September 14, 2017

El Paso County
Planning and Community Development
2880 International Circle
Colorado Springs, CO 80910

Attn: Raimere Fitzpatrick
Project Manager/Planner

Re: Grant Subdivision
Geologic & Soils Report

Dear Mr. Fitzpatrick:

This Report is intended to satisfy the Geology and Soils Report requirement for the Grant Subdivision. The address of the Grant Subdivision is 1315 Walsen Road, Colorado Springs, CO 80921, comprising approximately 41 acres, El Paso County Schedule number 6205000029. The proposal is to divide the 41 acres into 11 acres containing the existing residence, and a 30-acre parcel of bare land.

This report was modified from the originally submitted report of July 15, 2017. In communication with a Project Geologist from the geology firm, RMG—Rocky Mountain Group, I was advised that Raimere Fitzpatrick had sent the following details regarding a Report Modification:

"Where a report modification is authorized by the DSD Director such as in the instance of a minor subdivision, the report is not required to be prepared by a professional geologist but shall include information regarding the following:

- Streams, lakes, topography, and vegetation;
- Geologic characteristics of the area and a determination of the impacts of the characteristics on the proposed subdivision;
- Suitability of types of soil in the proposed subdivision, including where appropriate, maps and tables in accordance with any standard soil classification; and
- Identification of potential radiation hazards, where applicable."

Streams, lakes, topography, and vegetation

Smith Creek courses through the northwest portion of the 41-acre land parcel. This parcel is located outside the 100-year flood plain. According to the 2002 Smith Creek Drainage Basin Planning Study by JR Engineering, adopted by El Paso County in 2003, the 100-year floodplain is narrow and mostly contained within the stream channel for this section of Smith Creek. Thick vegetation including willows, shrubs, grasses, and trees are abundant surrounding this area of Smith Creek. This provides a natural habitat for the Preble's Meadow Jumping Mouse—a nationally endangered species that is protected. This has significance for potential future building of roads or residences near Smith Creek as there

are regulations to protect this species. One of the potential accesses to the 30-acre parcel is from a shared driveway, a portion of which courses over Smith Creek and is already existing. This driveway has been maintained since its construction in 1978, without complication of flooding or road damage. Based on these observations, the minor subdivision will have negligible adverse impact to the Preble's Meadow Jumping Mouse species and its habitat. However, the impact on Preble's mouse was addressed in a prior letter from the US Department of Interior, Fish and Wildlife granting permission for construction of a separate bridge across Smith Creek (previously considered, no longer planned), and is included as Appendix 1.

There are no lakes on the property, but Smith Creek does empty into a large pond beyond an adjacent property.

The topography of the 41-acre property is attached as Appendix 2. Aside from the afore mentioned Smith Creek, there are no topographical concerns as there have been no substantive changes in the 41 acres since the single residence was built in 1978.

The vegetation on the 41 acres is fully detailed in a voluntary assessment conducted by the USDA NRCS of our land in 2011, included as Appendix 3.

Geologic characteristics of the area, and suitability of soil types

According to the Soil Survey of El Paso County Area, Colorado by the United States Department of Agriculture, the soil of the site can be summarized as a combination of Tomah-Crowfoot complex (70%) and Pring coarse sandy loam (30%), both of which are part of hydrologic soil group B (map and explanations, Appendix 4). They are both well drained (map and explanation included as Appendix 5) with low-medium runoff, more than 80 inches to the water table, with frequencies of flooding or ponding listed as "none". Regarding suitability for "Dwellings Without Basements", the Pring coarse sandy loam is "not limited", and the Tomah-Crowfoot complex is "somewhat limited" (map and explanations are included as Appendix 6; the ratings are exactly the same with Dwellings With Basements—map and explanation not included). The suitability for "Lawns and Landscaping" for both soil areas is described as somewhat limited, implying that the soils have "features that are moderately favorable for the specified use, and the limitations can be overcome or minimied by special planning, design, or installation (map and explanations included as Appendix 7).

Geology for the site consists of a major structural feature known as the Rampart Range Fault about 7 miles west of the Grant Subdivision site. The fault is the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The bedrock underlying the site consists of the Dawson formation of Tertiary to Cretaceous Age and is typically gently dipping in a northwesterly direction. The geology of the site using site specific mapping of the Map of the Monument Quadrangle, El Paso County, Colorado by Thorson and Madole in 2003 is included as Appendix 8. The base units of TKda3 and Qsw are described by The Colorado Geological Survey Division of Minerals and Geology, Department of Natural Resources:

> ***TKda3*** **Facies unit three (Paleocene)**— Unit consists of subequal amounts of thick and very thick-bedded, massive and cross-bedded white, tan, and light-gray arkose and pebbly arkose; thin to thick beds of light-green to olive-gray clay-rich, fine- to medium-grained micaceous and feldspathic sand-stone; and thin to thick beds of dark-gray to greenish-gray sandy claystone. Very thick-bedded, massive or cross-bedded, light-colored arkose beds in facies

unit three resemble those in facies unit one but are finer grained and generally thinner; lithologies of coarse grains more varied than facies unit one, with quartz, white feldspar, pink feldspar, white granite, pink granite, and small amounts of tan vuggy dolomite and red, black or orange-brown chert, rare altered volcanics. The light-green to olive-gray, clay-rich, fine- to medium-grained micaceous and feldspathic sandstone and dark-gray to greenish-gray sandy clastone resemble lithologies in the lower part of facies unit two in the Pikeview and Elsmere quadrangles; may have occasional thin, poorly developed, paleosols; reported coaly strata are not exposed at surface. Unit 500 to 600 ft thick in southeast; thins toward northwest as it interfingers with facies unit one and facies unit four.

Qsw **Sheetwash (Holocene and upper Pleistocene)**—Typically, pale-=brown to brown, extremely poorly sorted sand, silty and clayey sand, and minor amounts of gravel. Unit consists chiefly of material transported from the upper parts of valley-side slopes by sheet flow, but also includes some sediment delivered by runoff from rills and minor gullies. **Qsw** exists principally in sheets and wedges along valley sides and footslopes. Estimated thickness 5-20 ft.

There are no adverse Geologic or Soils conditions on the Grant Subdivision site.

Identification of potential radiation hazards

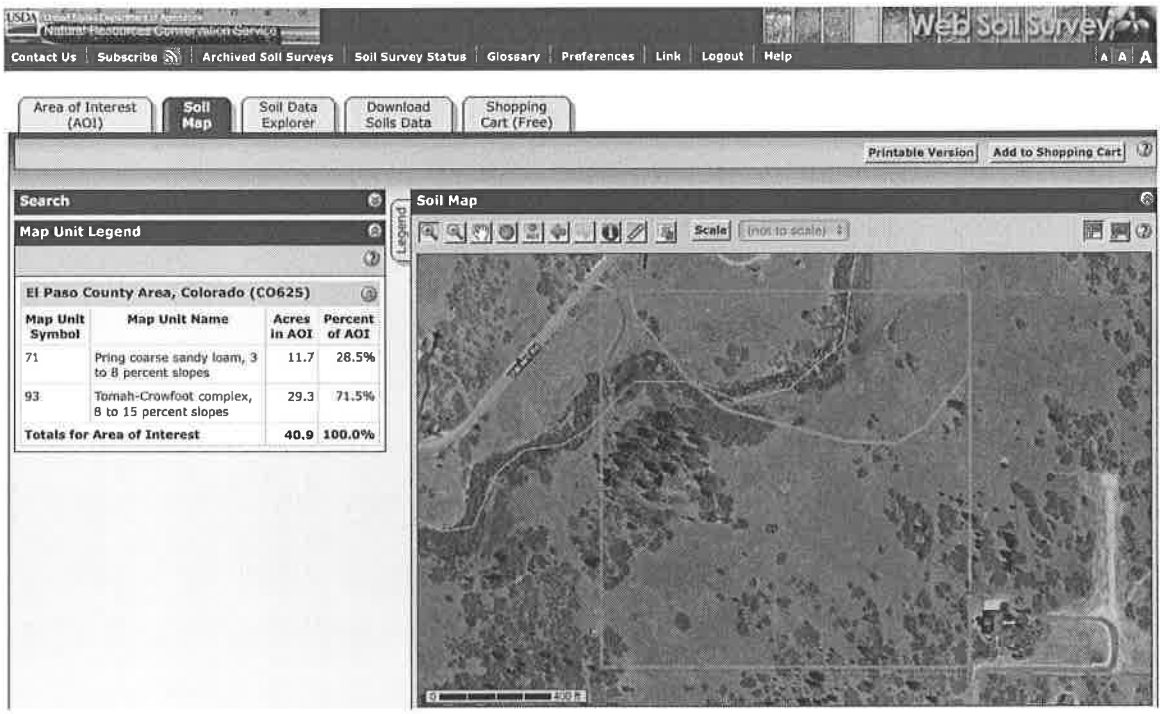
According to the US EPA and the US Geological Survey, almost the entire state of Colorado is included in Zone 1—High Radon Potential (probable indoor radon average >4pCi/L). Irrespective of the overall radon risk for residences in Zone 1, individual residences need to be specifically tested, and, if the level is above 4, radon mitigation is generally recommended.

As this Geology and Soil Report is submitted as part of the Grant Minor Subdivision, no professional geologist was required according to the previously documented guidelines by Project Manager Raimere Fitzpatrick to the geology firm RMG, and consistent with the advice and recommendations that he gave us during our initial, early project meeting. We have followed his direction in using the USDA NRCS database which we supplemented with the Colorado Geological Survey, the US Department of Interior Fish and Wildlife direction regarding the Preble's Meadow Jumping Mouse, and the National Geologic Map Database.

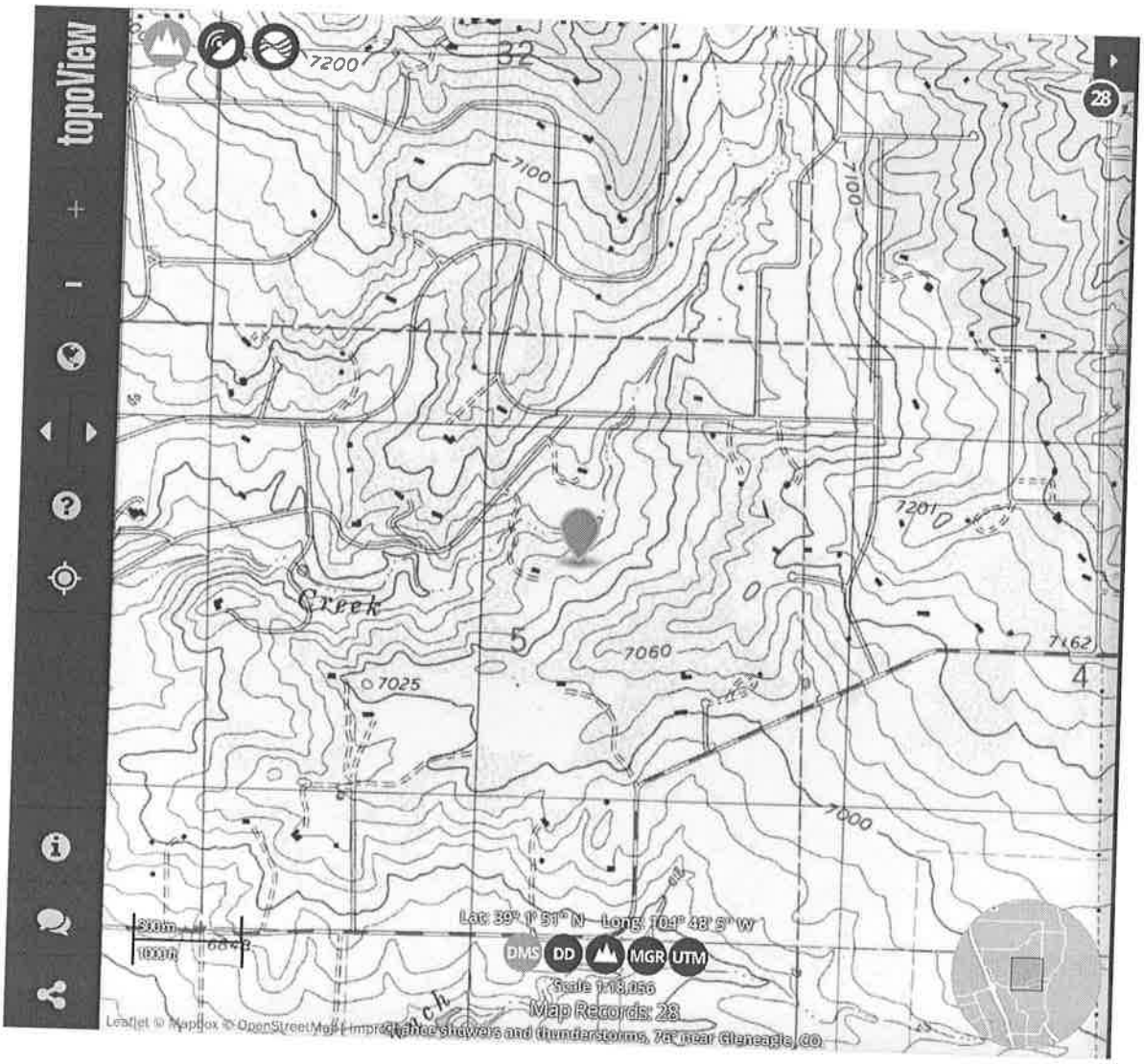
Clive and Karen Grant
Grant Minor Subdivision

Appendix 4. USDA NRCS Soil Area of Interest Map—Grant Subdivision (entire 41 acres)

USDA NRCS Soil Map—Grant Subdivision (entire 41 acres)



Appendix 2. Topography of the overall Grant Subdivision (Blue pointer in center of the map indicates Grant Subdivision property.)



Appendix 4. Overall Grant Subdivision Soil Report and Hydrologic Map

USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for El Paso County Area, Colorado

July 15, 2017

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 14, Sep 23, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 15, 2011—Sep 22, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

El Paso County Area, Colorado

71—Pring coarse sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369k
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Pring and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Loamy Park (R048AY222CO)
Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

Other soils

Percent of map unit:
Hydric soil rating: No

93—Tomah-Crowfoot complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 36bb
Elevation: 7,300 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Tomah and similar soils: 50 percent
Crowfoot and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tomah

Setting

Landform: Alluvial fans, hills
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkose and/or residuum weathered from arkose

Typical profile

A - 0 to 10 inches: loamy sand
E - 10 to 22 inches: coarse sand
C - 48 to 60 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Sandy Divide (R049BY216CO)
Hydric soil rating: No

Description of Crowfoot

Setting

Landform: Alluvial fans, hills

Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 12 inches: loamy sand
E - 12 to 23 inches: sand
Bt - 23 to 36 inches: sandy clay loam
C - 36 to 60 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Sandy Divide (R049BY216CO)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

Appendix 3. USDA NRCS Voluntary Soil and Vegetation Report, 41-acre plot, year 2010

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
P.O. Box 688
7519 East Highway 86
Franktown, CO 80116

303-688-3042, ext. 106
303-660-3838 (Fax)
daniel.nosal@co.usda.gov

February 8, 2011

Karen L. Grant Revocable Trust
2498 Hawk Hill Lane SW
Rochester, MN 55902

Dear Karen,

On August 30, 2010 you gave us permission to conduct a soil and vegetative inventory at your property in El Paso County, in order to collect data for the National Resource Inventory. You indicated that you would like to receive a copy of the data collected. I have attached the map and production data sheet listing plant species that were found. I have also summarized other data that may be of interest below.

Data Point 2
Soil: Pring Sandy Loam
Ecological Site: Sandy Divide
Total Production: 1728 pounds/ac.
Historic Average Potential Production: 1800 pounds/ac.
Similarity Index (current vegetative status compared to historic): 47%
Bare Ground (% of ground that is not covered by plant litter or a plant base): 0%
Basal Cover (% of ground covered by the basal area of plants): 23%
Canopy Cover (% of plant canopy covering the surface from birds-eye view): 88%
Litter Cover (% of ground covered by old plant residue/litter): 63%

I apologize for taking so long to get this information out. The final review of this data has taken longer than expected. Thank you again for allowing us to collect valuable resource data on this site. The data is used to help our agency provide conservation technical and financial assistance to help landowners/managers conserve our natural resources throughout the nation. The location of this data is strictly confidential within the NRCS. Landowner's names or other personal identifying information is not attached in any way to this data or the location it was collected from.

If you have any questions you may contact me at the information provided above.

Sincerely,

Daniel A. Nosal
Rangeland Management Specialist

Helping People Help the Land
An Equal Opportunity Employer and Provider

NRCS
Natural Resources Conservation Service

NRI - Species Composition by Weight

PSU ID: 0804I-060401U-2 — 4.8' frame

Range Site: Sandy Divide
Date: 8/30/10

Plant Name	Record Field Weight in Grams NE-SW 37.5	NE-SW 62.5	NE-SW 112.5	NW-SE 12.5	NW-SE 137.5	Plot Factor Used	% dry weight (c)	% current growth ungrazed (d)	% growth curve completed (e)	% of normal production (f)	Reconstruction factor c (d)(e)(f)	Reconstructed present weight (lbs/ac)	Weight in reference state (lbs/ac)	Weight allowable (lbs/ac)
Standing Dead	14	15	21	14	6			100	100	80				
Blue Grama	17	21	20	31	—		65							
Needle & Thread	43	37	—	—	—		67							
Elk Sedge	7	2	25	—	—		71							
western wheatgrass	—	3	4	—	—		65							
Sleepygrass	—	2	—	56	—		82							
Threeawn	—	6	5	—	—		69							
Jap Brome	—	—	T	1	—		100							
Bottlebrush	—	—	13	—	—		77							
Sand Dropseed	—	—	3	—	—		60							
Mt. Muhly	—	—	—	7	—		57							
Kentucky Bluegrass	—	—	—	—	30		54							
Wormwood - Green Sagebrush	4	—	—	—	—		55							
Hairy Goldaster	17	65	—	—	—		53							
western Ragweed	2	—	—	29	—		38							
Bastard Toadflax	5	7	1	T	3		43							
Goldenrod	2	1	—	2	—		50							
Pepperweed	1	—	—	—	—		100							
Green Thread	6	—	—	—	—		50							
Aster sp.	—	T	1	—	—		50							
Woolly Indianwheat	—	1	—	—	—		100							
western Salsify	—	—	3	—	—		95							
Daisy Fleabane	—	—	2	—	2		55							
Mullein	—	—	—	18	—		39							
Low Sage	—	—	10	11	—		50							
Horsetail	—	—	3	1	—		50							
Yellow Toadflax	—	—	—	1	—		40							
Leafy Spurge	—	—	—	—	2		40							
Solomon's Seal	—	—	—	—	2		40							
Penstemon	3	—	—	—	—		60							
Fringed Sage 229	352	—	132	—	—		50							
~~Rosa~~ Woods Rose 49	60	—	520	—	—		50							
Pincushion Cactus	12	—	12	—	—		10							
Yucca	7	—	180	—	—		55							
Prickly Pear Cactus	—	—	133	—	—		10							

Conversion of weight to pounds per acre

Plot	Ft²	Factor
1/92		50
	40	40
	80	20
	0.00	10
	96.00	1

TAP = 1728
RV = 1800
SI = 47

Sandy Divide 48

Appendix 8. Detailed Geology Maps and Explanation

National Geologic Map Database
Geologic Map of the Monument Quadrangle, El Paso County Colorado
Colorado Geological Survey

National Geologic Map Database

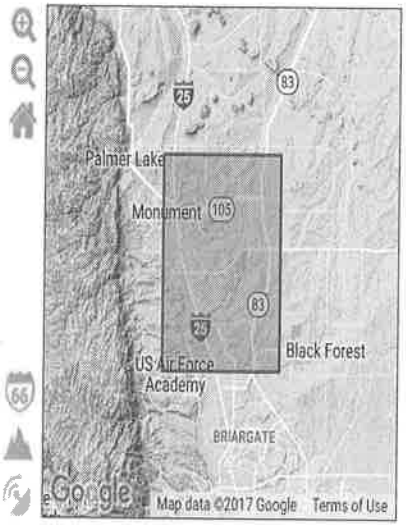
Product Description Page

General Information

Title: Geologic Map of the Monument Quadrangle, El Paso County, Colorado
Author(s): Thorson, J.P., and Madole, R.F.
Publishing Organization: Colorado Geological Survey
Series and Number: Open-File Report OF02-04
Publication Date: 2004
Map Scale: 1:24,000
Cross Section: Yes
North Latitude: 39° 7' 30" N (39.1250)
South Latitude: 39° 0' 0" N (39.0000)
East Longitude: 104° 45' 0" W (-104.7500)
West Longitude: 104° 52' 30" W (-104.8750)

Corrections? Tweet

Availability Map Services



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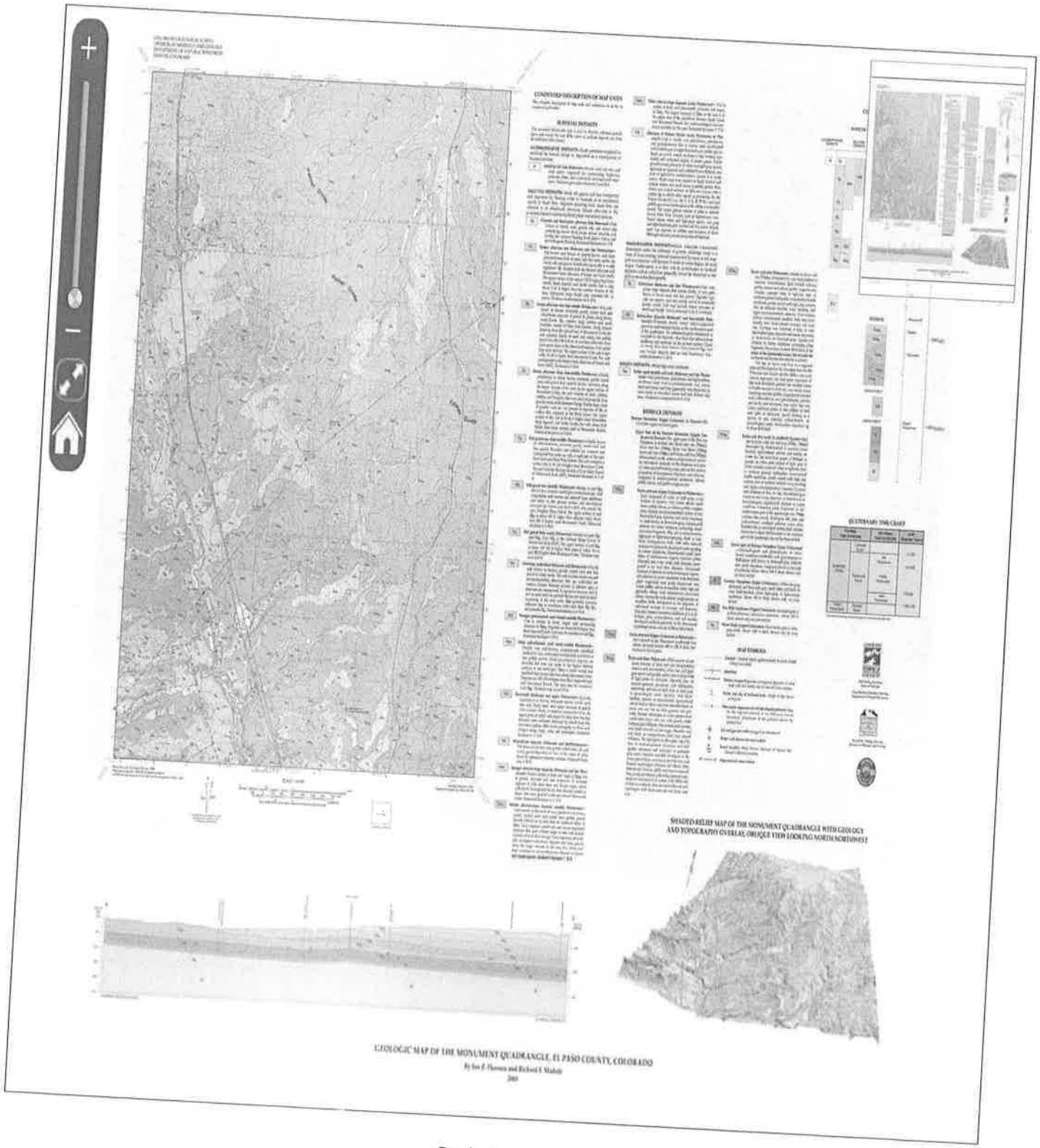
Colorado Geological Survey
Monument Quadrangle



Geologic map
Image provided by Colorado Geological Survey

National Geologic Map Database
Geologic Map of the Monument Quadrangle, El Paso County Colorado
Colorado Geological Survey
Specific site of Grant Subdivision indicated by red marker in center.