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STORMWATER UTILITY

Creating Solutions for Our Future

Josh Cummings, Director

MEMORANDUM

TO: Leah Davis, Associate Planner, Development Services -Community and Economic Planning and Development

FROM: Mark Biever, Water Resources Specialist, LPG. L.E.G.

DATE: April 30, 2019

SUBJECT: Reasonable Use Exception – Geotechnical Documents Review for 9020 Baird Rd NE (TC Project # 2019100758) – Manke

Background

A reasonable Use Exception (RUE) was submitted to the Community Planning and Economic Development Department for the proposed addition to the existing house. The addition is planned for the eastern side of the structure, within the Marine Bluff and Landslide Hazard buffers. The RUE request requires the applicant to submit geotechnical assessments to adequately characterize any potential negative impacts the proposal may have on site stability. The assessment must include the marine bluffs, steep slopes and the associated buffers.

The requirements are identified in Chapter 24.35 (subsections) and 24.03 (subsections) of the Thurston County Critical Areas Codes relating to landslide hazards and marine bluff hazards. The applicant is requesting reasonable use of the property due to the encumbrance of the buffers surrounding the peninsula on which the existing home is located.

Two geotechnical documents were submitted for this property related to slope stability and marine bluff hazards.

1. GeoResources – Geotechnical Report -Marine Bluff Hazard Area (Keith S. Schems, L.E.G. September 8, 2016)
2. Migizi Group Inc – Geological Assessment – Landslide Hazard Geotechnical Letter (James E. Brigham, P.E. June 14, 2017)



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Building No. 4, Room 100, 2000 Lakeridge Drive SW, Olympia, WA 98502
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These documents, in addition to LiDAR and areal maps, were reviewed and a site visit was conducted by Thurston County staff on April 11, 2019 to verify elements of the geotechnical documents and to observe site conditions firsthand.

Findings, Observations, and Results

During the April 11, 2019 site visit County staff walked the northern part of the property where the house is located and where some of the drainage features and other important geologic features were identified in the reports submitted for this RUE. Some features and analysis included in the geotechnical reports are listed below:

2016 GeoResources Report

- Indicates some wave cutting likely at very high tide or storms
- Site not susceptible to deep-seated slides
- Susceptible to shallow saturation earth flow
- Hand Augers only (2) to characterize subsurface geology near the peninsula bluff
- Slope stability Analysis performed – F.O.S. 1.32 stable static .97 seismic (existing)
- Slope susceptible to shallow erosion based on the analysis
- Liquefaction susceptibility is low
- Non-structural nurse logs best solution for toe erosion allowing for wave dispersion
- Recommends site drainage and interceptor drains for saturated soils
 - Tight-line drainage to beach with energy dispersal

2017 Migizi Report

- General discussion of geology
- General recommendations for setbacks (25 feet)
- Not specific to any project proposal

There is clear evidence that the steep marine bluff is actively eroding due to surface water (stormwater) runoff down the face of the bluff. The beach below the marine bluff does not appear to be chronically impacted by tidal action but likely experiences intermittent tidal erosion during extreme high tides or winter storms approaching from the north. This is a confirmation of elements in the GeoResources report. A well-developed beach with vegetation exists below the bluff supporting this observation (see photo #1).

There is evidence of smaller soil failures occurring via a debris flow process indicating saturation of the soils at the bluff face under the influence of gravity. Some larger shallow slides are also evident along the bluff indicating that instability occasionally exists further back into the slope (See photo#2). This is likely caused by near surface ground water or stormwater saturating the bluff near the top of the slope. This was identified in the GeoResource report and fits with the evidence seen during the site visit.

A slope stability analysis was performed as part of the GeoResource work and generally indicates a lack of susceptibility to deep landslides under static conditions. Seismic conditions are marginally unstable according to the GeoResources report. This is consistent with observations made during the site visit as no major indicators of deep-seated landslides was visible.

Summary

Marine Bluffs and Steep Slopes

- The bluffs surround the peninsula upon which the house is situated. The slopes facing west toward the water are near vertical and have numerous scars from recent and historic sloughing events (See photo #3). As stated earlier these events are small to intermediate in size and appear to be generated from the top of the bluff and *not* from constant wave action undercutting the toe of the slope.
- The slopes on the eastern portion of the site appear are less steep than the marine-facing bluffs. This part of the property is influenced more by a small stream and associated drainages than tidal/marine action. Slopes in this area are steep, however signs of instability are lacking. Large, old-growth timber is located undisturbed on the slope.

Drainage

- The drainage system was observed during the time of the site visit in April. The system appears to collect shallow groundwater and surface runoff. The collection systems were visible at the time of the site visit and was traceable to an outfall area at the base of the slope on the west side of the property.
- Perched shallow water does appear to be a problem creating instability in the marine bluffs consistent with the GeoResources report.

Recommendations

Based on all the information contained in the GeoResources and the Migizi reports and supplemental investigation, the site is encumbered by steep slopes on three sides. This creates multiple geotechnical issues resulting from the location of the property. These issues are exacerbated by shallow groundwater and surface water creating instabilities in the steep marine bluffs. This observation and recommendation in agreement with aspects of geotechnical reports submitted for this property.

The following recommendations and requests for additional information are outlined below:

- Request the drainage system be mapped, documented, and cleaned to improve performance.
- Recommend compliance with the setbacks established under the Critical Areas Ordinances.

Conclusion

The marine bluffs will continue to retreat at this location placing them ever closer to the home.

- The source of the erosion is most likely the surface and shallow groundwater saturating the bluffs and slopes on this property.
- Placement of bulkheads at the base of the marine bluffs will likely not significantly slow the rate of erosion.
- Placing woody debris, similar to what is currently located at the toe of the marine bluffs, may help prevent erosion that occurs when extreme high tides or winter storms occasionally impact the toe of the bluff.
- Toe protection will likely not remedy the more prevalent problem of erosion and mass wasting caused by surface and shallow/perched groundwater along the bluff faces.
- Improvement in drainage may be beneficial in reducing the amount of water reaching the bluff face
- Documenting, cleaning and maintaining existing engineered drainage will aid in removing water from the site.
- Additional recommended drainage may further improve stability of the bluffs

Based on the information reviewed for this application, any additions to the existing structures toward bluffs may adversely impact the long term stability of the slopes.

If you have any comments or questions please contact me at x2070. Thank you. Mark



Photo #1 – Beach from the top of the Bluff. Occasional high tide or winter storms may directly impact the base of the bluff but active erosion from the toe does not appear to be the predominant cause of bluff erosion. Established vegetation is observed at the base of the bluff.



Photo #2 – Small, recent debris flow originating near the top of the marine bluff.

Small debris flow indicates saturation of materials resulting fluid-like mass movement.



Photo #3 – West-facing Marine Bluff showing some of the historic slope failures on the order of a few yards to ten yards or more. Woody debris is seen at the top of the slope.