Final Drainage Report

Mary Jane Ranch
6425 J D Johnson Road, Peyton, El Paso County, Colorado 80831

Prepared for (Owner):
Mountains Reign Ranch Trust
16975 Falcon Highway
Peyton, Colorado 80831
Contact: Robert S. Williams
(406) 438-1874

Prepared by:
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Contact: Mitchell Hess, P.E.
(719) 453-0180

Project #: 196114001

Filing No.: MS242

Prepared: June 2024

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.

Please provided engineer stamp and signatures.

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.

_____ _____

Joshua Palmer, P.E. Date
County Engineer / ECM Administrator

Conditions:

TABLE OF CONTENTS

INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The purpose of this drainage report is to outline the existing and proposed drainage patterns for the Mary Jane Ranch subdivision, located at 6425 J D Johnson Road (the "Property") in El Paso County, Colorado (the "County"). This drainage letter identifies drainage patterns for the Site and proposes to safely route storm water to the adequate historic outfalls. The Property is 37.92 acres in size.

The Property is located in the Hook and Line Ranch drainage basin (CHBS1800) in El Paso County and is tributary to Black Squirrel Creek.

GENERAL PROJECT DESCRIPTION

This project improvements consist of subdividing the 40-acre quarter-quarter section into 4 single-family lots and the addition of a private gravel driveway to service 3 of the proposed lots with access from J D Johnson Road. The 4th lot, which contains the existing residence, will maintain its access via J D Johnson Road. The Project will be processed through El Paso County.

The Project is identified as the northwest 1/4 of the northwest 1/4 of Section 15, Township 13 south, Range 63 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 6425 J D Johnson Road, Peyton, CO. The Property is bounded by J D Johnson Road to the west, Falcon Highway to the north, a ±40-acre single-family residence with gravel lot to the east, and privately owned ±9-acre single-family lots to the south. The Property currently consists of a single residence with a gravel drive and accessory structures. The site is accessed via J D Johnson Road via a private driveway.

The property is bounded as follows:

North: Falcon Highway, 21220 Falcon Hwy (±80-acres), 21130 Oasis Ave (±4.75-acres)
West: J D Johnson Road, Section 16-13-63 (Owned by the State of Colorado)
South: 6609 J D Johnson Road (±8.59-acres), 6140 Coyote Lane (±8.95-acres)
East: 21225 Falcon Highway (±40-acres)

Stormwater will ultimately outfall to Black Squirrel Creek after surface flowing off-site to the south and through surrounding landscape areas and sheet-flowing through adjoining properties.

Survey data gathered from contours obtained from the publicly available USGS data and Bentley InfraWorks are the basis for design for this drainage documentation.

PROJECT CHARACTERISTICS

The Project Site is 40.0 acres in size (A quarter-quarter section in El Paso County). The Project involves the subdivision of property and construction of a shared private gravel driveway to provide access to three of the parcels. Individual lots will be developed independently, with their maximum buildout condition limited to what is documented in this drainage report without providing additional water quality treatment or detention.

The proposed impervious area is allowed to increase to a maximum of 10% weighted imperviousness per lot. The proposed project will disturb less than 1-acre of the Site. Overall, stormwater flows will remain nearly identical to existing conditions while implementing runoff

Please state what the increase in flows are from the site. The flows from existing to proposed are not identical

Not a listed reference. DCM and ECM are listed.

reduction practices per the Green Infrastructure Manual by routing impervious roof and drive areas through existing landscaping.

The existing Project Site generally slopes from northwest to southeast at grades of approximately 0.50 - 2%. The Site does not have any existing stormwater infrastructure, with rainfall surface draining off the Site. The proposed drainage patterns will be nearly identical to the existing conditions.

SOILS CONDITIONS

NRCS soil data is available for this Site and it has been noted that onsite soils are USGS Type A (Blakeland Loamy Sand, Columbine Gravelly Sandy Loam, and Truckton Sandy Loam). The NRSC Soils map and report has been provided in the Appendix.

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 08041C0590G, dated 12/7/2018) shows the Site to be located outside of the 100-year flood plain. No storm facilities are proposed as a part of this development. 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. The NOAA Atlas 14, Volume 8, Version 2 'Point Precipitation Frequency Estimates' 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. When individual lots are developed, drainage swales will be constructed as necessary to prohibit flows from draining toward structures.

VARIANCES FROM CRITERIA

No variances from the established CRITERIA are proposed as a part of this project.

EXISTING DRAINAGE CONDITIONS

EXISTING DRAINAGE BASIN

The existing property contains 3 sub-basins.

Sub-Basin A contains the entirety of the area to be subdivided into lots (37.93 acres), which is primarily made up of existing prairie grass and native seed (existing landscaping areas). There is a private residence onsite currently, consisting of 2,755 SF of rooftop area and 9,594 SF of existing gravel roadway. Sub-basin A has a weighted impervious value of 0.6% and 5-year and 100-year storm event direct runoff values of 6.45 and 45.40 cfs, respectively. Stormwater runoff flows within this sub-basin generally sheet flow south and southeast through existing landscape areas before surface flowing off-site and eventually reaching Black Squirrel Creek, the site's ultimate outfall. Sub-Basin A accepts flows from Sub-Basins O-R and O-E and routes them to the ultimate outfall.

Sub-Basin O-R is located around the northern and western boundaries of the property, and includes existing asphalt roadway (Falcon Highway) to the north, and adjacent landscaping areas south of Falcon Highway and east of JD Johnson Road that flow on-site (into Sub-Basin A). The sub-basin is 1.75 acres in size, and has a weighted impervious value of 28.7%. 5-year and 100-year storm events generate direct runoff of 0.67 and 1.87 cfs, respectively. Stormwater runoff flows within Sub-Basin O-R generally flow south and southeast through the site before discharging to the property south of the site. This sub-basin will remain unchanged as a part of this development.

Sub-Basin O-E is located east of the site and includes existing landscape areas. The sub-basin is 9.49 acres in size and has a weighted impervious value of 0.0%. 5-year and 100-year storm events generate direct runoff of 0.90 and 6.62 cfs, respectively. Stormwater runoff flows within Sub-Basin O-E generally flow south and southwest through the site (through Sub-Basin A) before discharging to the property south of the site. This sub-basin will remain unchanged as a part of this development.

PROPOSED DRAINAGE CONDITIONS

While ground disturbance is proposed as a part of this project, no significant re-grading is anticipated. All improvements will return grades to near existing conditions and will not impact the drainage characteristics of the site. The proposed development has been subdivided into 4 drainage sub-basins created based on the 4 lots to be platted.

Sub-basin 1 consists of 9.25 acres in the northwest corner of the site. This Lot/Sub-basin will have a maximum buildout condition of 10.0% impervious value, allowing for 18,000 SF of roof area and 30,000 SF of gravel roadway (or some other combination resulting in a weighted imperviousness under 10.0%). This will result in 5-year and 100-year storm event direct runoff values of 2.84 and 12.84 cfs respectively. Stormwater runoff within Sub-Basin 1 will continue to follow its historical path. Sub-basin 1 accepts offsite flows from a portion of Sub-basin O-R.

Sub-basin 2 consists of 9.23 acres in the northeast corner of the site. This Lot/Sub-basin will have a maximum buildout condition of 10.0% impervious value, allowing for 25,000 SF of roof area and 22,000 SF of gravel roadway (or some other combination resulting in a weighted imperviousness under 10.0%). This will result in 5-year and 100-year storm event direct runoff values of 3.04 and 13.67 cfs respectively. Stormwater runoff within Sub-Basin 2 will continue to follow its historical path.

Sub-basin 3 consists of 9.81 acres in the southeast corner of the site. This Lot/Sub-basin will have a maximum buildout condition of 10.0% impervious value, allowing for 26,000 SF of roof area and 24,000 SF of gravel roadway (or some other combination resulting in a weighted imperviousness under 10.0%). This will result in 5-year and 100-year storm event direct runoff values of 3.45 and 15.54 cfs respectively. Stormwater runoff within Sub-Basin 3 will continue to follow its historical path. Sub-basin 3 accepts flows from Sub-basins O-E, and 2, and a portion of 1.

Sub-basin 4 consists of 9.63 acres in the southwest corner of the site. This Lot/Sub-basin will have a maximum buildout condition of 10.0% impervious value, allowing for 28,000 SF of roof area and 21,000 SF of gravel roadway (or some other combination resulting in a weighted imperviousness under 10.0%). This will result in 5-year and 100-year storm event direct runoff values of 3.05 and 13.70 cfs respectively. Stormwater runoff within Sub-Basin 4 will continue to follow its historical path. Sub-basin 4 accepts flows from portions of Sub-basin O-R and 1.

The proposed development transmits the same off-site basin flows, which will remain unchanged as a part of this development. Under proposed conditions, the addition of the roof and gravel drive areas will increase peak runoff flows up to the allowed maximum buildout condition as limited by El Paso County Criteria. Drainage Calculations contained within this report are based on this theoretical maximum build condition (10% maximum imperviousness).

The proposed on-site development under maximum buildout conditions will have a weighted imperviousness of 10.0% (increased from 0.6% under existing conditions), 5-year and 100-year C Factors of 0.15 and 0.40 (compared to existing values of 0.08 and 0.35), and peak 5-year and 100-year runoff of 12.38 and 55.75 cfs (compared to 6.45 and 45.40 cfs under existing conditions).

EMERGENCY OVERFLOW ROUTING

Excess runoff within the site will continue to follow historic flow patterns and surface flow off-site to the south.

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 or storm sewer infrastructure 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 generated by impervious areas through existing landscaped areas, where the runoff can infiltrate into the ground. The proposed development of the site will conserve a majority of the ~38 acre site as existing

vegetation to minimize the extent of paved areas. Additionally, the site does not concentrate flows into underground storm drains, thus promoting stormwater infiltration and reduces stormwater runoff.

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, 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 discussed in Section I.7.1B of Appendix I of the ECM, water-quality facilities are not required for the Project as the development consists of 5-acre residential lots. Additionally, the existing and proposed development employ runoff reduction practices which result in a WQCV reduction, as noted in Step 1. As such, these runoff reduction methods, which consist of landscape areas and grass buffers, satisfy the requirements of step 3. The single-family lots will be restricted to a maximum imperviousness of 10% per lot, inclusive of any private/shared driveways.

Step 4: Consider Need for Industrial and Commercial CCMs
The proposed Project consists of developing an existing mostly vacant parcel as individual ~9-acre single family residential lots. Industrial permanent CCMs may be required for specific onsite uses, such as fuel storage, but are outside of the scope of this drainage report and should be implemented at the time of the individual lots development.

WATER QUALITY AND DETENTION REQUIREMENTS

The proposed Project development includes large-lot single-family lots which include minimal impervious areas. As discussed in the Four-Step Process above, the residential lots are exempt from WQCV requirements and will meet County MS4 requirements by using runoff reduction methods which will meet the 60% runoff reduction standard.

The project does not include a proposed detention pond for this development. Large-Lot Residential Developments, especially those in excess of 5-acres, do not increase post-development stormwater flows as substantially as smaller-lot residential and non-residential developments.

The proposed on-site development under maximum buildout conditions will have a weighted imperviousness of no more than 10.0% (increased from 0.6% under existing conditions), 5-year and 100-year C Factors of no higher than 0.15 and 0.40 (compared to existing values of 0.08 and 0.35), and peak 5-year and 100-year runoff not to exceed 12.38 and 55.75 cfs (compared to 6.45 and 45.40 cfs under existing conditions).

As discussed in the *Proposed Drainage Conditions* Section, the overall imperviousness of the site is being increased within the amount allowed by El Paso County. Because of this, detention facilities requirements are not triggered as a part of the proposed development.

EROSION CONTROL PLAN

Grading and Erosion Control Plans and associated Stormwater Management Reports are not required for this development, as site disturbance for the project will be less than 1-acre for the project. The only proposed improvements at this time include the construction of the shared

Please contact review engineer to discuss increase in flows

private gravel driveway to provide addition access for Lots 1, 2, and 3 from J D Johnson Road.

FLOODPLAIN STATEMENT

The FEMA Flood Insurance Rate Map (FIRM) map included in Appendix B (Map Number 08041C0590G, dated 12/7/2018) shows the Site to be located outside of the 100-year flood plain.

FEES DEVELOPMENT

APPLICABLE FEES

The Hook and Line Ranch drainage basin does not collect drainage basin or bridge fees.

CONSTRUCTION COST OPINION

No public or private drainage facilities are proposed as a part of this Project.

MAINTENANCE AND OPERATIONS

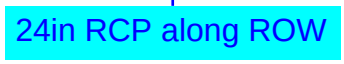
No detention or water quality facilities are proposed as part of the development.

SUMMARY

COMPLIANCE WITH STANDARDS

The drainage design presented within this report for Mary Jane Ranch conforms to the El Paso County Storm Drainage Criteria and the Urban Drainage and Flood Control District Manual. Additionally, the Site runoff will not adversely affect the downstream and surrounding developments or waterways.

As discussed in the Erosion Control Plan section of this report, Construction Control Measures, Erosion Control Plans, and Stormwater Treatment facilities will not be required as a part of this project. The total limits of disturbance for the master development improvements proposed herein will not exceed 0.78 acres.



REFERENCES

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

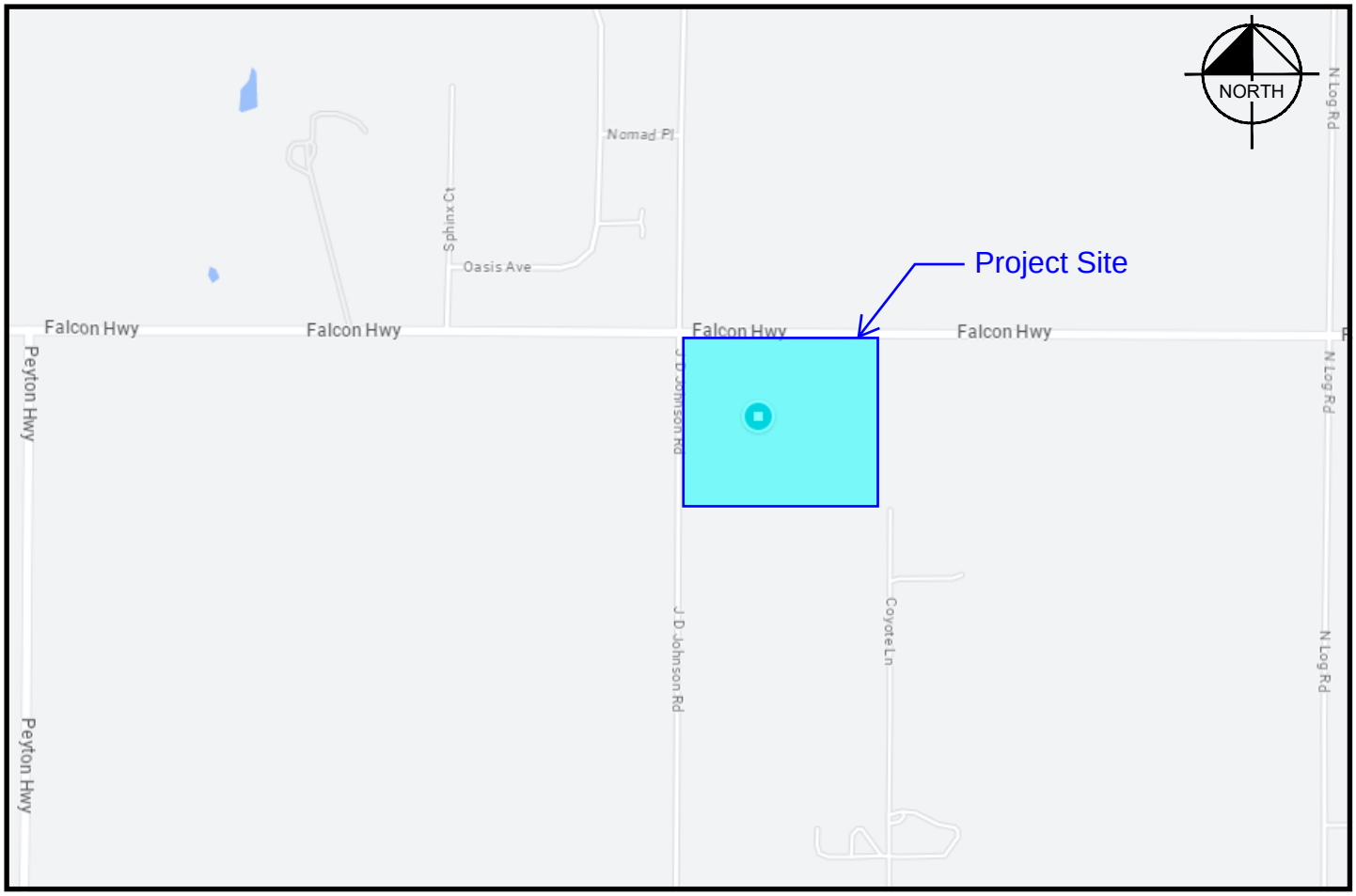
2. The City of Colorado Springs Drainage Criteria Manual, May 2014, Revised December 2020 and January 2021.

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 08041C0590G, Effective Date December 7, 2018, prepared by the Federal Emergency Management Agency (FEMA).

APPENDIX

APPENDIX A - VICINITY MAP



Vicinity Map

(N.T.S)

APPENDIX B – NRCS SOILS MAP/REPORT AND FEMA FIRM PANEL

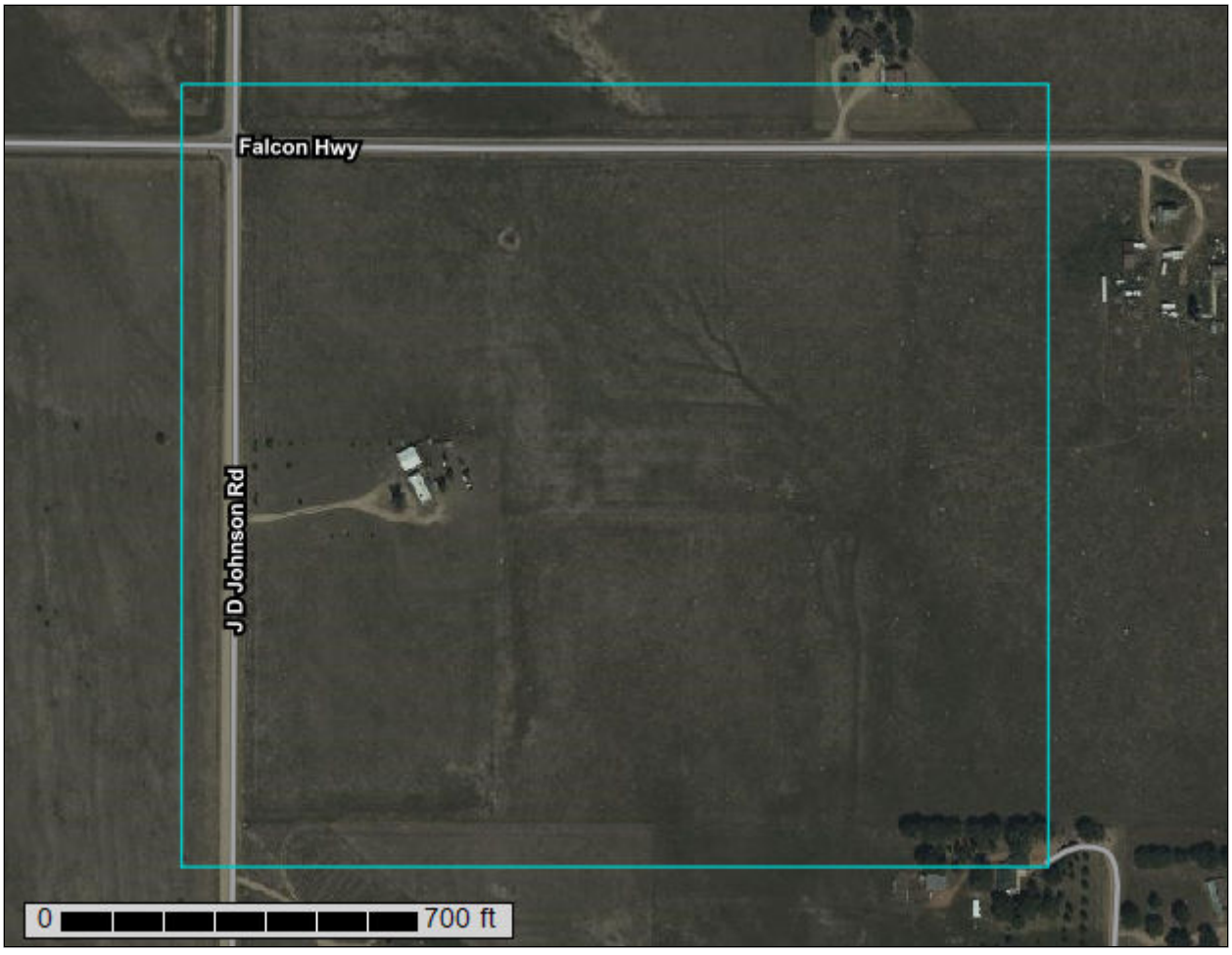
United States Department of Agriculture

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



September 7, 2023

Preface

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

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

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

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

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

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

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

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

Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

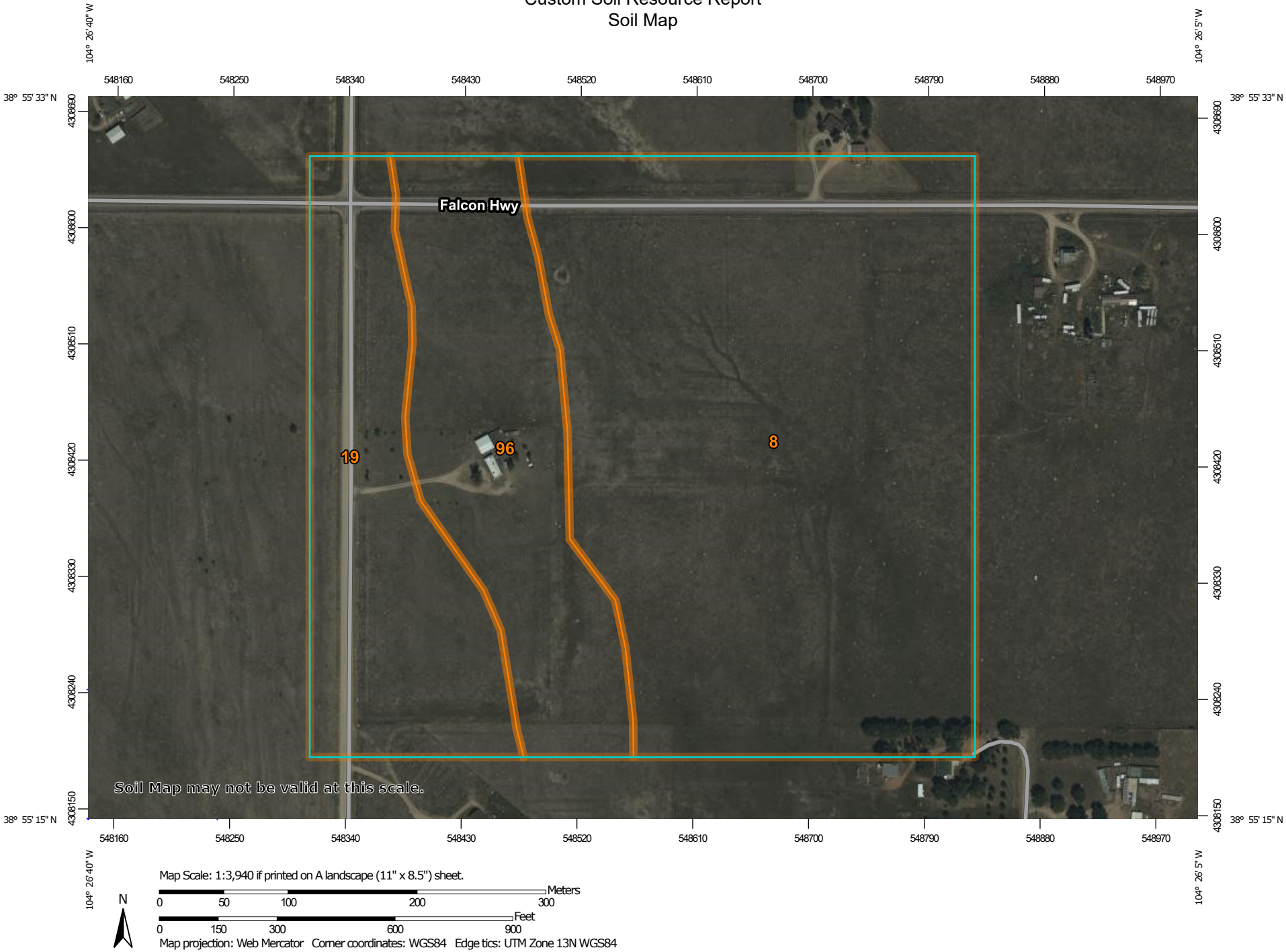
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,940 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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.

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 20, Sep 2, 2022

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

Date(s) aerial images were photographed: Sep 11, 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
8	Blakeland loamy sand, 1 to 9 percent slopes	35.8	60.0%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	11.7	19.6%
96	Truckton sandy loam, 0 to 3 percent slopes	12.1	20.3%
Totals for Area of Interest		**59.7**	**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: Flats, hills
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

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Fans, fan terraces, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

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 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
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill

Hydric soil rating: No

Minor Components

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

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: Fan remnants, interfluves
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: Hills, interfluves
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Bresser

Percent of map unit: 5 percent
Landform: Terraces, interfluves
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: Drainageways, flood plains
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: R067BY031CO - Sandy Bottomland
Hydric soil rating: No

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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, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

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/.

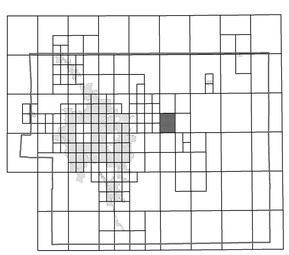
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

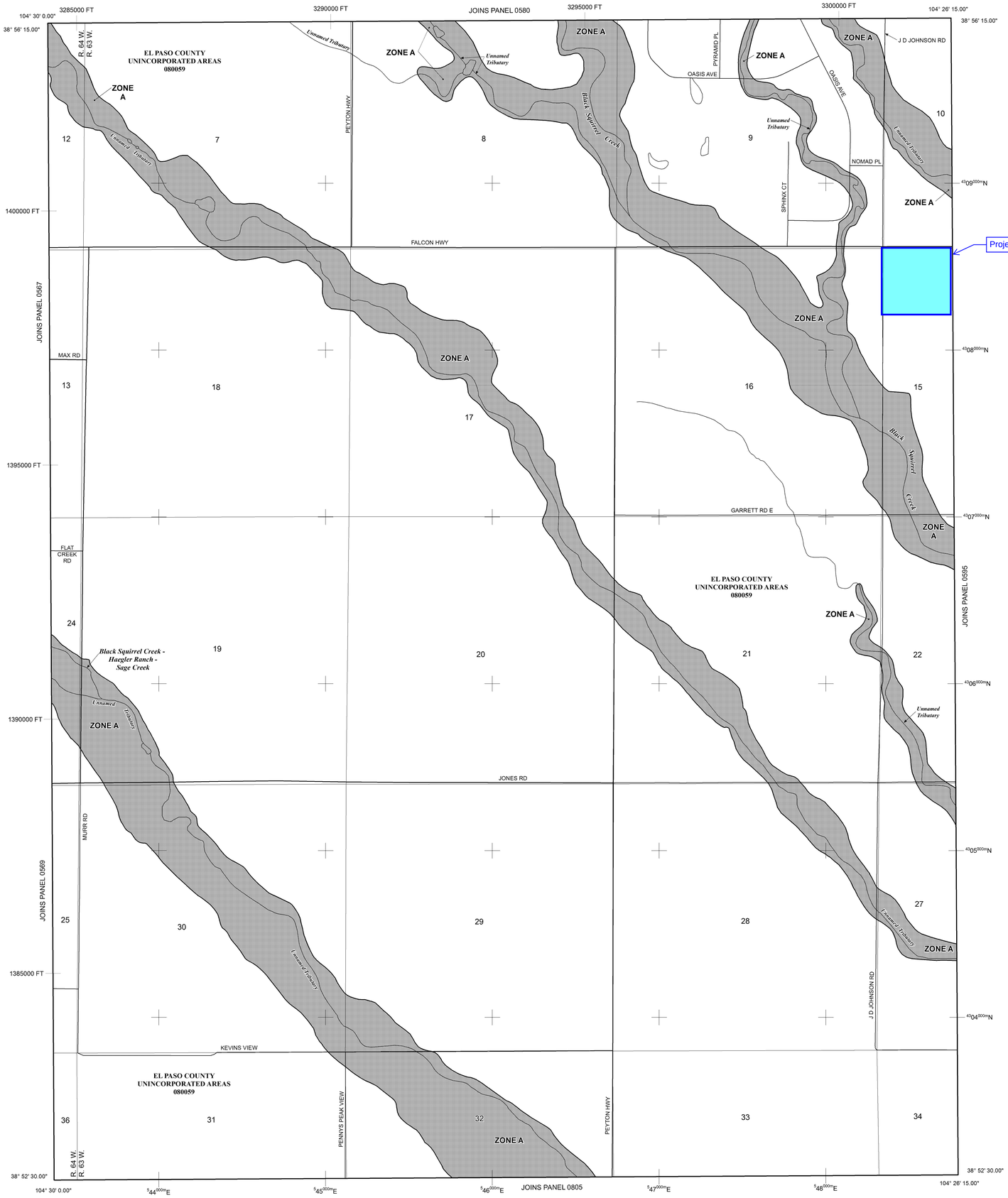
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

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 13 SOUTH, RANGE 63 WEST, AND TOWNSHIP 13 SOUTH, RANGE 64 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)
4275000mN — 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" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP

PANEL 0590G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 590 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0590	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
08041C0590G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX C - HYDROLOGIC CALCULATIONS

NOAA Atlas 14, Volume 8, Version 2
Location name: Peyton, Colorado, USA*
Latitude: 38.9236°, Longitude: -104.4398°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.242 (0.193-0.307)	0.296 (0.235-0.376)	0.388 (0.308-0.495)	0.470 (0.370-0.601)	0.590 (0.452-0.786)	0.688 (0.514-0.925)	0.791 (0.572-1.09)	0.901 (0.625-1.27)	1.05 (0.704-1.52)	1.18 (0.763-1.71)
10-min	0.355 (0.282-0.450)	0.433 (0.344-0.550)	0.569 (0.450-0.724)	0.689 (0.542-0.880)	0.864 (0.662-1.15)	1.01 (0.753-1.36)	1.16 (0.838-1.59)	1.32 (0.916-1.86)	1.54 (1.03-2.22)	1.72 (1.12-2.50)
15-min	0.433 (0.344-0.549)	0.528 (0.420-0.671)	0.694 (0.549-0.883)	0.840 (0.661-1.07)	1.05 (0.808-1.40)	1.23 (0.919-1.65)	1.41 (1.02-1.94)	1.61 (1.12-2.26)	1.88 (1.26-2.71)	2.10 (1.36-3.05)
30-min	0.626 (0.498-0.795)	0.763 (0.606-0.969)	1.00 (0.792-1.27)	1.21 (0.952-1.55)	1.52 (1.16-2.02)	1.77 (1.32-2.37)	2.03 (1.47-2.79)	2.31 (1.60-3.25)	2.70 (1.80-3.89)	3.00 (1.95-4.37)
60-min	0.800 (0.636-1.02)	0.970 (0.770-1.23)	1.27 (1.00-1.62)	1.54 (1.21-1.97)	1.94 (1.49-2.59)	2.27 (1.70-3.06)	2.63 (1.90-3.62)	3.01 (2.09-4.24)	3.54 (2.37-5.12)	3.97 (2.58-5.78)
2-hr	0.973 (0.779-1.23)	1.18 (0.940-1.48)	1.54 (1.23-1.94)	1.87 (1.48-2.37)	2.36 (1.83-3.14)	2.78 (2.10-3.73)	3.23 (2.36-4.42)	3.71 (2.60-5.20)	4.39 (2.96-6.31)	4.94 (3.24-7.15)
3-hr	1.06 (0.850-1.33)	1.27 (1.02-1.60)	1.66 (1.33-2.09)	2.02 (1.61-2.55)	2.57 (2.00-3.41)	3.04 (2.30-4.06)	3.54 (2.60-4.84)	4.09 (2.88-5.72)	4.87 (3.30-6.98)	5.51 (3.63-7.94)
6-hr	1.20 (0.972-1.49)	1.43 (1.16-1.78)	1.86 (1.50-2.32)	2.26 (1.81-2.84)	2.88 (2.27-3.81)	3.42 (2.62-4.55)	4.00 (2.96-5.44)	4.64 (3.30-6.46)	5.56 (3.80-7.92)	6.31 (4.19-9.03)
12-hr	1.36 (1.10-1.67)	1.60 (1.30-1.98)	2.06 (1.67-2.56)	2.50 (2.01-3.10)	3.16 (2.51-4.14)	3.74 (2.88-4.93)	4.36 (3.25-5.88)	5.04 (3.62-6.97)	6.03 (4.16-8.54)	6.84 (4.57-9.72)
24-hr	1.54 (1.26-1.88)	1.80 (1.48-2.21)	2.28 (1.87-2.81)	2.74 (2.22-3.38)	3.43 (2.74-4.45)	4.03 (3.13-5.27)	4.67 (3.51-6.25)	5.38 (3.89-7.38)	6.40 (4.45-8.99)	7.23 (4.88-10.2)
2-day	1.77 (1.46-2.15)	2.05 (1.69-2.49)	2.57 (2.11-3.13)	3.05 (2.50-3.73)	3.79 (3.04-4.87)	4.42 (3.45-5.73)	5.10 (3.86-6.76)	5.84 (4.25-7.94)	6.90 (4.84-9.63)	7.77 (5.29-10.9)
3-day	1.92 (1.60-2.33)	2.25 (1.86-2.72)	2.83 (2.34-3.43)	3.36 (2.76-4.09)	4.16 (3.34-5.30)	4.82 (3.78-6.21)	5.54 (4.21-7.30)	6.32 (4.61-8.54)	7.42 (5.22-10.3)	8.31 (5.68-11.6)
4-day	2.06 (1.72-2.49)	2.42 (2.01-2.92)	3.04 (2.52-3.68)	3.61 (2.97-4.38)	4.45 (3.58-5.64)	5.15 (4.05-6.60)	5.90 (4.49-7.74)	6.70 (4.91-9.02)	7.84 (5.53-10.8)	8.75 (6.00-12.2)
7-day	2.45 (2.05-2.94)	2.84 (2.37-3.40)	3.52 (2.93-4.23)	4.13 (3.42-4.98)	5.04 (4.08-6.35)	5.80 (4.58-7.38)	6.60 (5.05-8.60)	7.46 (5.50-9.99)	8.68 (6.17-11.9)	9.66 (6.67-13.4)
10-day	2.78 (2.34-3.32)	3.21 (2.69-3.83)	3.95 (3.30-4.72)	4.61 (3.83-5.53)	5.58 (4.53-6.98)	6.38 (5.06-8.08)	7.23 (5.56-9.38)	8.14 (6.02-10.8)	9.41 (6.71-12.9)	10.4 (7.24-14.4)
20-day	3.67 (3.10-4.34)	4.26 (3.60-5.04)	5.26 (4.42-6.24)	6.11 (5.11-7.27)	7.30 (5.94-9.00)	8.25 (6.57-10.3)	9.22 (7.12-11.8)	10.2 (7.60-13.5)	11.6 (8.32-15.7)	12.6 (8.86-17.4)
30-day	4.40 (3.74-5.18)	5.13 (4.35-6.04)	6.32 (5.34-7.46)	7.30 (6.14-8.66)	8.66 (7.05-10.6)	9.70 (7.74-12.0)	10.7 (8.31-13.6)	11.8 (8.79-15.4)	13.2 (9.49-17.7)	14.2 (10.0-19.5)
45-day	5.36 (4.56-6.27)	6.21 (5.29-7.28)	7.58 (6.43-8.91)	8.70 (7.34-10.3)	10.2 (8.31-12.3)	11.3 (9.05-13.9)	12.4 (9.63-15.6)	13.5 (10.1-17.5)	14.9 (10.7-19.8)	15.9 (11.2-21.6)
60-day	6.19 (5.29-7.22)	7.12 (6.08-8.32)	8.60 (7.32-10.1)	9.78 (8.28-11.5)	11.4 (9.28-13.7)	12.5 (10.0-15.3)	13.6 (10.6-17.1)	14.7 (11.0-19.0)	16.1 (11.6-21.3)	17.0 (12.1-23.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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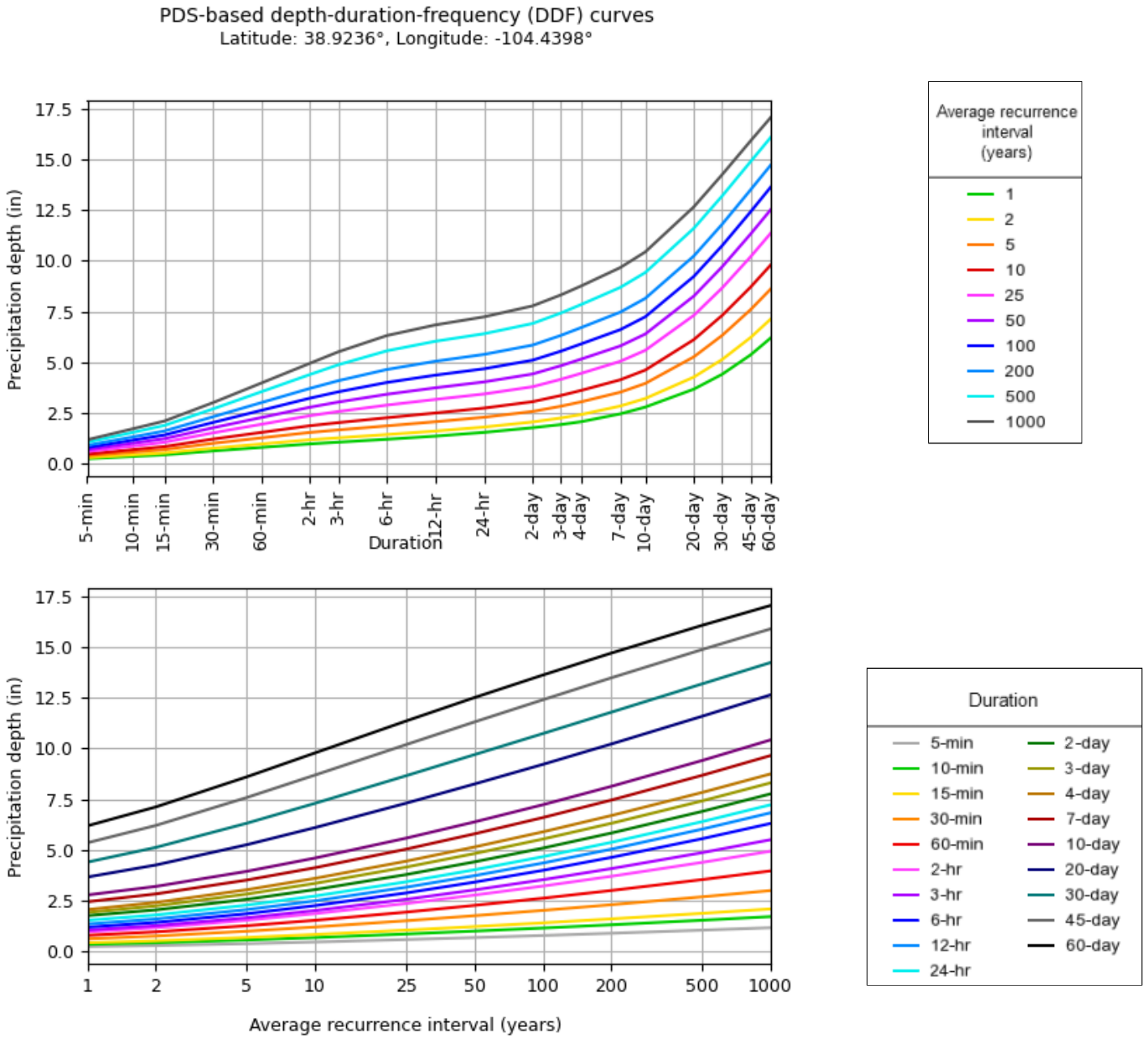
PF graphical



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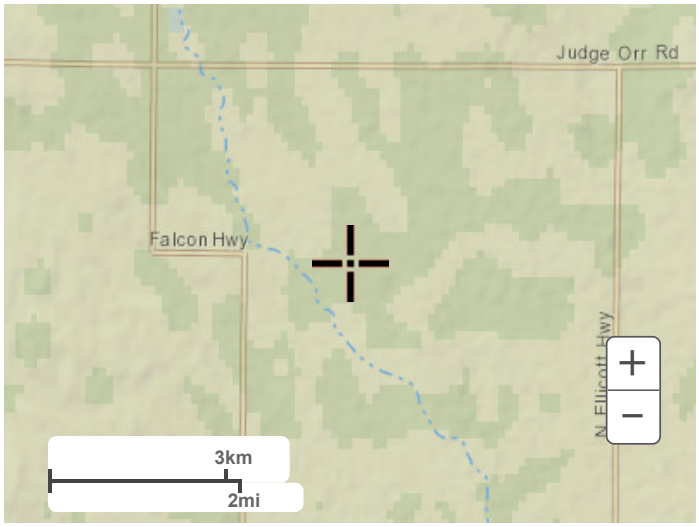
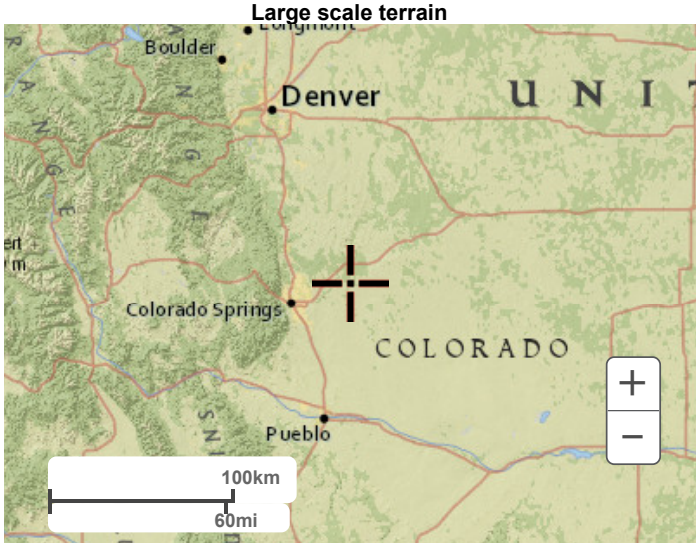
Maps & aerials

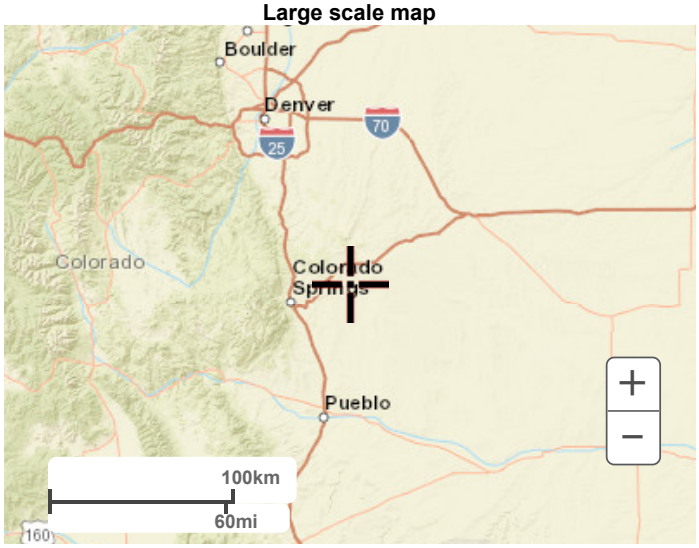
Small scale terrain



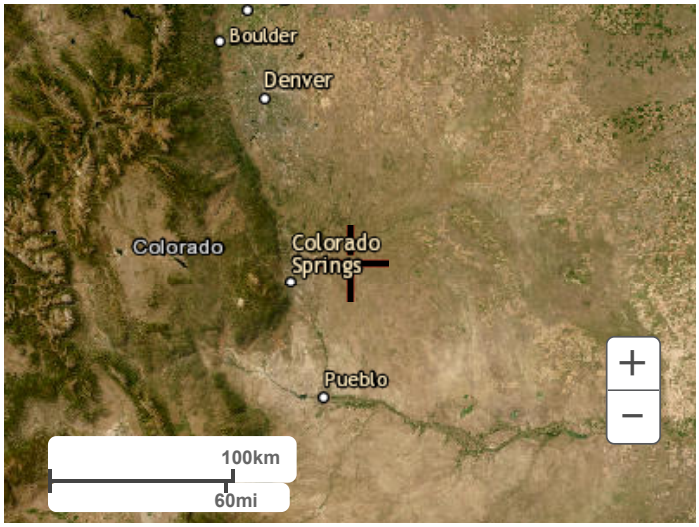
Large scale terrain



Large scale map



Large scale aerial



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National Weather Service
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Questions?: HDSC.Questions@noaa.gov

Disclaimer

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	ROAD AREA	PAVED IMPERVIOUSNESS	PAVEMENT C2	PAVEMENT C5	PAVEMENT C10	PAVEMENT C100	WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS C2	WEIGHTED COEFFICIENTS C5	WEIGHTED COEFFICIENTS C10	WEIGHTED COEFFICIENTS C100
A	1,652,072	37.93	2,755	90%	0.71	0.73	0.75	0.81	1,639,723	0%	0.02	0.08	0.15	0.35	9,594	80%	0.57	0.59	0.63	0.70	0.6%	0.02	0.08	0.15	0.35
On-Site	**1,652,072**	**37.93**	**2,755**	**90%**	**0.71**	**0.73**	**0.75**	**0.81**	**1,639,723**	**0%**	**0.02**	**0.08**	**0.15**	**0.35**	**9,594**	**80%**	**0.57**	**0.59**	**0.63**	**0.70**	**0.6%**	0.02	0.08	0.15	0.35
O-E	413,299	9.49	0	90%	0.71	0.73	0.75	0.81	413,299	0%	0.02	0.08	0.15	0.35	0	100%	0.89	0.90	0.92	0.96	0.0%	0.02	0.08	0.15	0.35
O-R	76,270	1.75	0	90%	0.71	0.73	0.75	0.81	54,406	0%	0.02	0.08	0.15	0.35	21,864	100%	0.89	0.90	0.92	0.96	28.7%	0.27	0.32	0.37	0.52
Off-Site	**489,569**	**11.24**	**0**	**90%**	**0.71**	**0.73**	**0.75**	**0.81**	**467,705**	**0%**	**0.02**	**0.08**	**0.15**	**0.35**	**21,864**	**100%**	**0.89**	**0.90**	**0.92**	**0.96**	**4.5%**	**0.06**	**0.12**	**0.18**	**0.38**
Total	**2,141,641**	**49.17**	**2,755**	**90.0%**	**0.71**	**0.73**	**0.75**	**0.81**	**2,107,428**	**0.00%**	**0.02**	**0.08**	**0.15**	**0.35**	**31,458**	**93.9%**	**0.79**	**0.81**	**0.83**	**0.88**	**1.5%**	**0.03**	**0.09**	**0.16**	**0.36**

EquipmentShare - Drainage Report
Existing 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)						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)	min.
A	A	1,652,072	37.93	0.08	300	1.5%	28.1	650	1.5%	7.00	0.9	12.6	40.7	40.7
O-E	O-E	413,299	9.49	0.08	300	0.5%	40.7	900	0.5%	7.00	0.5	30.3	71.0	71.0
O-R	O-R	76,270	1.75	0.32	300	0.5%	31.3	1145	0.5%	7.00	0.5	38.6	69.9	69.9

EquipmentShare - Drainage Report
Existing 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) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
A	A	37.93	0.08	40.7	3.19	2.02	6.45					
O-E	O-E	9.49	0.08	71.0	0.76	1.19	0.90					
O-R	O-R	1.75	0.32	69.9	0.55	1.21	0.67					

EquipmentShare - Drainage Report
Existing 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	
A	A	37.93	0.35	40.7	13.38	3.39	45.40					
O-E	O-E	9.49	0.35	71.0	3.32	1.99	6.62					
O-R	O-R	1.75	0.52	69.9	0.92	2.03	1.87					

Existing

SUMMARY - PROPOSED 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)
A	A	37.93	6.45	45.40	8.02	53.89
On-Site		*37.93*	*6.45*	*45.40*		
O-E	O-E	9.49	0.90	6.62		
O-R	O-R	1.75	0.67	1.87		
Off-Site		*11.24*	*1.57*	*8.49*		
Total		**49.17**	**8.02**	**53.89**	**8.02**	**53.89**

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	ROAD AREA	PAVED IMPERVIOUSNESS	PAVEMENT C2	PAVEMENT C5	PAVEMENT C10	PAVEMENT C100	WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS C2	WEIGHTED COEFFICIENTS C5	WEIGHTED COEFFICIENTS C10	WEIGHTED COEFFICIENTS C100
1	402,885	9.25	18,000	90%	0.71	0.73	0.75	0.81	354,885	0%	0.02	0.08	0.15	0.35	30,000	80%	0.57	0.59	0.63	0.70	10.0%	0.09	0.15	0.21	0.40
2	402,123	9.23	25,000	90%	0.71	0.73	0.75	0.81	355,123	0%	0.02	0.08	0.15	0.35	22,000	80%	0.57	0.59	0.63	0.70	10.0%	0.09	0.15	0.21	0.40
3	427,510	9.81	26,000	90%	0.71	0.73	0.75	0.81	377,510	0%	0.02	0.08	0.15	0.35	24,000	80%	0.57	0.59	0.63	0.70	10.0%	0.09	0.15	0.21	0.40
4	419,553	9.63	28,000	90%	0.71	0.73	0.75	0.81	370,553	0%	0.02	0.08	0.15	0.35	21,000	80%	0.57	0.59	0.63	0.70	10.0%	0.09	0.15	0.21	0.40
On-Site	**1,652,071**	**37.93**	**97,000**	**90%**	**0.71**	**0.73**	**0.75**	**0.81**	**1,458,071**	**0%**	**0.02**	**0.08**	**0.15**	**0.35**	**97,000**	**80%**	**0.57**	**0.59**	**0.63**	**0.70**	**10.0%**	0.09	0.15	0.21	0.40
O-E	413,299	9.49	0	90%	0.71	0.73	0.75	0.81	413,299	0%	0.02	0.08	0.15	0.35	0	100%	0.89	0.90	0.92	0.96	0.0%	0.02	0.08	0.15	0.35
O-R	76,270	1.75	0	90%	0.71	0.73	0.75	0.81	54,406	0%	0.02	0.08	0.15	0.35	21,864	100%	0.89	0.90	0.92	0.96	28.7%	0.27	0.32	0.37	0.52
Off-Site	**489,569**	**11.24**	**0**	**90%**	**0.71**	**0.73**	**0.75**	**0.81**	**467,705**	**0%**	**0.02**	**0.08**	**0.15**	**0.35**	**21,864**	**100%**	**0.89**	**0.90**	**0.92**	**0.96**	**4.5%**	**0.06**	**0.12**	**0.18**	**0.38**
Total	**892,454**	**20.49**	**97,000**	**90.0%**	**0.71**	**0.73**	**0.75**	**0.81**	**1,925,776**	**0.00%**	**0.02**	**0.08**	**0.15**	**0.35**	**118,864**	**83.7%**	**0.31**	**0.31**	**0.33**	**0.35**	**20.9%**	**0.16**	**0.29**	**0.45**	**0.89**

EquipmentShare - Drainage Report
Existing 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)						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)	min.
1	1	402,885	9.25	0.15	300	1.5%	26.4	650	1.5%	7.00	0.9	12.6	39.0	39.0
2	2	402,123	9.23	0.15	300	1.5%	26.4	480	1.5%	7.00	0.9	9.3	35.7	35.7
3	3	427,510	9.81	0.15	300	1.5%	26.4	300	1.5%	7.00	0.9	5.8	32.2	32.2
4	4	419,553	9.63	0.15	300	1.5%	26.3	600	1.5%	7.00	0.9	11.7	38.0	38.0
O-E	O-E	413,299	9.49	0.08	300	0.5%	40.7	900	0.5%	7.00	0.5	30.3	71.0	71.0
O-R	O-R	76,270	1.75	0.32	300	0.5%	31.3	1145	0.5%	7.00	0.5	38.6	69.9	69.9

EquipmentShare - Drainage Report
Existing 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) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
1	1	9.25	0.15	39.0	1.36	2.09	2.84					
2	2	9.23	0.15	35.7	1.37	2.22	3.04					
3	3	9.81	0.15	32.2	1.45	2.37	3.45					
4	4	9.63	0.15	38.0	1.43	2.13	3.05					
O-E	O-E	9.49	0.08	71.0	0.76	1.19	0.90					
O-R	O-R	1.75	0.32	69.9	0.55	1.21	0.67					

EquipmentShare - Drainage Report
Existing 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	1	9.25	0.40	39.0	3.67	3.50	12.84					
2	2	9.23	0.40	35.7	3.67	3.72	13.67					
3	3	9.81	0.40	32.2	3.90	3.98	15.54					
4	4	9.63	0.40	38.0	3.84	3.57	13.70					
O-E	O-E	9.49	0.35	71.0	3.32	1.99	6.62					
O-R	O-R	1.75	0.52	69.9	0.92	2.03	1.87					

SUMMARY - PROPOSED 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	1	9.25	2.84	12.84		
2	2	9.23	3.04	13.67		
3	3	9.81	3.45	15.54	9.14	43.19
4	4	9.63	3.05	13.70	4.81	21.05
On-Site		*37.93*	*12.38*	*55.75*		
O-E	O-E	9.49	0.90	6.62		
O-R	O-R	1.75	0.67	1.87		
Off-Site		*11.24*	*1.57*	*8.49*		
Total		**49.17**	**13.95**	**64.24**	**13.95**	**64.24**

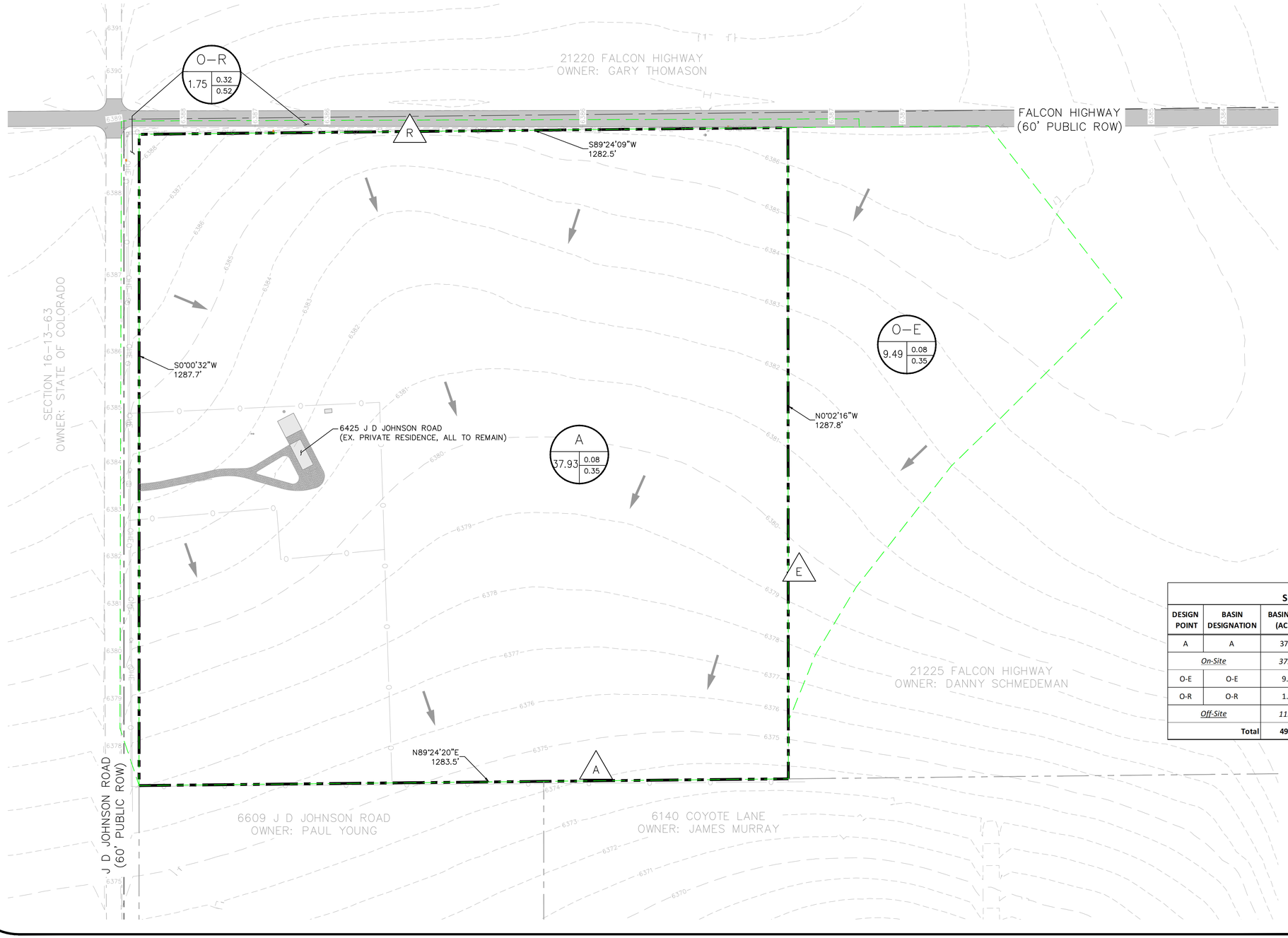
APPENDIX D – DRAIANGE EXHIBITS

MARY JANE RANCH - EL PASO COUNTY

EXISTING DRAINAGE EXHIBIT

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200



LEGEND

- A = BASIN DESIGNATION
- B = AREA (ACRES)
- C = 5-YR RUNOFF COEFFICIENT
- D = 100-YR RUNOFF COEFFICIENT

X = DESIGN POINT

FLOW DIRECTION

DRAINAGE BASIN BOUNDARY

PROPERTY LINE

NEIGHBORING LOT LINE

XXXX EXISTING MAJOR CONTOUR

XXXX EXISTING MINOR CONTOUR

Change to existing

SUMMARY - PROPOSED 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)
A	A	37.93	6.45	45.40	8.02	53.89
On-Site		*37.93*	*6.45*	*45.40*		
O-E	O-E	9.49	0.90	6.62		
O-R	O-R	1.75	0.67	1.87		
Off-Site		*11.24*	*1.57*	*8.49*		
Total		**49.17**	**8.02**	**53.89**	**8.02**	**53.89**

MARY JANE RANCH
EXISTING DRAINAGE MAP
10/13/2023

Kimley»Horn

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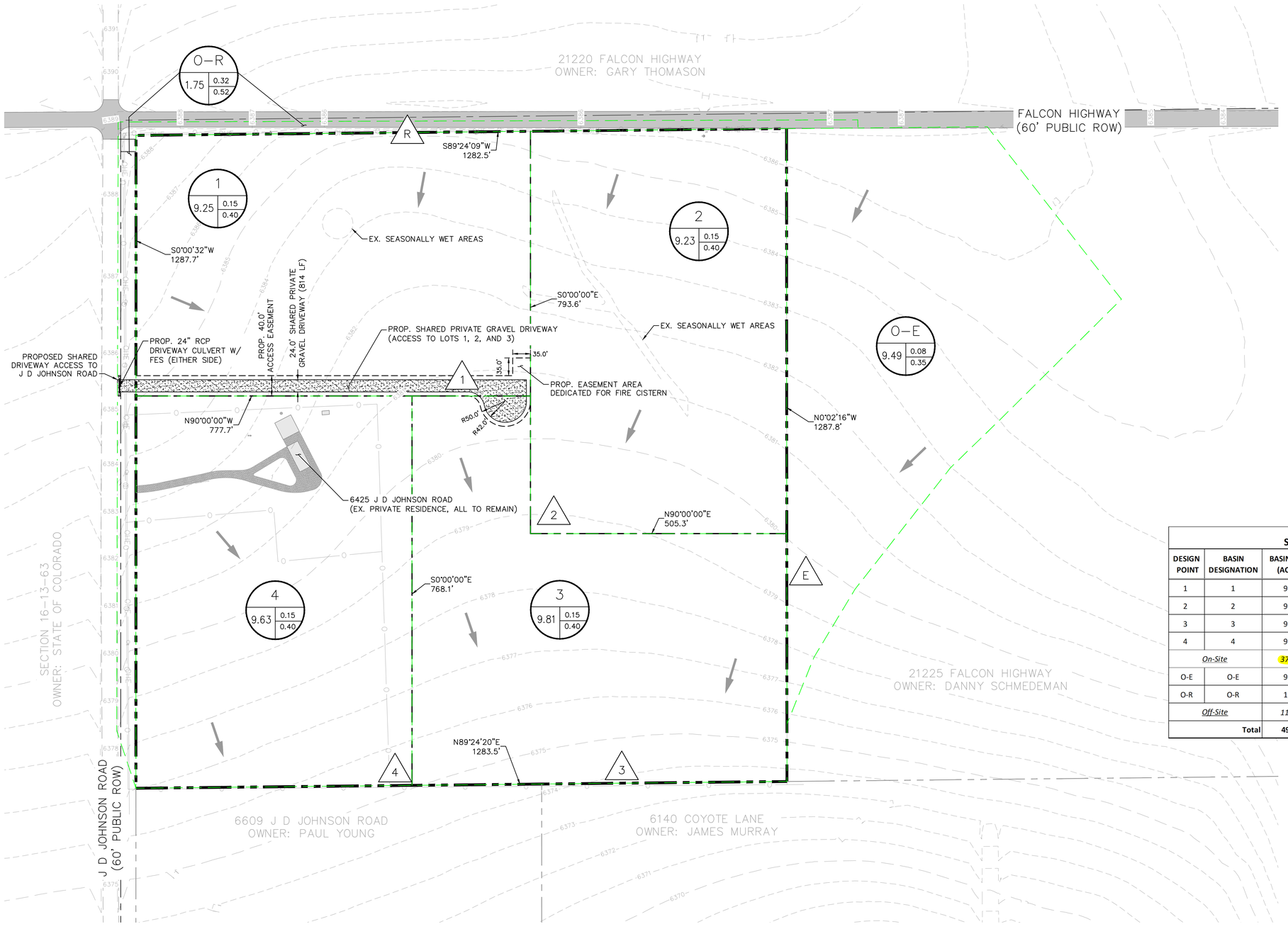
PHONE: 719-453-0180

MARY JANE RANCH - EL PASO COUNTY

PROPOSED DRAINAGE EXHIBIT

NORTH

GRAPHIC SCALE IN FEET
0 50 100 200



LEGEND

- A = BASIN DESIGNATION
- B = AREA (ACRES)
- C = 5-YR RUNOFF COEFFICIENT
- D = 100-YR RUNOFF COEFFICIENT
- X = DESIGN POINT
- FLOW DIRECTION
- DRAINAGE BASIN BOUNDARY
- PROPERTY LINE
- NEIGHBORING LOT LINE
- XXXX EXISTING MAJOR CONTOUR
- XXXX EXISTING MINOR CONTOUR

SUMMARY - PROPOSED 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	1	9.25	2.84	12.84		
2	2	9.23	3.04	13.67		
3	3	9.81	3.45	15.54	9.14	43.19
4	4	9.63	3.05	13.70	4.81	21.05
On-Site		*37.93*	*12.38*	*55.75*		
O-E	O-E	9.49	0.90	6.62		
O-R	O-R	1.75	0.67	1.87		
Off-Site		*11.24*	*1.57*	*8.49*		
Total		**49.17**	**13.95**	**64.24**	**13.95**	**64.24**

*PROPOSED DRAINAGE CALCULATIONS ARE BASED OFF OF A MAXIMUM BUILDOUT CONDITION OF 10% IMPERVIOUSNESS FOR EACH LOT.

MARY JANE RANCH
PROPOSED DRAINAGE MAP
06/12/2024

Kimley»Horn

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