FINAL DRAINAGE REPORT
for
LOT 1 BLOCK 1, JOHNSON VACATION

Falcon, Colorado

May 18, 2023

PCD File No: PPR-21-067

Prepared for:

HESED, LLC
10308 Mt. Evans Drive
Peyton, CO 80831
Contact: David Caban
(787) 565-5774

Prepared by:

Drexel, Barrell & Co.
3 South Seventh Street
Colorado Springs, CO 80905
Contact: Tim McConnell, P.E.
(719) 260-0887

TABLE OF CONTENTS

APPENDICES

FINAL DRAINAGE REPORT

for

LOT 1 BLOCK 1, JOHNSON VACATION

1.0 CERTIFICATION STATEMENTS

Engineer's 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 city/county for drainage reports and said report is in conformity with the 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): _____ 5-30-2023

For and on behalf of Drexel, Barrell & Co. Date
Katherine Varnum, P.E. #53459

Developer's Statement

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

30 May 2023

Authorized Signature Date
David Caban
HESED, LLC

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

Conditions:

FINAL DRAINAGE REPORT
for
LOT 1 BLOCK 1, JOHNSON VACATION

2.0 PURPOSE

The purpose of this Final Drainage Report for Lot 1 Block 1 Johnson Vacation is to identify the existing and proposed runoff patterns and drainage facilities required to safely route developed runoff to historic downstream facilities.

3.0 GENERAL SITE DESCRIPTION

Location

Lot 1 Block 1, Johnson Vacation is located in Falcon, El Paso County, Colorado, within the Southeast Quarter of Section 1, Township 13 South, Range 65 West of the 6th P.M. The property is bounded by Old Meridian Road to the southwest, Chicago Avenue to the northwest, and Lot 1 High Prairie Branch Library to the southeast. This property lies within the Falcon Drainage Basin.

A topographical field survey was completed by Drexel, Barrell & Co., dated September 8, 2021 and is used as the basis of design for the drainage improvements.

Proposed Development

The proposed development of Lot 1 is the construction of a karate studio and warehouse, with associated parking and landscaping. Cobble-lined swales will direct stormwater runoff from the parking lot and buildings towards the existing storm sewer.

On-site detention and water quality will not be provided because the increase in impervious area for this project was accounted for in El Paso County's drainage design for the Old Meridian Road Improvements. Runoff from this storm system is routed to the Highway 24 drainage ditch southwest of the Meridian Road and Highway 24 intersection. The regional detention facility for the area (Pond WU) over detains flows from the north and west of Meridian Road, allowing flows from this project area to be discharged without detention or water quality treatment.

Soils

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the site is underlain by the Blakeland loamy sand (Soil No. 9) and the Columbine gravelly sandy loam (Soil No. 19), both hydrologic type A soils. See appendix for Soils map.

Climate

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

Floodplain Statement

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 08041CO561G (December 7, 2018), no portion of the site lies within a floodplain.

4.0 DRAINAGE CRITERIA

The drainage analysis has been prepared in accordance with the current El Paso County Drainage Criteria Manual. Calculations were performed to determine runoff quantities during the 5-year and 100-year frequency storms for existing and developed conditions using the Rational Method as required for basins containing less than 100 acres.

5.0 EXISTING CONDITION

The site appears to have been overlot graded and generally slopes from northeast to southwest between 2%-4%. Sparse grasses and gravel cover the site. See existing conditions map in the appendix.

Improvements to Old Meridian Road, adjacent to the property have recently been completed. As part of these improvements, a Type D grated inlet was installed at the south corner of the Lot 1 property. This inlet captures onsite flows and directs them to the south and west, ultimately draining into the roadside ditch along Highway 24. In addition, the Chicago Avenue intersection with Old Meridian Road was completed along with installation of 5' Type R inlet on the north side of Chicago Avenue, and a 15' Type R inlet on the south side.

See below for basin/design point table and description:

BASIN & DESIGN POINT SUMMARY				
BASIN (S)	**DP**	**AREA (AC)**	**Q5**	**Q100**
OS1		0.88	3.0	5.4
OS2		0.15	0.6	1.1
E1		0.73	1.9	3.7
	DP1	0.88	2.5	4.7
E2		0.09	0.2	0.4

Basin OS1 covers an offsite area to the north of Lot 1. In the existing condition flows from this basin travel overland towards the Lot 1 site property to the existing 5' Type R inlet on the north side of the Chicago Ave intersection with Old Meridian Road.

Basin OS2 covers 0.15 acres to the north of the site. Flows from this basin travel onto the site towards to the existing Type D inlet at the south corner.

Basin E1 covers the majority of the Lot 1 site. Flows generated by this basin combine with those from offsite basin OS2, ultimately reaching the existing Type R inlet (Existing Design Point DP1) at the southwest corner alongside Old Meridian Road. Flows of Q_5=2.5cfs and Q_{100}=4.7cfs reach the existing Type D inlet (Design Point 1) in the current condition.

Basin E2 covers a small portion of the site that currently drains into the parking lot of the adjacent property to the southeast.

6.0 DEVELOPED CONDITION

The proposed development consists of two commercial buildings, and associated parking and landscaping. Runoff will be channel towards the existing Type D inlet at the south corner of the site (DP3) around the side and rear of the buildings, via cobble lined swale. These swales, by their nature, may function as a water quality treatment devices, but will not be considered regulatory (Reference El Paso County ECM Appendix I.7.1.C.1). Flows are intended to reach the swale, by curb cut from the parking lot and downspout discharge. Erosion protection at the outfalls into the swale will be provided by riprap. Flows will ultimately be captured by the existing Type D area inlet and discharge via the existing public storm sewer in Old Meridian Road.

Runoff generated by the offsite basin OS1 - as discussed in the existing conditions section of this report - will be captured by the proposed improvements to Chicago Avenue, ultimately reaching the existing inlets at the intersection with Old Meridian Road. As part of this project, Chicago Avenue asphalt pavement and curb and gutter is proposed to be extended along the site frontage to the northeast. Extension of the 30" RCP storm sewer system, from the stub at the intersection with Old Meridian Rd, will also be installed northeast to the limits of the Chicago Avenue improvements provided with this project, in order to provide for drainage connection for potential development to the east of this property. Hydraulic calculations have not been completed as part of this project, as the storm sewer will handle no flow at this time.

The increase in impervious area for this property and tributary offsite basins was accounted for by El Paso County in their design of the Old Meridian Road Improvements – per discussions with County staff, while no drainage report is available the piping was sized to account for the development of this site.

The existing public storm sewer system captures onsite flows from the area inlet at DP3 and the curb inlets along Chicago Avenue (DPO1) and directs them to the south towards the roadside ditch along Highway 24, ultimately discharging southwest of the Meridian Road and Highway 24 intersection. The regional detention facility for the area (Pond WU) over detains flows from the area north and west of Meridian Road, allowing flows from this project area to be discharged without treatment. The ditch is in a suitable condition to receive the flow and no negative downstream impacts are expected.

See below for basin/design point table and description:

RUNOFF SUMMARY				
BASIN (S)	**DP**	**AREA (AC)**	**Q5**	**Q100**
OS1	DPO1	0.70	2.2	4.0
OS2	DPO2	0.15	0.6	1.1
OS3		0.03	0.1	0.3
RD1	DP1	0.15	0.7	1.2
	DPO3	0.88	3.4	6.2
A1		0.14	0.6	1.0
	DP2	1.36	1.2	2.1
A2	DP3	0.26	0.9	1.8
A3	DP4	0.12	0.5	0.9
A4		0.26	0.9	1.6
	DP5	1.99	3.0	5.5
A5	DP6	0.02	0.0	0.1

Basin OS1, as in the existing condition covers an offsite area to the north of Lot 1. In the developed condition flows from this basin travel overland until reaching Chicago Avenue, where flows will then enter basin RD1 through Design Point O1 (DPO1).

Basin OS2, as in the existing condition covers an offsite area to the north of Lot 1. Flows from this basin will continue to travel overland into the proposed parking lot of this site.

Basin OS3, is located at the entrance of Chicago Avenue, from Old Meridian Road. This basin will receive flows from both basin OS1 as well as basin RD1 before directing all flows towards the existing type R curb inlets on either side of Chicago Avenue. Flows captured by the inlets will continue to the southeast via existing public storm infrastructure.

Design Point O3 represents all flows reaching the existing 5' and 15' Type R inlets at the Old Meridian Road/Chicago Ave. intersection in the developed condition. These developed flows (Q_5=3.4cfs and Q_{100}=6.2cfs) are comparable those captured by the inlet in its current condition (Q_5=3.0cfs and Q_{100}=5.4cfs), the slight increase is as a result of the asphalt roadway installation. As discussed previously this increase in impervious area was accounted for in El Paso County's drainage design for the Old Meridian Road Improvements.

Basin RD1 consists of the asphalt roadway installation within Chicago Avenue. While the basin is within the Lot 1 limits of disturbance, flows within this basin will flow offsite through Design Point 1 (DP1), into basin OS3 and continue as described above.

Basin A1 covers the parking lot to the northeast of the proposed buildings. Runoff will travel as curb and gutter flow and exit into the open swale by curb cut and sidewalk chase at Design Point DP1. Flows will continue into basin A2 via open swale around the north building towards the existing area inlet at DP3.

Basin A2 covers the north building and the swale around the side and rear. This swale is proposed as a 2-ft deep, 2-ft wide trapezoidal cobble lined swale, allowing for 1-ft of freeboard for the 100-yr storm event. Reference the appendix for swale design calculations.

Basin A3 covers the parking lot to the east of the proposed southerly building. Runoff will travel as curb and gutter flow and exit into the open swale by curb cut and sidewalk chase at Design Point DP2. Flows will continue into Basin A4 via open swale around the south building towards the existing area inlet at DP3.

Basin A4 covers the south building and the swale around the side and rear.

Design Point 3 represents all flows reaching the existing Type D inlet in the developed condition (OS2 & A1-A4). These developed flows (Q_5=3.0cfs and Q_{100}=5.5cfs) are less than those captured by the inlet in its current condition (Q_5=4.0cfs and Q_{100}=7.8cfs).

Basin A5 covers a small portion (2.5%) of the site that will discharge offsite to the east. This area is less than 20% of the development, and as such per ECM Appendix 1.7.1.C.1. is permitted to drain offsite. This basin will be landscaped and no impact downstream is anticipated.

7.0 FOUR STEP PROCESS

This project conforms to the El Paso County Four Step Process. The process for this site focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls.

1. ***Employ Runoff Reduction Practices*:** Proposed impervious areas on this site (roofs, asphalt/sidewalk) will sheet flow across landscaped ground as much as possible to slow runoff and increase time of concentration prior to being conveyed to the proposed public streets and storm sewer system. This will minimize directly connected impervious areas within the project site.

2. ***Implement BMP's that provide a Water Quality Capture Volume with slow release*:** Runoff from this project will be routed through an open cobble-lined swale along the south and western boundaries of the project site. This open swale may function as a water quality device before discharging into the storm system.

3. ***Stabilize Drainage Ways*:** The ultimate outfall of runoff generated by this project is the roadside drainage ditch along Highway 24. The ditch is in an acceptable condition and is able to convey the developed flow without impact to downstream facilities. No further stabilization of the ditch is required at this time.

4. ***Implement Site Specific and Other Source Control BMP's*:** Standard commercial source control will be utilized in order to minimize potential pollutants entering the storm system. Example source control measures consist of: indoor storage of household chemicals; and trash receptacles in common areas.

8.0 DRAINAGE & BRIDGE FEES

Drainage and bridge fees are not required as the site has been previously platted.

9.0 SUMMARY

Development of Lot 1, Block 1 Johnson's Vacation will not adversely affect surrounding or downstream developments. The developed flows (Q_5=3.0cfs and Q_{100}=5.5cfs) reaching the existing Type D inlet at the south corner of the site, are less than those captured by the inlet in its current condition (Q_5=4.0cfs and Q_{100}=7.8cfs) due to the introduction of open space, landscaping and cobble-lined swales.

The runoff generated by this site can be accommodated downstream by the roadside ditch along Highway 24, due to the over-detention of Pond WU to the north allowing area basins to discharge without detention. The ditch is able to accommodate the developed flows without impact to downstream or adjacent properties.

10.0 REFERENCES

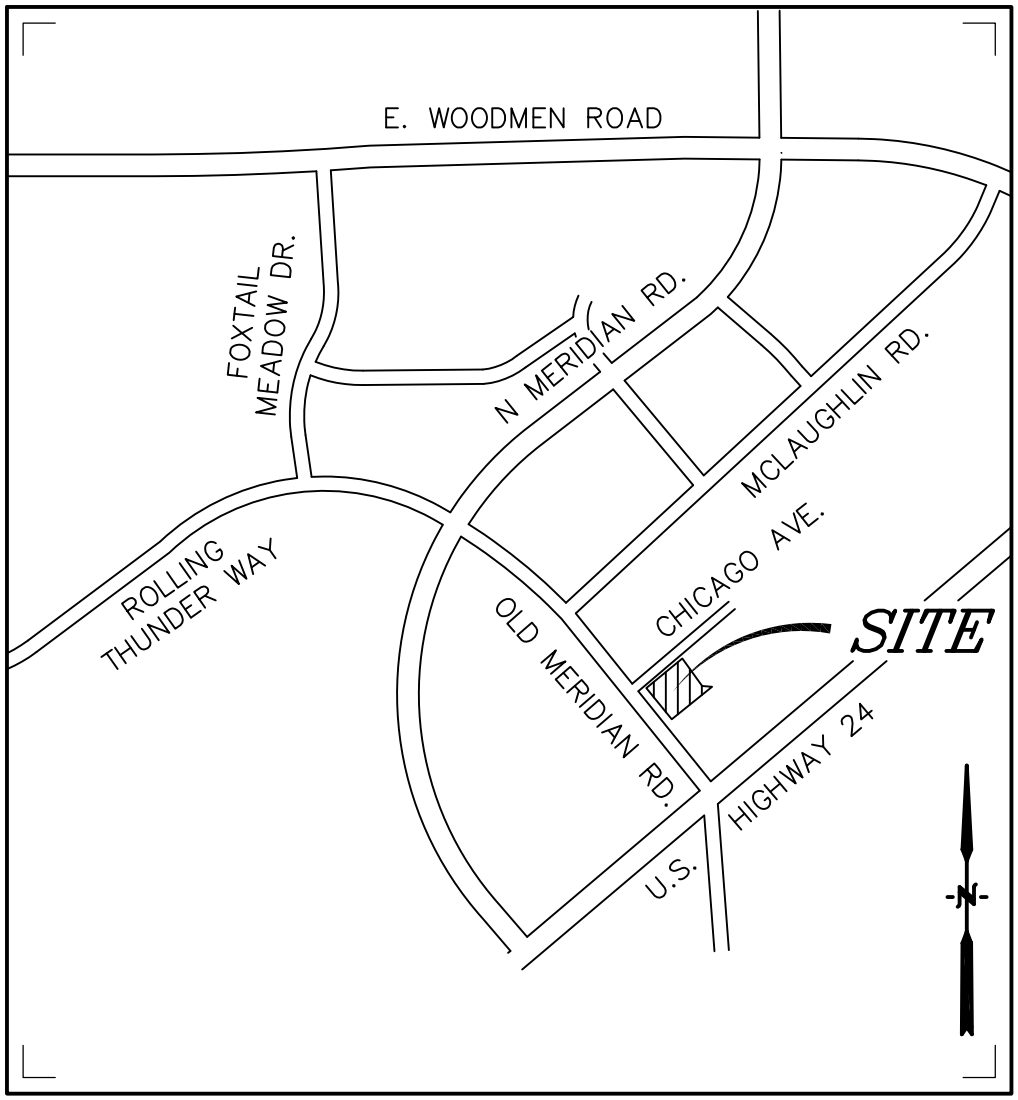
The sources of information used in the development of this study are listed below:

1. El Paso County Drainage Criteria Manual, 10-31-2018.

2. Falcon Highlands Master Development Drainage Plan & Preliminary Drainage Report & Final Drainage Report for Filing No. 1 (URS, Revised January 2005)

3. Falcon Drainage Basin Planning Study (Matrix Design Group, September 2015).

Appendix



Vicinity Map
Not to scale

LOT 1, BLOCK 1 JOHNSONS VAC.
FALCON, CO
VICINITY MAP

Drexel, Barrell & Co.
Engineers • Surveyors

DATE:

JOB NO: 21496-01CSCV

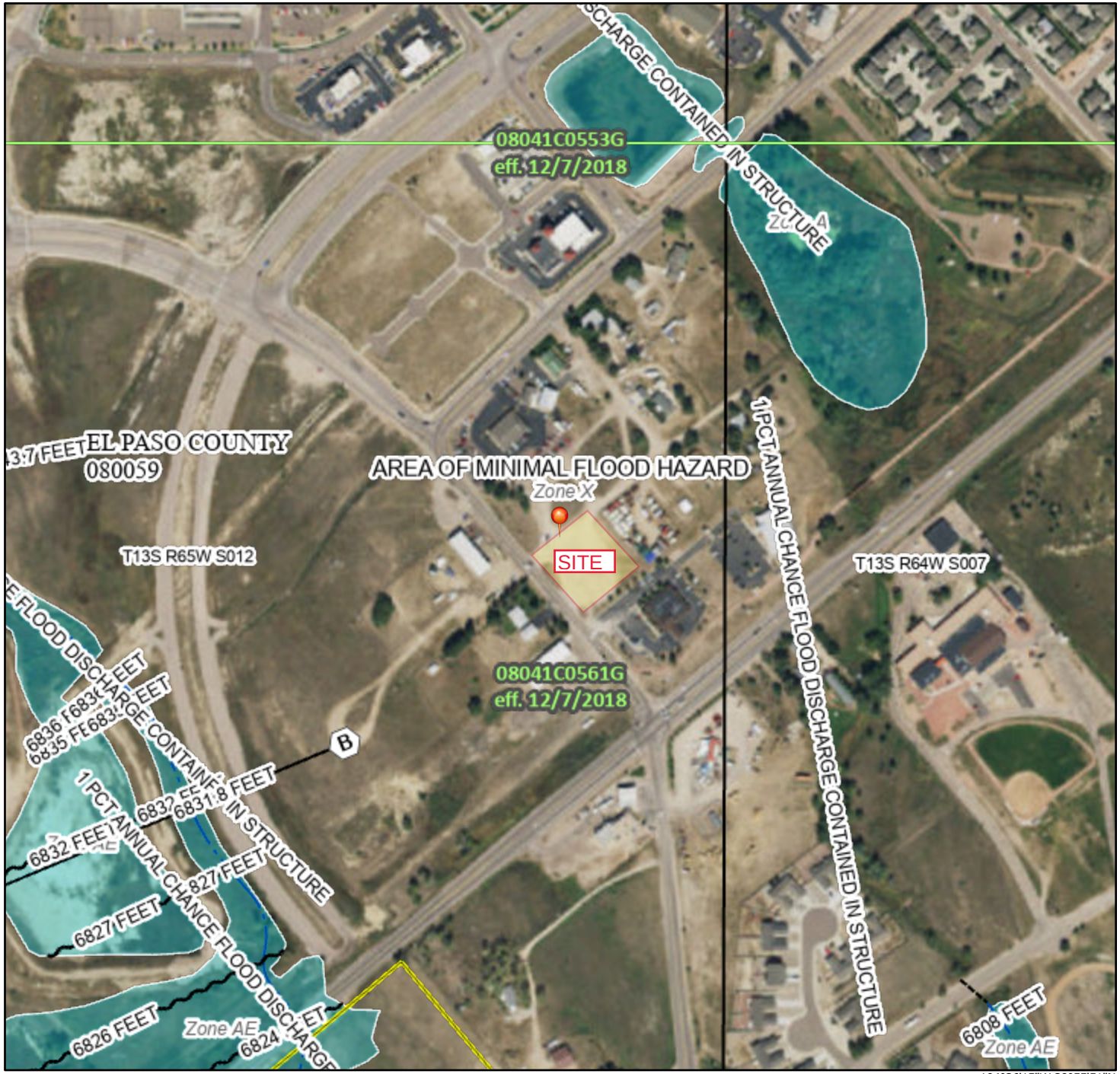
DWG. NO. VMAP

SHEET 1 OF 1

National Flood Hazard Layer FIRMette

FEMA

104°36'53"W 38°56'19"N



104°36'15"W 38°55'51"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/20/2021 at 3:25 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Custom Soil Resource Report
Soil Map

Map Scale: 1:824 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

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 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: 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	0.7	57.6%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	0.5	42.4%
Totals for Area of Interest		**1.2**	**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

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: Flood plains, fan terraces, fans
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

PROJECT INFORMATION

PROJECT: Falcon Kenshin
PROJECT NO: 21496-01
DESIGN BY: KGV
REV. BY: TDM
AGENCY: El Paso County
REPORT TYPE: Final
DATE: 5/18/2023

Drexel, Barrell & Co.

	C2*	C5*	C10*	C100*	% IMPERV
Open Space		0.30		0.45	0
Roof		0.90		0.95	90
Parking/Drives		0.90		0.95	100
Streets: Gravel		0.80		0.85	80

*C-Values and Basin Imperviousness based on Table 5-1, El Paso County Drainage Criteria Manual

EXISTING CONDITION

SUB-BASIN	SURFACE DESIGNATION	AREA ACRE	COMPOSITE RUNOFF COEFFICIENTS C2	C5	C10	C100	% IMPERV
OS1	Open Space	0.15		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Parking/Drives	0.16		0.90		0.95	100
	Streets: Gravel	0.57		0.80		0.85	80
	WEIGHTED AVERAGE			0.73		0.80	70%
TOTAL OS1		0.88					
OS2	Open Space	0.00		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Parking/Drives	0.00		0.90		0.95	100
	Streets: Gravel	0.15		0.80		0.85	80
	WEIGHTED AVERAGE			0.80		0.85	80%
TOTAL OS2		0.15					
E1	Open Space	0.25		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Parking/Drives	0.00		0.90		0.95	100
	Streets: Gravel	0.47		0.80		0.85	80
	WEIGHTED AVERAGE			0.63		0.71	52%
TOTAL E1		0.73					
E2	Open Space	0.06		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Parking/Drives	0.00		0.90		0.95	100
	Streets: Gravel	0.03		0.80		0.85	80
	WEIGHTED AVERAGE			0.46		0.58	26%
TOTAL E2		0.09					

PROJECT INFORMATION

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

EXISTING TIME OF CONCENTRATION

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				TIME OF CONCENTRATION t_c		
BASIN	DESIGN PT:	C_5	C_{100}	AREA	LENGTH	SLOPE	t_i	LENGTH	SLOPE	VEL.	t_t	COMP.		MINIMUM
				Ac	Ft	%	Min	Ft	%	FPS	Min	t_c		t_c
OS1		0.73	0.80	0.88	100	1.0	6.7	235	1.0	5.20	0.8	7.5		5
OS2		0.80	0.85	0.15	100	1.0	5.5	25	1.0	5.20	0.1	5.6		5
E1		0.63	0.71	0.73	100	1.0	8.7	135	1.0	5.20	0.4	9.1		5
OS2+E1	DP1	0.66	0.73	0.88	From E1							9.1		5
E2		0.46	0.58	0.09	76	1.0	10.2					10.2		5

PROJECT INFORMATION

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

EXISTING RUNOFF 5 YR STORM P1= **1.50**

DIRECT RUNOFF							
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C * A	I (IN/HR)	Q (CFS)
OS1		0.88	0.73	7.5	0.65	4.57	3.0
OS2		0.15	0.80	5.6	0.12	5.00	0.6
E1		0.73	0.63	9.1	0.46	4.26	1.9
OS2+E1	DP1	0.88	0.66	9.1	0.58	4.26	2.5
E2		0.09	0.46	10.2	0.04	4.10	0.2

PROJECT INFORMATION

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

EXISTING RUNOFF 100 YR STORM P1= **2.52**

DIRECT RUNOFF

BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C * A	I (IN/HR)	Q (CFS)
OS1		0.88	0.80	7.5	0.71	7.67	5.4
OS2		0.15	0.00	5.6	0.00	8.40	0.0
E1		0.73	0.71	9.1	0.52	7.16	3.7
OS2+E1	DP1	0.88	0.73	9.1	0.65	7.16	4.7
E2		0.09	0.58	10.2	0.05	6.88	0.4

PROJECT INFORMATION

Drexel, Barrell & Co.

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

	C2*	C5*	C10*	C100*	% IMPERV
Open Space		0.30		0.45	0
Roof		0.90		0.95	90
Asphalt/Concrete		0.90		0.95	100
Gravel		0.80		0.85	80

*C-Values and Basin Imperviousness based on Table 5-1, El Paso County Drainage Criteria Manual

DEVELOPED CONDITION

SUB-BASIN	SURFACE DESIGNATION	AREA	COMPOSITE RUNOFF COEFFICIENTS				% IMPERV
		ACRE	**C2**	**C5**	**C10**	**C100**	
OS1	Open Space	0.15		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.00		0.90		0.95	100
	Gravel	0.56		0.80		0.85	80
	WEIGHTED AVERAGE			0.69		0.77	63%
TOTAL OS1		0.70					
OS2	Open Space	0.00		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.00		0.90		0.95	100
	Gravel	0.15		0.80		0.85	80
	WEIGHTED AVERAGE			0.80		0.85	80%
TOTAL OS2		0.15					
OS3	Open Space	0.00		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.03		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.90		0.95	100%
TOTAL OS3		0.03					

RD1	Open Space	0.00		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.15		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.90		0.95	100%
TOTAL RD1		0.15					
A1	Open Space	0.03		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.11		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.78		0.85	80%
TOTAL A1		0.14					
A2	Open Space	0.09		0.30		0.45	0
	Roof	0.12		0.90		0.95	90
	Asphalt/Concrete	0.05		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.69		0.78	61%
TOTAL A2		0.26					
A3	Open Space	0.01		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.11		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.84		0.90	90%
TOTAL A3		0.12					
A4	Open Space	0.09		0.30		0.45	0
	Roof	0.12		0.90		0.95	90
	Asphalt/Concrete	0.04		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.69		0.77	60%
TOTAL A4		0.26					
A5	Open Space	0.02		0.30		0.45	0
	Roof	0.00		0.90		0.95	90
	Asphalt/Concrete	0.00		0.90		0.95	100
	Gravel	0.00		0.80		0.85	80
	WEIGHTED AVERAGE			0.30		0.45	0%
TOTAL A5		0.02					

PROJECT INFORMATION

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

DEVELOPED TIME OF CONCENTRATION

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				TIME OF CONCENTRATION t_c			FINAL t_c
BASIN	DESIGN PT:	C_5	C_{100}	AREA	LENGTH	SLOPE	t_i	LENGTH	SLOPE	VEL.	t_t	COMP.		MINIMUM	
				Ac	Ft	%	Min	Ft	%	FPS	Min	t_c		t_c	Min
OS1	DPO1	0.69	0.77	0.70	100	1.0	7.4	235	1.0	5.20	0.8	8.2		5	8.2
OS2	DPO2	0.80	0.85	0.15	25	1.0	2.8	100	1.0	5.20	0.3	3.1		5	5.0
OS3		0.90	0.95	0.03	20	1.0	1.6	30	1.8	5.20	0.1	1.7		5	5.0
RD1	DP1	0.90	0.95	0.15	20	1.9	1.3	130	1.8	3.00	0.7	2.0		5	5.0
DPO1+DP1+OS3	DPO3	0.74	0.80	0.88	From OS1			30	1.8	5.20	0.1	0.1		5	5.0
A1		0.78	0.85	0.14	10	2.0	1.5	85	1.0	2.50	0.6	2.1		5	5.0
DPO2+A1	DP2	0.17	0.18	1.36	From OS2			85	1.0	2.50	0.6	5.6		5	5.6
A2	DP3	0.69	0.78	0.26	20	10.0	1.5	187	1.0	2.50	1.2	2.8		5	5.0
A3	DP4	0.84	0.90	0.12	20	0.5	2.7	110	1.6	3.00	0.6	3.3		5	5.0
A4		0.69	0.77	0.26	20	10.0	1.6	67	1.0	2.50	0.4	6.0		5	6.0
DP2+DP3+DP4+A4	DP5	0.34	0.38	1.99	From DP2			260	1.0	1.50	2.9	8.5		5	8.5
A5	DP6	0.30	0.45	0.02	25	1.0	7.3	60	1.0	2.50	0.4	7.7		5	7.7

PROJECT INFORMATION

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

DEVELOPED RUNOFF 5 YR STORM P1= **1.50**

DIRECT RUNOFF							
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C * A	I (IN/HR)	Q (CFS)
OS1	DPO1	0.70	0.69	8.2	0.49	4.43	2.2
OS2	DPO2	0.15	0.80	5.0	0.12	5.17	0.6
OS3		0.03	0.90	5.0	0.03	5.17	0.1
RD1	DP1	0.15	0.90	5.0	0.13	5.17	0.7
DPO1+DP1+OS3	DPO3	0.88	0.74	5.0	0.65	5.17	3.4
A1		0.14	0.78	5.0	0.11	5.17	0.6
DPO2+A1	DP2	1.36	0.17	5.6	0.23	5.01	1.2
A2	DP3	0.26	0.69	5.0	0.18	5.17	0.9
A3	DP4	0.12	0.84	5.0	0.10	5.17	0.5
A4		0.26	0.69	6.0	0.18	4.89	0.9
DP2+DP3+DP4+A4	DP5	1.99	0.34	8.5	0.69	4.38	3.0
A5	DP6	0.02	0.30	7.7	0.00	4.51	0.02

PROJECT INFORMATION

PROJECT:	Falcon Kenshin
PROJECT NO:	21496-01
DESIGN BY:	KGV
REV. BY:	TDM
AGENCY:	El Paso County
REPORT TYPE:	Final
DATE:	5/18/2023

Drexel, Barrell & Co.

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

DEVELOPED RUNOFF 100 YR STORM P1= **2.52**

DIRECT RUNOFF

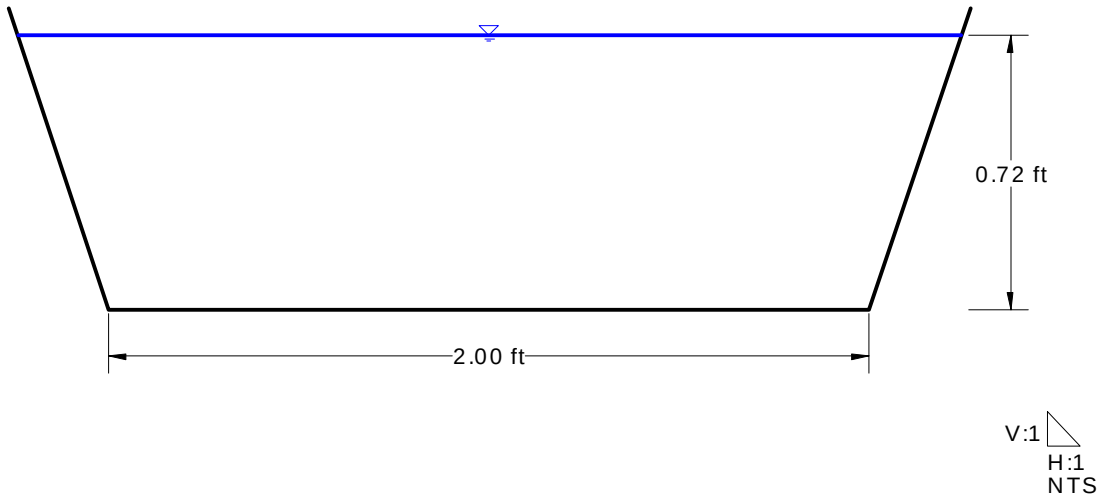
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C * A	I (IN/HR)	Q (CFS)
OS1	DPO1	0.70	0.77	8.2	0.54	7.44	4.0
OS2	DPO2	0.15	0.85	5.0	0.13	8.68	1.1
OS3		0.03	0.95	5.0	0.03	8.68	0.3
RD1	DP1	0.15	0.95	5.0	0.14	8.68	1.2
DPO1+DP1+OS3	DPO3	0.88	0.80	5.0	0.71	8.68	6.2
A1		0.14	0.85	5.0	0.12	8.68	1.0
DPO2+A1	DP2	1.36	0.18	5.6	0.25	8.41	2.1
A2	DP3	0.26	0.78	5.0	0.20	8.68	1.8
A3	DP4	0.12	0.90	5.0	0.11	8.68	0.9
A4		0.26	0.77	6.0	0.20	8.21	1.6
DP2+DP3+DP4+A4	DP5	1.99	0.38	8.5	0.75	7.36	5.5
A5	DP6	0.02	0.45	7.7	0.01	7.58	0.1

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channe
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.035	
Slope	015000	ft/ft
Depth	0.72	ft
Left Side Slope	3.00	V : H
Right Side Slope	3.00	V : H
Bottom Width	2.00	ft
Discharge	5.00	cfs

2' DEEP CHANNEL. 0.72' FLOW DEPTH = MORE THAN 1' OF FREEBOARD AT 100-YR CONDITION



Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Trapezoidal Channe
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.035	
Slope	015000	ft/ft
Left Side Slope	3.00	V : H
Right Side Slope	3.00	V : H
Bottom Width	2.00	ft
Discharge	5.00	cfs

Results		
Depth	0.72	ft
Flow Area	1.6	ft²
Wetted Perim	3.52	ft
Top Width	2.48	ft
Critical Depth	0.56	ft
Critical Slope	0.032882	ft/ft
Velocity	3.09	ft/s
Velocity Head	0.15	ft
Specific Energ	0.87	ft
Froude Numb	0.68	
Flow Type	Subcritical	

2' DEEP CHANNEL. 0.72' FLOW DEPTH = MORE THAN 1' OF FREEBOARD AT 100-YR CONDITION

MATCHLINE LOWER RIGHT

TRACT A
BLOCK 14
FALCON

CHICAGO AVE.

LOTS 1–8 BLOCK 20
& LOTS 14–16 BLOCK 19
FALCON

OS1
1.01 0.56 0.66

OS2
0.15 0.80 0.85

E1
0.73 0.63 0.71

E2
0.09 0.48 0.58

EXISTING 5' TYPE R
CURB INLET

EXISTING 15' TYPE R
CURB INLET

EXISTING TYPE D
AREA INLET

6842
6841
6840
6839
6838
6837

LP

OLD MERIDIAN ROAD

LOT 1
HIGH PRAIRIE
BRANCH LIBRARY

MATCHLINE UPPER LEFT

OS1
1.01 0.39 0.68

LEGEND

PROPOSED INTERMEDIATE CONTOUR 5522
PROPOSED INDEX CONTOUR 5520
EX. INTERMEDIATE CONTOUR 5364
EX. INDEX CONTOUR 5365
DIRECTION OF FLOW .....
BASIN BOUNDARY
FLOW DIRECTION
DESIGN POINT

X
AREA (ACRE) — BASIN
AREA C5 C100 — C5
C100

BASIN & DESIGN POINT SUMMARY				
BASIN (S)	DP	AREA (AC)	Q5	Q100
OS1		0.88	3.0	5.4
OS2		0.15	0.6	1.1
E1		0.73	1.9	3.7
	DP1	0.88	2.5	4.7
E2		0.09	0.2	0.4

N

20 10 0 20 40
SCALE: 1"=20'

PREPARED BY:

DREXEL, BARRELL & CO.
Engineers • Surveyors
3 SOUTH 7TH STREET
COLORADO SPGS, COLORADO 80905
CONTACT: TIM D. McCONNELL, P.E.
(719)260-0887
BOULDER • COLORADO SPRINGS • GREELEY

CLIENT:

HESED, LLC
10308 MT. EVANS DRIVE
PEYTON, CO 80831

SITE PLAN FOR:
FALCON KENSHIN
KARATE STUDIO
FALCON, COLORADO

ISSUE	DATE
INITIAL ISSUE	9/30/21
REVISED	4/4/22

DESIGNED BY:	KGV
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	21496-01 DRN

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF DREXEL, BARRELL & CO.

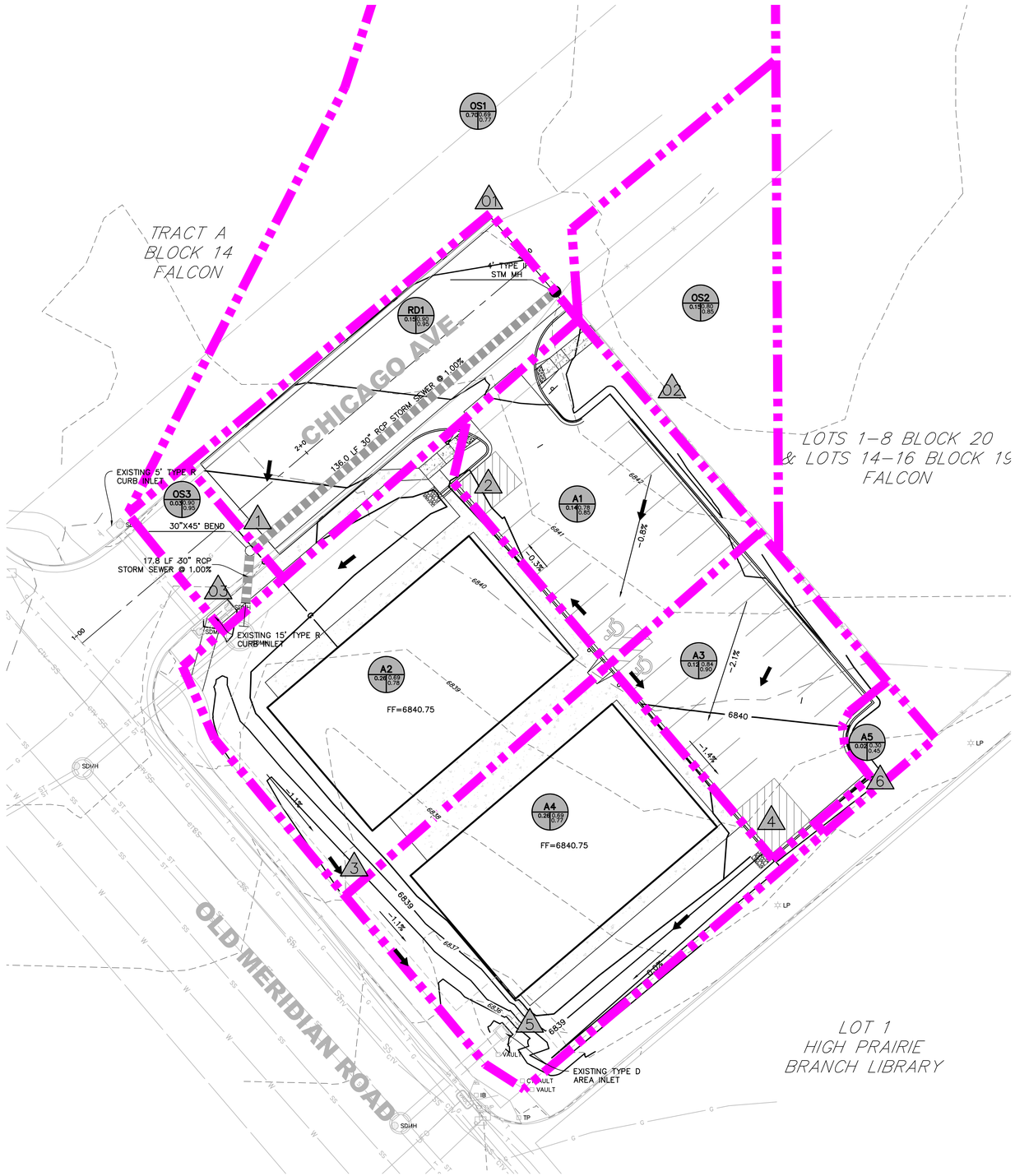
DRAWING SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: N/A

EXISTING
DRAINAGE
CONDITIONS

PROJECT NO. 21496-01CSCV

DRAWING NO.

E1



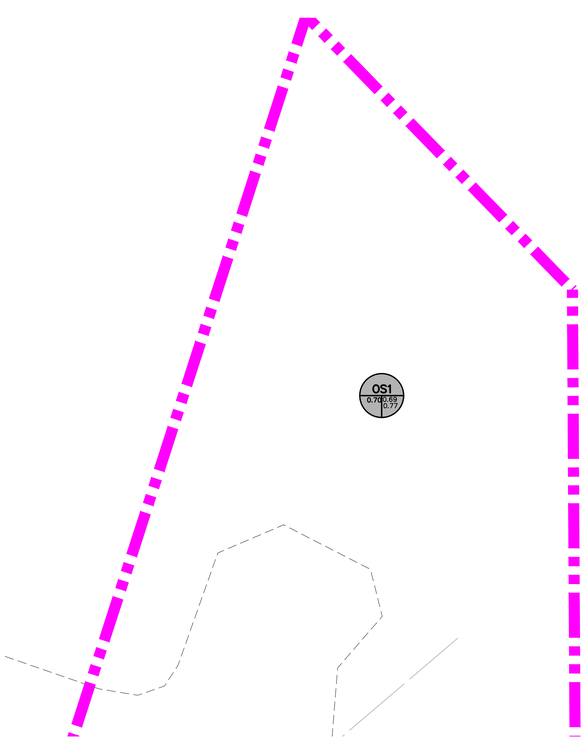
LEGEND

- PROPOSED INTERMEDIATE CONTOUR 5522
- PROPOSED INDEX CONTOUR 5520
- *EX. INTERMEDIATE CONTOUR* *5364*
- *EX. INDEX CONTOUR* *5365*
- DIRECTION OF FLOW ..... ←
- HIGH POINT ..... HP
- LOW POINT ..... LP
- PROPOSED INLET ..... ▬
- PROPOSED MANHOLE ..... ●
- BASIN BOUNDARY
- FLOW DIRECTION
- DESIGN POINT (X)
- AREA (ACRE) / BASIN / C5 / C100

20 10 0 20 40

SCALE: 1"=20'

RUNOFF SUMMARY				
BASIN (S)	DP	AREA (AC)	Q5	Q100
OS1	DPO1	0.70	2.2	4.0
OS2	DPO2	0.15	0.6	1.1
OS3		0.03	0.1	0.3
RD1	DP1	0.15	0.7	1.2
	DPO3	0.88	3.4	6.2
A1		0.14	0.6	1.0
	DP2	1.36	1.2	2.1
A2	DP3	0.26	0.9	1.8
A3	DP4	0.12	0.5	0.9
A4		0.26	0.9	1.6
	DP5	1.99	3.0	5.5
A5	DP6	0.02	0.0	0.1



PREPARED BY:

DREXEL, BARRELL & CO.
Engineers • Surveyors
3 SOUTH 7TH STREET
COLORADO SPGS, COLORADO 80905
CONTACT: TIM D. McCONNELL, P.E.
(719)260-0887
BOULDER • COLORADO SPRINGS • GREELEY

CLIENT:

HESED, LLC
10308 MT. EVANS DRIVE
PEYTON, CO 80831

SITE PLAN FOR:

FALCON KENSHIN KARATE STUDIO

FALCON, COLORADO

ISSUE	DATE
INITIAL ISSUE	10/17/21
RESUBMITTAL	1/27/23

DESIGNED BY:	KGV
DRAWN BY:	KGV
CHECKED BY:	TDM
FILE NAME:	21496-01 DRN

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF DREXEL, BARRELL & CO.

DRAWING SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: N/A

PROPOSED DRAINAGE CONDITIONS

PROJECT NO. 21496-01CSCV

DRAWING NO.

P1

SHEET: 2 OF 2