

March 10, 2022

Project: 21050

Michael and Lauren Schoenbrun
1005 Wiltshire Ave
San Antonio, TX 78209

Subject: Supplemental Geotechnical Recommendations
“Geological Report Guidelines for New Development on Oceanfront Properties”
Proposed New Single-family Residence
Tax Lot 1880, Map 28S-15W-36BC, Coos County
Beach Loop Road, Bandon, Oregon

PURPOSE AND SCOPE

At your request, we are responding to the “Geological Report Guidelines for New Development on Oceanfront Properties” provided by the City of Bandon in the process of reviewing your application for a building permit for the subject project. Our understanding is that the City of Bandon is requiring specific responses to these guidelines. We were not aware of these guidelines when our Geotechnical Report for the project was completed (dated October 27, 2021).

RESPONSE TO GEOLOGICAL REPORT GUIDELINES

A – SITE DESCRIPTION

1 - Site History

Relevant site history includes description of “historical” erosion observed at the site, detailed in section 3.4.1 Existing Condition.

2 - Topography

A typical cross section through the property and down to the beach was presented in the report (Appendix A).

3 - Vegetation

The site surface conditions were adequately described in the Report in section 2.2.

4 - Subsurface Materials

Subsurface conditions were discussed in detail, including the summary of section 2.3, and boring and probe logs in Appendix A.

5 - Seaward Conditions

These conditions are described in sections 2.2 and 3.4.1 of the report.

6 - Drift Logs

There are no drift logs that affect the property.

7 - Streams or Other Drainages

No streams or drainages affect the property.

8 - Headlands

There are no adjacent headlands that affect the site.

9 - Shore Protection Structures

No man-made structures are located on or adjacent to the property. However, section 3.4.1 discusses the existence of bedrock outcrops at the toe of slope that descends the site to the beach and how this rock has a positive benefit of limiting toe erosion from wave action.

10 - Pathways or Stairs

To our knowledge there are no pathways or stairs on the slope that descends to the beach.

11 - Human Impacts

No human impacts (i.e. structures or disturbances) were observed that would alter resistance to "wave attack."

B - FRONTING BEACH DESCRIPTION

1 - Average Beach Widths

We assume that beach width means the distance from the toe of the descending slope to the ocean edge in a direction normal to the toe of the slope. The beach width at this reach ranges from approximately 200 to 400-feet, depending on tides. The variation of beach width by season is not available but we assume that its relevancy has to do with impacts to the toe of the slope at high tide. In this case, the existence of bedrock at the toe of the slope is a significant factor that greatly reduces hazards associated with high tides and toe erosion thus minimizes the concern with beach width, especially considering that the beach gradient at this area drops about 10-feet over the 400-feet which is more than the typical variation between high and low tide.

2 - Median Grain Size

This has no relevancy to the project considering the topographic and geologic nature of the site.

3 - Average Beach Slopes

We assume this has relevancy to tidal variation and erosion at the toe of the descending slope. This was discussed in our response to item (1) of this section. Based on elevational data presented by the DOGAMI Slido bare-earth lidar data, the beach has a grade difference of approximately 10-feet over 385-feet, for an average gradient of 2.6-percent. There is no evidence that suggests that this might change from summer to winter.

4 – Elevations

The west edge of the property is presumed to be at the top of the slope that descends to the beach, which is at least approximately 75-feet or more above mean sea level and more than 100-feet east of the beach edge. To our knowledge, the beach does not extend to the property boundary and, therefore, the question is irrelevant.

5 – Rip Currents

To our knowledge no such conditions exist along the beach that affect the project in this manner.

6 – Rock Outcrops

Minor outcrops or rock protrusions do exist along the beach west of the toe of the slope that descends from the project site. These irregularities do not significantly affect tidal elevation but do serve to reduce wave energy delivered to the toe of the slope. This is a positive benefit to the slope stability and probably one of the reasons why the slope is well vegetated with no visible indications of wave-related slope movement or erosion.

7 – Depth of Beach Sand

Based on the observations of rock outcrops that are exposed at the toe of the descending slope and protruding from the beach surface, it is logical to assume that beach depth is relatively shallow in the reach of beach that affects the project site. Actual beach depths are unknown and could only be determined by an extensive subsurface investigation. The relevancy of this issue with regard to the project is uncertain.

C – ANALYSIS OF EROSION AND FLOODING POTENTIAL

1 – DOGAMI Monitoring Data

No DOGAMI monitoring data is available for this beach.

2 – Human Activities

We have not observed any current human activities that would affect shoreline erosion. We have discussed in the Report assumptions regarding improper storm water drainage that, in our opinion, most likely caused erosion and sloughing at the top of the descending slope. This discussion is in section 3.4.1 of the Report. We are unaware of any current or past human activities on the descending slope or along the toe or on the beach that have, in any way, affected erosion at the project site.

3 – Analysis of Mass Wasting

Our report summarized our comprehensive evaluation of slope stability in section 3.4.2 of the report.

4 – Wave Run-up

Visual evidence of a significantly high bedrock outcrop at the toe of the slope plus and existing dense vegetation on the slope above the outcrop is evidence that wave run-up at this site is not a significant hazard to erosion at the project site.

5 – Frequency of Erosion-inducing Processes

We have evaluated the likelihood of liquefaction and lateral spreading for the most extreme seismic event (a 2,475-year event). Liquefaction and the resulting lateral spreading is an "erosion-inducing process." We have also evaluated the likelihood of slope movement both in the static condition and including earthquake accelerations. Our report makes recommendations to mitigate the affect of these natural causes of slope erosion and destabilization. None of these causes involve "unusually high water levels together with severe storm wave energy."

6 - Dune-backed Shoreline

This site has no dune-backed shoreline. This issue is irrelevant to the project.

7 – Coastal Erosion

There is no current DOGAMI data for shoreline erosion. An evaluation of available aerial photography (Google Earth) ranging from 1994 to 2019 (25-years) indicates no significant regression of the toe of the descending slope over that period.

8 – Sea Level Rise

No definitive data documenting actual sea level rise at the project site in the past is available. Modeling projecting *possible* sea level rise has been documented, and these projections are that there could be a mean cumulative rise of:

- 10-cm (.3-feet) by 2030,
- 30-cm (1.0-feet) by 2050, and
- 1-m (3.3-feet) by the year 2100

along the coastline of California, Oregon, and Washington.¹ The rise by 2100 would likely cause or initiate minor wave erosion at the toe from extreme storm events. However, the time span for this projection exceeds the expected life of the project. We recommend that the hazard of sea level rise to the project is low.

No data exists for any reliable prediction local tectonic subsidence or uplift with the resolution necessary to make any commitments to reliably estimating the hazard.

¹ Committee of Sea Level Rise in California, Oregon, and Washington, "Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future." National Academy of Sciences Press. 2012.

D – ASSESSMENT OF POTENTIAL REACTIONS TO EROSION EPISODES

1 – Determination of Legal Restrictions

Determination of legal restrictions is not in the purview of the project consultant and would be a conflict of interest. However, we recommend that there is not a need for establishing any sort of legal restrictions of this kind at the project site by local planning officials.

2 – Assessment of Potential Reactions to Erosion Events

The Report evaluates, in detail, the “potential reaction” to probable extreme seismic events that would result in major erosion (slope movement, liquefaction, and lateral spreading). The Report addresses these hazards and makes specific recommendations for mitigation including:

- Offset “No Build” zones (section 4.2 of the Report),
- Site Grading and Drainage (section 4.3 of the Report), and
- Deep foundation support of permanent foundations (section 4.4 of the Report).

E – RECOMMENDATIONS

1 – Setbacks, Building Techniques, and other Mitigation

Setbacks

A no-build zone was specified in the Report in section 4.2. This is a reasonable offset from the top of the descending slope to minimize the impact of possible erosion on the structural support and occupational safety.

Building Techniques

Deep foundation support of the structure was specified in the Report (section 4.4) to ensure occupational safety in the event of liquefaction and subsequent lateral spreading.

Other Mitigation

Recommendations were made in the report (section 3.4.3) for grading the over-steepened areas at the top of the bluff to provide the most favorable environment for establishment of vegetation.

We also recommend planting of native dense vegetation in bare soils at the top of the bluff that have been regraded.

2 – Preservation of Vegetation and Grade

Recommendations were made in the Report for site grading and temporary erosion control measures in the setback zone. See section 4.3 of the Report.

3 – Variances

To our knowledge, variances are not required to accommodate the proposed development while meeting the requirements of erosion control.

4 - Water Drainage

Recommendations for this purpose were presented in the Report for drainage. See section 4.3 of the Report.

LIMITATIONS AND USE OF GEOTECHNICAL RECOMMENDATIONS

These supplemental recommendations have been prepared for the exclusive use of Michael and Lauren Schoenbrun for the subject project.

These supplemental geotechnical recommendations meet the standards of care of competent geotechnical engineers providing similar services at the time these services were provided. We do not warrant or guarantee site surface subsurface conditions.

Some of the issues raised in the "Geological Report Guidelines for New Development on Oceanfront Properties" are poorly substantiated in the literature and no definitive methods of evaluation or determination have been established. Thus, any recommendations made are based on the experience and judgement of the professional. While K & A Engineering, Inc. has accumulated an impressive amount of experience on coastal stability, our recommendations are subjective in nature and must be recognized as such.

The scope of our services does not include construction safety precautions, techniques, sequences, or procedures, except as specifically recommended in this report. Our services should not be interpreted as an environmental assessment of site conditions.

Thank you for the opportunity to be of service. Please call us if you have questions or need further assistance.

Sincerely,



Michael Remboldt, P.E., G.E.
K & A Engineering, Inc.



RENEWS: 12/31/2022