

EP-22-0102\_1 Sterling Ranch East Phase I PUDSP224

Location: Sections 27, 28, 33 & 34, T12S, R65W, 6th P.M.  
38.9616, -104.6693

761 SF lots on 321 acres for future residential development

The available referral documents include a Soil, Geology, and Geologic Hazard Study, Sterling Ranch East – Preliminary Plan No. 1 (Entech Engineering, Job No. 220571, April 19, 2022), Preliminary Plan (N.E.S. Inc., June 10, 2022), Letter of Intent (N.E.S., Inc., June 2022), Grading and Erosion Control Plans (Classic Consulting, April 1, 2022), and other documents.

As noted on page 1 of Entech’s Soil, Geology, and Geologic Hazard Study (Entech Engineering, Inc., April 19, 2022), the hazards and constraints identified on this site include artificial fill, expansive soils, erosion, hydrocompaction, potentially unstable slopes, seasonal and potential seasonally shallow groundwater areas, floodplains, flowing/ponded water, and radon. Additionally, Entech’s Engineering Geology/Geology Map (figure 7) separates the site into the following: floodplain (fp), potentially seasonal shallow groundwater areas (psw), seasonal groundwater area (sw), areas of ponded water (w), and potentially unstable slope (pu). Hydrocompaction (h) is also a hazard shown on the map but not listed in the legend. Entech makes appropriate preliminary recommendations for mitigating the site’s hazards. We offer the following comments and recommendations.

1. Sheet 1 of the preliminary plan shows Filing 3 to the north of Sterling Ranch Rd. and north of Briargate Pkwy. Our review of the grading plans indicates that the parcel north of Sterling Ranch Rd. is Filing 1.
2. In the test borings drilled, groundwater was encountered at 3 to 19 feet below grade during drilling, and Entech observed areas of ponded water in some locations. According to Entech (page 2), “The proposed housing has will (sic) potentially utilize crawlspaces, garden level basements, or full basements.” Monitoring/observations of groundwater fluctuations have not been conducted. If basements are planned, **CGS recommends the county require a groundwater monitoring/observation** program prior to the preliminary plan’s approval to determine if basements are feasible and if an underdrain system could be employed for this site. To be effective, however, this monitoring should include measurements/observations through fall, winter, and spring and not merely during site-specific building investigations.

We agree with Entech (page 12), “A minimum separation of 3 feet between foundation components and groundwater levels are recommended.” Proposed floor levels should be *at least three feet* (preferably five feet) above maximum anticipated groundwater levels and maintained year-round. CGS recommends no below-grade construction in areas with seasonal shallow groundwater levels within three feet of proposed floor levels.

3. According to the preliminary plan's geologic hazard disclosure statement on sheets 1 and 35, “*In Areas of High Groundwater: Due to high groundwater in the area, all foundations shall incorporate an underground drainage system. Under drains to be maintained by the District.*” **CGS recommends the underground drainage system and maintenance requirements are shown in the plans, and the “District” understands the maintenance requirements throughout the life of the development.**

Page 12 of Entech's report states, "In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains will be necessary to help prevent the intrusion of water into areas located below grade." As individual underdrains are typically tied to the storm sewer system or underdrain system that gravity discharges to a daylight outfall, **CGS recommends that underdrain systems are designed early in the design stage and noted on the plans.** No drawings were included with the current referral documents showing an underdrain system. An underdrain system should be allowed ONLY if it can gravity discharge to a daylight outfall or is connected to an existing underdrain system that gravity discharges to a daylight outfall. Individual foundation perimeter drains are intended to handle small amounts of intermittent, perched water and may NOT be used as sole mitigation of persistent shallow groundwater conditions.

4. Entech identified areas containing potentially unstable slopes but states on page 11, "these areas are to be avoided" and provides a setback distance of 20 feet from the crest of these slopes unless stabilized. Once final grading is complete, Entech should review the grades to verify these areas will be avoided or regraded and that the appropriate setbacks from unstable slopes are adhered to.

Reviewed on 8.1.2022 by Amy Crandall, Engineering Geologist ([acrandall@mines.edu](mailto:acrandall@mines.edu), 303-384-2634)