Final Drainage Report

Clearview Food Mart, Convenience Store & Gas Station Lot 1 of Clearview West Filing No. 2 4815 Yucatan Dr. Colorado Springs, CO 80911

Prepared for (Owner):
FATEH, LLC
4609 Desert Varnish Dr.
Colorado Springs CO, 80922
Contact: Karanjeet Singh

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(719) 453-0180

Project #: 196192000

PCD File No._____

Prepared: April 5, 2022

Kimley»Horn

CERTIFICATION

ENGINEERS STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal): _____

Mitchell Hess, Colorado P.E. No. 53916 Date

DEVELOPER'S STATEMENT

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

_____
Name of Developer

_____
Authorized Signature Date

_____
Printed Name

_____
Title

_____
Address:

EL PASO COUNTY

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

_____ _____
Jennifer Irvine, P.E. Date
County Engineer / ECM Administrator

Conditions:

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INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The purpose of this drainage report is to outline the drainage facilities for 4815 Yucatan Drive (the "Property") Colorado Springs, El Paso County, Colorado (the "County"). This drainage letter identifies drainage patterns and infrastructure for the Site and proposes to safely route storm water to adequate outfalls. The Property is 1.028 acres in size.

The Property is located in an unstudied drainage basin and is tributary to the Little Johnson Drainage Basin. The Site is discussed in the *Little Johnson/Security Creek Drainage Basin Planning Study*, dated April 1988 and prepared by Simons, LI & Associates, Inc. ("DBPS").

GENERAL PROJECT DESCRIPTION

The project improvements consist of minor on-site improvements, including the addition of two underground gas tanks and associated pumps and canopies as well as construction of some curb and gutter at the edge of the parking lot on the southwest side of the Site. The Project will be processed through El Paso County.

The Project is located in a portion of the west 1/2 of Section 1, Township 15 south, Range 66 west of the 6th P.M., County of El Paso, State of Colorado (see Vicinity Map in Appendix A). More specifically, the site is located at 4815 Yucatan Drive, Colorado Springs, CO. The Property is bounded by Hancock Expressway to the west, Yucatan Drive to the north, and privately owned vacant commercial lots to the south and east. The Property currently consists of a single building (convenience store) and associated surface parking. The site is accessed via Yucatan Drive via a private driveway. Stormwater will ultimately outfall to the Little Johnson Reservoir after surface flowing onto the surrounding landscape perimeter areas and then discharging to the right-of-way where any excess runoff is collected within public storm drain inlets.

Survey data gathered from contours provided with the Clearview Market Site Development Plan (County File No. AL-09-002) along with references from the 2011 NAVD88 Contours (CSU GIS Utility Mapping) are the basis for design for the drainage improvements.

PROJECT CHARACTERISTICS

The Project Site is 1.028 acres (44,800 SF) in size. The Project involves the construction of 2 underground gasoline tanks with associated gas pumps and canopies. The proposed impervious area will decrease relative to existing conditions due to the addition of rooftops over existing paved areas. The existing building is a convenience store. As reported by the owner, the property was previously a gas station. Historical aerials as well as state underground tank records indicate that the gas station use at the site was in place until as recent as 2006. The proposed redevelopment at this site would reinstate the gas station use at this property.

The existing Project Site generally slopes from northeast to southwest at grades of approximately 1–2%. The proposed drainage patterns will be nearly identical to the existing conditions. The Site consists of a single convenience store and surface parking. The Site does not have any existing stormwater infrastructure, with rainfall surface draining off the Site.

DRAINAGE BASIN PLANNING STUDY INFRASTRUCTURE AND ANALYSIS

The Project Site is contained within the Little Johnson Drainage Basin and is discussed within the DBPS. According to the DBPS, "This basin shall utilize a regional detention pond system in conjunction with storm sewers and open channels, including an independent outfall to Fountain Creek".

SOILS CONDITIONS

NRCS soil data is available for this Site and it has been noted that onsite soils are primarily Truckton Sandy Loam (USGS Type A). The NRSC Soils map and report has been provided in Appendix B.

DRAINAGE DESIGN CRITERIA

REGULATIONS

The proposed development does not propose any deviations from The City of Colorado Springs/El Paso County Drainage Criteria Manual, dated October 12, 1994 or any subsequent revisions.

DEVELOPMENT DESIGN CRITERIA REFERENCE AND CONSTRAINTS

The FEMA Flood Insurance Rate Map (FIRM) map included in Appendix B (Map Number 08041C0763G, dated 12/7/2018) shows the Site to be located outside of the 100-year flood plain. The proposed private storm facilities follow The City of Colorado Springs/El Paso County Drainage Criteria Manual (the "CRITERIA"), El Paso County Engineering Criteria Manual (the "ECM), and the Urban Storm Drainage Criteria Manual (the "MANUAL"). Site drainage is impacted by constraints of existing development. The proposed Project is a minor redevelopment of an existing convenience store. Further detail regarding onsite drainage patterns has been provided in the Proposed Drainage Conditions Section.

HYDROLOGIC CRITERIA

The 5-year and 100-year design storm events were used in determining rainfall and runoff for the proposed drainage system per Chapter 6 of the CRITERIA. Table 6-2 of the CRITERIA is the source for rainfall data for the 5-year and 100-year design storm events. Design runoff was calculated using the Rational Method for developed conditions as established in the CRITERIA and MANUAL. Runoff coefficients for the proposed development were determined using Table 6-6 of the CRITERIA by calculating weighted impervious values for each specific site sub-basin.

HYDRAULIC CRITERIA

No proposed flows for the site are routed through drainage swales and/or underground storm drain pipes. As such, no hydraulic analysis has been completed for the proposed redevelopment.

VARIANCES FROM CRITERIA

No variances from the Criteria have been identified for the proposed redevelopment.

EXISTING DRAINAGE CONDITIONS

EXISTING DRAINAGE BASIN

The existing property contains 2 sub-basins.

Sub-Basin E1 is located on the northwest portion of the property, includes the building roof, an asphalt parking lot and drive aisles and landscape areas, is 0.63 acres in size, and has a basin impervious value of 83.3% and 5-year and 100-year storm event direct runoff values of 1.94 and 3.66 cubic feet per second (cfs) respectively. Stormwater runoff flows within Sub-Basin E1 generally flow west and southwest to landscape areas before discharging into the Hancock Expressway ROW.

Sub-Basin E2 is located on the southeast portion of the property, includes asphalt drive aisles and landscape areas, is 0.40 acres in size, and has a basin impervious value of 57.4% and 5-year and 100-year storm event direct runoff values of 0.95 and 2.03 cfs respectively. Stormwater runoff flows within Sub-Basin E2 generally flow south and southeast to landscape areas before discharging to the property south of the site.

PROPOSED DRAINAGE CONDITIONS

The proposed development also contains 2 sub-basins.

Sub-basin P1 is identical in shape and size to Sub-Basin E1, but includes the proposed gas dispenser canopies which will cover existing asphalt paved areas. The impervious value of this sub-basin is 82.6% and the 5-year and 100-year storm event direct runoff values with the sub-basin are proposed to be 1.89 and 3.58 cfs respectively. Stormwater runoff within Sub-Basin P1 will continue to follow its historical path.

Sub-basin P2 is also identical in size to Sub-Basin E2. The impervious value of this sub-basin is 57.4% and the 5-year and 100-year storm event direct runoff values with the sub-basin are proposed to be 0.95 and 2.03 cfs respectively. Stormwater runoff within Sub-Basin P2 will continue to follow its historical path.

The proposed development keeps the same basin delineation as the existing conditions. Under proposed conditions, the addition of the canopy roof areas in Sub-Basin P1 above the gas dispensers creates a less impervious surface and extends the time of concentration. The peak runoff from the site ends up remaining the same or being slightly reduced in both the 5 and 100-year storm events. No additional stormwater infrastructure is proposed, other than the canopy roof drains, which will outfall onto the existing parking lot surface. The proposed site changes will not affect the existing drainage patterns in Sub-Basin P2.

The proposed development will have a weighted I Factor of 72.7% (reduced from 73.2% under existing conditions) and 5-year and 100-year C Factors of 0.70 and 0.78 (compared to existing values of 0.71 and 0.79), respectively. Because the actual weighted I Factor and 5-year and 100-year C Factors are less than or equal to existing conditions, the proposed renovation of the lot conforms to all drainage requirements.

CONFORMANCE WITH THE DBPS

The proposed Project complies with the DBPS. As stated within the DBPS, "The concept of detention and retention of stormflows has been limited to the development of regional ponds. Regional ponds have been defined as ponds receiving stormwater from more than one subdivision. On-site detention/retention has been specifically ruled out as a future stormwater management alternative, excepting those individual ponds which may serve as an interim facility, prior to the construction of downstream facilities".

EMERGENCY OVERFLOW ROUTING

All overflow routing will be directed to the existing landscape areas. Excess runoff within the landscape areas will continue to follow historic flow patterns and drain west into Hancock Expressway or south into vacant land. This flow path matches the historical stormwater runoff path.

HYDRAULIC ANALYSIS METHODOLOGY

The proposed drainage facilities were designed in accordance with the CRITERIA and MANUAL. Floodplain identification was determined using a custom FIRMette map by FEMA and information provided in the CRITERIA. No underground storm drain pipes are proposed for the development. There are no proposed variances from the City of Colorado Springs/El Paso County Criteria for the proposed development.

No inlets have been proposed as part of the Project.

Four-Step Process

The Site was designed in accordance with the four-step process to minimize adverse impacts of urbanization, as outlined in Section I.7.2 BMP Selection of the CRITERIA. The four-step process per the CRITERIA provides guidance and requirements for the selection of siting of structural Best Management Practices (BMPs) for new development and significant redevelopment.

Step 1: Employ Runoff Reduction Practices
Both the existing and proposed conditions for the site employ runoff reduction methods. The methods used include directing stormwater runoff flows to landscaped areas, grass buffers, where the runoff can infiltrate into the ground. The proposed redevelopment of the site was designed to conserve as much of the existing vegetation as possible and to minimize the extent of paved areas. Additionally, the site was designed to eliminate underground storm drains, which promotes stormwater infiltration and reduces stormwater runoff.

As shown within the Runoff Reduction Exhibit and Calculations included in the appendix, the proposed development green infrastructure practices reduce the water quality control volume by 90%.

Step 2: Stabilize Drainageways
There are no known drainageways in the immediate vicinity of the site. The project does promote green infrastructure or runoff reduction practices though, which allows more stormwater to infiltrate into the ground. These practices ultimately reduce the amount of stormwater runoff flows within downstream drainageways, which helps keep drainageways stabilized.

Step 3: Provide Water Quality Capture Volume (WQCV)
As noted in step 1, the existing and proposed development employ runoff reduction practices which result in a WQCV reduction of 90%. As such, the runoff reduction methods, which consist of landscape areas and grass buffers, satisfy the requirements of step 3.

Furthermore, Part I.E.4.a of the County's MS4 Permit allows for the runoff reduction standard to satisfy the control measure requirements. To meet this standard, a WQCV reduction of 60% is required. With a 90% WQCV reduction, the runoff reduction standards are meet for the development.

Step 4: Consider Need for Industrial and Commercial BMPs
The proposed Project consists of redeveloping an existing convenience store back into a gas station. Gas Stations are regulated at the federal, state and local levels to reduce pollution from petroleum products. Spill Prevention, Control and Countermeasure (SPCC) Plans are often required by the EPA which assist in planning for and preventing petroleum discharges that could reach water bodies. Additionally, specific federal and state regulations for underground storage tanks (USTS), specify minimum requirements related to the design, installation, operation, maintenance and monitoring of UTSs. By following federal, state and local regulations related to gas stations and underground storage tanks, best management practices for the proposed development will be in place and will help reduce the risk of petroleum releases into drainageways and stormwater systems.

DETENTION AND WATER QUALITY REQUIREMENTS

As discussed in the *Proposed Drainage Conditions* Section, the overall imperviousness of the site is being decreased and the stormwater runoff amounts for the major and minor storm events are less than or equal to the existing stormwater runoff amounts. Because of this, detention facilities are required or needed for the proposed development.

The water quality requirements for the site are being met by Option C of Part I.E.4.a.iv of the County's MS4 Permit, the *Runoff Reduction Standard*. Additionally, a grass buffer control measure will be employed at the site. All of the stormwater runoff that will pass by the proposed gas tanks and dispensers will be routed to the existing grass buffer area. As recommend by the Mile High Flood District, the grass buffers are a minimum of 14-ft wide. A drainage easement will be dedicated over the grass buffer area to ensure that the grass buffer control measure stays in place to provide water quality treatment for the site.

Other Water Quality BMPs were evaluated for the site such as porous pavement detention, porous landscape detention, extended detention basins, sand filter extended detention basins, constructed wetland basins and retention ponds. Based on the small size of the site and limited size of impervious areas, the desire to reduce stormwater runoff through infiltration, the existing established landscape areas and grass buffers, and the desire to reduce additional disturbance to the site and reduce erosion, the grass buffer control measure was chosen for this development.

EROSION CONTROL PLAN

Erosion Control Plans will be submitted separately as a standalone construction document.

FLOODPLAIN STATEMENT

The FEMA Flood Insurance Rate Map (FIRM) map included in Appendix B (Map Number

08041C0763G, dated 12/7/2018) shows the Site to be located outside of the 100-year flood plain.

FEES DEVELOPMENT

APPLICABLE FEES

The site was previously platted as Lot 1 of Clearview West Filing Number 2. As Drainage and Bridge Fees are required to be paid at the time of Final Plat recording and the site has already been platted, no fees should be due at this time.

CONSTRUCTION COST OPINION

An opinion of probable construction cost for the construction of the private drainage facilities for the Project has been included in Appendix E. There are no public drainage ponds proposed as part of the Project.

MAINTENANCE AND OPERATIONS

Detention BMP's are not proposed as part of the development. The grass buffers, which will provide water quality treatment will require annual inspections and maintenance.

Grass buffer vegetation should be inspected at least twice annually for uniform cover and any traffic impacts (if applicable). The grass buffer area should also be inspected to identify if any sediment has accumulated and if any rill and gullies have developed.

Maintenance of the grass buffer area should include litter, debris and trash removal, annual aeration (2" holes, no more than 4" apart) when the ground is not frozen and when conditions are not extremely hot and dry, and mowing when grasses reach heights above 6". Finally, as recommended by the Criteria, grass buffers should be fertilized by using the "…minimum amount of biodegradable nontoxic fertilizer and herbicides needed to establish and maintain dense vegetation cover that is reasonably free of weeds".

GROUNDWATER CONSIDERATIONS

Groundwater depths are currently unknown for the site. Underground storage tanks for gasoline have previously been permitted through the Colorado Department of Public Health and Environment. It is anticipated that groundwater levels are deep enough to allow new underground storage tanks to be installed at this development.

SUMMARY

COMPLIANCE WITH STANDARDS

The drainage design presented within this report for the Clearview Food Mart, Convenience Store & Gas Station Development conforms to the City of Colorado Springs/El Paso County Storm Drainage Criteria and the Urban Drainage and Flood Control District Manual. Additionally, the Site runoff and private storm sewer facilities will not adversely affect the downstream and surrounding developments or waterways. This report and its findings are consistent with the drainage requirements documented in the DBPS.

REFERENCES

1. The City of Colorado Springs Drainage Criteria Manual, May 2014, Revised December 2020 and January 2021.

2. El Paso County Drainage Criteria Manual, Vol. 1 and 2, October 1994

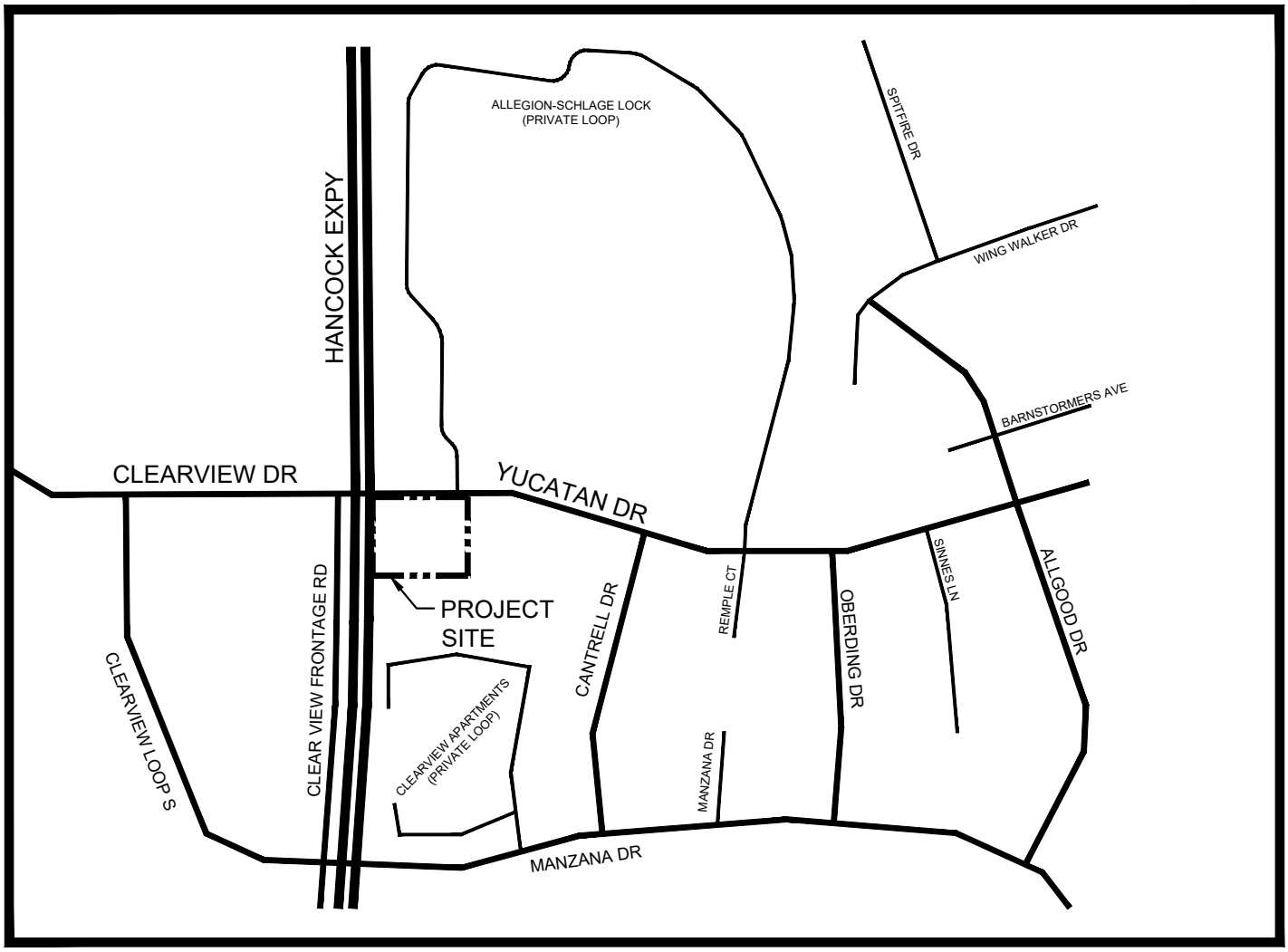
3. Urban Drainage and Flood Control District Drainage Criteria Manual (UDFCDCM), Vol. 1, prepared by Wright-McLaughlin Engineers, June 2001, with latest revisions.

4. Flood Insurance Rate Map, El Paso County, Colorado and Incorporated Areas, Map Number 08041C0763G, Effective Date December 7, 2018, prepared by the Federal Emergency Management Agency (FEMA).

5. Little Johnson/Security Creek Drainage Basin Planning Study. Prepared by Simons, LI & Associates, April 1988.

APPENDIX

APPENDIX A - VICINITY MAP



VICINITY MAP
CLEARVIEW FOOD MART C-STORE & GAS STATION

4815 YUCATAN DR.
COLORADO SPRINGS, CO 80911

11/16/2021

© 2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 N NEVADA AVE, SUITE 300, COLORADO SPRINGS, CO 80903
PHONE: 719-453-0180

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APPENDIX B - SOILS MAP AND REPORT AND FEMA FIRM PANEL

United States Department of Agriculture

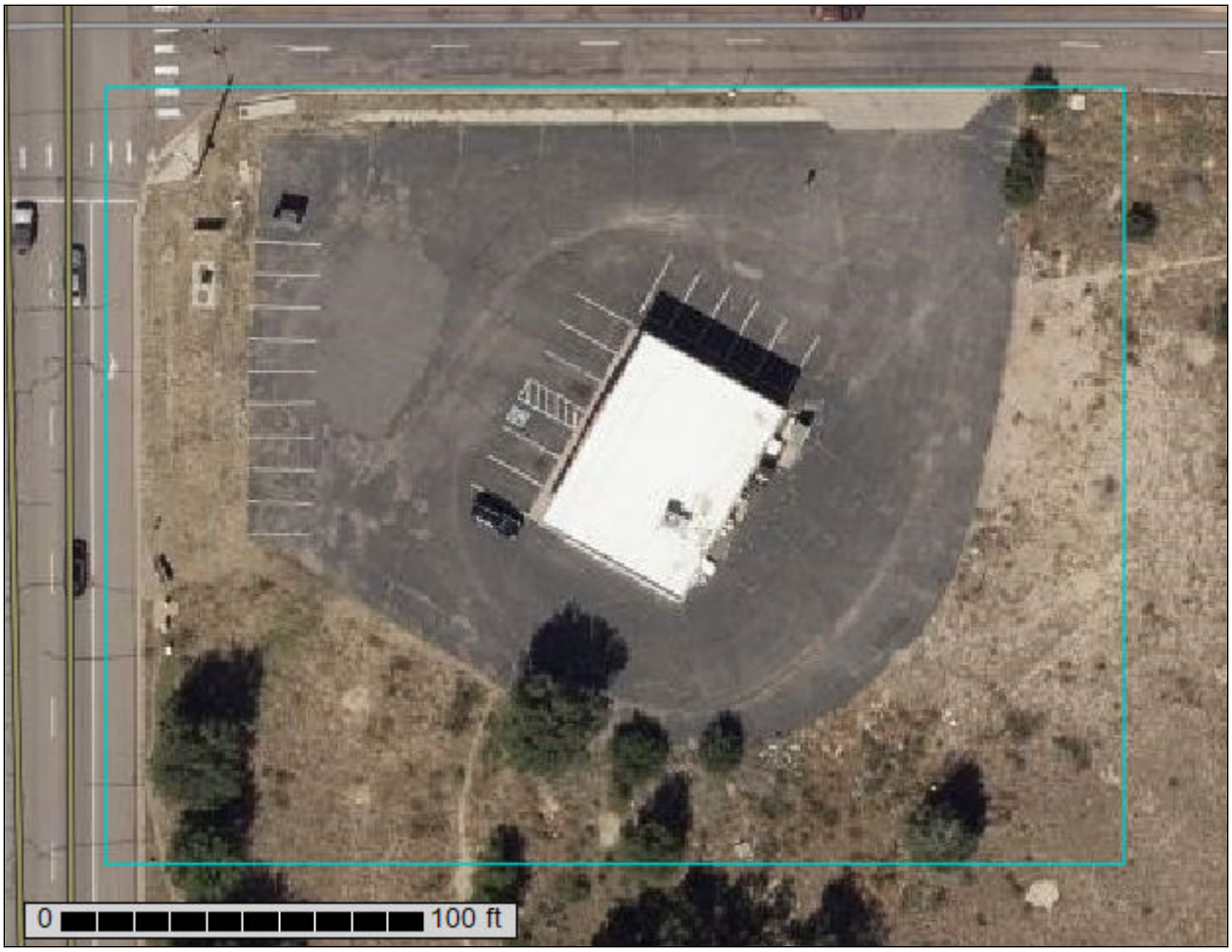
Natural Resources Conservation Service

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

Yucatan Drive



February 8, 2022

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

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Contents

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 LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, 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: Aug 19, 2018—Sep 23, 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
8	Blakeland loamy sand, 1 to 9 percent slopes	0.0	0.1%
96	Truckton sandy loam, 0 to 3 percent slopes	1.4	99.9%
Totals for Area of Interest		**1.4**	**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

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Blakeland

Setting

Landform: Hills, flats
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
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

96—Truckton sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2yvrd
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 14 to 23 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 90 to 155 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

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

Description of Truckton

Setting

Landform: Interfluves, fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind re-worked alluvium derived from arkose

Typical profile

A - 0 to 4 inches: sandy loam
Bt1 - 4 to 12 inches: sandy loam
Bt2 - 12 to 19 inches: sandy loam
C - 19 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 5 percent
Landform: Interfluves, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Bresser

Percent of map unit: 5 percent
Landform: Interfluves, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Pleasant, frequently ponded

Percent of map unit: 2 percent
Landform: Closed depressions
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Upland Depression
Hydric soil rating: Yes

Urban land

Percent of map unit: 2 percent
Hydric soil rating: No

Ellicott, occasionally flooded

Percent of map unit: 1 percent
Landform: Flood plains, drainageways
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R067BY031CO - Sandy Bottomland
Hydric soil rating: No

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.

Map—K Factor, Whole Soil

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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, 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: Aug 19, 2018—Sep 23, 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.

Table—K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	.10	0.0	0.1%
96	Truckton sandy loam, 0 to 3 percent slopes	.28	1.4	99.9%
Totals for Area of Interest			**1.4**	**100.0%**

Rating Options—K Factor, Whole Soil

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

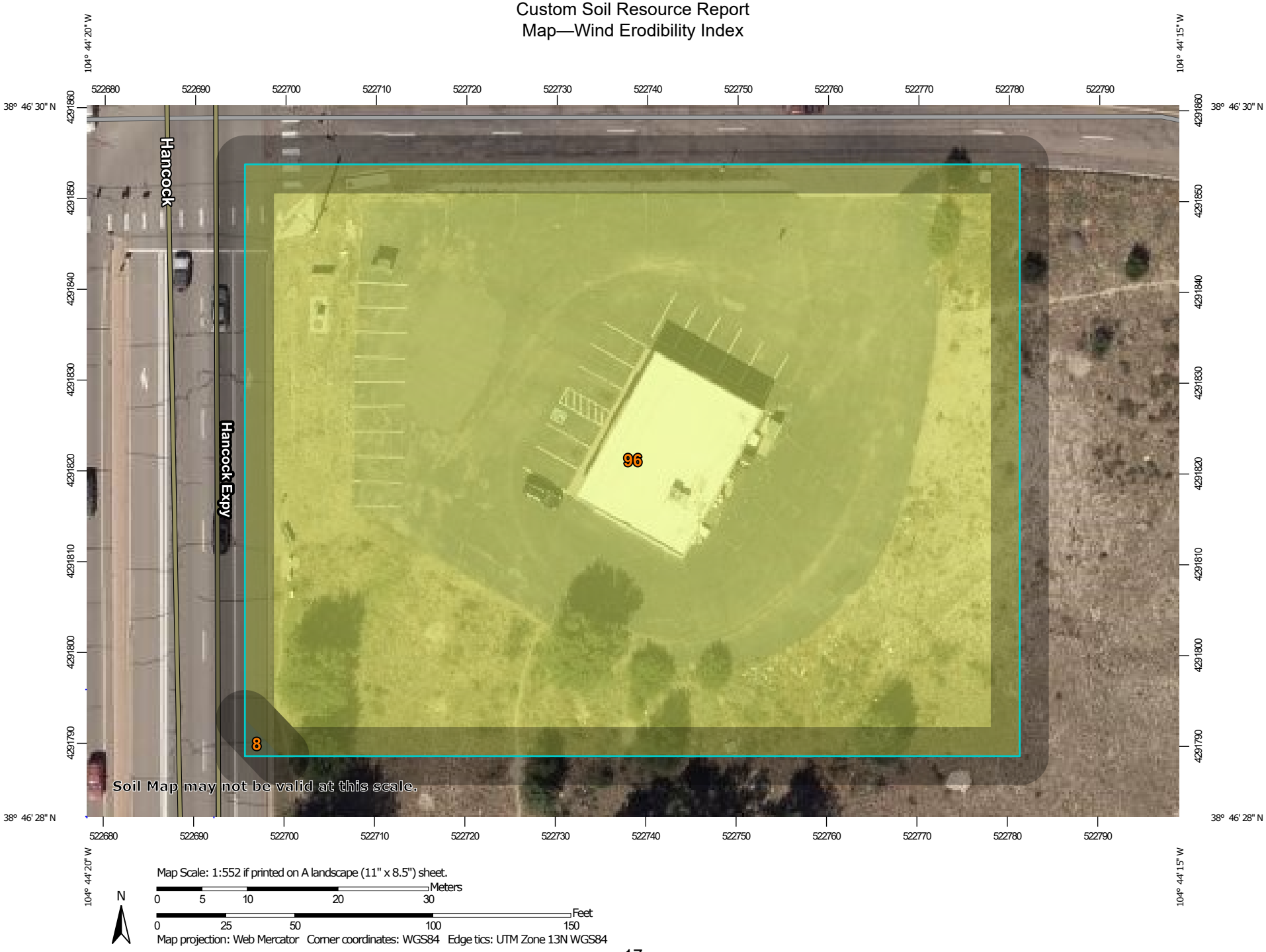
Tie-break Rule: Higher

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

Wind Erodibility Index

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Map—Wind Erodibility Index



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0

38

48

56

86

134

160

180

220

250

310

Not rated or not available

Soil Rating Lines

0

38

48

56

86

134

160

180

220

250

310

Not rated or not available

Soil Rating Points

0

38

48

56

86

134

160

180

220

250

310

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 1:24,000.

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

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

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

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

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

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Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, 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: Aug 19, 2018—Sep 23, 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.

Table—Wind Erodibility Index

Map unit symbol	Map unit name	Rating (tons per acre per year)	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	134	0.0	0.1%
96	Truckton sandy loam, 0 to 3 percent slopes	86	1.4	99.9%
Totals for Area of Interest			**1.4**	**100.0%**

Rating Options—Wind Erodibility Index

Units of Measure: tons per acre per year

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained

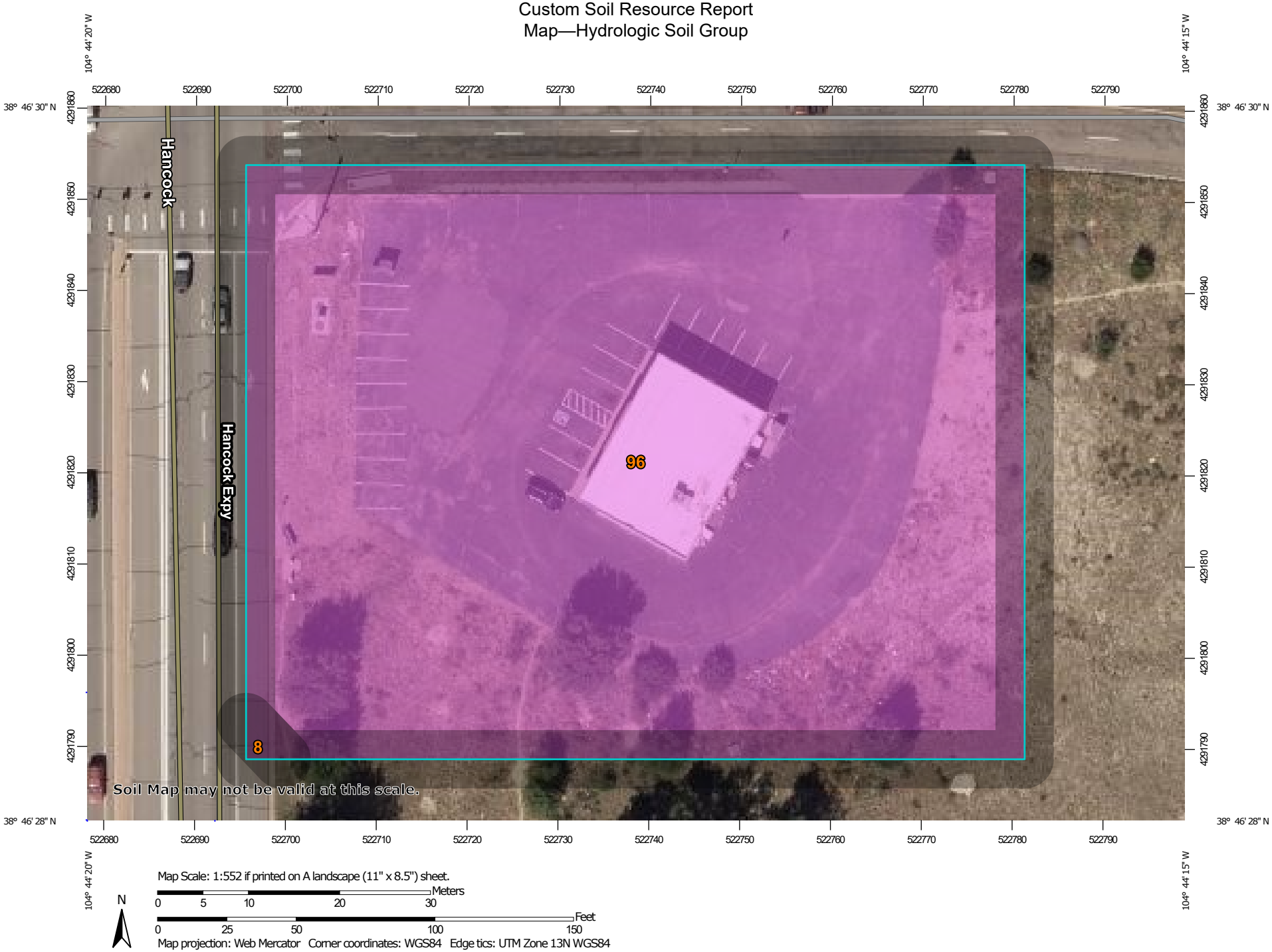
soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- 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 1:24,000.

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

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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 19, 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: Aug 19, 2018—Sep 23, 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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	0.0	0.1%
96	Truckton sandy loam, 0 to 3 percent slopes	A	1.4	99.9%
Totals for Area of Interest			**1.4**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

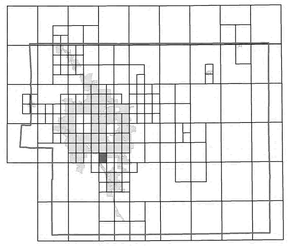
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

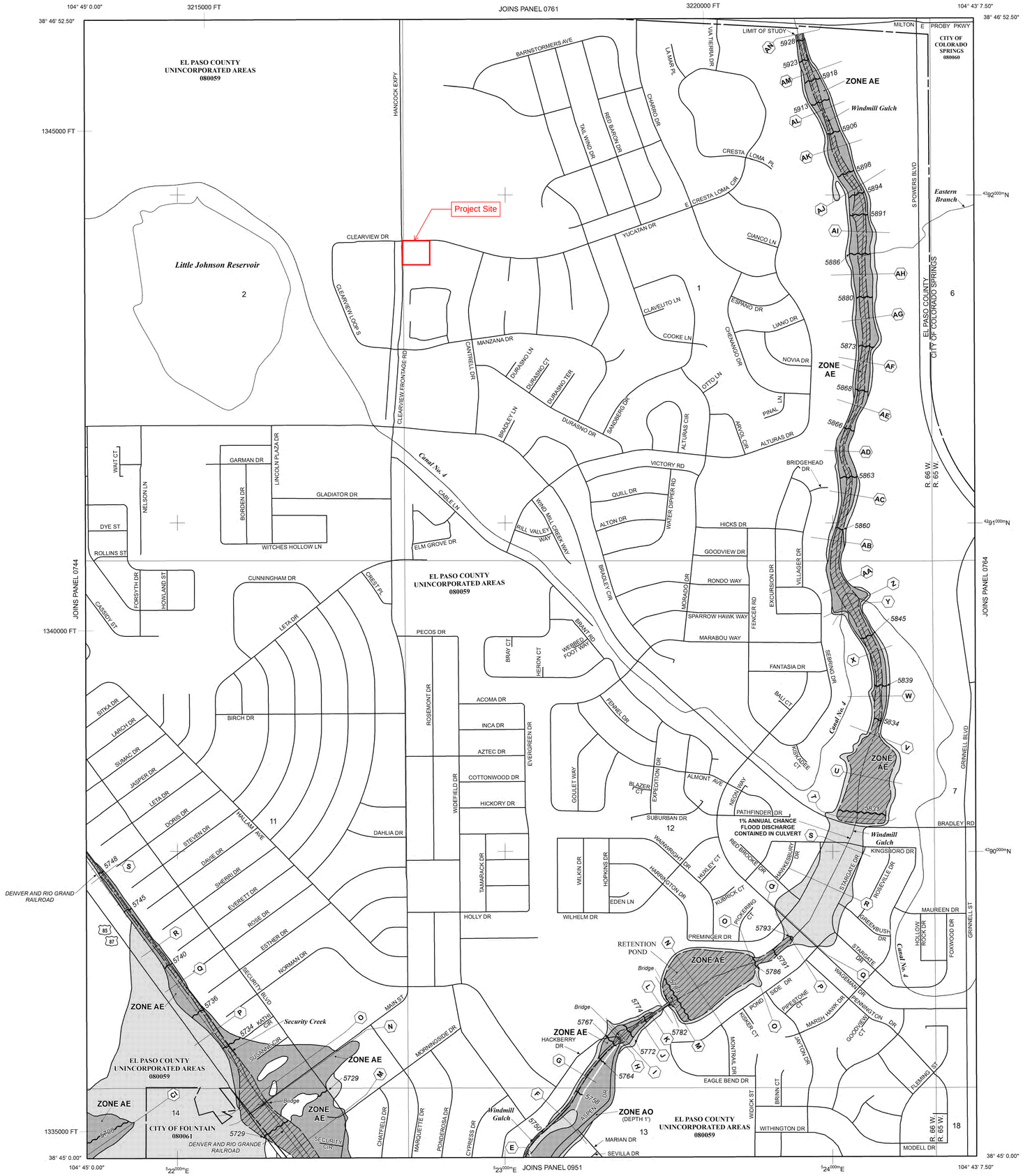
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 15 SOUTH, RANGE 65 WEST, AND TOWNSHIP 15 SOUTH, RANGE 66 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
^{4275000m}N	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0763G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 763 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0763	G
EL PASO COUNTY	080059	0763	G
FOUNTAIN, CITY OF	080061	0763	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
08041C0763G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX C - HYDROLOGIC CALCULATIONS

Onsite Existing Weighted Imperviousness Calculations

SUB-BASIN	AREA (SF)	AREA (Acres)	ROOF AREA	ROOF IMPERVIOUSNESS	ROOF C2	ROOF C5	ROOF C10	ROOF C100	LANDSCAPE AREA	LANDSCAPE IMPERVIOUSNESS	LANDSCAPE C2	LANDSCAPE C5	LANDSCAPE C10	LANDSCAPE C100	PAVEMENT AREA	PAVEMENT IMPERVIOUSNESS	PAVEMENT C2	PAVEMENT C5	PAVEMENT C10	PAVEMENT C100	WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS C2	WEIGHTED COEFFICIENTS C5	WEIGHTED COEFFICIENTS C10	WEIGHTED COEFFICIENTS C100
E1	27,265	0.63	2,700	90%	0.71	0.73	0.75	0.81	4,281	0%	0.02	0.08	0.15	0.35	20,284	100%	0.89	0.90	0.92	0.96	83.3%	0.74	0.75	0.78	0.85
E2	17,537	0.40	0	90%	0.71	0.73	0.75	0.81	7,466	0%	0.02	0.08	0.15	0.35	10,071	100%	0.89	0.90	0.92	0.96	57.4%	0.52	0.55	0.59	0.70
TOTAL	44,802	1.03	2,700	90%	0.71	0.73	0.75	0.81	11,747	0%	0.02	0.08	0.15	0.35	30,355	100%	0.89	0.90	0.92	0.96	73.2%	0.65	0.67	0.71	0.79

Onsite Proposed Weighted Imperviousness Calculations

SUB-BASIN	AREA (SF)	AREA (Acres)	ROOF AREA	ROOF IMPERVIOUSNESS	ROOF C2	ROOF C5	ROOF C10	ROOF C100	LANDSCAPE AREA	LANDSCAPE IMPERVIOUSNESS	LANDSCAPE C2	LANDSCAPE C5	LANDSCAPE C10	LANDSCAPE C100	PAVEMENT AREA	PAVEMENT IMPERVIOUSNESS	PAVEMENT C2	PAVEMENT C5	PAVEMENT C10	PAVEMENT C100	WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS C2	WEIGHTED COEFFICIENTS C5	WEIGHTED COEFFICIENTS C10	WEIGHTED COEFFICIENTS C100
P1	27,265	0.63	4,648	90%	0.71	0.73	0.75	0.81	4,281	0%	0.02	0.08	0.15	0.35	18,336	100%	0.89	0.90	0.92	0.96	82.6%	0.72	0.74	0.77	0.84
P2	17,537	0.40	0	90%	0.71	0.73	0.75	0.81	7,466	0%	0.02	0.08	0.15	0.35	10,071	100%	0.89	0.90	0.92	0.96	57.4%	0.52	0.55	0.59	0.70
TOTAL	44,802	1.03	4,648	90%	0.71	0.73	0.75	0.81	11,747	0%	0.02	0.08	0.15	0.35	28,407	100%	0.89	0.90	0.92	0.96	72.7%	0.64	0.67	0.70	0.78

Yucatan C-Store - Drainage Conformance Letter
Runoff Calculations
Time of Concentration

Watercourse Coefficient					
Forest & Meadow	2.50	Short Grass Pasture & Lawns	7.00	Grassed Waterway	15.00
Fallow or Cultivation	5.00	Nearly Bare Ground	10.00	Paved Area & Shallow Gutter	20.00

	SUB-BASIN DATA				INITIAL / OVERLAND TIME			TRAVEL TIME T(t)					T(c) CHECK (URBANIZED BASINS)			FINAL T(c)
DESIGN POINT	DRAIN BASIN	AREA sq. ft.	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	min.
1	E1	27,265	0.63	0.75	278	1.5%	9.2	50	1.5%	7.00	0.9	1.0	10.2	328	11.8	10.2
2	E2	17,537	0.40	0.55	88	2.1%	7.4	100	2.1%	7.00	1.0	1.6	9.0	188	11.0	9.0
1	P1	27,265	0.63	0.74	278	1.5%	9.5	50	1.5%	7.00	0.9	1.0	10.5	328	11.8	10.5
2	P2	17,537	0.40	0.55	88	2.1%	7.4	100	2.1%	7.00	1.0	1.6	9.0	188	11.0	9.0

Yucatan C-Store - Drainage Conformance Letter
Runoff Calculations ***Design Storm*** ***5 Year***
(Rational Method Procedure)

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA (ac)	RUNOFF COEFF	T(c) in/hr	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
1	E1	0.63	0.75	10.2	0.47	4.10	1.94	11.3	0.45	3.95	1.78	
2	E2	0.40	0.55	9.0	0.22	4.28	0.95	9.0	0.21	4.20	0.88	
1	P1	0.63	0.74	10.5	0.46	4.06	1.89	10.5	0.46	3.91	1.82	
2	P2	0.40	0.55	9.0	0.22	4.28	0.95	9.0	0.22	4.20	0.93	

Yucatan C-Store - Drainage Conformance Letter
Runoff Calculations ***Design Storm*** ***100 Year***
(Rational Method Procedure)

BASIN INFORMATION				DIRECT RUNOFF				CUMMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
1	E1	0.63	0.85	10.2	0.53	6.89	3.66	9.0	0.51	7.09	3.61	
2	E2	0.40	0.70	9.0	0.28	7.19	2.03	9.0	0.28	7.09	2.00	
1	P1	0.63	0.84	10.5	0.52	6.82	3.58	10.5	0.52	6.69	3.51	
2	P2	0.40	0.70	9.0	0.28	7.19	2.03	9.0	0.28	7.09	2.00	

SUMMARY - RUNOFF TABLE

DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)	CUMULATIVE 5-YR RUNOFF (CFS)	CUMULATIVE 100-YR RUNOFF (CFS)
1	E1	0.63	1.94	3.66	1.94	3.66
2	E2	0.40	0.95	2.03	0.95	2.03
1	P1	0.63	1.89	3.58	1.89	3.58
2	P2	0.40	0.95	2.03	0.95	2.03

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer:	0
Company:	**Kimley-Horn**
Date:	**March 15, 2022**
Project:	**Clearview Convenience Store**
Location:	**4815 Yucatan Drive, Colorado Springs, CO**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth	0.60	inches
Depth of Average Runoff Producing Storm, d_6 =	0.43	inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA	UIA:RPA	DCIA	SPA	SPA						
Area ID	1	2	3	4	5	6						
Downstream Design Point ID	1	2	3	4	5	6						
Downstream BMP Type	None	None	None	None	None	None						
DCIA (ft^2)	--	--	--	1,425	--	--						
UIA (ft^2)	18,326	12,335	1,425	--	--	--						
RPA (ft^2)	3,769	3,753	1,064	--	--	--						
SPA (ft^2)	--	--	--	--	2,767	682						
HSG A (%)	100%	100%	100%	--	100%	100%						
HSG B (%)	0%	0%	0%	--	0%	0%						
HSG C/D (%)	0%	0%	0%	--	0%	0%						
Average Slope of RPA (ft/ft)	0.020	0.005	0.005	--	--	--						
UIA:RPA Interface Width (ft)	153.00	164.00	104.00	--	--	--						

CALCULATED RUNOFF RESULTS

Area ID	1	2	3	4	5	6						
UIA:RPA Area (ft^2)	22,095	16,088	2,489	--	--	--						
L / W Ratio	0.94	0.60	0.23	--	--	--						
UIA / Area	0.8294	0.7667	0.5725	--	--	--						
Runoff (in)	0.05	0.00	0.00	0.50	0.00	0.00						
Runoff (ft^3)	86	0	0	59	0	0						
Runoff Reduction (ft^3)	677	514	59	0	138	34						

CALCULATED WQCV RESULTS

Area ID	1	2	3	4	5	6						
WQCV (ft^3)	764	514	59	59	0	0						
WQCV Reduction (ft^3)	677	514	59	0	0	0						
WQCV Reduction (%)	89%	100%	100%	0%	0%	0%						
Untreated WQCV (ft^3)	86	0	0	59	0	0						

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

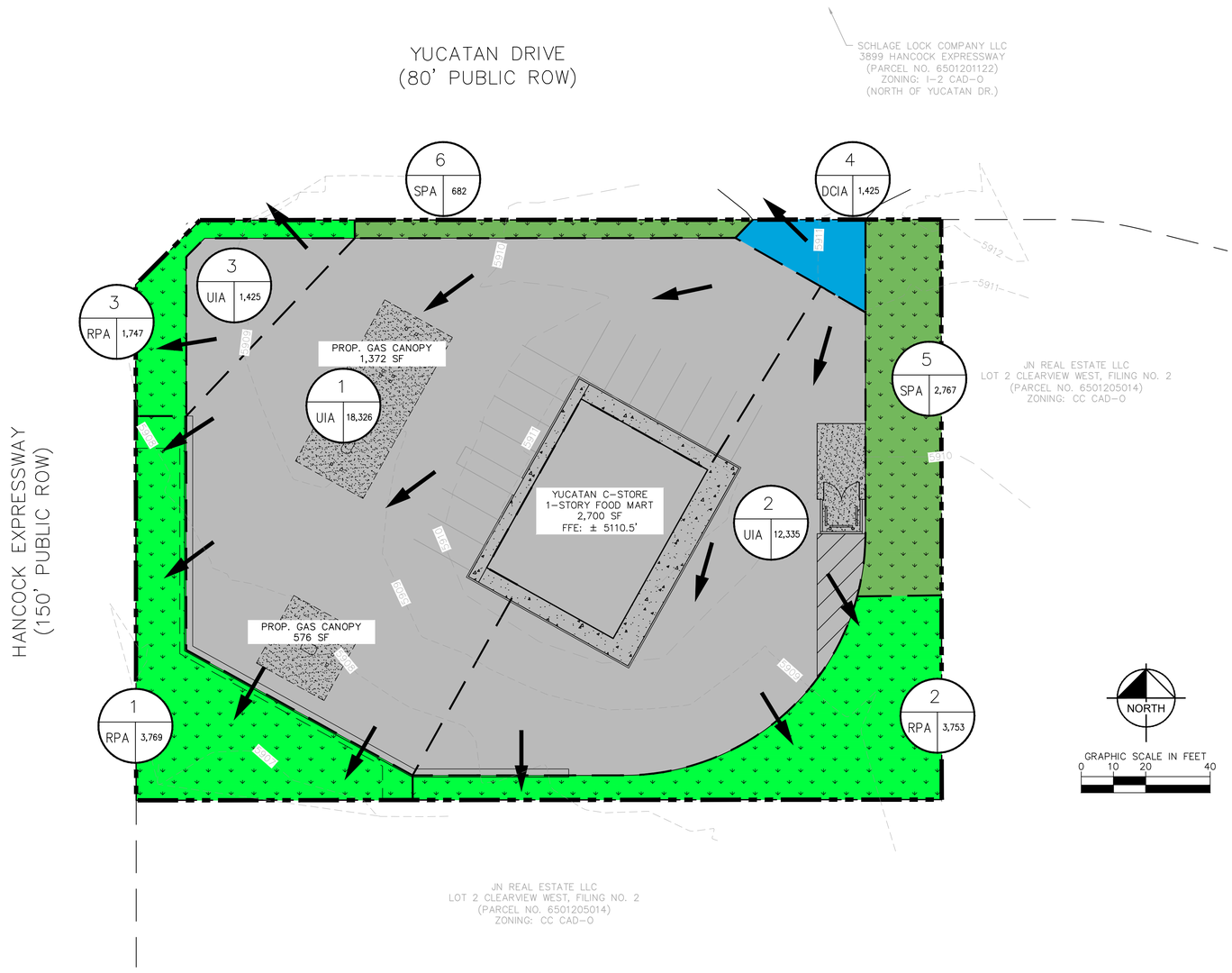
Downstream Design Point ID	1	2	3	4	5	6						
DCIA (ft^2)	0	0	0	1,425	0	0						
UIA (ft^2)	18,326	12,335	1,425	0	0	0						
RPA (ft^2)	3,769	3,753	1,064	0	0	0						
SPA (ft^2)	0	0	0	0	2,767	682						
Total Area (ft^2)	22,095	16,088	2,489	1,425	2,767	682						
Total Impervious Area (ft^2)	18,326	12,335	1,425	1,425	0	0						
WQCV (ft^3)	764	514	59	59	0	0						
WQCV Reduction (ft^3)	677	514	59	0	0	0						
WQCV Reduction (%)	89%	100%	100%	0%	0%	0%						
Untreated WQCV (ft^3)	86	0	0	59	0	0						

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	45,546
Total Impervious Area (ft^2)	33,511
WQCV (ft^3)	1,396
WQCV Reduction (ft^3)	1,251
WQCV Reduction (%)	90%
Untreated WQCV (ft^3)	146

YUCATAN CONVENIENCE STORE - 4815 YUCATAN DR.

RUNOFF REDUCTION EXHIBIT



LEGEND

- DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)
- UNCONNECTED IMPERVIOUS AREA (UIA)
- RECEIVING PERVIOUS AREA (RPA)
- SEPARATE PERVIOUS AREA (SPA)
- PROP. FLOW DIRECTION
- PROPERTY LINE
- XXXX EXISTING MAJOR CONTOUR
- XXXX EXISTING MINOR CONTOUR
- RUNOFF AREA DELINEATION LINE
- ID / TYPE / SF

YUCATAN C-STORE
RUNOFF REDUCTION MAP
04/07/2022

Kimley»Horn

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2 N NEVADA AVE., SUITE 300, COLORADO SPRINGS, 80903
PHONE: 719-453-0180

APPENDIX D - EOPCC

Kimley»Horn

Kimley-Horn & Associates, Inc. **Opinion of Probable Construction Cost**

Client:	**BBKern Designs**	**Date:**	**3/19/2022**
Project:	**Clearview Food Mart, Convenience Store & Gas Station**	**Prepared By:**	**MH**
KHA No.:	**196192000**	**Checked By:**	**MH**

Sheet: **1 of 1**

This OPC is not intended for basing financial decisions, or securing funding. Review all notes and assumptions. Since Kimley-Horn & Associates, Inc. has no control over the cost of labor, materials, equipment, or services furnished by others, or over methods of determining price, or over competitive bidding or market conditions, any and all opinions as to the cost herein, including but not limited to opinions as to the costs of construction materials, shall be made on the basis of experience and best available data. Kimley-Horn & Associates, Inc. cannot and does not guarantee that proposals, bids, or actual costs will not vary from the opinions on costs shown herein. The total costs and other numbers in this Opinion of Probable Cost have been rounded.

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Private Storm Sewer (Non-Reimbursible)				
1	*Curb and Gutter, Type A (6" Vertical)	58	LF	$31.00	$1,798
2	*Curb and Gutter, Type A (6" Vertical - Slotted)	143	LF	$34.00	$4,862
		Subtotal:			$6,660
		Contingency (%,+/-)		10%	$666
		Project Total:			**$7,326**

Basis for Cost Projection:

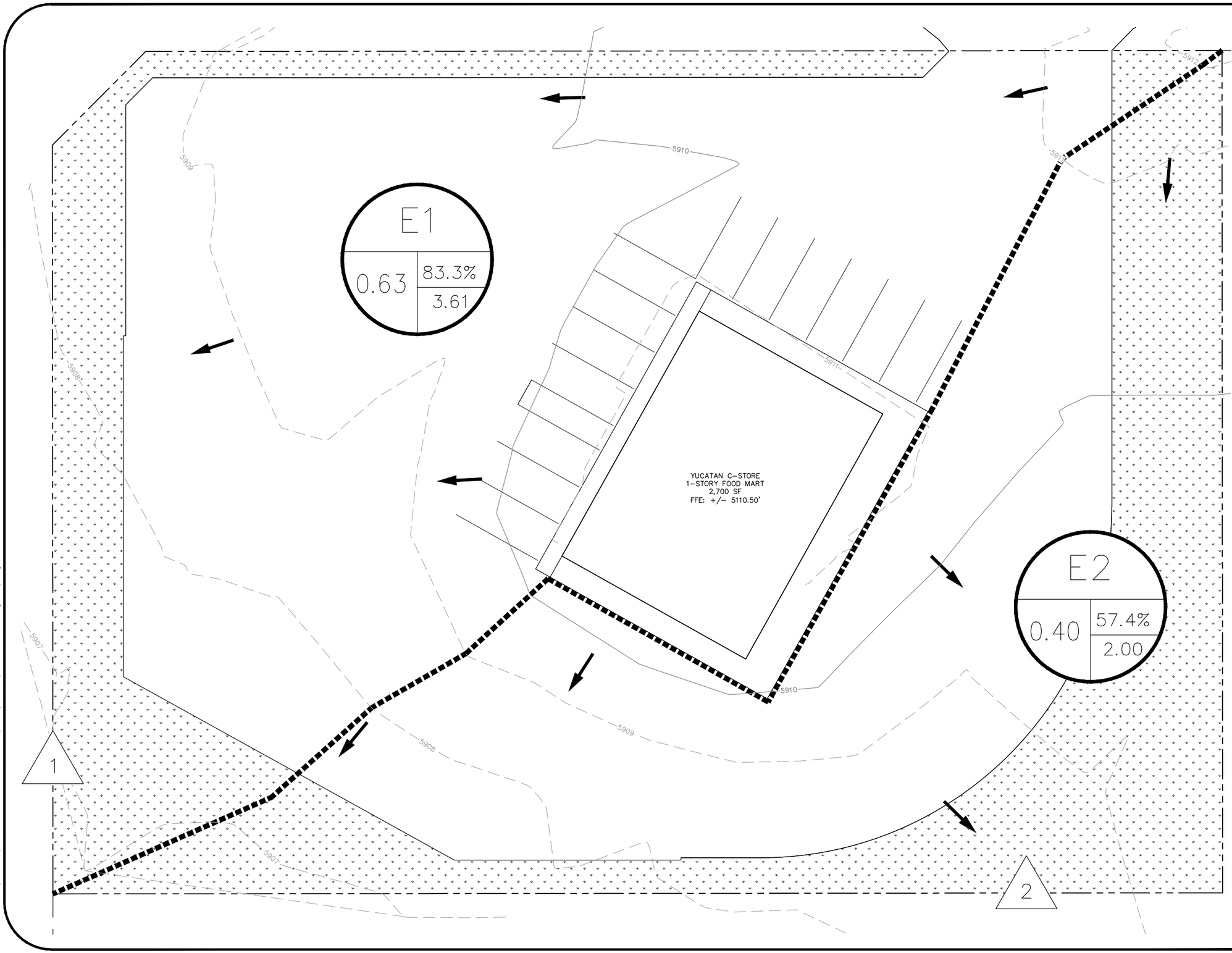
- ☐ No Design Completed
- ☐ Preliminary Design
- ☑ Final Design

*Curb and gutter is to be used as a level-spreader for the existing grass buffer control measure.

Design Engineer:

Mitchell O. Hess
Registered Professional Engineer, State of Colorado No. 53916

APPENDIX E – DRAINAGE EXHIBITS



LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

FLOW DIRECTION

PROPERTY LINE

DRAINAGE BASIN BOUNDARY

XXXX EXISTING MAJOR CONTOUR

XXXX EXISTING MINOR CONTOUR

EDGE OF PAVEMENT

GRASS AND LANDSCAPING

NORTH

GRAPHIC SCALE IN FEET
0 5 10 20

CLEARVIEW FOOD MART & C-STORE
EXISTING CONDITIONS
04/07/2022

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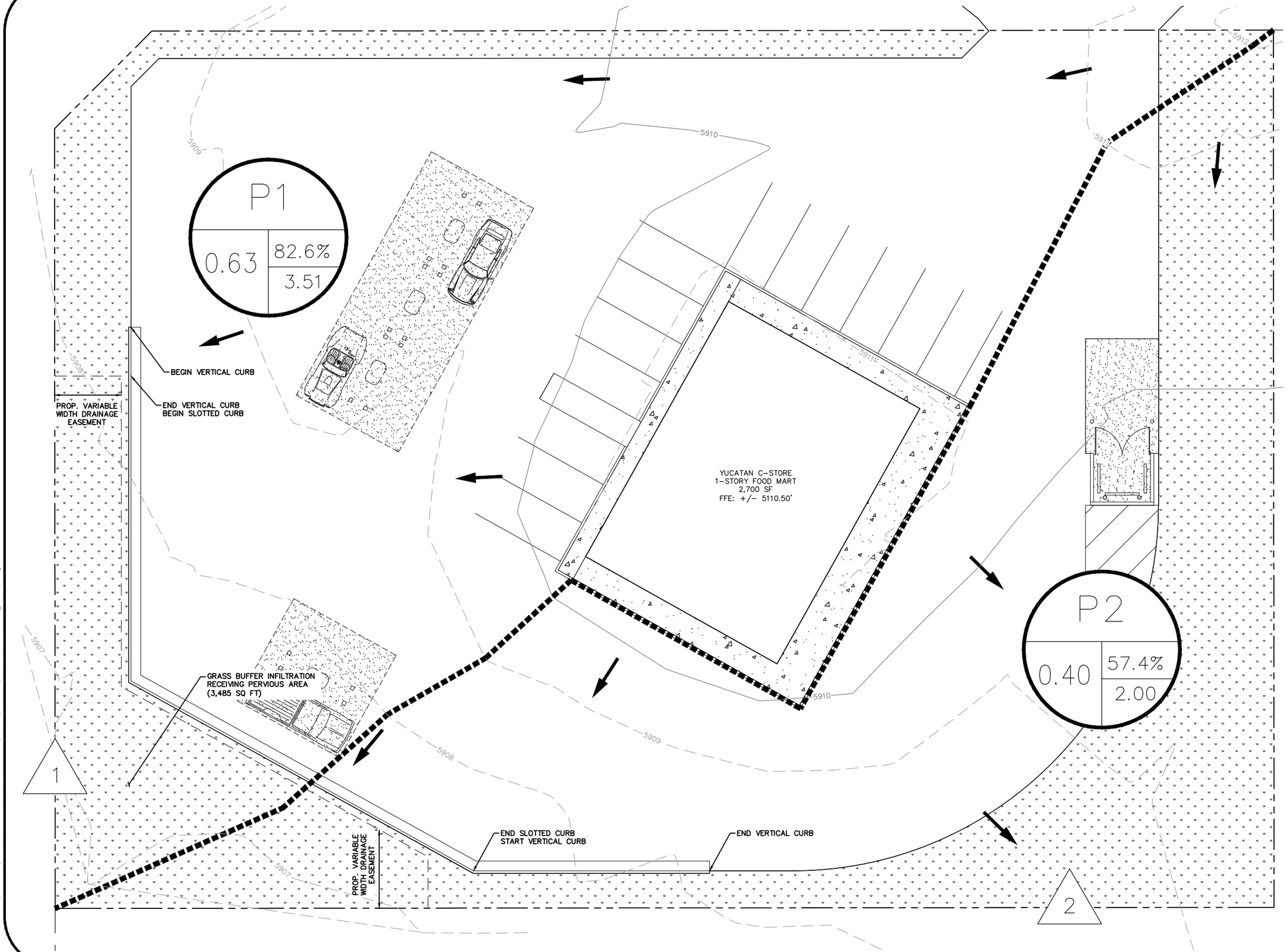

LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

FLOW DIRECTION

PROPERTY LINE

DRAINAGE BASIN BOUNDARY

XXXX EXISTING MAJOR CONTOUR

XXXX EXISTING MINOR CONTOUR

PROPOSED GAS DISPENSER CANOPY

GRASS AND LANDSCAPING

NORTH

GRAPHIC SCALE IN FEET
0 5 10 20

CLEARVIEW FOOD MART & C-STORE
PROPOSED CONDITIONS
04/07/2021

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