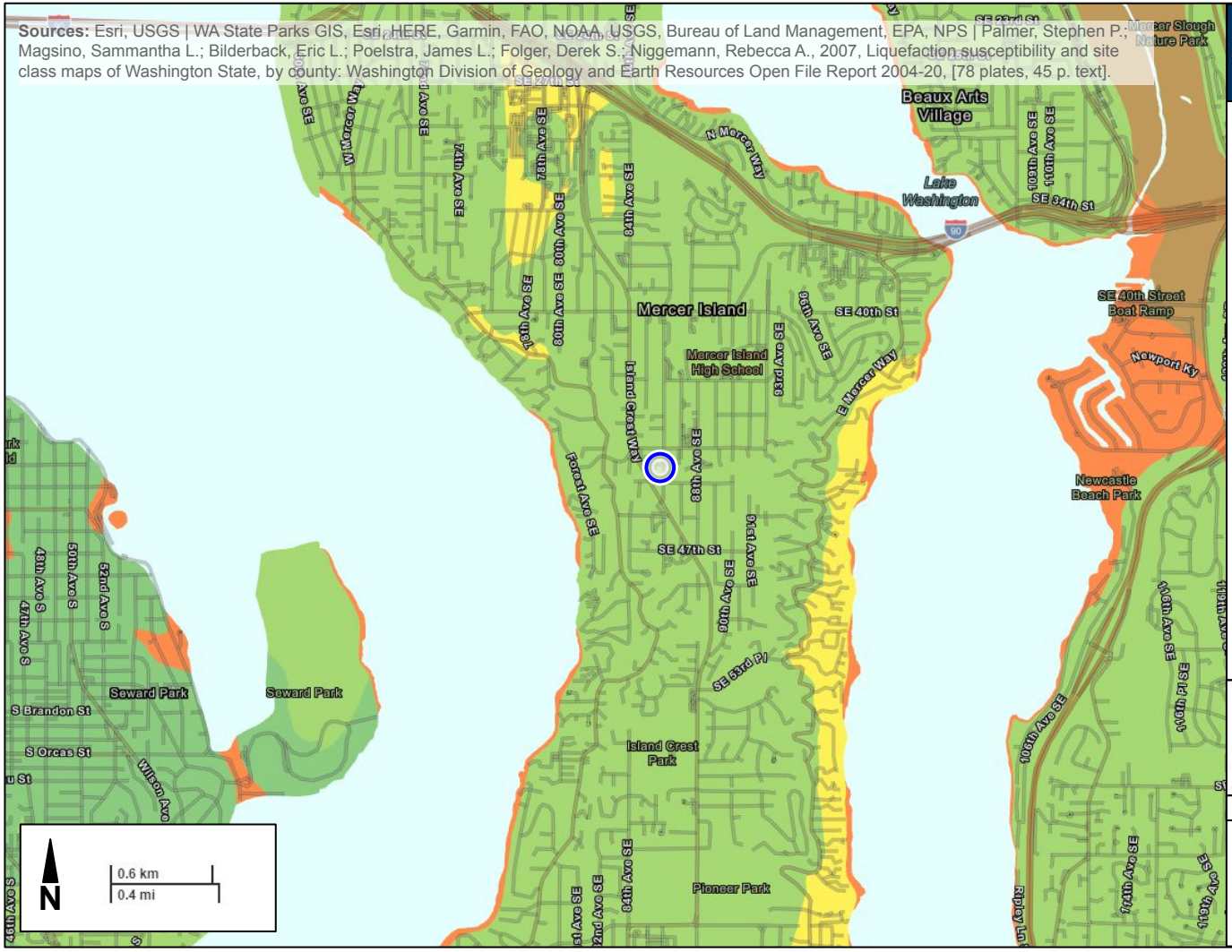
Job #:2921-KIN	Date:Nov., 2025

Figure 6: Site Exploration Map

4433 86th Ave SE

Mercer Island, WA 98040

Geotechnical Report



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Legend

- Approximate Site Location

Liquefaction Susceptibility

- High
- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low
- Bedrock
- Peat

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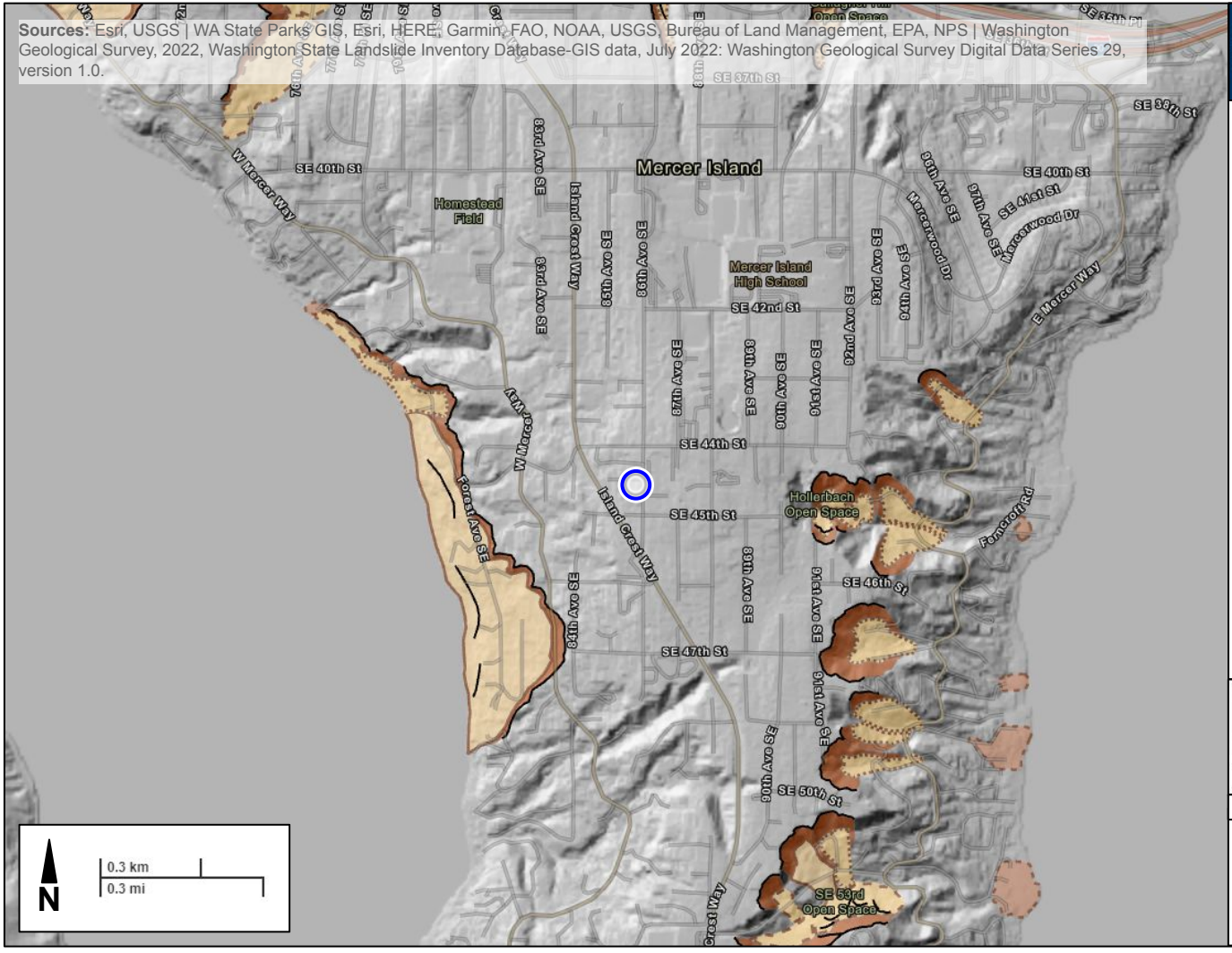
Job #:2921-KIN	Date:Nov., 2025

Figure 7: Liquefaction Hazard Map
4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report



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Legend

- Approximate Site Location

Landslides

- Scarps
- Scarps and Flanks

Landslide Deposits

- High (30-40)
- Moderate (11-29)
- Low (1-10)

Fans

- High (23-30)
- Moderate (8-22)
- Low (1-7)

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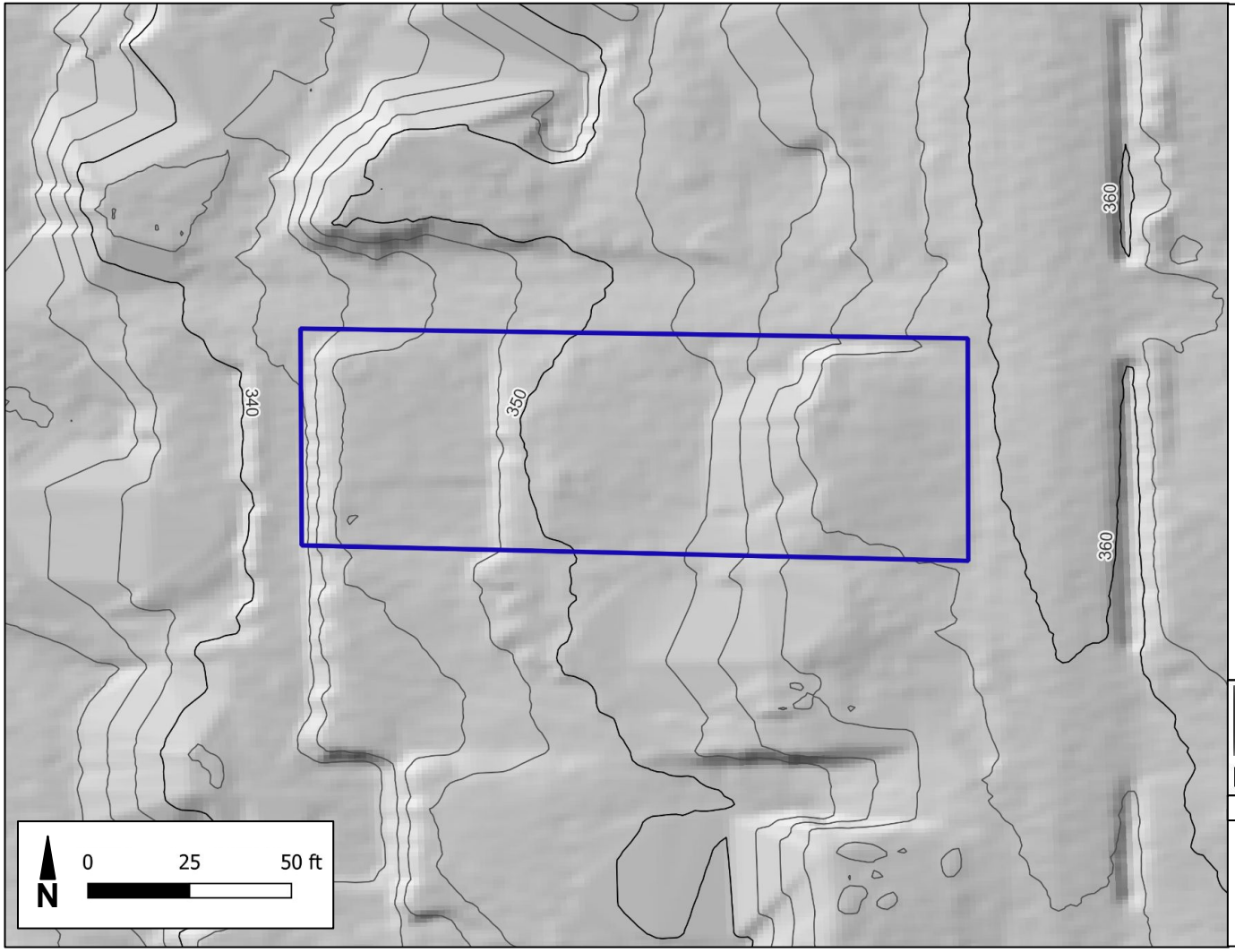
Figure 8: WA DNR Landslide Map
4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report



Legend

- Approximate Parcel Boundary
- 10’ Contour Line
- 2’ Contour Line

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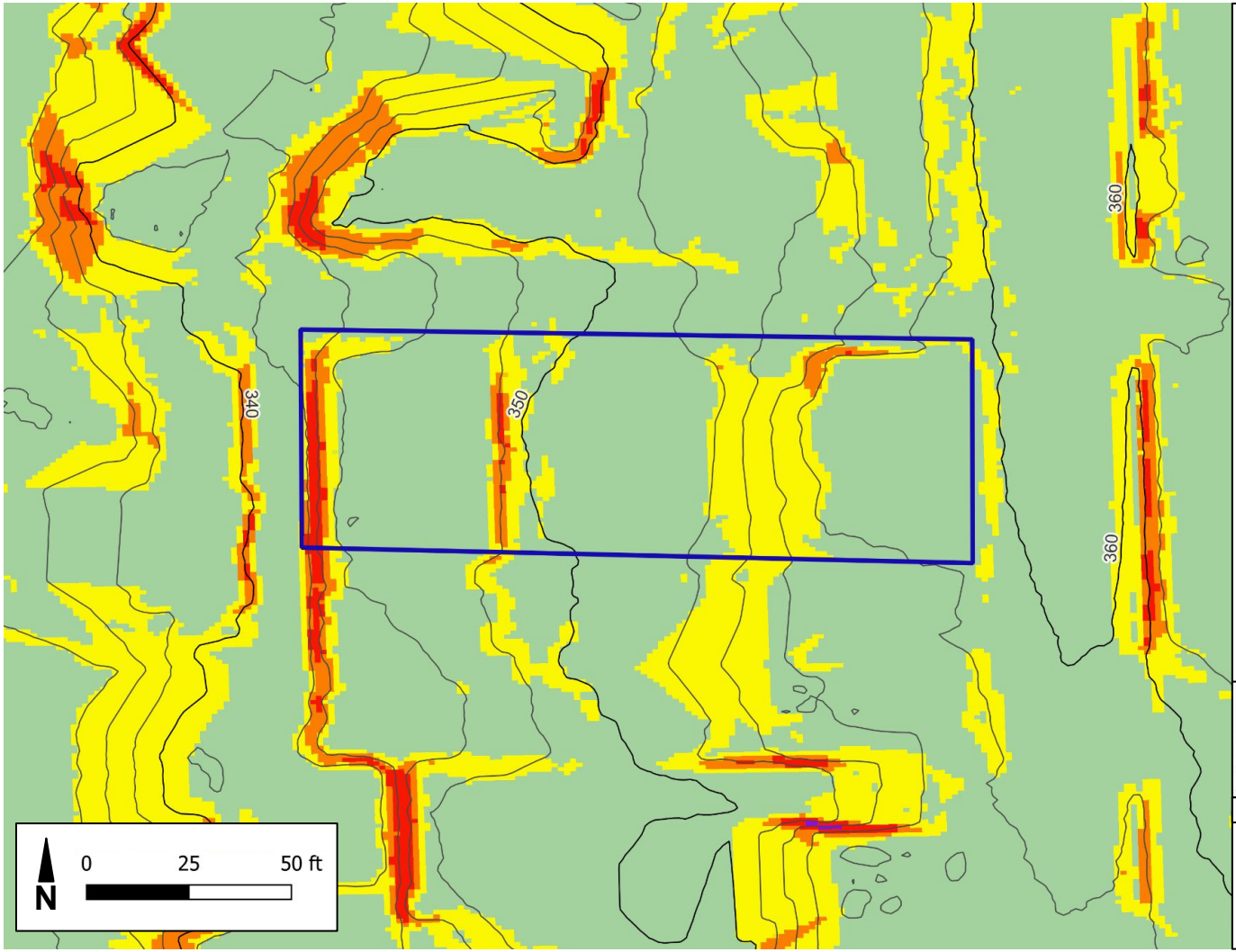
Figure 9: QGIS LiDAR & Contour Map

4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report



Legend

- Approximate Parcel Boundary
- 10’ Contour Line
- 2’ Contour Line

Slope Percentage

- 0-15%
- 15-40%
- 40-60%
- 60-100%
- >100% (45° +)

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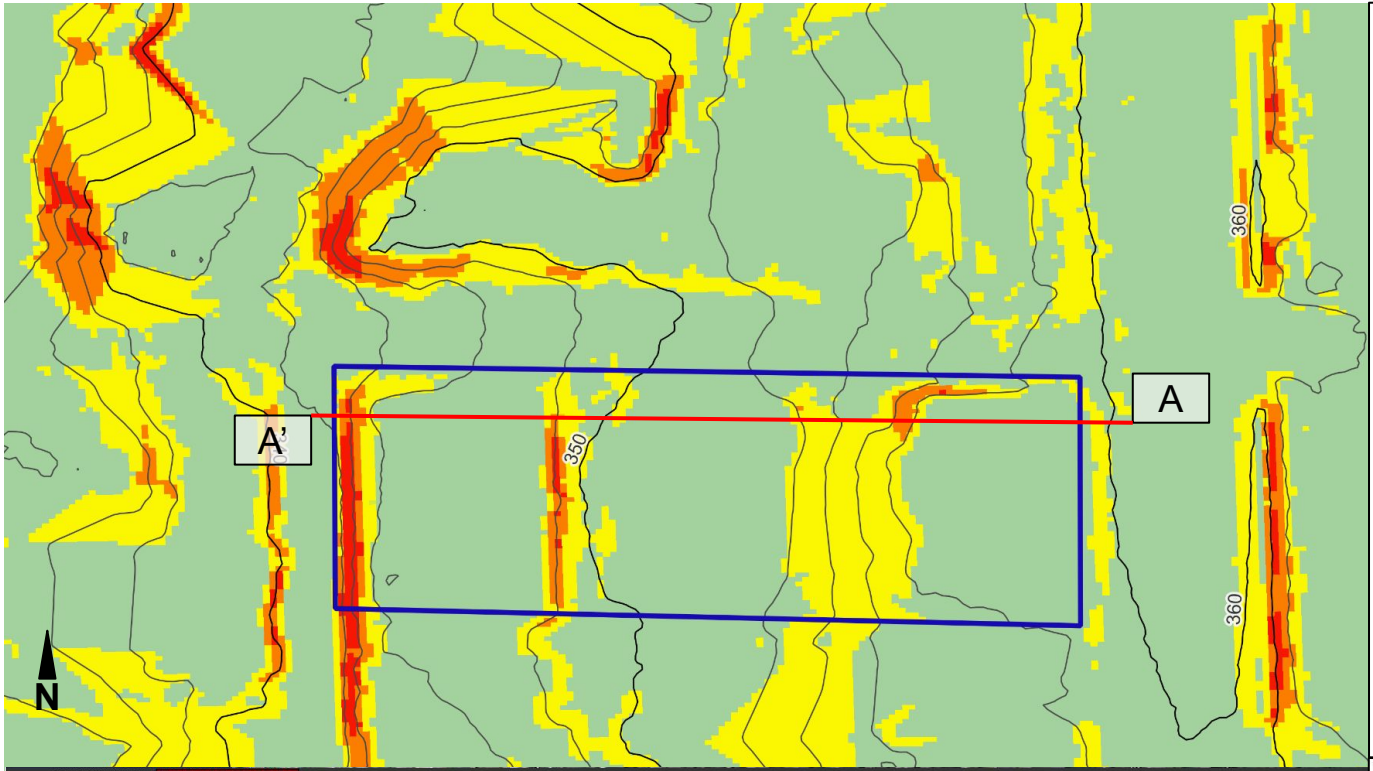
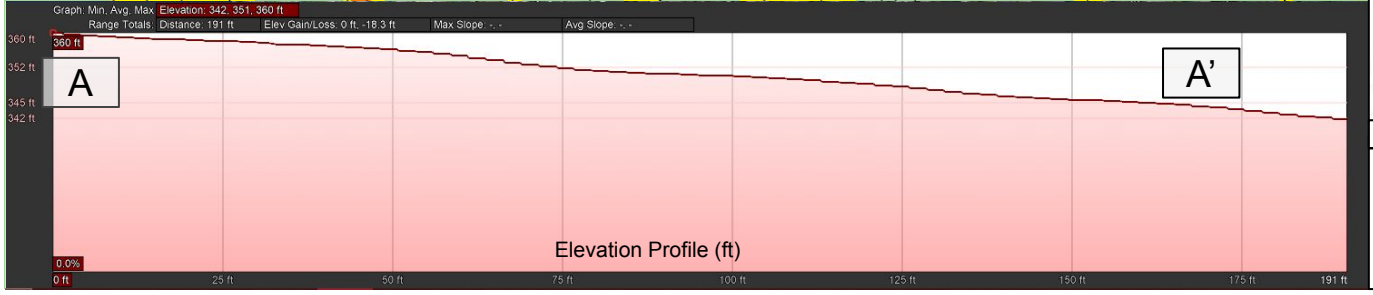
Figure 10: QGIS Slope & Contour Map

4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report





Legend

- Approximate Parcel Boundary
- 10' Contour Line
- 2' Contour Line
- Transect Line A-A'

Slope Percentage

- 0-15%
- 15-40%
- 40-60%
- 60-100%
- >100% (45° +)

MBGS

Mud Bay Geotechnical Services, LLC

Job #:2921-KIN	Date:Nov., 2025

Figure 11: Slope Transect & Profile

4433 86th Ave SE
Mercer Island, WA 98040
Geotechnical Report

APPENDIX A – FINAL BORING LOGS

MBGS Mud Bay Geotechnical Services, LLC	Project: ECA	Client: Xiao Zhou	Bore No. 1 of 2: BH-2-25
	Project Number: 2921-KIN	Contractor: Drift Interiors + Architecture	Equipment: Humboldt H-4414QC Auger
Address: 4433 86th Ave SE, Mercer Island, WA 98040	Date — Started: 11/13/2025	Bit Type: Bucket Tube Auger	Diameter: 4 inches
	Date — Completed: 11/13/2025	Hammer Type: Humboldt H-4202A	Fluid: n/a
Logged By: Maria Cools	Date — Backfilled: 11/13/2025	Hammer Weight: 15 lbs	Hammer Drop: 20 inches
Helper: Hannah Anderson	Groundwater Depth: Not Encountered	Elevation: Existing Surface	Total Depth of Boring: 72 inches
GPS Method: Google Maps	GPS Coordinates: 47.566354, -122.224734		GPS Elevation: n/a

Depth (in.)	Sample Type	Sample Number	Blow Counts (blows / 1 3/4")	Graphic Log	Lithology	Dry Density (pcf)	Moisture Content (%)	Additional Test
					0-6": **(TOPSOIL)**			
					6-36": **(ML)**			
24"	☒	S-1	15		**S1 @ 24":** Medium dense, dry, light brown, sandy silt **(ML)**			
36"	☒	S-2	12		**S2 @ 36":** Medium dense, dry, light brown, sandy silt **(ML)**			
					36-72": **(SW-SM)**			
72"	☒	S-3	REF		**S3 @ 72":** Dense, moist, well graded sand with trace silt **(SW-SM)**			
					End boring @ 72". Unable to advance auger.			

Lithology

Soil Group Name: modifier, color, moisture, density/consistency, grain size, other descriptors

Rock Description: modifier, color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.

Test Pit and Boring Log Symbols

- Standard Penetration Slit Spoon Sampler (SPT)
- California Sampler
- Shelby Tube
- CPP Sampler
- Stabllized Ground water
- Groundwater At time of Drilling
- Bulk/ Bag Sample

Soil Density Modifiers

Gravel, Sand, Non-Plastic Silt		Elastic Silts and Clays	
Blows/1 3/4"	Density	Blows/1 3/4"	Consistency
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-24	Medium Dense	5-8	Medium Stiff
25-50	Dense	9-15	Stiff
REF	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

MBGS Mud Bay Geotechnical Services, LLC	Project: ECA	Client: Xiao Zhou	Bore No. 2 of 2: BH-2-25
	Project Number: 2921-KIN	Contractor: Drift Interiors + Architecture	Equipment: Humboldt H-4414QC Auger
Address: 4433 86th Ave SE Mercer Island, WA 98040	Date Started: 11/13/2025	Bit Type: Bucket Tube Auger	Diameter: 4 inches
	Date Completed: 11/13/2025	Hammer Type: Humboldt H-4202A	Fluid: n/a
Logged By: Maria Cools	Date Backfilled: 11/13/2025	Hammer Weight: 15 lbs	Hammer Drop: 20 inches
Helper: Hannah Anderson	Groundwater Depth: Not Encountered	Elevation: Existing Surface	Total Depth of Boring: 48 inches
GPS Method: Google Maps	GPS Coordinates: 47.566354, -122.224847		GPS Elevation: n/a

Depth (in.)	Sample Type	Sample Number	Blow Counts (blows / 1 3/4")	Graphic Log	Lithology	Dry Density (pcf)	Moisture Content (%)	Additional Test
					Soil Group Name: modifier, color, moisture, density/consistency, grain size, other descriptors **Rock Description:** modifier, color, hardness/degree of concentration, bedding and joint characteristics, solutions, void conditions.			
					0-6": **(TOPSOIL)**			
					6-24": **(ML)**			
24"	☒	S-1	15		**S1 @ 24":** Medium dense, dry, light brown, sandy silt **(ML)**			
					24-48": **(SW-SM)**			
48"	☒	S-2	27		**S3 @ 48":** Dense, moist, well graded sand with trace silt **(SW-SM)**			
					End boring @ 48". Unable to advance auger.			

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REF	Very Dense	16-30	Very Stiff
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		>60	Very Hard