TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) REPORT

TESV21-0013

Project:

Montaine Filing 4 –

Vertical Construction

Location:

Portion of Section 26, Township 8 South, Range 67 West of the 6th Prime Meridian
Coal Bank Trail & Jolity Ct.
Town of Castle Rock, State of Colorado 80104

Applicant/Owner:

Wonderland Homes
Derek Peterson
5660 Greenwood Plaza Blvd., Suite 101-N
Greenwood Village, CO 80111
(303) 567-7630

Prepared by:

CMS Environmental Solutions, LLC
Dave Haines, P.E.
1778 S. Broadway
Denver, CO 80210
(720) 810-0805

November 2021

Signature Page

The Temporary Erosion and Sediment Control (TESC) report included herein has been prepared under my direct supervision in accordance with the requirements of the Town of Castle Rock Temporary Erosion and Sediment Control Criteria Manual, as amended.

Designer's Seal and Signature

Wonderland Homes hereby acknowledges the review and acceptance of responsibility presented in the TESC Plan and Report for Montaine Filing 4 – Vertical Construction project.

TOWN OF CASTLE ROCK ACCEPTANCE BLOCK

THESE DRAWINGS HAVE BEEN REVIEWED BY THE TOWN OF CASTLE ROCK FOR TEMPORARY EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

DEVELOPMENT SERVICES

TOWN OF CASTLE ROCK COLORADO

APPROVED

by Larry Hearold

on 01/19/2022

Approved TESV21-0013 TESV Report.pdf
Record Document on File

DEVELOPMENT SERVICES DEPARTMENT DATE

Wonderland Homes

Authorized Signature

NOTE

This Temporary Erosion and Sediment Control Plan is on file at the Town of Castle Rock and appears to fulfill the applicable Town of Castle Rock Temporary Erosion and Sediment Control Criteria, as amended. I understand that additional grading, erosion and sediment control measures may be required of the Permittees, due to unforeseen erosion problems or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the Permittees until such time as the plan is properly completed, modified or voided.

1.0 Project Description

Project Information

Name: Montaine Filing 4 – Vertical Construction

Location: - Section 26, Township 8 S., Range 67 West of the 6th Principal Meridian, Castle Rock, State of Colorado 80104
- Coal Bank Trail and Jolity Ct.
-Latitude: 39.32425º Longitude: -104.85164º

Project Area: ~ 10.2 Acres
Disturbed Area: ~ 10.2 Acres

Wonderland Homes plans to build single-family homes within The Lanterns at Montaine Filing 4 subdivision on finished lots. Land development of the subdivision has been previously or is in the process of being completed. Soil disturbing activities include foundation excavation and stockpiling, foundation backfill and compaction, home building activities and staging, until final stabilization (landscaping) is complete.

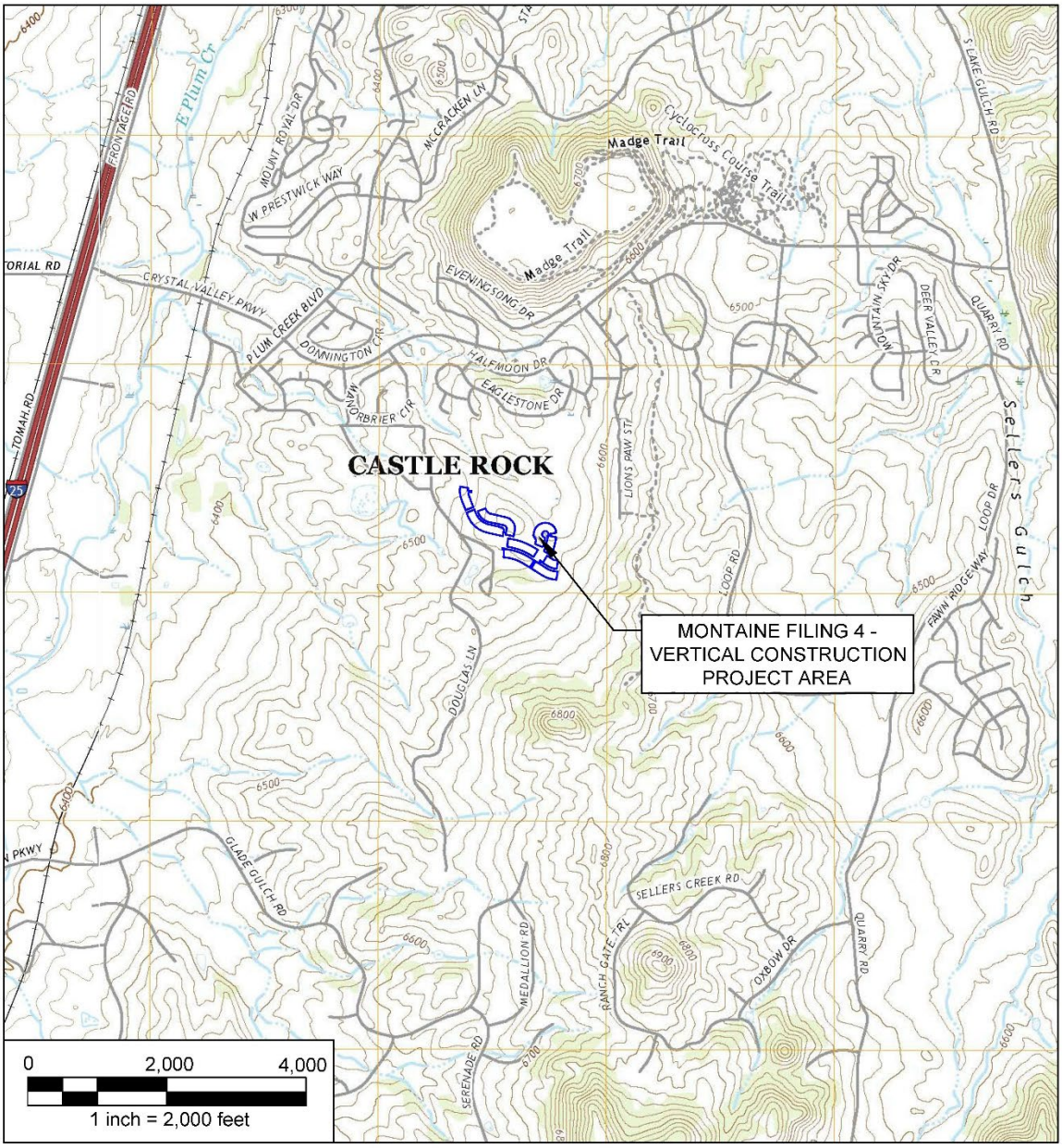
The objective of this document is to fulfill the Town of Castle Rock TESC permit requirements as outlined in the TESC Manual. A separate Stormwater Management Plan (SWMP) has been prepared for the site that satisfies the State of Colorado general permit COR400000 requirements.

Sediment control measures will be implemented per the approved TESC Plans throughout vertical construction. Sediment controls such as silt fence, sediment control log or equivalent will be implemented on the downgrade sides of the residential lots. Individual lot controls will only be implemented when a lot becomes active. Side lot controls may not be required when neighboring lots are also disturbed or when adequate perimeter controls are in place on the block.

Additional construction activities will include parking, and staging area.

TESC plan modifications may be subject to additional review by the Town of Castle Rock.

Figure 1. Montaine Filing 4 – Vertical Construction Vicinity Map



2.0 Existing Site Conditions

The project area consists of 56 single family lots within The Lanterns at Montaine Filing 4 Subdivision. The site has been previously disturbed prior to the current vertical construction phase and final stabilization has not yet been re-established. Filing 4 generally drains from south to north. Runoff from the site will be conveyed to downgradient stormwater quality facilities via streets and storm sewer prior to discharging into the receiving waters.

3.0 Adjacent Areas

The project area consists of finished lots within filing 4 of the Lanterns at Montaine Subdivision. The project area is within the greater Lanterns at Montaine community and it is bordered with future and existing residential development, including single family lots and some open areas to the south and NW of the project site. A tributary to East Plum Creek runs through the Lanterns at Montaine subdivision the site on a western direction and discharge to East Plum Creek which runs south to north approximately 1 mile west of the project area. Vegetation on adjacent areas that have not been cleared for development consists primarily of native prairie grasses as well as some shrub and tree species typical of the region. Vegetation density on these areas is typically 50% - 60%.

4.0 Soils

NCRS soils data was obtained for the site. The existing soils onsite are Fondis-Kutch association; and Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes.

Table 1. Soil Attributes for this Project

Map symbol and soil name	Pct of AOI	Hydrologic group	Kf	T factor	% Sand	% Silt	% Clay	WEG Rating
Fu—Fondis-Kutch association	50.0							6
Fondis		C	.28	5	39.2	37.3	23.5	
Kutch		D	.24	3	67.2	15.3	17.5	
PpE—Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes	50.0							3
Peyton		C	.20	5	65.9	19.1	15.0	
Crowfoot		B	.17	5	65.9	23.1	10.0	
Pring		A	.10	5	65.9	19.1	15.0	

Group A soils are well drained soils. Group B soils are moderately-well drained soils. Group C soils are poorly drained soils. Group D soils are extremely poorly drained soils. An erosion factor (Kf) of 0.20 represents a moderately-low susceptibility to sheet and rill erosion. (K values range from extremely low 0.02 to high 0.69)

For a detailed explanation of the erosive properties of these soils see the full NCRS report in the soils tab.

5.0 Areas and Volumes

Over lot grading has been previously completed for the site. No cut or fill is anticipated during vertical construction.

6.0 Erosion and Sediment Control Measures

Control Measures will be implemented in conformance with Castle Rock standards to control erosion and sedimentation within the project area.

Prior to the start of construction operations in an area, perimeter controls will be placed around the downgrade sides of the lot/block. Silt fence or an equivalent sediment control measure will be installed per the approved TESC plan and the Lot Controls details for A and B type lots. Also inlet protections will be installed on storm sewer inlets located downgrade of disturbance areas.

Vehicle tracking control practices must be implemented for all areas of potential vehicle tracking, and can include: minimizing site access, street sweeping or scraping, tracking pads, graveled parking areas, requiring that vehicles stay on paved areas on-site, wash racks, and contractor education. Tracking control measures will be maintained and monitored regularly for effectiveness. Street sweeping as needed.

Stockpiles from foundations excavation must be placed behind adequate control measures to prevent materials from migrating off site and into the storm sewer system. For temporary stockpiles on the interior portion of a construction site, where other downgradient controls, including perimeter control, are in place, stockpile perimeter controls may not be required.

Good housekeeping will be implemented in all areas of the project and stabilized staging area to maintain a clean site, including the use of dumpsters, drip-pans, secondary containment for hazardous materials, and onsite sanitary facilities being installed in a manner where they will not tip over (anchoring). Prior to the pouring of any concrete on site a concrete washout area (CWA) will be installed per Castle Rock standards with signs to easily identify its location. Ensure all masonry spoils are contained in the CWA and trades are aware of their obligation to not discharge their waste directly to the ground.

Any slopes greater than 4:1 will need to be stabilized using erosion control blankets or other stabilization measures approved by the Town of Castle Rock.

7.0 Timing/Phasing Schedule

Estimated Project Start Date: 01/2022 Estimated Project Completion Date: 10/2023

The following table describes the sequencing of the project as well as the planned control measures for each phase. Specific locations of control measures are shown on the Site Maps. Installation and maintenance specifications for each control measure are described in the TESC Plan Standard Notes and Details. Also it is always important to plan accordingly and minimize disturbed areas to the maximum extent practicable through proper planning.

Table 1. Vertical Construction Sequencing

Construction Activity	Anticipated Start Date	Anticipated End Date
Phase I - Lot Start, Install Initial Control Measures (Based on lot sales), Excavation, Foundation Installation and Backfill -Maintain or install back of curb controls. When applicable install rear and side lot controls, multi-lot construction may share same block controls. -Install or maintain inlet protections. -Install dumpsters and portable sanitary facilities. -Implement vehicle tracking control measures, -Locate and protect stockpiles as needed. -Install or maintain concrete washout area for project. -Maintain perimeter controls and inlet protections. -Street sweeping, -Implement good housekeeping, maintain dumpsters and portable sanitary facilities.	01/2022	04/2023
Phase II - Frame, Roof, Exterior Siding and Masonry, Interior Finishes -Maintain lot or block sediment controls as appropriate -Maintain inlet protections -Implement materials handling control measures -Use secondary containment for mixing operations. Berms to be used for masonry mixing operations. Tarps, trays, “kiddie pools”, or equivalent to be used when mixing liquids (ex: drywall, paint, stains, etc.) -Upon completion of home/unit construction fine grade lots -Street sweeping -Implement good housekeeping, maintain dumpsters and portable sanitary facilities.	02/2022	09/2023
Phase III - Final Stabilization -Per sale agreement with homeowner, stabilize front yard only with sod and/or landscaping -Remove front perimeter controls, dumpsters, and portable sanitary facilities	08/2021	10/2023

8.0 Permanent Stabilization

Final stabilization is reached when all ground surface disturbing activities at the construction site are complete; and, for all areas of ground surface disturbing activities, either a uniform vegetative cover with an individual plant density of at least 70 percent of pre-disturbance levels is established, or equivalent permanent alternative stabilization methods are implemented. Final stabilization must be designed and installed as a permanent feature.

For the residential lots, Wonderland Homes anticipates to convey each residential lot to homeowners with front landscaping only. Wonderland Homes will leave front, side and/or rear lot controls in place as appropriate upon transfer of the lot to the homeowner. It will be up to the individual homeowner to maintain those sediment controls until all landscaping has been installed in accordance with the local HOA if such rules apply. Once construction activities on the residential lot is complete and the lot sold to the homeowner permit coverage for the lot may be terminated.

It is not anticipated that Wonderland Homes will disturb areas outside the permitted areas however should such a disturbance occur seed and temporary erosion controls may need to be installed until final stabilization is achieved.

Refer to the Town of Castle Rock details for seed mix and application rates. Refer to the Site Map for locations vegetated and non-vegetated final stabilization locations.
The permittee(s) must ensure all temporary control measures are removed from the construction site once final stabilization is achieved, except when the control measure specifications allow the control measure to be left in place (i.e., bio-degradable control measures).

Seeding and Mulching:

- Existing topsoil shall be stripped to a depth of six inches (unless otherwise approved) from areas to be disturbed. The stripped topsoil shall be stockpiled during grading operations, then replaced to a depth of at least six inches in all areas to be seeded. If quantities of on- site topsoil are inadequate to provide a replaced depth of six inches, the Permittee(s) will have to import topsoil or condition the soil as approved by Castle Rock. All disturbed areas are to be ripped prior to placing topsoil. Topsoil shall be thoroughly loosened prior to seeding to a depth of at least six inches.

- All seeding shall be accomplished using a drill seeder at a depth of seeding not less than 1/4 -inch and not more than 3/4-inch and at the rates specified in the TESC Drawing Standard Notes and Details. In small areas that are impossible to drill seed, the Permittee(s), with the County's approval, may hand broadcast seed at twice the drilled rate, lightly rake to cover the seed, and crimp mulch. Information on seed types in the Castel Rock standard seed mixes is provided in Appendix E of the Castle Rock TESC Manual.

- Straw mulch shall be applied at 2 tons per acre and mechanically crimped into the soil. Revegetation is considered complete when the site is covered by an average of 3 plants per square foot of the variety and species found in the Town of Castle Rock-approved mix (for blue-grass or equivalent turf areas, the required coverage shall be at least 80-percent cover

of the species planted). There shall be no bare areas larger than 4 square feet (2 feet by 2 feet or equivalent). The site shall be free of eroded areas and shall be free from infestation of noxious weeds in accordance with the Castle Rock TESC manual. Inspections (monthly) and reseeding operations are required twice per year until a satisfactory stand of grass as denoted above is achieved.

- The TESC Permit shall be active until revegetation has reached completion for all areas and Final Close-out Acceptance is granted. Seeding and mulching operations must be undertaken when a TESC Permit expires and no renewal is granted.

DOUGLAS COUNTY AND CASTLE ROCK SEED MIX INFORMATION

Douglas County and Castle Rock Permanent Drill Seed Mix

Common Name	Botanical Name	Variety	Notes	%in Mix	Pounds of PLS Per Acres
Big Bluestem	Andropogon gerardi	Kaw	PNWS	10	1.1
Yellow Indiangrass	Sorghastrum nutans	Cheyenne	PNWS	10	1
Switchgrass	Panicum virgatum	Blackwell	PNWS	10	0.4
Sideoats Grama	Bouteloua curtipendula	Vaughn	PNWB	10	0.9
Western Wheatgrass	Pascopyrum Smithii	Arriba	PNCS	10	1.6
Blue Grama	Bouteloua gracilis	Hachita	PNWB	10	0.3
Thickspike Wheatgrass	Elymus lanceolatus ssp. dasystachyum	Critana	PNCS	10	1
Prairie Sandreed	Calamovilfa longifolia	Goshen	PNWS	10	0.7
Green Needlegrass	Stipa viridula	Lodorm	PNCB	10	1
Slender Wheatgrass	Elymus trachycaulus ssp. Trachycaulus	Pryor	PNCB	5	0.6
Streambank Wheatgrass	Elymus lanceolatus ssp. riparium	Sodar	PNCS	5	0.6

Douglas County and Castle Rock Temporary Drill Seeding Mix

Common Name	Botanical Name	Variety	Notes	%in Mix	Pounds of PLS Per Acres
Smooth Bromegrass	Bromus inermis	Lincoln	PICS	30	3.9
Intermediate Wheatgrass	Elytrigia intermedia ssp. Intermedia	Oahe	PICS	30	4.5
Pubescent Wheatgrass	Elytrigia intermedia ssp. Trichophorum	Luna	PICS	30	4.2
Annual Ryegrass	Lolium multiflorum	N/A	AICB	10	0.8

Douglas County and Castle Rock Low Growth Drill Seed Mix

Common Name	Botanical Name	Variety	Notes	%in Mix	Pounds of PLS Per Acres
Buffalograss	Buchloe dactyloides	Texoka	PNWS	20	3.2
Blue Grama	Bouteloua gracilis	Hachita	PNWB	20	0.6
Western Wheatgrass	Pascopyrum smithii	Arriba	PNCS	20	3.2
Sideoats Grama	Boutelous curtipendula	Vaughn	PNWB	20	1.8
Thickspike Wheatgrass	Elymus lanceolatus ssp. Dasystachyum	Critana	PNCS	10	1
Streambank Wheatgrass	Elymus lanceolatus ssp. Riparium	Sodar	PNCS	10	1.2

9.0 Stormwater Management Considerations

It is the intent of this TESC Plan that stormwater runoff is managed on site in a manner where erosion and sedimentation do not take place outside of the project area. Surface flows on the site generally drain to the south and are conveyed to downgradient regional stormwater quality facilities via roads and storm sewer. Runoff from the site will be treated with control measures as specified in the approved TESC Plan and in the lot control details (details 27 and 28) included in the TESC Plan Standard Notes and Details as well as with inlet protections if the flows are entering the storm sewer system.

The proper installation and maintenance of the perimeter controls on site as well as any additional control measures will be vital to the success of the project in removing sediment as they are the primary control measures.

Additional control measures may be needed for unforeseen circumstances during construction operations. It is the responsibility of the permittee to make the necessary modifications to the TESC Plan in cooperation with the city inspector to achieve successful stormwater compliance.

10.0 Maintenance

The TESC administrator shall be responsible for the maintenance of on-site control measures to ensure that they comply with required Castle Rock specifications and maintain the TESC Plan to reflect current site conditions. All control measures are to be inspected every 14 days and within 24 hours of a storm on active sites (72 hours for inactive sites). Any necessary control measure repairs will be completed as soon as possible, and immediately in most cases. Installations, modifications and repairs, as required by Castle Rock, will be completed within 48 hours of notification. Control Measures that are no longer functioning properly or not necessary shall be removed immediately and disposed of properly. Additional control measures may be needed not otherwise noted in this TESC Plan.

A copy of the approved PE stamped TESC plans/report, and the project permits shall be readily available on site at all times (digital or hard copy). The location of these items may vary. The Town Inspector will perform inspection to ensure that the proposed TESC plan is being implemented as well as being effective. The permittee or his/her agent shall set up and coordinate the needed inspections and meetings with the city.

Control Measures are to be maintained in working condition per Town of Castle Rock standards, including: the removal of accumulated sediment from effective control measures (SF, SCL, etc.); repairing any damaged or compromised control measures; reinstalling improperly installed or utilized control measures and the removal or any sediment/debris on any adjacent roadways using sweeping or vacuuming methods, the use of pressure washers is strictly prohibited.

Trash waste containers/dumpsters are to be routinely emptied and contained in a manner where they will not overflow. Portable sanitary facilities will be regularly maintained by a professional company and anchored to prevent possible spilling. A spill kit is recommended on site. Ensure all concrete washout and masonry waste (if any) is placed in the designated washout area that should be easy to identify via signage throughout the site. Clean the concrete washout area as required by Castle Rock standards.

Initial Close-Out may be requested when all disturbed areas have had final stabilization methods implemented and vegetated areas meet the required reestablishment standards in accordance with Castle Rock criteria.

11.0 Opinion of Probable Cost

Town of Castle Rock
TESC Permit - Cost Opinion Spreadsheet
Project # TESV21-0013
Montaine Filing 4 – Vertical Construction

NO.	Control Measure	ID	Unit	Installation Unit Cost	Quantity	Cost
1	Check Dam	CD	LF	$ 24.00		$ -
2	Compost Blanket	CB	SF	$ 0.36		$ -
3	Compost Filter Berm	CFB	LF	$ 2.00		$ -
4	Concrete Washout Area	CWA	EA	$ 100.00	1	$ 100.00
5	Construction Fence	CF	LF	$ 2.00		$ -
6	Construction Markers	CM	LF	$ 0.20		$ -
7	Dewatering	DW	EA	$ 600.00		$ -
8	Diversion Ditch	DD	LF	$ 1.60		$ -
9	Erosion Control Blanket	ECB	SY	$ 5.00		$ -
10	Inlet Protection	IP	LF	$ 20.00	48	$ 960.00
11	Reinforced Check Dam	RCD	LF	$ 36.00		$ -
12	Reinforced Rock Berm	RRB	LF	$ 9.00		$ -
13	RRB for Culvert Protection	RRC	LF	$ 9.00		$ -
14	Sediment Basin	SB	AC	$ 1,100.00		$ -
15	Sediment Control Log	SCL	LF	$ 2.00		$ -
16	Sediment Trap	ST	EA	$ 600.00		$ -
17	Seeding and Mulching	SM	AC	$ 2,500.00		$ -
18	Silt Fence *	SF	LF	$ 2.00		$ -
19	Stabilized Staging Area	SSA	SY	$ 2.00	780	$ 1,560.00
20	Surface Roughening	SR	AC	$ 600.00		$ -
21	Temporary Road Crossing	TRC	EA	$ 3,000.00		$ -
22	Temporary Slope Drain	TSD	LF	$ 30.00		$ -
23	Temporary Stream Crossing	TSC	EA	$ 1,000.00		$ -
24	Terracing	TER		N/A		$
25	Vehicle Tracking Control	VTC	EA	$ 1,000.00	1	$ 1,000.00
26	VTC with Wheel Wash	WW		N/A		$
27	Temporary Batch Plant Restoration		AC	$ 5,000.00		$ -
28	A Lot Controls	A	EA	$ 1,500.00	17	$ 25,500.00
29	B Lot Controls	B	EA	$ 2,000.00	39	$ 78,000.00

Total Costs	**$ 107,120.00**
10% Contingency	**$ 10,712.00**
Grand Total	**$ 117,832.00**
Total Surety Amount (Grand Total x 1.15)	**$ 135,506.80**

*Silt fence shown in plans is considered part of A/B Lot Controls.

12.0 Calculations

N/A

13.0 Other Information

- NRCS Custom Soils Report
- FEMA Map
- Resource List

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 Castle Rock Area, Colorado

November 11, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,760 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 14, Aug 31, 2021

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

Date(s) aerial images were photographed: Jul 4, 2010—Oct 16, 2017

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Fu	Fondis-Kutch association	5.7	50.0%
PpE	Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes	5.7	50.0%
Totals for Area of Interest		**11.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Castle Rock Area, Colorado

Fu—Fondis-Kutch association

Map Unit Setting

National map unit symbol: jqyq
Elevation: 5,500 to 6,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fondis and similar soils: 50 percent
Kutch and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fondis

Setting

Landform: Valley sides, draws
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits over coarse-silty outwash derived from arkose

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 24 inches: clay
H3 - 24 to 60 inches: sandy clay loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R049XB208CO - Clayey Foothill
Hydric soil rating: No

Description of Kutch

Setting

Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Fine-textured residuum weathered from calcareous shale

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 32 inches: clay
H3 - 32 to 36 inches: weathered bedrock

Properties and qualities

Slope: 5 to 40 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R049XB208CO - Clayey Foothill
Hydric soil rating: No

Minor Components

Bresser

Percent of map unit: 5 percent
Hydric soil rating: No

Newlin

Percent of map unit: 5 percent
Hydric soil rating: No

Hilly gravelly land

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

PpE—Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes

Map Unit Setting

National map unit symbol: jqzn
Elevation: 6,500 to 8,000 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 44 to 46 degrees F
Frost-free period: 115 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Peyton and similar soils: 40 percent
Pring and similar soils: 25 percent
Crowfoot and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peyton

Setting

Landform: Ridges, valley sides
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Weathered alluvium derived from arkose

Typical profile

H1 - 0 to 11 inches: sandy loam
H2 - 11 to 30 inches: sandy clay loam
H3 - 30 to 40 inches: sandy loam
H4 - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Base slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkosic sedimentary rock

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 5 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Description of Crowfoot

Setting

Landform: Ridges, valley sides
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from arkosic sedimentary rock

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 19 inches: loamy sand
H3 - 19 to 32 inches: gravelly sandy clay loam
H4 - 32 to 43 inches: gravelly sandy loam
H5 - 43 to 60 inches: coarse sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Minor Components

Brussett

Percent of map unit: 3 percent
Hydric soil rating: No

Tomah

Percent of map unit: 3 percent
Hydric soil rating: No

Jarre

Percent of map unit: 3 percent
Hydric soil rating: No

Aquic haploborolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

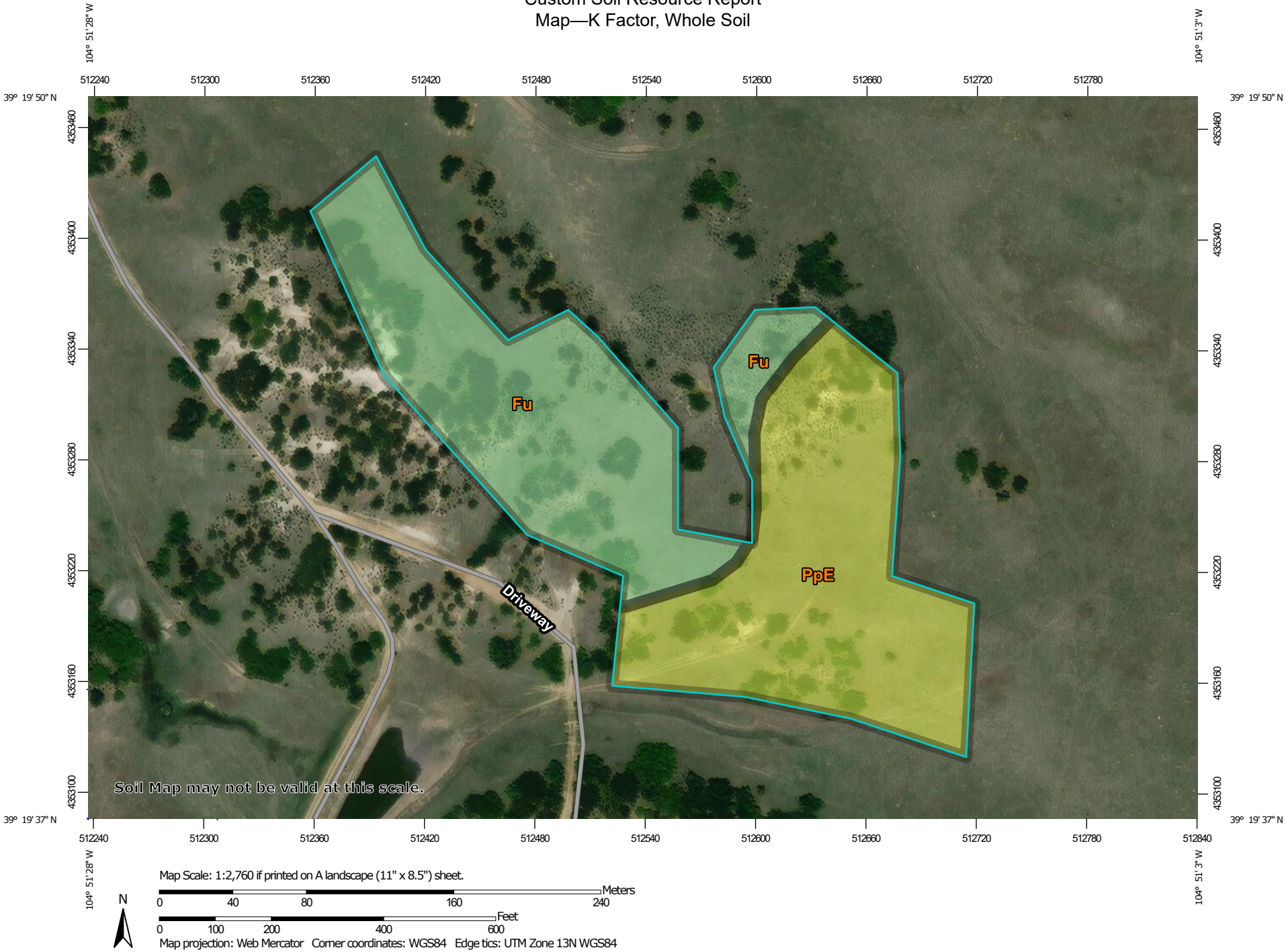
K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Factor K does not apply to organic horizons and is not reported for those layers.

Custom Soil Resource Report
Map—K Factor, Whole Soil



Map Scale: 1:2,760 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 14, Aug 31, 2021

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

Date(s) aerial images were photographed: Jul 4, 2010—Oct 16, 2017

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.

Table—K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Fu	Fondis-Kutch association	.28	5.7	50.0%
PpE	Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes	.20	5.7	50.0%
Totals for Area of Interest			**11.3**	**100.0%**

Rating Options—K Factor, Whole Soil

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

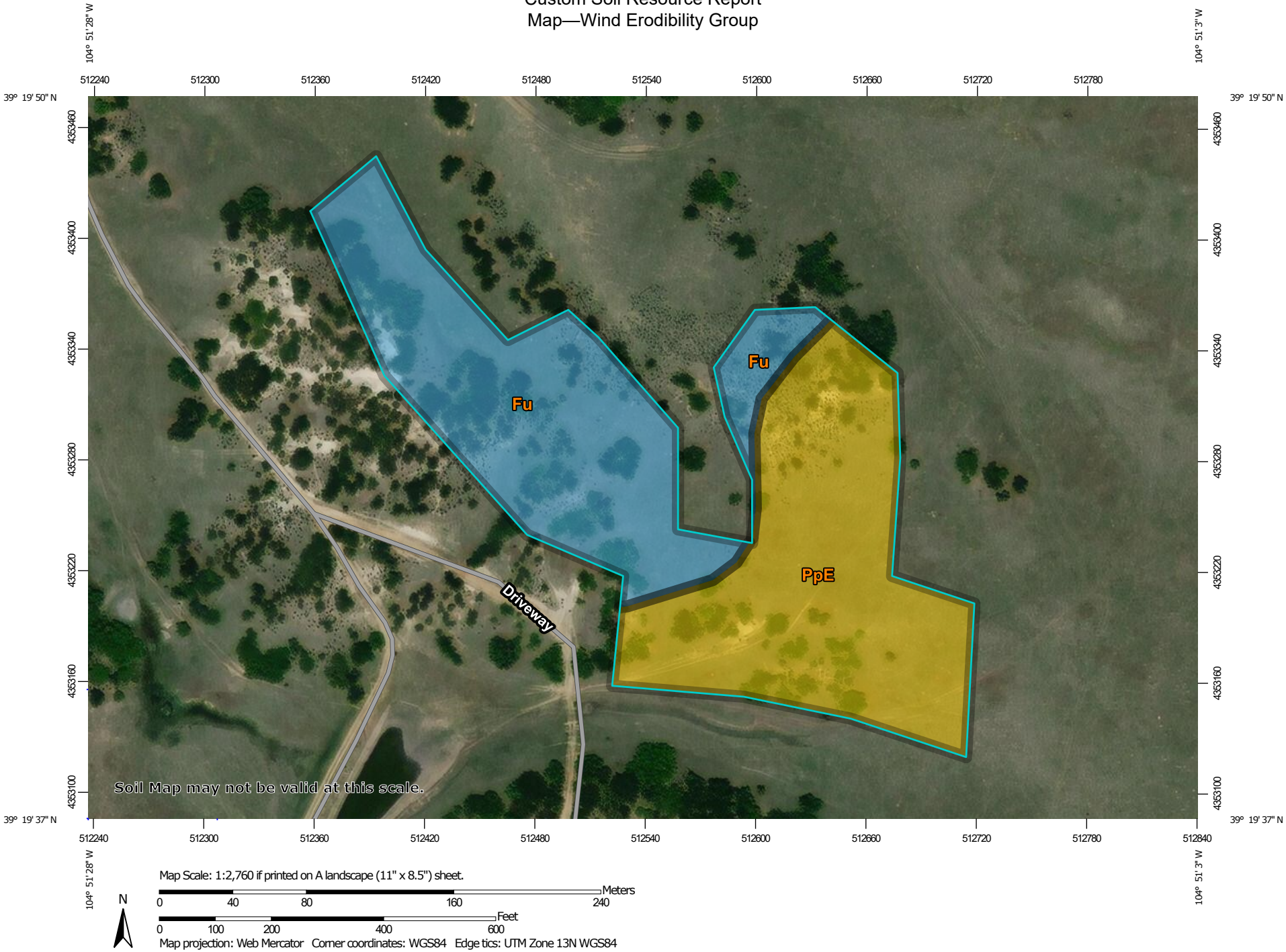
Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

Wind Erodibility Group

A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

Custom Soil Resource Report
Map—Wind Erodibility Group



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

1
2
3
4
4L
5
6
7
8
Not rated or not available

Soil Rating Lines

1
2
3
4
4L
5
6
7
8
Not rated or not available

Soil Rating Points

1
2
3
4
4L
5
6
7
8
Not rated or not available

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 14, Aug 31, 2021

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

Date(s) aerial images were photographed: Jul 4, 2010—Oct 16, 2017

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.

Table—Wind Erodibility Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Fu	Fondis-Kutch association	6	5.7	50.0%
PpE	Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes	3	5.7	50.0%
Totals for Area of Interest			**11.3**	**100.0%**

Rating Options—Wind Erodibility Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Erosion

This folder contains a collection of tabular reports that present soil erosion factors and groupings. The reports (tables) include all selected map units and components for each map unit. Soil erosion factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factor Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic layer.

Report—RUSLE2 Related Attributes

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed or the first mineral horizon below an organic surface horizon. Organic horizons are not displayed.

RUSLE2 Related Attributes–Castle Rock Area, Colorado

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
Fu—Fondis-Kutch association								
Fondis	50	—	C	.28	5	39.2	37.3	23.5
Kutch	35	—	D	.24	3	67.2	15.3	17.5

RUSLE2 Related Attributes–Castle Rock Area, Colorado								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
PpE—Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes								
Peyton	40	—	C	.20	5	65.9	19.1	15.0
Crowfoot	25	—	B	.17	5	66.9	23.1	10.0
Pring	25	—	A	.10	5	65.9	19.1	15.0

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

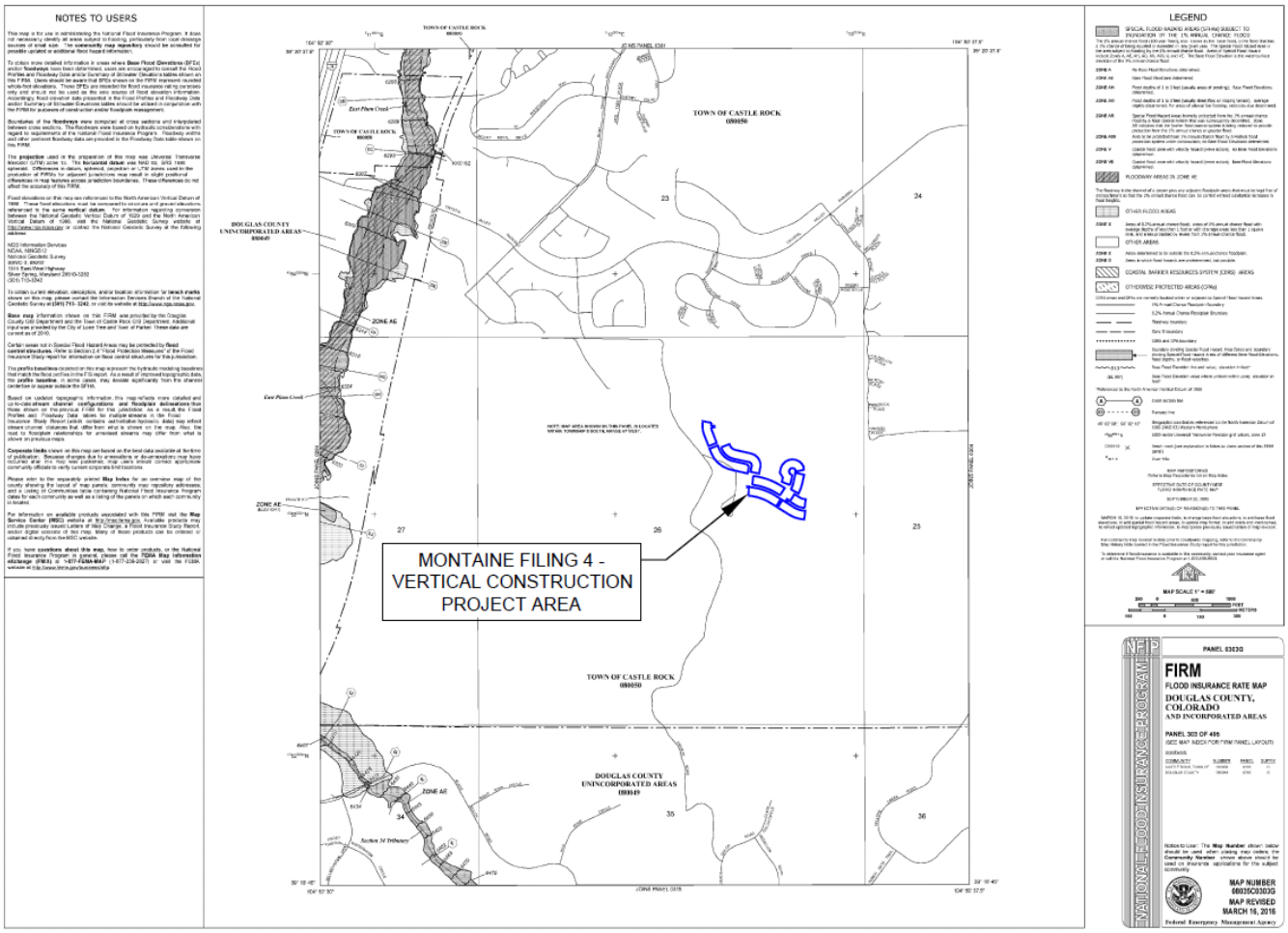
United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf


NOTES TO USERS
LEGEND
TOWN OF CASTLE ROCK
080050
DOUGLAS COUNTY
UNINCORPORATED AREAS
080049
ZONE AE
MONTAINE FILING 4 -
VERTICAL CONSTRUCTION
PROJECT AREA
NFIP
PANEL 0303G
FIRM
FLOOD INSURANCE RATE MAP
DOUGLAS COUNTY,
COLORADO
AND INCORPORATED AREAS
PANEL 303 OF 495
MAP NUMBER
08035C0303G
MAP REVISED
MARCH 16, 2016
Federal Emergency Management Agency

NFIP
PANEL 0303G
FIRM
FLOOD INSURANCE RATE MAP
DOUGLAS COUNTY,
COLORADO
AND INCORPORATED AREAS
PANEL 303 OF 495
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CASTLE ROCK, TOWN OF 080050 0303 G
DOUGLAS COUNTY 080049 0303 G
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
08035C0303G
MAP REVISED
MARCH 16, 2016
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM

Resource List

The Soils Conservation Service: *http//websoilsurvey.NRCS.USDA.gov*

Mile High Flood Control District: Urban Storm Drainage Criteria Manual: https://mhfd.org/resources/criteria-manual/

Castle Rock Stormwater Program and Castle Rock TESC Manual

Mohr Separation Research, Inc: http//www.mohrseperations.com/stormwat.htm

Certified Professional in Erosion and Sediment Control: Review Manual August 2004.

California Stormwater Quality Associations Construction Handbook: http//www.cabmphandbooks.org/Constructio.asp

Minnesota Stormwater Inspection Guide: http//www.pca.state.mn.us/publications/wq-strm2-10.pdf

Western Washington Stormwater Management Manual-Volume 11- Construction Stormwater Pollution

Prevention: http://www.ecy.wa.gov/programs/wq/stormwater/manual.html

Eastern Washington Stormwater Management Manual: http//ecy.wa.gov/biblio/0410076.html

North Central Texas COG Integrated Stormwater Management: iswm.ncRanchg.org/Documents/Construction.asp

Applied Principles of Hydrology 3rd addition, By John C. Manning 1997

North American Green: http://www.nagreen.com/

Western Native Seed: http://www.westernnativeseed.com/

http://www.fhwa.dot.gov/environment/rdsduse/co.htm

http://www.nationalregisterofhistoricplaces.com

http://ndis.nrel.colostate.edu/ftp/data/sam/meta/pj_mouse.html

http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=CO&status=listed

Disclaimer

This plan was prepared in accordance with applicable stormwater regulations. This document represents a planning tool to assist the client to comply with all applicable stormwater regulations during the construction of the project.

It is the clients' sole responsibility on how to operate the construction site and not CMS Environmental Solutions, LLC. Therefore, CMS Environmental Solutions, LLC is not liable for operational decisions made by the client and for the clients' failure to follow recommendations as outlined in this TESC.

Client agrees to hold CMS Environmental Solutions, LLC Harmless for any potential violations the client may receive for operational violations brought forth by any regulatory agency including all Federal, State and local agencies.

By accepting the TESC the client agrees to this disclaimer and its conditions.