



January 3, 2018

Henry Walker Homes
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Attention: Brock Loomis
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Subject: Proposed Edgewater Beach Resort
Phases 1 and 3
6350 East Highway 39
Huntsville, Utah
Project No. 1170319

Gentlemen:

This letter presents the results of a geologic-hazard study for the proposed Edgewater Beach Resort, Phases 1 and 3 to be constructed at 6350 East Highway 39 in Huntsville, Utah.

This study was conducted to evaluate geologic hazards that may affect the proposed development of Phases 1 and 3 of Edgewater Beach Resort. The hazards evaluated are surface fault rupture, landslide, tectonic subsidence, rockfall, debris flow and liquefaction. The study included a review of geologic literature, aerial photographs and Lidar data and geologic analysis. This report has been prepared to summarize the data obtained during the study and to present our conclusions.

We performed a similar study for Lots 10 through 29 of Phase 2 and presented our findings in a letter dated May 9, 2017 under Project No. 1170319.

PROPOSED CONSTRUCTION

We understand that commercial buildings are planned for the unbuilt lots of Phase 1 and 24 residential units are planned for Phase 3. We anticipate buildings will be two-story, wood-frame structures with slab-on-grade floors for the commercial units and basements for the residential buildings of Phase 3 of Edgewater Beach Resort. The grading plan provided shows minor amounts of grade change for Phase 3. Roads have already been constructed for Phases 1 and 2 of the development.

SITE DESCRIPTION

At the time of our site reconnaissance in April 27, 2017 for the Phase 2 study, there were no permanent structures on the site but roads had been constructed and some underground utilities had been installed for Phases 1 and 2. The remaining portion of the site consisted of undeveloped ground.

The ground surface at the site sloped gently down toward the north.

Vegetation had been removed in several areas but generally consisted of grass and weeds with some areas of brush. The Phase 3 area was mostly grass and brush covered.

There were similar condominiums in Phase 1 and undeveloped land to the east and west. Highway 39 bordered the south edge of the property. There was undeveloped land south of the Highway. Pineview reservoir was to the north.

OFFICE METHODS OF INVESTIGATION

Geologic conditions at the site were evaluated by a review of geologic literature and aerial photographs. Aerial photographs used during the investigation were downloaded from the Utah Geological Survey website. They have photograph numbers of AAJ-2B-29 and 30. The photographs have a date of August 10, 1946.

A. Geologic Literature Review

The site is located in Ogden Valley, which is a northwest trending valley within the Wasatch Mountains of north/central Utah. The valley is filled with an accumulation of lacustrine, alluvial and colluvial sediments from deposition during the past 15 million years. The surface deposits across the site consist of Quaternary-age lake deposits. These sediments are underlain by bedrock consisting of Tertiary-age pyroclastics of the Norwood Formation.

Ogden Valley is a down-dropped structure with the Ogden Valley Northeast margin fault along the northeast side of the valley and the Ogden Valley Southwest margin fault and the Ogden Valley North Fork fault along the southwest side of the valley. These faults are oriented in a general northwest/southeast direction with the two western faults estimated to have moved in the last 750,000 years and the east fault having evidence of movement in the last 2.6 million years. The faults are considered normal faults with dip direction down to the northeast on the two west fault systems and down to the southwest for the Ogden Valley Northeast margin fault. The faults are considered relatively old structures and do not represent a significant surface-fault-rupture hazard for development within the Ogden Valley area. Tectonic subsidence associated with fault movement would similarly not be a significant hazard at this site.

The Elliott and Harty (2010) landslide map shows no landslide deposits for the site and surrounding area.

The King and others (2014) geologic map, which is a map in progress and currently has no legend, shows the site mapped as the Tertiary Age Norwood Formation, the northern portion of the site and lake deposits in the southern and central portions of the property. The map does not show that there are any geologic hazards associated with the property.

B. Aerial Photograph Review

The geologic literature indicates that there are landslides in the drainage to the east of the site but no landslide deposits on the property. Review of aerial photographs and Lidar data finds no evidence of potential geomorphology consistent with landslide deposits on or near the property. There appears to be some erosion occurring along the shoreline north of the site. It may be that stability of the slope above the shoreline is a concern such that it could affect the area of proposed development in Phase 3. Subsurface investigation, laboratory testing and engineering analysis would be needed to evaluate this concern.

Based on the topography of the site and surrounding area, rockfall and debris flow are not potential geologic hazards at the site.

C. Seismicity

The property is located in the Intermountain Seismic Zone, which consists of an area of relatively high historical seismic activity. The most intense seismic ground shaking at the site is expected to originate from the Wasatch fault zone. The Wasatch fault zone is considered capable of producing earthquakes on the order of 7 to 7.5 magnitude and can result in significant seismic ground shaking at the site. The US Geological Survey data indicate that a peak ground acceleration of 0.39g can be expected to have a 2 percent probability of being exceeded in a 50-year time period at this site (IBC, 2015).

FIELD METHODS OF INVESTIGATION

A site reconnaissance was performed on April 27, 2017 for Phase 2 but not for this current study. No evidence of geologic hazards were identified during the site reconnaissance. The drainage of Smith Creek to the east is approximately 100 to 200 feet east of the site and consists of a channel eroded into the Norwood Formation. No evidence of landslide was identified within the drainage slopes.

Clay was observed in trench excavations at the site. There was no evidence of seeps in the slope above Smith Creek and outcrops of Norwood Formation are exposed in the slope. Since the soil is clay and overlies bedrock, liquefaction is not considered a hazard at this site.

Henry Walker Homes
January 3, 2018
Page 4

CONCLUSIONS

Seismic ground shaking and possibly slope stability along the north side of Phase 3 are considered potential geologic hazards at the site. The seismic ground shaking hazard can be mitigated through structural design. Slope stability evaluation would require subsurface investigation, laboratory testing and engineering analysis to evaluate. It is our professional opinion that debris flow, rockfall, surface fault rupture, tectonic subsidence and liquefaction are not significant hazards at the site.

LIMITATIONS

The analysis and report findings are based on published geologic maps and aerial photographs of the site. Our conclusions are based on currently accepted geologic interpretation of this information.

REFERENCES

Elliott, A.H. and Harty, K.M., 2010; Landslide maps of Utah, Ogden 30' X 60' quadrangle, Utah Geological Survey Map 246DM, Plate 6.

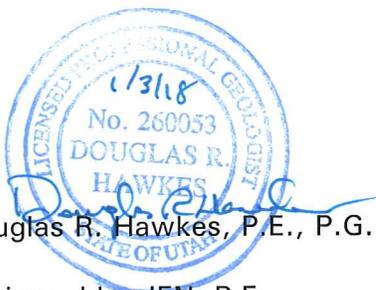
King, J.K., McDonald, G.N. and Coogan, J.C., 2014; Progress report geologic map of the Huntsville quadrangle, Weber and Cache Counties, Utah, Utah Geological Survey map in progress.

Utah fault and fold database accessed on May 2, 2017 at geology.utah.gov/resources/data-databases/qfaults/.

If you have any questions or if we can be of further service, please call.

Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Douglas R. Hawkes, P.E., P.G.

Reviewed by JEN, P.E.
DRH/rs