COLORADO GEOLOGICAL SURVEY

1801 19th Street
Golden, Colorado 80401

Karen Berry
State Geologist

May 1, 2017

Raimere Fitzpatrick
El Paso County
Planning and Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Location:
SE SE NW Section 17,
T14S, R67W of the 6th P.M.
38.8326, -104.9149

Subject: Crystal Park Filing 2, Lot S-184 (184 Camelot Road)
File Number unassigned; El Paso County, CO; CGS Unique No. EP-17-0049

Dear Mr. Fitzpatrick:

Colorado Geological Survey has reviewed the Crystal Park Site 184 referral. We understand a single family home is proposed on approximately 0.7 acre located within the Crystal Park PUD. With this referral, we received a Geologic Hazard Report by RMG dated March 3, 2017, and a Concept Site Plan by Virginia Ownbey (February 8, 2017).

CGS visited the site on April 25, 2017. There appears to be a suitable building site that avoids slopes of ≥30% at the end of the driveway shown on Ownbey's Concept Site Plan. **CGS agrees with RMG that the site does not contain, nor is it exposed to, any geologic hazards that would preclude the proposed lot and residential use.** However, we have several comments:

Construction-related slope instability. There are risks associated with construction on steep slopes such as are present at this site. Slopes that appear to be stable under current conditions can be destabilized if modifications are made through excavation of cuts, addition of fills, or erosion. Stable slopes may become unstable, as a result of reduced soil strengths, if 1) significant moisture is added to the slope through residential irrigation, extended precipitation or snowmelt, or infiltration from OWS, and/or 2) the existing drainage pattern is altered through grading, introducing water to areas that were previously drier. RMG's "Unstable or Potentially Unstable Slopes" recommendations (page 5) regarding surface grading, positive drainage away from the structure, xeriscaping, and identifying areas where slopes are steeper than 30% as non-buildable, are valid and should be strictly adhered to. To further reduce potential hazards associated with erosion, construction-related slope instability, and shallow failures such as creep and slumping:

- Grading for driveways, structures, and other improvements should be designed to minimize temporary and permanent cuts and fills to the extent possible.
- RMG or a qualified geotechnical professional should determine maximum allowable, unretained temporary and permanent cut/fill heights and slope angles.
- All planned cuts exceeding four feet in height should be evaluated for slope stability.
- Driveway retaining walls, building foundations, and upslope walls that will function as retaining walls must be designed by a qualified geotechnical or civil engineer, and must include adequate behind-wall drainage.

- If the soils on or near any part of the property become saturated through rainfall, snowmelt, a water or septic pipeline failure or unchanneled road runoff, the soils could lose strength and fail slowly or catastrophically. Surface drainage must be designed and maintained to quickly channel all runoff away from structures and roads and off of slopes as efficiently as possible. It is imperative that water is allowed to drain quickly and NOT pond anywhere within or near developed areas.
- Existing vegetative cover should be left intact to the extent possible, and every effort should be made to restore native vegetation within disturbed areas as quickly as possible. Irrigation beyond the bare minimum required to reestablish native vegetation should not be permitted.

Geotechnical investigation, analysis and design. A lot-specific geotechnical investigation, consisting of drilling or test pits, sampling, testing, and analysis should be conducted, if one has not been completed already, once the development plan and building location are finalized. The investigation should characterize subsurface conditions such as soil and bedrock engineering properties, 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 should be used to develop recommendations for subgrade preparation and structural fill placement, maximum allowable cut and fill slope angles and heights (discussed above), and design of foundations, floor systems, retaining walls, and surface and subsurface drainage.

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

Sincerely,

Jill Carlson, C.E.G.
Engineering Geologist