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ENGINEERS

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JAN 22 2003

Job No. 63790

January 17, 2003

PLANNING DEPARTMENT

Jensen Realty
1107 Manitou Avenue
Manitou Springs, CO 80829

Re: Geologic Study
Crystal Park Road
S-315, Crystal Park Subdivision
El Paso County, Colorado

Gentlemen:

At your request, personnel of RMG Engineers, Inc. have performed a site visit at the above referenced address on January 15, 2003. The purpose of our site visit was to perform a visual observation of the proposed building and septic field areas and provide our professional opinion on the possible geologic concerns that may affect the performance of the proposed residential structure to be constructed on the above referenced site.

Based upon our visual observations and a review of the geologic information provided for this area, the soils underlying the site typically consist of a decomposed granite consisting of fine to coarse grained sand and gravel overlying granite bedrock of the Pikes Peak Granite Formation.

Vegetation consists of dense scrub oak and a few scattered pine trees with moderate ground cover. No significant drainage gullies were present in the proposed building area or septic system location. The house is to be placed on a steep slope. At the time of our site visit, the driveway, garage and lowest level had been excavated to "rough" grade. An elevation difference of approximately 1.5 feet was observed between the garage level and lowest (basement) level. Soils exposed in the excavated area consisted of decomposed granite and formation granite bedrock.

The permeability of the sand and gravel is generally considered high to very high. Surface runoff is also rapid and the potential for erosion can be high. It is our recommendation that long-term slopes be no steeper than a 3:1 (horizontal to vertical) in both the cut areas and any fill slopes. Erosion of the material can be high and some rip rap type of material may be required to prevent erosion. Revegetation of any disturbed areas should be performed as soon as possible with revegetation/erosion mats placed as required. All excavation cuts and soil disturbance should be held to a minimum on this site.

Crystal Park Road
S-315, Crystal Park Subdivision
El Paso County, Colorado

Downslope creep, which is the accelerated movement of the surficial soils in the downslope direction is a concern at this site. The potential for downslope creep of the walkout trench at this site is considered moderate to high. The proposed structure should be designed to resist downslope creep pressures and the structures should be designed as rigid as possible to resist additional pressures that may be exerted on the structure due to its placement on the hillside. The slopes at this site are steep and it is important that the structure be designed with as much rigidity as possible. Tie beams and additional reinforcing will likely be required to achieve the desired rigidity. The foundation must rest on native soil and should not rest on any uncontrolled fill material.

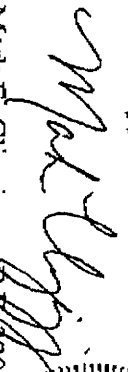
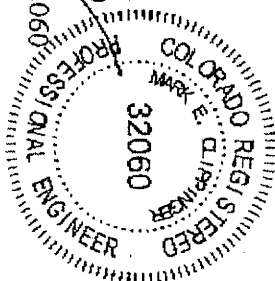
The septic system will be placed on the moderate to steep lower portion at the north side of the lot. It is anticipated that a shallow septic field will be placed at this site, due to the shallow percolation test performed by Colorado Engineering. Care should be taken to terrace the absorption field in such a way as to prevent surface seepage of the effluent. Because of the 35% slope across the proposed septic field site, an engineered septic system will be required.

walkout do
pit

Based on our site observations, a rockfall hazard does not exist at this site.

I hope this provides the information you requested. Should you have any questions, please do not hesitate to call.

Cordially,

Mark E. Clippinger, P.E. 32060

MEC/slf

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RMG Engineers, Inc.

STATE OF COLORADO

COLORADO GEOLOGICAL SURVEY

Division of Minerals and Geology

Department of Natural Resources
1313 Sherman Street, Room 715
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Phone: (303) 866-2611
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April 14, 2003

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4/15/03*

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Mr. Terry Rorick
El Paso County Planning
27 E. Vermijo
Colorado Springs, CO 80903-2088

Re: Crystal Park Site 315
CCS Review No. EP-03-0045

Dear Mr. Rorick:

In response to your request I visited this site to review the plans for development. A Geologic Study report prepared by RMG Engineers (January 2003) and a Percolation Report prepared by Colorado Engineering & Geotechnical Group, Inc (November 2002) were included in the referral.

Slopes. The slopes at the site are steep, ranging up to 50 percent within the building envelope. The cuts for the building and the driveway should be designed and examined by a geotechnical engineer for stability concerns. Tie-backs to the bedrock will probably be required in the foundation design. Additional retainage might be necessary for the access drive. Future owners should be made aware that the costs associated with building on steep slopes can be substantial.

The house should be designed to resist increased lateral earth pressures. Features might include limited window and door space on the ground floor and increased width of foundation walls.

The residuum of the Pike's Peak granite is very erodible. Silt fence should be installed at the downslope part of the site to prevent sediment loss. Disturbed areas should be reseeded as soon as possible.

Drainage. Crystal Park Road lies above the site. The road is graded to slope into the hillside, and as such, runoff flows along the inside of the road rather than off the edge. The only runoff that would affect the site will be what intersects the driveway, which could still produce nuisance flooding during periods of heavy precipitation. The site design should consider a means to divert these flows, by crowning the driveway or including a swale or drain to capture water.

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ISDS. The topographic grade in the vicinity of the proposed leach field is about 35 percent, as scaled from the site map provided by Virginia Ownbey. The schematic provided by Colorado Engineering states that slopes were 2 percent grade, but based on observation and the site map, there is no place that fits this criterion except by the road. The area is in the trees and would have a northeast exposure, limiting the amount of sunlight to the leach field area. Bedrock was not encountered in the profile hole. The subsurface soil to a depth of 19 ft was described as decomposed granite. The average percolation rate was 5.67 minutes per inch.

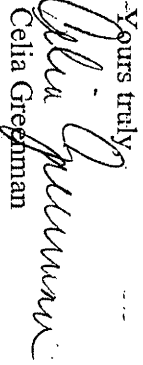
The chief limitation to ISDS is the slope of the site. It is more difficult to achieve acceptable performance when components are placed on an angle. The leach field site can be graded and terraced, but this creates disturbance and possible concerns for slope stability. Seepage pits, which are commonly used in Crystal Park, would be a possible design, based on the thick soil section. If a drain field is constructed, lines should be carefully laid to achieve consistent flow throughout the field, rather than discharging mostly at the entry point. Consideration should be given to lining the downslope part of the pit or field to prevent wastewater from exiting to the hillside.

The percolation rate is fast, although within prescribed limits set by the state and county health departments. The decomposed granite has little filtering capacity, which means that unless the native material is combined with a clay or graded sand mix, there is the potential that the ISDS will release inadequately treated wastewater to the subsurface.

In summary, the chief concern at the site is the steep slopes, which will require engineering of the foundation to increase stability. Special design for the leach field is also necessary to achieve standards of performance, prevent inadequately treated wastewater from discharging to the hillside or entering the groundwater system, and to minimize disturbance to the hillside.

Please call me if there are any questions.

Yours truly,


Celia Greppman
Geologist