

COLORADO GEOLOGICAL SURVEY

1801 Moly Road
Golden, Colorado 80401



Matthew L. Morgan
State Geologist and Director

March 15, 2023

Ryan Howser
El Paso County Development Services Department
Sent via email: RyanHowser@elpasoco.com

Location:
NW¼ of Sec. 3 and NE¼ Sec. 10
T13S, R64W of the 6th PM
38.9475, -104.5435

Subject: Saddlehorn Ranch Filing 2, El Paso County File Number SF2133
El Paso County, Colorado; CGS Unique No. EP-19-0140_6

Dear Ryan,

As requested, the Colorado Geological Survey (CGS) has reviewed the Saddlehorn Ranch Filing 2 referral documents. Pertinent documents provided with this referral include the Soil, Geology, & Geologic Hazard Study (Entech Engineering, Inc., April 29, 2019, revised April 24, 2020). A soils and geology report specific to Filing 2 was not provided with the referral documents.

CGS agrees with most of Entech's geologic interpretations, identification of hazards and constraints associated with the geologic conditions, and the proposed mitigation measures. The geologic conditions identified by Entech, with the exception of shallow groundwater, can be determined during a site-specific soil and foundation investigation. During the preliminary plan submittal for Saddlehorn Ranch, CGS recommended and commented on the need for a groundwater monitoring program or drain systems if below grade levels are planned (letter dated December 14, 2020). We offer the following comments and recommendations based on the updated documents.

Shallow Groundwater. Shallow and potentially shallow groundwater has been identified at the site. However, data has yet to be collected for the extent of groundwater fluctuations that can be expected here. Groundwater was encountered in all test borings and seven test pits within the Saddlehorn Ranch Subdivision at depths ranging from 6 to 13 feet during drilling operations (p. 8). Without a seasonal groundwater monitoring program, potential impacts from shallow groundwater remain indeterminate in sites with persistent but intermittent shallow groundwater such as this one. Seasonal fluctuations of shallow groundwater cannot be determined from these singular data points but require measurements during spring, summer, fall, and winter.

Therefore, if below grade levels are desired for lots within Filing 2, **CGS recommends the county require groundwater monitoring/observation to verify that proposed floor levels are at least three feet (preferably 5 feet) above maximum anticipated groundwater levels and maintained year-round.** This monitoring/observation program should be conducted to determine if basements are feasible, to design detention ponds, and to determine if an underdrain system for the development is required due to shallow groundwater conditions. If site grades cannot be raised to maintain the minimum separation distance and/or an underdrain system is determined not to be feasible, then full-depth basements should not be allowed, and a statement indicating "No Basements" be shown on the final plat.

Subsurface Drainage Systems. Entech has recommended drain systems for areas with seasonal groundwater issues. The other identified shallow groundwater condition identified at the site relates to perched groundwater.

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They state (p.13), “*Perched water conditions could be encountered across the entire site where water can flow within permeable sand layers overlying impermeable bedrock. These areas should be identified on an individual basis at the time of construction. Where perched water conditions are encountered, the mitigation recommendations for seasonal and potentially seasonal shallow groundwater should be followed.*” **As perched water conditions can be encountered anywhere within the site, CGS recommends that the drain systems (perimeter, underslab, interceptor, etc.) presented by Entech on p. 13 of their April 24, 2020 report should be required for all lots within Filing 2 unless it can be proven with a groundwater monitoring program that below grade areas (basements or storage areas) will be maintained 3 to 5 feet above the highest expected groundwater elevations and/or perched groundwater locations.** These drain systems should be connected to an underdrain system constructed for the subdivision. Please note that individual foundation perimeter drains are needed around any below-grade (basement) space and are intended to handle only small amounts of intermittent water and should not be used to mitigate a persistent shallow groundwater condition.

In summary, as a condition for approval of the final plat for Filing 2, a groundwater observation/monitoring program should be performed if below-grade levels are planned, or drain systems should be required for all lots within Filing 2.

Thank you for the opportunity to review and comment on this project. If you have questions or require further review, please call me at 303-384-2632 or email acrandall@mines.edu.

Sincerely,



Amy Crandall, P.E.
Engineering Geologist