COLORADO GEOLOGICAL SURVEY

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Matthew L. Morgan
State Geologist and Director

November 17, 2026

Kylie Bagley
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Location:
NW Section 2
T11S, R67W of the 6th P.M.
39.1283, -104.8662

Subject: **Buc-ee's Plot Plan Review and Site Development Plan**
El Paso File # PPR2628; El Paso County, CO; CGS Unique No. EP-26-0007

Dear Kylie:

At your request (Email dated November 3, 2026), the Colorado Geological Survey has reviewed the Buc-ee's Plot Plan Review and Site Development Plan referral. The applicant proposes the following: 74,000-square-foot travel center and treatment building, fuel canopies, underground storage tanks and remote generator pads, pole sign, and parking/drive lanes. Additionally, this development plan includes a treatment building, 500K water tank, sanitary lift station, booster pump station, retaining walls, detention ponds, and other improvements. With this referral, we received a Letter of Intent (Vertex Consulting Services, LLC, undated), Site Development Plan (Kimley Horn & Associates, Inc., September 11, 2026), Grading and Erosion Control Plans (Kimley Horn, September 11, 2026), Geotechnical Engineering Report (Terracon, January 31, 2025 (Revised October 8, 2026)), and other documents.

Based on our review of the submitted materials, CGS has not identified geologic hazards that would necessarily preclude the proposed development; however, several geologic and geotechnical constraints warrant further evaluation or clarification. Consistent with the geologic hazard review considerations identified in Appendix C of the El Paso County Engineering Criteria Manual, CGS offers the following comments and recommendations.

Deep fills and settlement: The Terracon geotechnical engineering report indicates that proposed grading will require substantial cuts and fills across the site, including maximum cuts of approximately 27 feet and fills of approximately 31 feet (p. 5). However, the report contains inconsistencies regarding the anticipated grading beneath the proposed travel center building. Page 5 identifies approximately 18 to 28 feet of cut beneath the building, whereas pages 12 and 13 describe approximately 18 to 28 feet of fill, and page 17 identifies approximately 10 to 30 feet of fill beneath portions of the building. The report also provides varying descriptions of the locations and depths of cuts across the site (pp. 5, 14, and 17). These discrepancies should be clarified to confirm that the geotechnical recommendations accurately reflect the proposed grading conditions for this development.

Terracon states (p. 13), "Foundation elements constructed on deep fills are subject to settlement resulting from self-weight of the new engineered fill materials, which is anticipated to be on the order of about 4 to 6 inches or more." Terracon also estimates an additional 1 to 2 inches of settlement could occur in the underlying native soils. The report recommends monitoring settlement during and after fill placement to verify that the majority of settlement has occurred before constructing improvements in these areas.

Given the substantial proposed fill depths and anticipated settlement, CGS recommends that Terracon clarify the proposed cut-and-fill conditions and confirm that the foundation recommendations are appropriate for the final grading and building locations. CGS also recommends developing and implementing a site-specific settlement

monitoring program, as recommended by Terracon, including monitoring locations, measurement frequency, and criteria for determining when settlement has sufficiently stabilized to allow construction.

Existing stockpiled material: Based on CGS's site observations and correspondence from residents near the project area (emails provided by the County dated November 6 and November 11, 2026), substantial quantities of material have been stockpiled and graded on portions of the site. The Kimley-Horn Grading and Erosion Control Plans (September 11, 2026) identify an existing stockpile permit (CDR261) associated with the Beacon Lite Road improvements and indicate that the contractor must coordinate with El Paso County regarding the existing permit and stockpiled materials before commencing construction.

Although Terracon provides general recommendations for removing unsuitable or unexpected fills (p. 12), the geotechnical report does not specifically address the existing stockpiled material or document its engineering properties, placement conditions, or suitability for supporting proposed improvements. It is unclear whether this material was present during Terracon's subsurface investigation or whether portions will remain beneath proposed improvements.

CGS recommends that Terracon evaluate the extent and characteristics of the existing stockpiled material and provide recommendations for its removal, reworking, or incorporation into engineered fills, as appropriate. Any existing fill remaining beneath proposed structures, pavements, retaining walls, or proposed within detention pond embankments should be evaluated for suitability and compliance with the project geotechnical recommendations.

Retaining walls: Terracon states (p. 32), "we understand the approximately 1,300-foot-long wall is planned to retain earth along the eastern portion of the Buc-ee's project site and has a maximum height of around 36 feet." Terracon further indicates that global stability analyses, design parameters, and recommendations for mechanically stabilized earth (MSE) retaining walls are not included in the submitted geotechnical report but are addressed in a separate report (Buc-ee's Monument Retaining Wall GeoReport, dated July 23, 2026).

Given the substantial proposed wall heights, associated engineered fills, and proximity to the I-25 corridor, CGS recommends that the retaining-wall evaluation address global stability, foundation bearing capacity, settlement, subsurface drainage, and potential impacts to adjacent improvements. CGS requests a copy of the July 23, 2026, retaining-wall geotechnical report for review and our files to confirm that these considerations have been adequately evaluated.

Groundwater and underground fuel tanks: Terracon's report indicates that groundwater was encountered in several borings at depths ranging from approximately 8.5 to 40 feet below the existing ground surface (pp. 8–10). Although groundwater was not encountered in the borings near the proposed underground fuel storage tanks and buried vault, groundwater conditions may vary seasonally and in response to precipitation and snowmelt. Terracon indicates that the proposed underground fuel tanks will require excavations approximately 15 feet deep, while the booster pump vault may extend approximately 25 feet below finished grade. CGS recommends that Terracon review the current site development plans, as the booster pump station and vault appear to be located within the southern portion of the project area where fill will be placed. CGS agrees with Terracon that below-grade structures be designed for buoyancy forces, assuming groundwater levels within 5 feet of finished grade.

Consistency between the report and development plans: Terracon's report references several changes to the proposed development layout during the subsurface investigation, including relocation of the travel center building approximately 500 feet south and consideration of an alternative water tank location approximately 300 feet east of the original location. The report also contains discrepancies in the anticipated cut-and-fill depths and locations across the site, as discussed above. Additionally, Terracon indicates that its foundation recommendations for the proposed 500,000-gallon water tank were developed using subsurface conditions at the original tank location, despite additional borings completed at the alternative location.

CGS recommends that Terracon review the current Kimley-Horn Site Development and Grading and Erosion Control Plans (GEC) (September 11, 2026) and provide written confirmation that its geotechnical recommendations remain applicable to the proposed development. Where improvements have been relocated or grading conditions have changed, Terracon should evaluate whether supplemental subsurface investigations or revised geotechnical recommendations are warranted.

Existing drainage channels and subsurface drainage. The development plans identify existing drainage channels and swales within the proposed development area. According to the GEC plans (sheet number 4), an Existing Channel 1 (R4SBC – Seasonally Flooded Stream) and Existing Swale 1 are located within the proposed travel center building footprint. These features may provide preferential pathways for infiltration and subsurface seepage, particularly where existing drainage channels are modified, filled, or incorporated into the proposed grading. CGS recommends that Terracon evaluate the existing drainage alignments and associated subsurface materials to determine whether they could affect groundwater conditions, settlement, or the performance of proposed improvements. Where warranted, appropriate subsurface drainage measures should be incorporated into the final design to prevent water accumulation within engineered fills or beneath proposed structures.

Potentially collapsible or loose soils and localized expansive soils: Terracon indicates that native clay soils generally have nil to low expansive and collapse potential, while native sand and sandstone bedrock are considered non-expansive but have low to high collapse potential (p. 8). Laboratory testing identified compression upon wetting of up to 10.4 percent in a sample from boring B-93, indicating the potential for significant localized collapse. Terracon also identifies potentially loose soils beneath foundations and other improvements and recommends corrective measures that may include removal and recompaction or replacement, in-place densification, or deepening footing excavations to suitable bearing materials (pp. 11–12).

CGS recommends that Terracon evaluate the extent and potential effects of collapsible and loose soils beneath proposed improvements, particularly in areas subject to increased loading from deep fills or changes in moisture conditions. Site-specific remedial recommendations should be provided where warranted, and foundation excavations should be observed by the project geotechnical engineer to verify suitable bearing conditions.

Foundation recommendations. Terracon indicates that the proposed building will be constructed across a cut-fill transition and recommends a minimum of 3 feet of new engineered fill beneath foundations and floor slabs to reduce the potential for differential movement (pp. 18 and 30). Terracon estimates approximately 1 inch of total foundation movement, with differential movement of approximately one-half to three-quarters of that amount (p. 19). However, Terracon also estimates approximately 4 to 6 inches or more of self-weight settlement of the deep engineered fills, with an additional 1 to 2 inches of settlement possible in the underlying native soils (p. 13). Although Terracon recommends that settlement of the deep-fill areas be substantially complete before foundation construction, it is unclear how potential residual settlement of the engineered fills and underlying native soils is accounted for in the estimated foundation movements.

CGS recommends that Terracon clarify how potential residual settlement has been considered in the estimated total and differential foundation movements and confirm that the foundation recommendations remain appropriate for the final grading conditions. This evaluation should also consider the proposed water tank, utility structures, and other improvements supported on engineered fills.

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 e-mail acrandall@mines.edu.

Sincerely,

Amy Crandall

Amy Crandall, P.E.
Engineering Geologist