

# COLORADO GEOLOGICAL SURVEY

1801 19<sup>th</sup> Street  
Golden, Colorado 80401



Karen Berry  
State Geologist

December 19, 2016

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

**Location:**  
W ½ SE ¼ of Sec. 11,  
T11S, R67W of the 6<sup>th</sup> PM  
39.1038, -104.8562

**Subject:** **North Bay at Lake Woodmoor – PUDSP-16-004**  
**El Paso County, CO; CGS Unique No. EP-17-0024**

Dear Mr. Fitzpatrick:

The Colorado Geological Survey has reviewed the North Bay at Lake Woodmoor development referral. The applicant proposes to divide 7.23 acres to create 28 townhome lots at the north end of Woodmoor Lake near the intersection of Woodmoor Drive and Deer Creek Road in Monument, Colorado. As indicated in the letter of intent, the site is located between two existing developments: “The Cove at Woodmoor” condominiums and the “Lake Woodmoor” residential neighborhood.

Included with this referral were the request for CGS review (12/06/16), development application form, letter of intent (N.E.S., Inc. 11, 20126), “Geologic Hazards Evaluation and Preliminary Geotechnical Investigation” report (CTL Thompson, Inc. Project CS18589-115, 9/29/2016), “Natural Features, Wetland, Wildfire, Noxious Weeds & Wildlife” report (ecosystem services, LLC., project 2016-11-1, 9/1/2016), and “PUD Development Plan” drawings (12 sheets; N.E.S., Inc., 11/15/16).

CTL Thompson identified the following anticipated geologic hazards and constraints to development: expansive soil and bedrock, shallow groundwater, flooding, erosion, shallow bedrock, regional seismicity, and naturally-occurring radioactive materials. CGS agrees that this list represents the possible geologic hazards and constraints at the site and has the following additional comments:

**Shallow groundwater.** CTL Thompson reported encountering groundwater at depths ranging from 8 to 28 feet below ground during drilling and 3 to 10 feet below ground surface 5 days after drilling. Groundwater levels fluctuate seasonally, and water levels commonly rise post-development due to construction of impermeable ground cover and landscape irrigation. CTL Thompson stated (p. 6) that their measurements were collected in the early spring months when groundwater and lake levels are “typically just starting to rise”, suggesting that even shallower water levels should be anticipated. The maximum depth of the lowermost floor levels of habitable space *must* be located at least three feet, preferably five feet, above shallowest anticipated groundwater levels. CTL Thompson suggests (p. 10) that perched groundwater conditions can be mitigated by installing drain systems around below-grade spaces. However, individual foundation perimeter drains are only intended to handle small amounts of intermittent, perched water, and are not to be used to mitigate a persistent shallow groundwater conditions such as those suggested by the water levels observed by CTL Thompson during and after drilling. **Because of the extremely shallow observed groundwater levels, and the possibility for groundwater to raise further during the wet**

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**season, full-depth basements should not be considered feasible on this site.**

**Flooding and bedrock erosion.** As noted by CTL Thompson, a mapped FEMA 100-year floodplain crosses through the site. The CTL Thompson report and the PUD Development Plan drawings indicate that the existing floodplain will be channelized to create an engineered floodway through the center of the property. Additionally, the PUD Development Plan drawings show retaining walls along several stretches of the proposed floodway. As noted by CTL Thompson (p. 9), soil and bedrock at the site are susceptible to wind and water erosion; in particular, as pointed out in the documentation for the Geologic Map of the Monument Quadrangle (Thorson and Madole, 2003), the Dawson Sandstone (TKda5) can be friable and easily eroded on weathered outcrops. If present and left unprotected during extreme flooding events, weathered bedrock exposed along the outside bend of the floodway could be subject to lateral erosion potentially undermining the proposed retaining walls and/or nearby parts of the developed area. CTL Thompson noted that they did not observe weathered lenses in their borings, but it is unclear what the conditions are along the edge of the proposed floodway. **The possible presence of erodible weathered bedrock along the edges of the proposed floodway should be evaluated; additional erosion control measures should be designed as necessary by a qualified professional and implemented to reduce potential erosion of weathered bedrock during flood events.**

CTL Thompson makes appropriate *preliminary* recommendations regarding grading, foundations, floor systems, surface and subsurface drainage, construction-related erosion control, pavements, irrigation, etc. Additional lot-specific soils and foundation investigations should be performed to refine foundation, floor, pavement, utility, and subsurface drainage recommendations.

Thank you for the opportunity to review and comment on this project. If you have questions, please contact me by phone at 303-384-2632 or e-mail kemccoy@mines.edu.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin McCoy", written in a cursive style.

Kevin McCoy  
Engineering Geologist