Environment

Submitted to:
Colorado Springs Utilities
Colorado Springs, CO

Submitted by:
AECOM
Greenwood Village, Colorado
60729498
November 8, 2024

Coal Combustion Residuals (CCR) Landfill Post-Closure Plan Clear Spring Ranch El Paso County, Colorado

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Clear Spring Ranch
El Paso County, Colorado

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Reviewed By
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Approved By
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List of Acronyms

CCR	coal combustion residuals
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CSR	Clear Spring Ranch
CSU	Colorado Springs Utilities
CYs	cubic yards
EDOP	Engineering Design and Operations Plan
H:V	horizontal to vertical
RCRA	Resource Conservation and Recovery Act
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
Utilities	Colorado Springs Utilities

1.0 Introduction

This Post-Closure Plan has been prepared on behalf of Colorado Springs Utilities (Utilities) to meet the Coal Combustion Residuals (CCR) Regulations (CCR Rule) as detailed in 40 Code of Federal Regulations (CFR) 257.104. Historically, the site has received CCR from the Martin Drake and Ray Nixon Power Plants; however, the Martin Drake Power Plant was decommissioned in 2021 and the Ray Nixon Plant is projected to close in approximately 2029. To account for these closures and the change in expected CCR volume, Utilities prepared a Final 30% Design Package for the redesign of the CCR Landfill in December, 2023 (AECOM, 2023). Utilities has also updated a final Closure Plan (AECOM, 2024) under separate cover to account for the expected change in CCR volume and reflect the details of the redesign.

Once closure of the CCR Landfill has been completed in accordance with the CCR Landfill Closure Plan and closure has been deemed adequate, the post-closure period begins. During post-closure, the CCR Landfill will be inspected and maintained to ensure the integrity and effectiveness of the final cover system. Post-closure activities will also include inspections and maintenance of the run-on and run-off control system and long-term groundwater monitoring system, if applicable.

1.1 Background

Clear Spring Ranch (CSR) is a 4,759-acre property located at the intersection of Interstate 25 and Ray Nixon Road, approximately 17 miles south of Colorado Springs (**Figure 1**). It was acquired in 1972 by the City of Colorado Springs on behalf of its enterprise Colorado Springs Utilities. The primary land uses on the CSR property are those related to utility services: electric generation & transmission, water / wastewater treatment & delivery, and waste management. Power generation at Utilities' Ray Nixon Power Plant produces CCR. Utilities places these residuals in the site located in the southern part of CSR. Utilities' materials currently authorized by the Colorado Department of Public Health and Environment (CDPHE) and El Paso County for placement in the CCR Landfill are listed in the facility's Engineering Design and Operations Plan (EDOP) (CSU, 2019). The location of the CCR Landfill is shown on **Figure 1**.

1.2 Regulations

The CCR Landfill is regulated by the CCR Rule promulgated by the United States Environmental Protection Agency (USEPA, 2024) under 40 CFR Part 257, Subtitle D of the Resource Conservation and Recovery Act (RCRA). The CCR Landfill is also regulated by the CDPHE Hazardous Materials and Waste Management Division under the Regulations Pertaining to Solid Waste Sites and Facilities (6 Code of Colorado Regulations 1007-2, Part 1) (Solid Waste Regulations) (CDPHE, 2024 and by the Local Governing Authority (i.e., El Paso County). The disposal area, as shown on **Figure 1**, is located within the boundaries established by the Clear Spring Ranch Certificate of Designation (CD-04-001) and Use Subject to Special Review (AL-05-006), which were approved by the Board of County Commissioners. This Post-Closure Plan was developed to meet the requirements of the CCR Rule, as detailed in 40 CFR 257.104.

1.3 Owner/Operator Information

The owner and operator of the CCR Landfill (and the contact during the post-closure period) is:

Colorado Spring Utilities – Operations Division
Attn: Power Plant Manager
P.O. Box 1103, Mail Code 40
Colorado Springs, CO 80947
Phone: 719-668-4800
Email: askus@csu.org

1.4 Purpose

The purpose of the post-closure activities is as follows.

1. Maintain the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover.
2. Maintain the groundwater monitoring system, if applicable.
3. Provide an initial written post-closure plan to meet the requirements of 40 CFR 257.104.

2.0 Site Characterization

This section characterizes the site and includes a discussion of the site hydrology, hydrogeology, soil, and current conditions at the CCR Landfill.

2.1 Site Hydrology and Hydrogeology

The CCR Landfill is located in the area referred to as Sand Canyon, which is a small, west-east trending topographic depression that is bounded to the north and south by outcroppings of Pierre Shale. Approximately 50 feet of Quaternary sediments have been deposited in the canyon. These sediments, referred to as the Piney Creek Alluvium, consist of horizontal layers of clay, silty clay, sand, and gravel. Most of the alluvium is poorly-sorted and fine-grained with silt-sized materials predominating. Bedding is poorly defined except for a thin layer of gravel near the base of the deposit. The Piney Creek Alluvium is saturated beneath the CCR Landfill and forms the uppermost water-bearing zone in Sand Canyon. It is underlain by approximately 3,500 to 4,000 feet of Pierre Shale that forms a hydraulic barrier between the alluvium and deeper water-bearing formations, if present. Groundwater within the Piney Creek Alluvium flows to the east-southeast along the top of the alluvium-Pierre Shale contact. Water level measurements indicate that the saturated thickness of the alluvial water-bearing zone is approximately zero to 25 feet.

Approximately one mile east of the CCR Landfill, Sand Canyon intersects the north-south alluvial channel of Fountain Creek. The upgradient portion of Sand Canyon occupied by the CCR Landfill is cut off from Fountain Creek by the Retention Dam installed by Utilities in 1978. The Retention Dam, located approximately 3,000 feet downgradient (east) of the landfill (**Figure 1**), has a bentonite core and is keyed into the Pierre Shale bedrock. It captures surface water run-off from the CCR Landfill and also restricts groundwater flow. To enhance the Dam’s performance, Utilities installed a bentonite barrier wall through the upgradient toe of the dam in October 1994. The Retention Dam is intended to prevent releases that may occur from migrating downgradient to Fountain Creek.

2.2 Site Surficial Soil

According to the United States Department of Agriculture (USDA) Web Soil Survey (USDA, 2016), the CCR Landfill was constructed in an area consisting primarily of two soil types: Razor-Midway complex and Limon clay. The Razor-Midway complex is well-drained, and the surface layer consists of stony/cobbly clay loam and clay to a depth of approximately 15 to 30 inches. Permeability of the soil is estimated to be moderately low to moderately high and the available water storage capacity is low to very low. The Limon clay is well-drained, and the surface layer consists of clay, silty clay, and silty clay loam to a depth of at least 60 inches. Permeability of the soil is estimated to be moderately low to moderately high and the available water storage capacity is high. A printout showing the locations of each soil type from the Web Soil Survey is provided in **Appendix A**.

2.3 Anticipated Post-Closure Conditions

As of December 2022, the volume of the landfill was approximately 3,824,000 CY. Bottom ash is currently disposed of in the western portion of the landfill and fly ash is currently disposed of in the eastern portion of the landfill. Both bottom ash and fly ash are being removed from the site for beneficial reuse. Currently volumes of bottom ash beneficial reuse exceed volumes of bottom ash disposal and mining of bottom ash for beneficial reuse is expected to continue. There is an estimated 555,000 CY of bottom ash to be beneficially reused, and a maximum volume of approximately 3,269,000 CY of CCR waste remaining at the landfill. It is anticipated that approximately 500,000 CY of material will be generated for disposal by the time the Ray Nixon Plant closes and will need to be placed within the footprint of the landfill. The total anticipated maximum volume of waste being disposed of for closure-in-place is 3,769,000 CY.

As described in the Closure Plan, the CCR Landfill will be completed by installing an engineered turf final cover system, known as ClosureTurf® (AGRU, 2023), over an intermediate cover which will be placed over the existing CCR. ClosureTurf® is comprised of three components: a structured geomembrane, an engineered turf, and a specified infill material. A conceptual cross-section of the ClosureTurf® cover is shown in **Figure 2**. Additional details regarding the design and construction of this cover system are included in the Closure Plan.

The anticipated post-closure topography is shown in **Figure 2**. The final grades on the side slopes of the CCR Landfill will be no greater than 3:1 (horizontal to vertical [H:V]) and the final grades on the top of the CCR Landfill will be crowned with a slope of no less than 20:1 (H:V). These grades will promote surface water run-off and preclude the future impoundment of water. The final contours, including the ClosureTurf®, will reach an elevation no greater than 5,531 feet at the highest grade. The overall height of the landfill will be approximately 70-80 feet above the surrounding native ground surface.

The western portion of the landfill, currently designated as the Bottom Ash Mining Area, is anticipated to be either fully destacked for beneficial reuse or placed in the landfill. All material will be excavated to base grades, as shown on the Design Plans, and the area will be seeded.

The 3:1 (H:V) grade was approved as part of the approval of the 2004 Certificate of Designation for Clear Spring Ranch (CDPHE, 2004). In 2009, Utilities hired a third-party geotechnical engineering firm (Kleinfelder) to assess the global stability of the landfill's then-current configuration and its anticipated configuration with various cover thicknesses at closure. Kleinfelder's slope stability analysis concluded that there was a low risk of slope instability under any of the analyzed closure configurations (Kleinfelder, 2009).

The post-closure specific land use will continue as industrial use. Post-closure use of the property will be managed to not disturb the integrity of the final cover, the run-on/run-off controls, or the groundwater monitoring system. Disturbance will only be permitted if Utilities demonstrates that disturbance of the final cover (including removal of CCR) will not increase the potential threat to human health or the environment.

3.0 Inspections, Maintenance, and Monitoring During Post-Closure

According to the CCR Rule, the Utilities will conduct post-closure care for a minimum period of 30 years. This section discusses the inspection, maintenance, and monitoring requirements throughout the post-closure care period.

3.1 Inspections

Periodic visual inspections of the CCR Landfill will be performed by a qualified person (either a Utilities' employee or a third-party consultant). ClosureTurf® inspections will be performed every 5 years to maintain the sand infill under normal conditions. After a significant rainfall event, additional inspections may be required to ensure the sand infill thickness is maintained. Inspections of the CCR Landfill will continue for the duration of the post-closure period; however, the frequency of inspection may be reduced (or increased) based on observed conditions during the post-closure period.

The CCR Landfill will be inspected to evaluate the following:

- Growth of weeds
- Erosion and/or deposition of material within the perimeter ditch
- Animal intrusion
- Settlement
- Surface water drainage and run-on and run-off controls
- Groundwater monitoring system (if required)

Inspection for established vegetative cover is not needed in a ClosureTurf® application. The CCR Landfill is located within the CSR facility, which is a secure/fenced facility with locked gates. Therefore, inspections for security are not required.

3.2 Maintenance

Routine maintenance is not anticipated during the post-closure period of the CCR Landfill due to the installation of the ClosureTurf® system. The ClosureTurf® system has a design life of 100+ years and is comprised of three components: a structured geomembrane, an engineered turf, and a specified infill material (AGRU, 2023). Details of the system can be found in the CCR Landfill Closure Plan (AECOM, 2024). Maintenance activities typically required by a traditional final cover system, including mowing, reseeding, fertilizing, pond clean-out, animal burrows, and major storm repair, are not generally applicable to the ClosureTurf® system. If sand infill is lost or migrates into the perimeter ditch, it will need to be replaced and/or cleaned out as necessary.

The western portion of the landfill, currently designed as the Bottom Ash Mining Area, is anticipated to be either fully destacked for beneficial reuse or placed in the landfill. The area will be seeded, monitored, and maintained to meet post-closure care requirements and non-routine maintenance based on inspection findings. Maintenance activities are discussed in the following sections.

3.2.1 Vegetation Maintenance

Vegetation maintenance is not applicable to the CCR Landfill due to the use of the ClosureTurf® system in place of vegetation.

The Bottom Ash Mining Area will be seeded according to the Soil Conservation Service guidelines. The specific seed mix will consist of grasses native to Colorado, or otherwise considered appropriate by overseeing regulatory agencies, and will be chosen based on results of prior experience with the seed mix at the facility. The goal will be to obtain a good stand of grass with a dense root structure. If necessary to support vegetative growth, commercial fertilizer (or other soil amendments) can be incorporated into the seedbed prior to seeding of permanent species. The permanent perennial seeding may consist of both cool- and warm-season native grasses that are tolerant to drought and adaptable to fine-textured clay soils. Straw mulch may be applied and anchored with a straw crimper to promote plant germination and growth by decreasing soil surface temperature, conserving soil moisture, and controlling erosion from wind and water run-off. The required maintenance may include re-seeding bare areas or inter-seed planting and/or addition of soil amendments to bare areas.

3.2.2 Weed Control

Weed control is not applicable to the CCR Landfill due to the use of the ClosureTurf® system in place of vegetation.

In the Bottom Ash Mining Area, weeds and invasive or woody plants will be controlled by mowing and/or weed spraying with approved herbicides, as needed. Mowing should not be lower than six inches. Chemical weed spraying should be avoided during the first growing season to protect new perennial growth. Weed control methods will be modified as necessary based on recommendations by the weed control contractor.

3.2.3 Erosion Repair

Erosion is not expected to occur at the CCR Landfill as a result of capping the site using the ClosureTurf® system with the impermeable geomembrane layer. Minimal movement of the sand infill down the side slopes of the landfill is expected to occur over time. The distribution of the sand infill will be redistributed if determined necessary.

In the Bottom Ash Mining Area, if required, erosion rills/gullies/channels will be repaired by hand raking (for small areas) or by grading or backfilling (for larger areas). Backfilled areas will be seeded, mulched, and protected with erosion controls (erosion control blankets, wattles, etc.) as needed. The use of riprap or other forms of armoring may be evaluated for use in drainage channels and on steep slopes, as needed.

3.2.4 Animal Intrusion Control

Animal intrusion control is not applicable to the CCR Landfill due to the use of the ClosureTurf® system in place of vegetation.

3.2.5 Settlement Monitoring and Repair

As discussed in the CCR Landfill Closure Plan (AECOM, 2024), as the landfill contains relatively homogenous soil-like waste, and does not contain putrescible materials, settling and subsidence is anticipated to be minimal. A baseline survey of the landfill’s contours will be conducted upon completion of the installation of the final cover. If merited at any time following placement of the final cover, a new survey of the landfill will be conducted and compared to the initial survey to evaluate if subsidence is of concern.

Minor settlement, subsidence, or displacement will be corrected by grading to promote positive surface drainage. The ClosureTurf® system of the CCR Landfill can be opened and resealed if additional soil or grading is needed. Major settlement, subsidence, or displacement, as verified by survey, may require an engineer to evaluate the cause and recommend corrective action.

3.2.6 Maintenance of Run-on and Run-off Controls

Run-on / run-off controls during post-closure will be in general accordance with the most recently updated version of the Run-on and Run-off Control System Plan (AECOM, 2022). Eroded stormwater letdowns, benching, tack-on berms, and culverts will be graded and repaired as necessary to return the controls to design conditions. Debris and any infill material blocking and/or accumulating in any of the stormwater controls will be removed. Damaged, filled, or otherwise mal-functioning stormwater controls will be replaced or repaired as needed to maintain design capacity.

3.2.7 Groundwater Monitoring and Maintenance of the Groundwater Monitoring System

If a groundwater monitoring system is in use during post-closure, the monitoring wells will be inspected and maintained during post-closure. Maintenance may include repair of concrete well pads, repair or replacement of well casings, and/or replacement of locks.

3.3 Inspection/Maintenance Reporting

A post-closure inspection form is provided in **Appendix B**. Indications of problems and recommended actions will be noted after each inspection. This documentation, along with records of maintenance activities and other relevant information will be kept in the landfill operating records and will be available for review.

4.0 Amendment, Recordkeeping, and Notification

4.1 Amendment of the Plan

As required by 40 CFR 257.104(d)(3), Utilities may amend this initial written Post-Closure Plan at any time provided the revised plan is placed in the facility's Operating Record. Utilities will amend this plan whenever there is a change in operation of the CCR Landfill that would substantially affect the plan and if unanticipated events (after post-closure activities have commenced) necessitate a revision. Utilities will amend this plan at least 60 days prior to a planned change in the operation of the CCR Landfill, or no later than 60 days after an unanticipated event requires revising the existing plan. If this plan is revised after post-closure activities have commenced for the CCR Landfill, Utilities will amend the plan no later than 30 days following the triggering event. Any amendment of this plan will be certified by a qualified professional engineer.

4.2 Recordkeeping

Utilities will maintain their files with this Post-Closure Plan, any subsequent revisions/amendments of this Post-Closure Plan, inspection reports, documentation of maintenance, and other pertinent documents within the facility's Operating Record for a period of at least five years in accordance with 40 CFR 257.105.

4.3 Notification

Utilities will notify CDPHE whenever the Post-Closure Plan (along with any subsequent updates) has been placed in the operating record in accordance with the notification requirements specified in 40 CFR 257.106. No later than 60 days following the completion of the post-closure care period, Utilities will prepare a notification verifying that post-closure care has been completed. The notification will include a written certification from a qualified professional engineer verifying that post-closure has been completed in accordance with this post-closure plan.

5.0 Certification

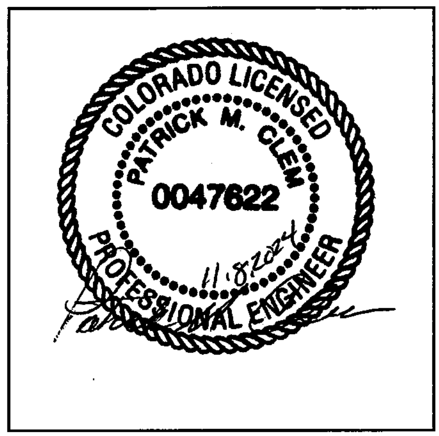
Certification Statement 40 CFR § 257.104(d)(4) – Coal Combustion Residuals (CCR) Landfill Post-Closure Plan, Clear Spring Ranch, El Paso County, Colorado

CCR Unit – Colorado Springs Utilities, Clear Spring Ranch, CCR Landfill

I, Patrick Clem, being a Registered Professional Engineer in good standing in the State of Colorado, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the CCR Landfill Post-Closure Plan dated November 8, 2024, meets the requirements of 40 CFR § 257.104.

Patrick Clem
Printed Name

November 8, 2024
Date



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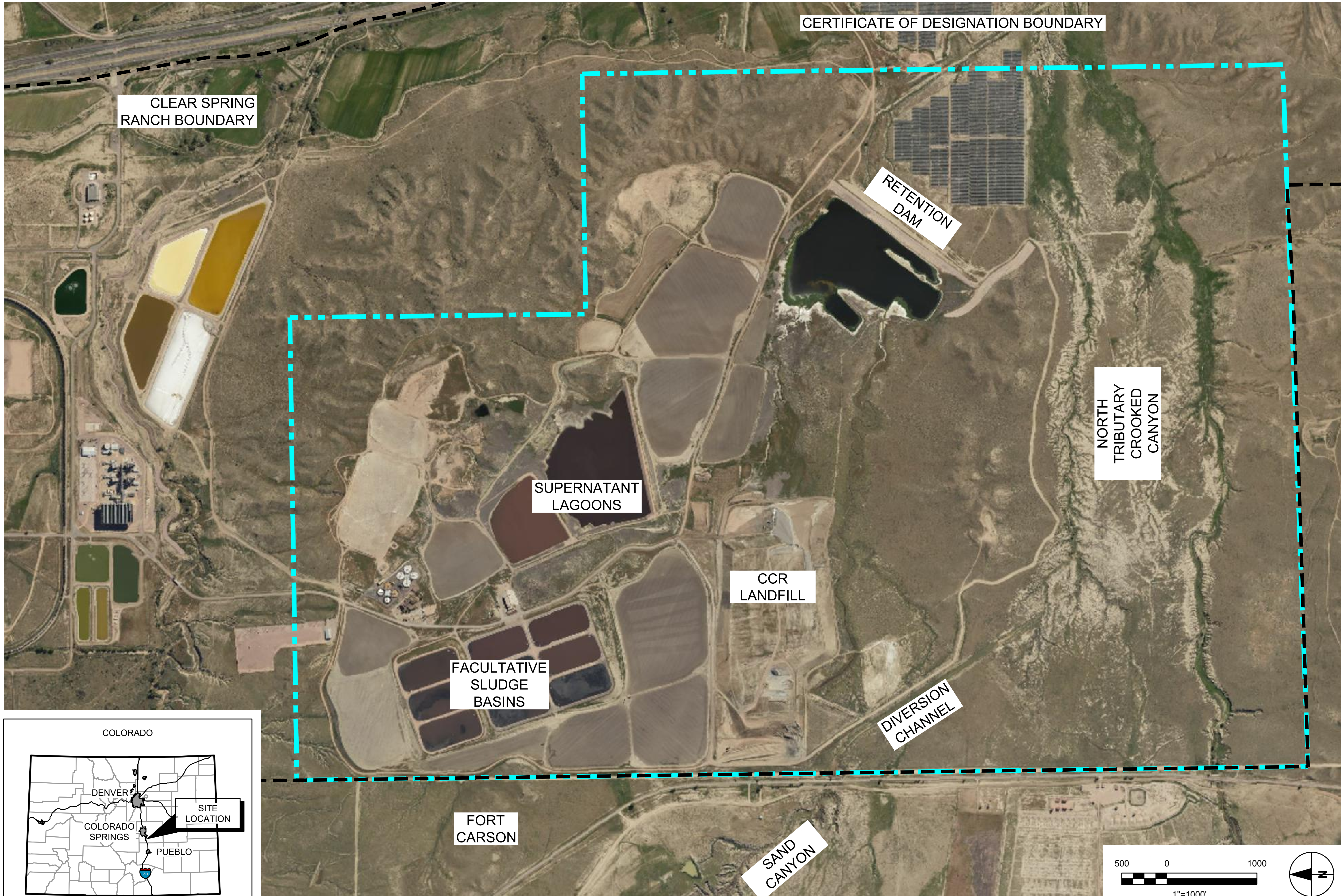
Figures



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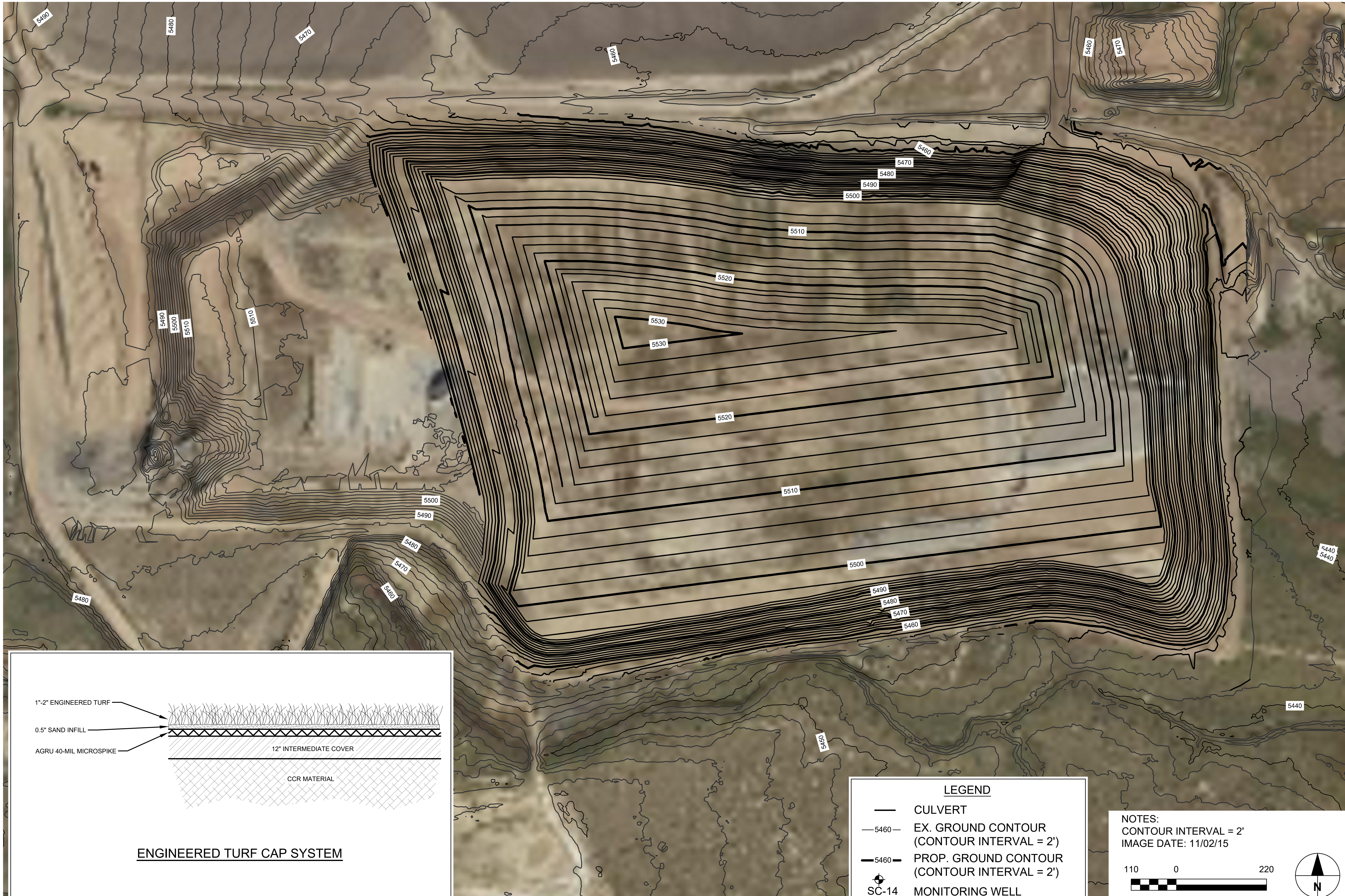
Project Management Initials: Designer:____ Checked:____ Approved:____ ANSI B 11" x 17"

AECOM

Figure: 1

SITE LOCATION MAP

CCR Landfill Post-Closure Plan
Colorado Springs Utilities Clear Spring Ranch Facility
El Paso County, Colorado
Project No.: 60729498 Date: 9/5/2024



AECOM

Figure: 2

CCR LANDFILL
ANTICIPATED POST-CLOSURE CONDITIONS

CCR Landfill Post-Closure Plan
Colorado Springs Utilities Clear Spring Ranch Facility
El Paso County, Colorado
Project No.: 60729498 Date: 9/5/2024

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Project Management Initials: Designer: Checked: Approved: ANSI B 11" x 17"

Appendix A
Web Soil Survey Information

United States Department of Agriculture

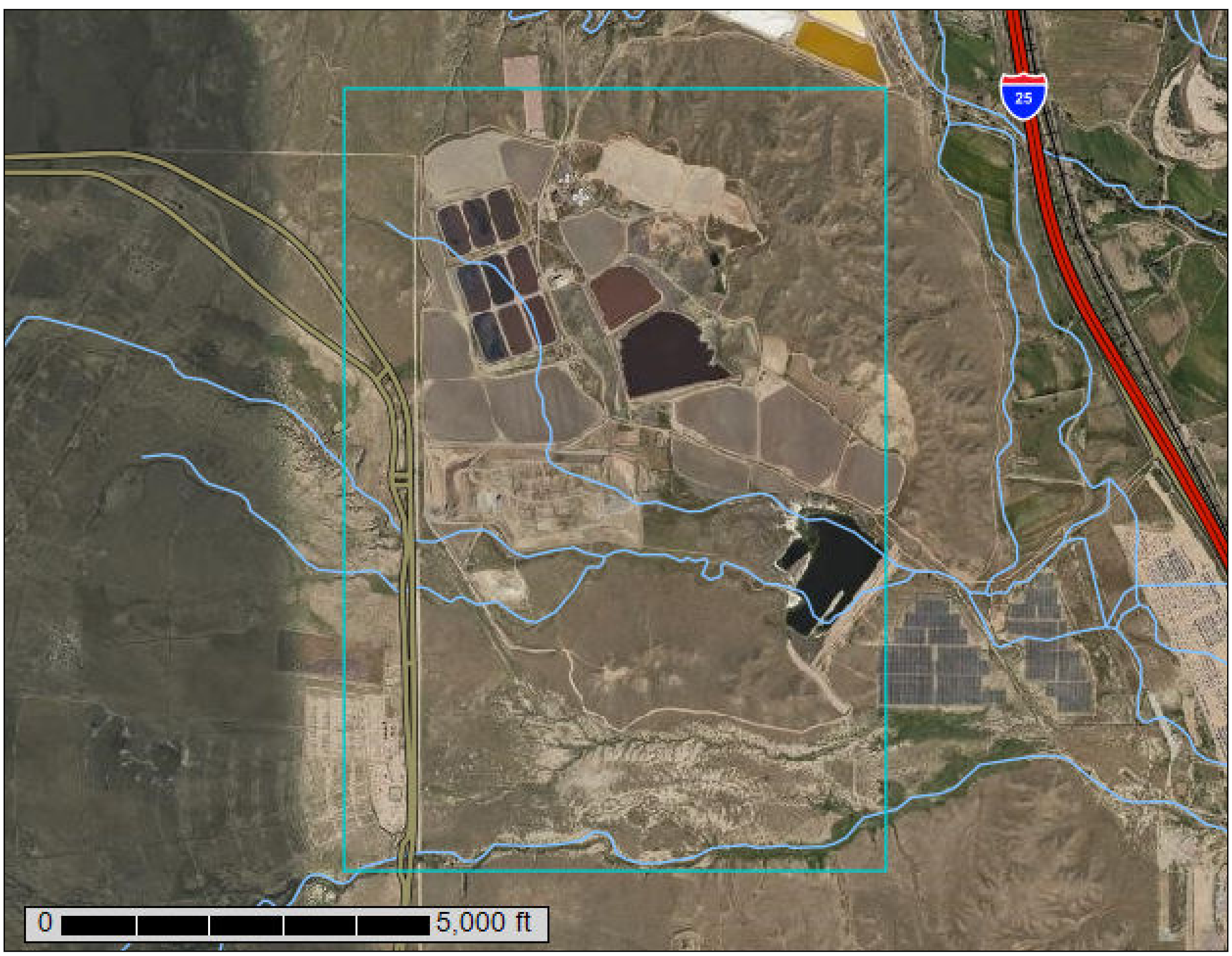
NRCS

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



August 27, 2024

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.

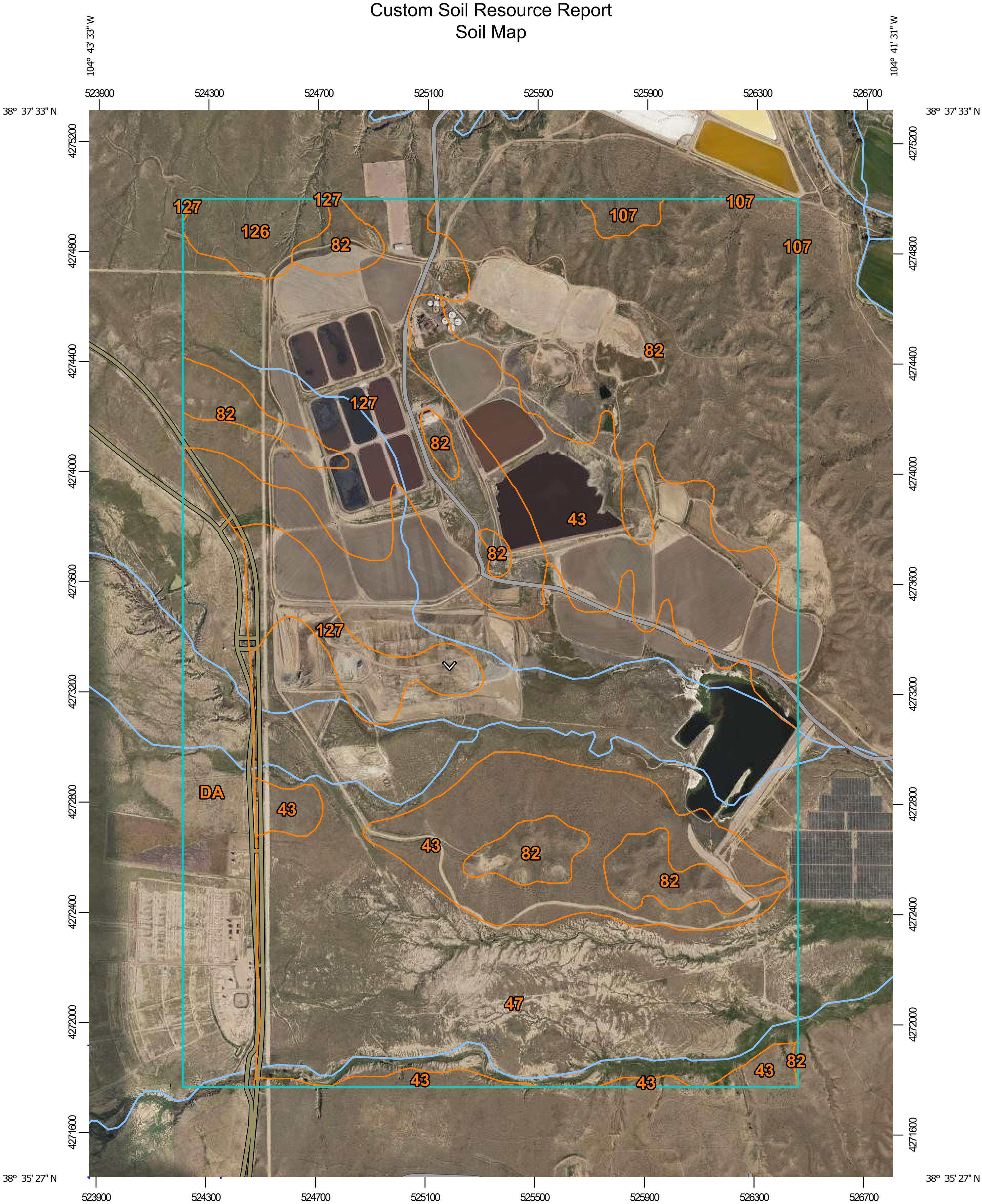
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.

Soil Map



Map Scale: 1:18,900 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 250, 500, 1000, 1500

Feet: 0, 500, 1000, 2000, 3000

N

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 1:24,000.

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 21, Aug 24, 2023

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

Date(s) aerial images were photographed: Aug 14, 2018—Oct 20, 2018

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
43	Kim loam, 1 to 8 percent slopes	297.9	16.6%
47	Limon clay, 0 to 3 percent slopes	658.4	36.7%
82	Schamber-Razor complex, 8 to 50 percent slopes	381.6	21.3%
107	Wilid silt loam, 0 to 3 percent slopes	7.8	0.4%
126	Midway clay loam, dry, 1 to 15 percent slopes	28.0	1.6%
127	Midway-Razor clay loams, dry, 1 to 18 percent slopes	285.3	15.9%
DA	Denied access	135.9	7.6%
Totals for Area of Interest		**1,795.0**	**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.

El Paso County Area, Colorado

43—Kim loam, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 368k
Elevation: 5,300 to 5,600 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Kim and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kim

Setting

Landform: Fans, hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous loamy alluvium

Typical profile

A - 0 to 6 inches: loam
C - 6 to 60 inches: loam

Properties and qualities

Slope: 1 to 8 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 (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R069XY006CO - Loamy Plains
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

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

47—Limon clay, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 368p
Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Limon, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Limon, Occasionally Flooded

Setting

Landform: Flood plains, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium derived from shale

Typical profile

A - 0 to 4 inches: clay
AC - 4 to 12 inches: silty clay
C - 12 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 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 low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R069XY033CO - Salt Flat
Hydric soil rating: No

Minor Components

Other soils

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

Pleasant

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

82—Schamber-Razor complex, 8 to 50 percent slopes

Map Unit Setting

National map unit symbol: 369y
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Schamber and similar soils: 55 percent
Razor and similar soils: 43 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schamber

Setting

Landform: Breaks
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite and/or colluvium derived from granite and/or eolian deposits derived from granite

Typical profile

A - 0 to 5 inches: gravelly loam
AC - 5 to 15 inches: very gravelly loam
C - 15 to 60 inches: very gravelly sand

Properties and qualities

Slope: 8 to 50 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): High (2.00 to 6.00 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: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R069XY064CO - Gravel Breaks
Hydric soil rating: No

Description of Razor

Setting

Landform: Breaks
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey slope alluvium over residuum weathered from shale

Typical profile

A - 0 to 3 inches: clay loam
Bw - 3 to 9 inches: clay loam
Bk - 9 to 31 inches: clay
Cr - 31 to 35 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
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: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 15.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R069XY047CO - Alkaline Plains
Other vegetative classification: ALKALINE PLAINS (069AY047CO)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

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

107—Wilid silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2qnmq
Elevation: 4,000 to 6,200 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 125 to 175 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wilid and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wilid

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess and/or eolian deposits

Typical profile

A - 0 to 6 inches: silt loam
Bt - 6 to 10 inches: silty clay loam
Btk - 10 to 30 inches: silty clay loam
Bk1 - 30 to 44 inches: silty clay loam
Bk2 - 44 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
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
Calcium carbonate, maximum content: 40 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.5 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Ecological site: R069XY006CO - Loamy Plains
Forage suitability group: Loamy (G069XW017CO)
Other vegetative classification: Loamy (G069XW017CO), Loamy Plains #6 (069XY006CO_2)
Hydric soil rating: No

Minor Components

Minnequa

Percent of map unit: 5 percent
Landform: Pediments, ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY006CO - Loamy Plains
Other vegetative classification: Loamy (G069XW017CO)
Hydric soil rating: No

Almagre

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY006CO - Loamy Plains
Other vegetative classification: Loamy (G069XW017CO), Loamy Plains #6 (069XY006CO_2)
Hydric soil rating: No

Manzanola

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: R069XY006CO - Loamy Plains
Other vegetative classification: Clayey (G069XW001CO), Loamy Plains #6 (069XY006CO_2)
Hydric soil rating: No

126—Midway clay loam, dry, 1 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t520
Elevation: 3,700 to 6,400 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Midway, dry, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Midway, Dry

Setting

Landform: Ridges, hillslopes, pediments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 3 inches: clay loam
AC - 3 to 9 inches: clay
C - 9 to 16 inches: paragravelly clay
Cr - 16 to 79 inches: bedrock

Properties and qualities

Slope: 1 to 15 percent
Depth to restrictive feature: 11 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.21 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: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 7.9 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D
Ecological site: R069XY046CO - Shaly Plains
Hydric soil rating: No

Minor Components

Razor, dry

Percent of map unit: 10 percent
Landform: Pediments, hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R069XY047CO - Alkaline Plains
Hydric soil rating: No

Manzanola

Percent of map unit: 5 percent
Landform: Fan remnants, hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY042CO - Clayey Plains
Other vegetative classification: Loamy Plains #6 (069XY006CO_2)
Hydric soil rating: No

127—Midway-Razor clay loams, dry, 1 to 18 percent slopes

Map Unit Setting

National map unit symbol: 2t52f
Elevation: 3,700 to 6,400 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Midway, dry, and similar soils: 46 percent
Razor, dry, and similar soils: 44 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Midway, Dry

Setting

Landform: Ridges, hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 3 inches: clay loam
AC - 3 to 9 inches: clay
C - 9 to 16 inches: paragravelly clay
Cr - 16 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 18 percent
Depth to restrictive feature: 11 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.21 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: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 7.9 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R069XY046CO - Shaly Plains
Hydric soil rating: No

Description of Razor, Dry

Setting

Landform: Pediments, hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium and/or residuum weathered from shale

Typical profile

A - 0 to 4 inches: clay loam
Bw - 4 to 15 inches: silty clay
Bky - 15 to 30 inches: clay
Cr - 30 to 79 inches: bedrock

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.21 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: 5 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 7.9 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R069XY047CO - Alkaline Plains
Hydric soil rating: No

Minor Components

Manzanola

Percent of map unit: 9 percent
Landform: Fan remnants, hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R069XY042CO - Clayey Plains
Other vegetative classification: Loamy Plains #6 (069XY006CO_2)
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: No

DA—Denied access

Map Unit Composition

Denied access: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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Appendix B
Post-Closure Inspection Form

CCR Landfill Post-Closure Inspection Form

Clear Spring Ranch, El Paso County, Colorado

Date of Inspection: ____________________________ Time of Inspection: ____________________

Name of Qualified Inspector: ____

Signature of Qualified Inspector: ____

Inspection Areas/Items (circle yes or no)

Vegetation	Any bare areas?	Yes	No
	Any signs of stressed vegetation?	Yes	No
Weeds	Any presence of noxious weeds?	Yes	No
	Any woody vegetation?	Yes	No
	Any other unwanted vegetation?	Yes	No
Erosion	Any rills/gullies on side slopes?	Yes	No
	Any noted erosion within drainage channels?	Yes	No
	Any noted erosion at inlets/outlets to culverts?	Yes	No
	Any noted erosion of perimeter roads?	Yes	No
	Any evidence of exposed CCR or CCR transport off-site?	Yes	No
Settlement	Any depressions or standing water?	Yes	No
	Any cracking/sliding/sloughing of slopes?	Yes	No
	Any damage to survey benchmark or settlement monuments?	Yes	No
Run-on/Run-off Controls			
	Any damage to culverts?	Yes	No
	Any obstructions of culverts or drainage channels?	Yes	No
	Any standing water within drainage channels?	Yes	No
	Any damage to sediment basin embankments/outlets/spillways?	Yes	No
Groundwater Monitoring System			
	Any damage to monitoring well pads?	Yes	No
	Any damage to monitoring well casings?	Yes	No
	Any missing, rusted, or corroded locks?	Yes	No
ClosureTurf® System			
	Any significant movement of the sand infill?	Yes	No
	Any sand migration in perimeter channel?	Yes	No
	Any water pooling present?	Yes	No

Explanation of any “Yes” answers from above:

Description of any required maintenance: