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August 17, 2015

Dana Shuler, P.E.
Weber County Engineering Division
2380 Washington Blvd., Suite 240
Ogden, UT 84401

Subject: Geologic Review
Lot 39R Summit at Powder Mountain Phase I Subdivision
8365 East Summit Pass Road
Eden, Utah
SA Project No: 15-161

Report: IGES Report - Geotechnical Investigation Report, Lot 39R of Powder Mountain Resort, 8365 East Summit Pass, Weber County, Utah (IGES Project No. 02052-001), dated June 3, 2015; prepared for Ms. Cassandra Beresini, 1 Letterman Drive, Bldg. D, Suite 500, San Francisco, California 94129.

Geologic Submittal Status: **INCOMPLETE SUBMITTAL**

Dear Ms. Shuler,

At your request, SA reviewed the above referenced June 3, 2015, IGES Geotechnical, Inc., report. The purposes of the IGES investigation was to assess the nature and engineering properties of the subsurface soils at the proposed home site and to provide recommendations for the design and construction of foundations, grading, and drainage. The scope of work completed for the IGES study included subsurface exploration (two test pits to depths of about 20 feet below ground surface), literature review, engineering analyses, and preparation of the subject report.

The purpose of SA's review is to evaluate whether or not the IGES document adequately addresses geologic conditions at the site, consistent with concerns for public health, safety, and welfare; reasonable professional standards-of-care, and; the Weber County Hillside Development Review Procedures and Standards.

The June 3, 2015, IGES report indicates "Lot 39R is a 2.2-acre single-family residential lot with a buildable envelope of approximately 0.2 acres. A single-family home will be constructed at the site... Based on available plans, the home will be a two-story wood framed structure with a walk-out basement (three levels total), founded on conventional spread footings. The plans also show a guest house and a storage space underlying the garage. The project is expected to include improvements common for residential developments such as underground utilities, curb and gutter, flatwork, landscaping, and possibly appurtenant structures. Several rockeries are also planned for the driveway."

IGES Geologic Conclusions

IGES primary geologic conclusions follow:

1. "The site is overlain by approximately 24 inches of dark brown topsoil characterized by an abundance of organic matter (roots, etc.). The topsoil was underlain by coarse colluvium consisting of dense dark reddish-brown clayey gravel with sand," (page 3).
2. "Groundwater was not encountered in the test pit excavations. However, in TP-2 we observed water flowing in through a gravel seam at a depth of 7 feet below existing grade; this seepage is likely associated with spring run-off and will probably not persist throughout the year. Groundwater is not anticipated to adversely impact the proposed construction. However, groundwater levels could rise at any time based on several factors including recent precipitation, on- or off-site runoff, irrigation, and time of year (e.g., spring run-off). Seeps and/or springs may be present on the foundation excavation during spring run-off," (page 3).
3. "... the potential for expansive soils impacting the proposed development is considered low," (page 3).
4. "...wetting induced collapse is not expected to significantly impact the proposed improvements," (page 3).

5. "Geology and geologic hazards have been previously addressed by Western Geologic in a separate submittal (Western Geologic, 2012)¹. This work has also been referenced in our previous geotechnical reports for the project (IGES, 2012a² and 2012b)³. The report by Western Geologic indicates that the building envelope is located outside of known geologically unstable areas. The lower quarter of the lot (beyond buildable areas) is mapped as undifferentiated "mixed slope colluvium, shallow landslides, and talus" (Western Geologic, 2012)."

"During our subsurface investigation, potentially adverse geologic structures (e.g., evidence of faulting or landslides) were not evident to the maximum depth of exploration (20 feet). Geomorphic expressions of shallow, surficial landslides were not observed on, or near the lot. Based on currently available data and our observations, the potential for geologic hazards such as landslides, liquefaction, or surface fault rupture impacting the site is considered low," (page 4).

6. "Based on the results of field observations, laboratory testing during a previously completed geotechnical investigation (IGES, 2012a), and other recent geotechnical work nearby, the subsurface conditions are considered suitable for the proposed construction provided that the recommendations presented in this report are incorporated into the design and construction of the project," (page 5).

SA Comments

1. According to Weber County Hillside Development Review Procedures and Standards, the term "restricted lot" means a lot or parcel of land with questionable slope which:
 - a. Has an average slope of 25 percent or more;

¹ Western Geologic, 2012, Report: Geologic Hazards Reconnaissance, Proposed Area 1 Mixed-Use Development, Powder Mountain Resort, Weber County, Utah, dated August 28, 2012.

² IGES, Inc., 2012a, Design Geotechnical Investigation, Powder Mountain Resort, Weber County, Utah, Project No. 01628-003, dated November 9, 2012.

³ IGES, Inc., 2012b, Preliminary Geotechnical Investigation, Powder Mountain Resort, Weber County, Utah, Project No. 01628-001, dated July 26, 2012.

- b. Does not contain a building area of at least 75 feet by 100 feet on a buildable portion of the lot with slope of less than 25 percent, exclusive of easements or required setbacks; or
 - c. Has been identified as having potential geologic or other environmental hazards or constraints which require further investigation prior to issuance of a building permit.
 2. Possible landslide deposits have been documented within the southern part of the lot (Western, 2012), which constitute a potential geologic hazard.
 3. The 2012 Western Geologic development report:
 - a. Provided a "... reconnaissance-level⁴ engineering geology and geologic hazards review and evaluation..."
 - b. Was "...intended to be a reconnaissance-level tool to assist with project planning and reduce and minimize impacts from high-risk geologic hazards..." (page 1).
 - c. States "...All the above evidence suggests slopes bounding Lefty's canyon have marginal stability and the risk from landslides in the project area is high. Landslide risk can be minimized by avoiding mapped landslides and steep slopes in the project area, particularly at a planning level. Mapped colluvial and landslide areas in the project area appear to be in slopes steeper than 20%. We therefore recommend that stability of slopes be evaluated in a site-specific geotechnical engineering evaluation prior to construction for any development in slope area exceeding 20%."

⁴ reconnaissance-level: an examination or survey of the general geological characteristics of a region (dictionary.com, <http://dictionary.reference.com>)

SA Recommendations

Based on Weber County Hillside Development Review Procedures and Standards, SA recommends Weber County not consider the June 3, 2015, IGES report complete from a geologic perspective.

Sec. 104-27-4 (a) (Studies and reports required., Requirement for report) of Chapter 27 of the Weber County Hillside Development Review Procedures and Standards, addresses requirements for natural hazard studies and reports. In accordance with Chapter 27 and recommendations provided in the Western Geologic (2012) development report, SA recommends Weber County request IGES:

1. Perform a slope stability analysis as stipulated in the Geologic Hazard Study for the development (Western Geologic, 2012), since the slope on the lot is approximately 30 percent (i.e., greater than 20%), and;
2. Show the location of any potential geologic hazard with delineation of a recommended setback distance from the hazard and proposed location of the structure as stipulated in Chapter 27 of the Weber County Hillside Development Review Procedures and Standards. The report should include a detailed site map (scale: one inch equals 200 feet or larger). The evidence on which recommendations and conclusions are based should be clearly stated in the report and completed under the direction of an engineering geologist.

Closure

Comments and recommendations in this review are based on data presented in the referenced Consultant's report. SA accordingly provides no warranty that the data in the Consultant's report or any other referenced reports are correct or accurate. SA has not performed an independent site evaluation. Comments and recommendations presented herein are provided to aid Weber County in reducing risks from geologic hazards and to protect public health, safety, and welfare. There is no other warranty, either express or implied.

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All services performed by SA for this review were provided for the exclusive use and benefit of Weber County; no other person or entity may or is entitled to use or rely upon any of the information or reports generated by SA as a result of this review.

SA would be pleased to meet with Weber County and/or the Consultant, at a mutually convenient time, to discuss any of the issues presented herein. In the meantime, if you have any questions, please feel free to contact the undersigned. The opportunity to be of service to Weber County is appreciated.

Very truly yours,

SA



The image shows a handwritten signature in blue ink that reads "David B. Simon". The signature is written over a circular blue ink seal. The seal contains the text: "LICENSED PROFESSIONAL GEOLOGIST", "DAVID B. SIMON", "8234321-2250", "8-17-15", and "STATE OF UTAH".

David B. Simon, P.G.
Principal Geologist

DBS/AOT

Dist: 1/addressee