

COLORADO GEOLOGICAL SURVEY

1801 19th Street
Golden, Colorado 80401



Karen Berry
State Geologist

December 22, 2017

Raimere Fitzpatrick
El Paso County Development Services Dept.
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Location:
SW $\frac{1}{4}$ of NE $\frac{1}{4}$ Section 17,
T14S, R67W of the 6th P.M.
38.8351°, -104.9141°

Subject: Crystal Park Site 315R – 4854 Crystal Park, El Paso County, CO,
El Paso County File Number CP-17-10, CO; CGS Unique No. EP-18-0025

Dear Raimere:

Colorado Geological Survey has reviewed the submittal for this property. For this review we received: request for review (El Paso County, 11.29.17), Elevation and Site Plans (BBKern Designs, 6.9.17), and Geologic Study (RMG, 1.17.03). CGS previously reviewed this location (4.15.03). We understand that the site plan approved after that review has been revised requiring another review. At the time of our site visit (11.16.17) grading and excavation was ongoing. A site access drive was in place and excavation has occurred on several levels of the hillside. The well was in place.

Site geology. The site is underlain at variable depths by relatively loose material weathered from the underlying Pikes Peak Granite. Pikes Peak Granite is typically not problematic from a geotechnical, or foundation performance perspective. However, the rock is fractured and weathered, sometimes extensively. Both of these rock quality characteristics can impact slope stability and erosion potential. Additionally, the material weathered from the bedrock (commonly known as “Grus”, or “Colluvium”) is weaker than the bedrock and can be highly variable in depth.

Steep slopes. The lot contains steep slopes, and the site plan shows the structure in locations with slopes estimated to be greater than 45%. While mapped landslides are not present and evidence of existing slope instability was not observed there are risks associated with construction on these steep slopes where erosion is also a significant constraint.

- Slopes that appear to be currently stable can be destabilized if modifications are made through excavation of cuts, addition of fills, and loading due to structures.
- Presently stable slopes may become unstable, as a result of reduced soil strengths, if 1) significant moisture is added to the slope through residential irrigation (including infiltration from septic fields), extended precipitation or snowmelt, and/or 2) the existing drainage pattern is altered through grading, introducing water to areas that were previously drier.
- Block slope failures in the bedrock can occur along concealed fractures and weathered zones anywhere beneath the planned building site. The foundation excavation should be carefully inspected for evidence of fractures, discontinuities, and weathered zones.

These risks and constraints should be evaluated by the geotechnical engineer prior to completion of the foundations for the planned residence. Should observed rock conditions indicate differences from those assumed in the foundation design the design should be re-evaluated by the structural engineer.

Surface Drainage and Erosion. The onsite soil and colluvium (“Grus”) is highly susceptible to erosion. Concentrated, developed flows can cause serious and damaging erosion and rapidly erode the surface material down to hard rock. Site drainage should be designed and constructed to prevent concentrated flows from being developed within the site. Drainage should be designed to prevent any flows from Crystal Park road being directed at the lot.

Additional geotechnical investigations, analysis and design. A lot-specific geotechnical investigation, with testing, analysis and recommendations, should be conducted. Sheet A-8 includes note S-5 that references “engineered foundation design” and “engineered soils report”. We have not seen these reports. The investigation should include characterization of subsurface conditions, such as depth to hard bedrock that may require blasting, and locations (if any) of discontinuities and/or weathered bedrock zones that may need to be “bridged” or spanned by the foundation. Additionally, the investigation needs to develop specifications for subgrade preparation and structural fill placement, maximum allowable cut and fill slope angles and heights, and design of foundations, floor systems, retaining walls, and surface and subsurface drainage.

RMG’s geology letter includes recommendations to design the structure with as much rigidity as possible due to the potential of downslope creep. These recommendations should be strictly adhered to.

The geotechnical engineer should evaluate the stability of the slopes in relation to the existing retaining walls associated with Crystal Park Road. This evaluation should determine what impacts, if any, the excavations associated with the proposed structure will have on the existing walls. In addition, the geotechnical engineer should discuss the depth of weathered bedrock (Grus) evident at the site and make a determination on if the proposed stacked retaining walls associated with the proposed structure need to be further engineered.

Thank you for the opportunity to review and comment on this project. If you have questions or need additional review, please call at (303) 384-2643, or e-mail jlovekin@mines.edu.

Sincerely,



Jonathan R. Lovekin, P.G.
Senior Engineering Geologist