

DRAINAGE LETTER
for
ROLLING HILLS RANCH ESTATES FILING NO. 3

525 S. Page Rd.
Colorado Springs, CO 80930

September 2024

PCD File No. EA2472

Prepared for:

Debra Osban
839 Queride Dr.
Colorado Springs, CO 80909
(719) 243-0544

Prepared by:

Drexel, Barrell & Co.
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DRAINAGE LETTER
for
ROLLING HILLS RANCH ESTATES FILING NO. 3

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 El Paso 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 omission on my part in preparing this report.



Tim D. McConnell, P.E. Date
Colorado P.E. License No. 33797
For and on Behalf of Drexel, Barrell & Co.

Developer's Statement

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

Authorized Signature Date
Debra Osban – Property owner
839 Queride Dr.
Colorado Springs, CO 80909

El Paso County

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

Joshua Palmer, PE Date
County Engineer/ECM Administrator

Conditions:

2.0 PURPOSE

The purpose of this report is to identify the existing and proposed runoff patterns and drainage facilities required for Rolling Hills Ranch Estates Filing No. 3 development, and to present the ability to safely route developed storm water.

3.0 GENERAL SITE DESCRIPTION

Location

Rolling Hills Ranch Estates Filing No. 3 is a 9.72 acre site located in Section 18, Township 14 South, Range 63 West of the 6th Principal Meridian in the County of El Paso, State of Colorado. The site is bounded to the west by Page Rd., to the south and east by undeveloped land, and to the north by Lot 8 Rolling Hills Ranch Estates Filing No. 1, which is currently undeveloped.

Site Conditions

The site is 9.72 acres and is currently undeveloped. It is covered with native grass and vegetation. The site generally slopes from west to east at slopes ranging from 1-5%. The proposed development is one single-family home, which will disturb approximately 0.9 acres. The proposed project is not part of a larger common plan of development, so no water quality or full spectrum detention is required.

Soils

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Natural Resources Conservation Service (NCRS), the site is underlain by blakeland loamy sand. These soils are classified as hydrological soil group A, and are considered to be well drained with low runoff potential. Runoff coefficients corresponding to group A were used for the purposes of the site drainage analysis.

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 08041C0805G (12/7/2018), no portion of the site lies within a designated 100-year 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 historic and developed conditions using the Rational Method as required for basins containing less than 100 acres.

5.0 EXISTING CONDITION

Rolling Hills Ranch Estates Filing No. 3 is currently undeveloped and covered in native grasses and vegetation. This site is being treated as one drainage basin for purposes of this report, as drainage patterns are proposed to remain the same, and in order to show the difference in percent imperviousness and runoff quantities from the existing condition to the proposed condition. See appendix for existing condition map.

The Rational Method was used to determine runoff quantities for the 5- and 100-yr storm recurrence intervals. See below for a summary runoff table.

Rational Method Runoff Summary

BASIN	AREA (AC)	% IMPERV	Q5 (cfs)	Q100 (cfs)
A	9.72	0%	2.4	18.3

6.0 PROPOSED CONDITION

The proposed site consists of one single-family residence, which will disturb under an acre (0.9 acres). Development will include the house, surrounding grading and a gravel driveway connecting to Page Rd. This site is being treated as one drainage basin for purposes of this report, as drainage patterns are proposed to remain the same, and in order to show the difference in percent imperviousness and runoff quantities from the existing condition to the proposed condition. See appendix for existing condition map.

The Rational Method was used to determine runoff quantities for the 5- and 100-yr storm recurrence intervals. See below for a summary runoff table.

Rational Method Runoff Summary

BASIN	AREA (AC)	% IMPERV	Q5 (cfs)	Q100 (cfs)
A	9.72	2%	2.7	18.9

As can be seen, the site remains mostly undisturbed. The percent imperviousness from the existing to proposed condition is an increase of 2%. The site runoff increase from the

existing condition to the proposed condition is 0.3 cfs for the 5-yr storm occurrence and 0.6 cfs for the 100-yr storm occurrence. These increases are considered negligible and will not adversely affect downstream areas as they flow in historic patterns across undeveloped native grasslands to the south approximately 1,000 feet to an unnamed tributary. This tributary eventually carries the flows to Black Squirrel Creek. With the Type A soils in the area, it is likely that the small increase in flows will infiltrate prior to reaching the creek.

7.0 PROPOSED DETENTION/WATER QUALITY FACILITIES

There is no proposed detention for this site as it is under an acre of disturbance and is not part of a larger common plan of development, so no water quality or full spectrum detention is required.

8.0 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 area, gravel and natural grasses in an effort to slow runoff and increase time of concentration prior to entering the unnamed tributary. 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:** The total disturbed area of the site is 0.90 acres. There is no proposed on-site detention for this project.
3. **Stabilize Drainage Ways:** The unnamed tributary will not require any stabilization to occur due to the small increase in runoff from this site. The tributary is in acceptable condition and is able to convey the flows without impact to downstream facilities.
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 creek. Example source control measures consist of: indoor storage of chemicals; and trash receptacles in common areas.

9.0 DRAINAGE & BRIDGE FEES

The project site is located within the Livestock Company Drainage Basin.

The 2024 Livestock Company Drainage Basin Fees are as follows:

Drainage fee \$22,973/impervious acre
Bridge Fee \$273/impervious acre

The percent imperviousness for this project site is calculated as follows:

9.72 acres x 2.1% = 0.20 impervious acres

Therefore, the following fees are due:

0.20 acres x \$22,973 = **\$4,594.60 drainage fee**
0.20 acres x \$273 = **\$54.60 bridge fee**

See appendix for impervious acre calculations.

10.0 CONSTRUCTION COST ESTIMATE

No storm sewer improvements are proposed.

11.0 SUMMARY

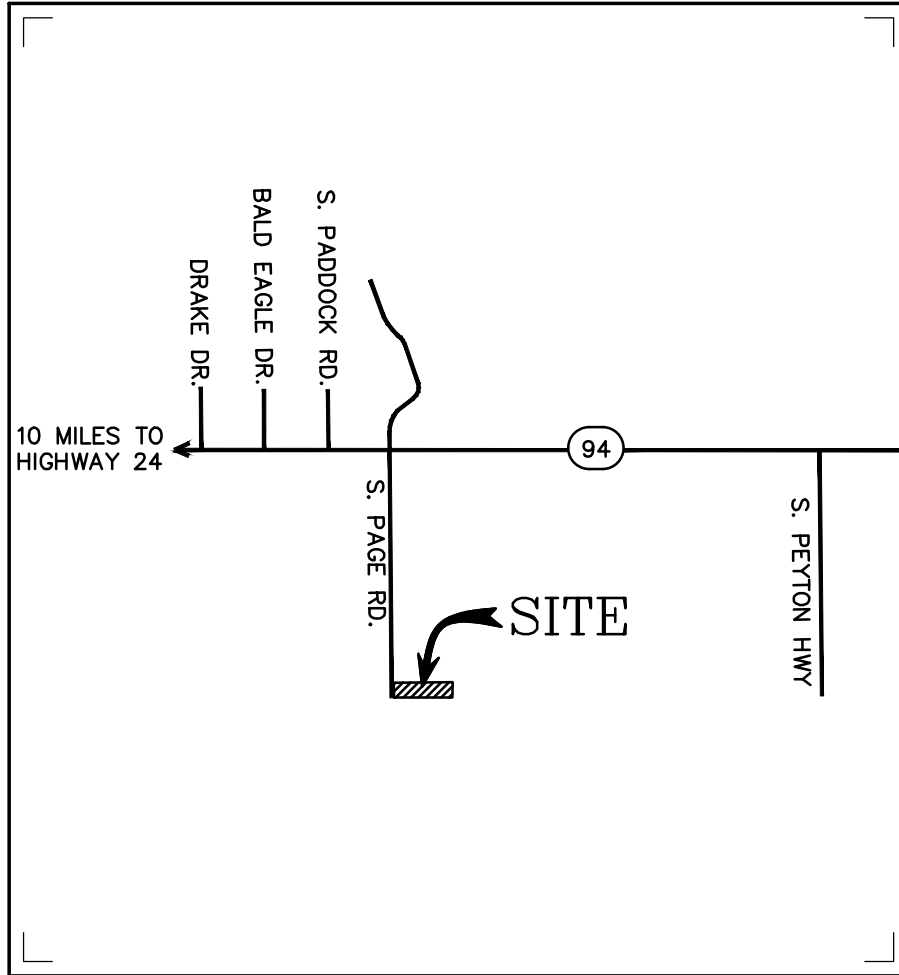
Site runoff associated with the proposed construction of a single-family residence on Rolling Hills Ranch Estates Filing No. 3 is negligible and will not adversely affect the surrounding or downstream developments. Developed runoff will be safely routed in historic patterns to the east.

12.0 REFERENCES

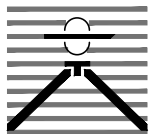
The sources of information used in the development of this study are listed below:

1. El Paso County Drainage Criteria Manual, October 2018
2. El Paso County Engineering Criteria Manual, October 2020
3. Urban Storm Drainage Criteria Manuals, Urban Drainage and Flood Control District. June 2001, Revised April 2008.
4. Natural Resources Conservation Service (NRCS) Web Soil Survey
5. Federal Emergency Management Agency, Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Map Number 8041CO805G, Effective Date December 7, 2018.

APPENDIX



Vicinity Map
Not to scale



**ROLLING HILLS RANCH ESTATES
FILING NO. 3
VICINITY MAP**

Drexel, Barrell & Co.
Engineers • Surveyors

DATE:

DWG. NO.

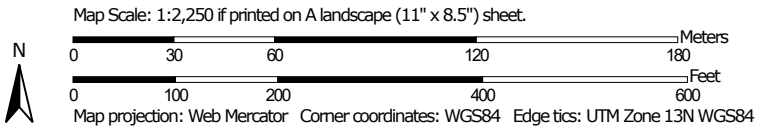
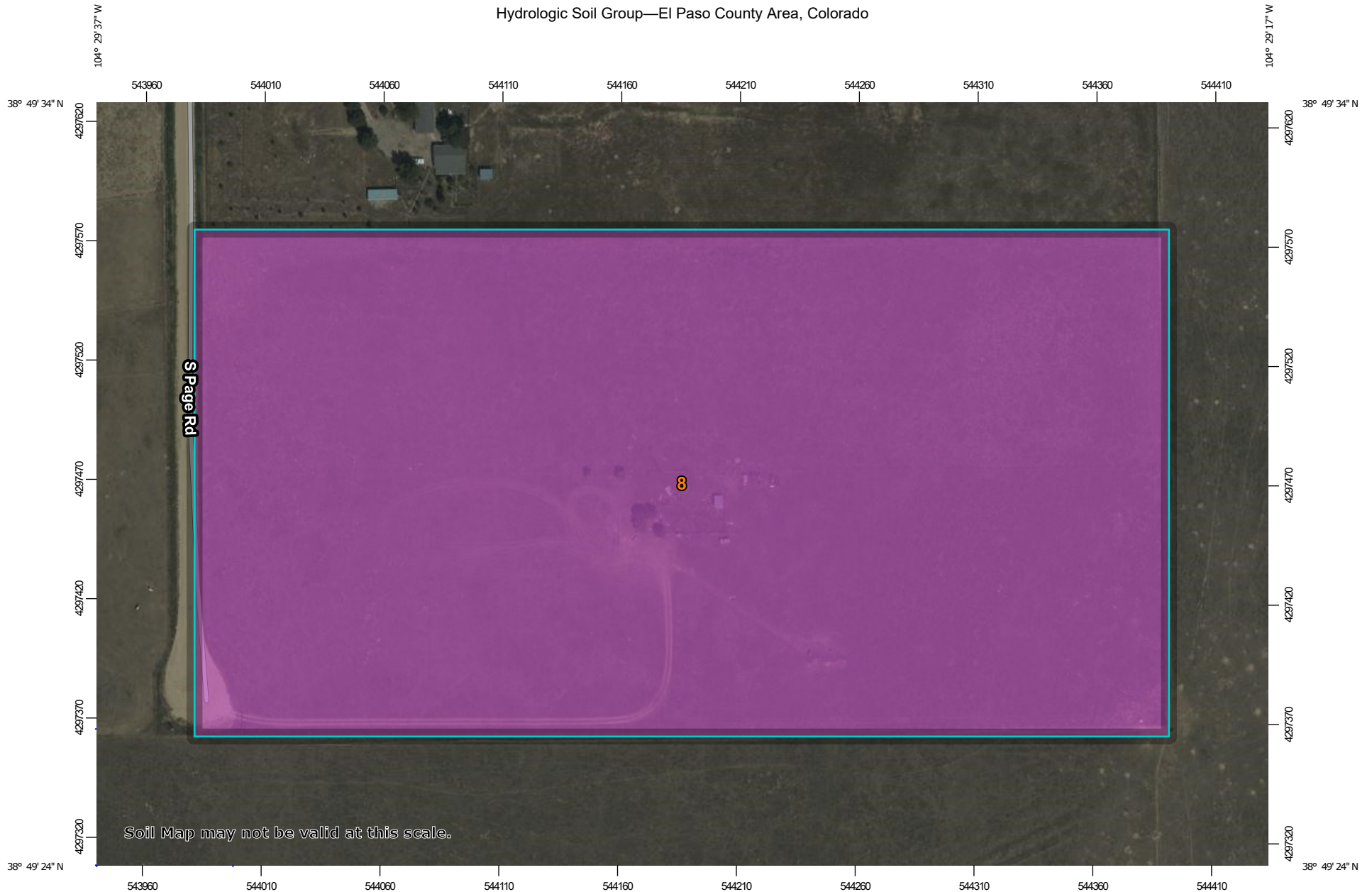
JOB NO:

21919-01CSCV

VMAP


SHEET 1 OF 1

Hydrologic Soil Group—El Paso County Area, Colorado



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines


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

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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 21, Aug 24, 2023

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

Date(s) aerial images were photographed: 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	21.6	100.0%
Totals for Area of Interest			21.6	100.0%

Description

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

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

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

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

National Flood Hazard Layer FIRMette



104°29'47"W 38°49'42"N



Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		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 <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
		Area of Undetermined Flood Hazard <i>Zone D</i>
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 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

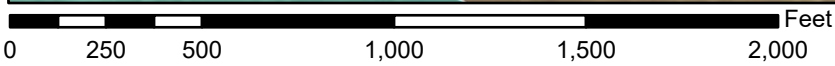


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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 **9/12/2024 at 10:57 AM** 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.



1:6,000

104°29'9"W 38°49'14"N

Basemap Imagery Source: USGS National Map 2023

PROJECT INFORMATION



Drexel, Barrell & Co.

PROJECT: Rolling Hills Ranch
 PROJECT NO: 21919-01
 DESIGN BY: SBN
 REV. BY: TDM
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 9/16/2024
 Soil Type: A

	C2*	C5*	C10*	C100*	% IMPERV
Pasture/Meadow		0.08		0.35	0
1 acre Residential		0.20		0.44	20
Gravel		0.59		0.70	80

*C-Values and Basin Imperviousness based on Table 6-6, El Paso County "Drainage Criteria Manual"

EXISTING

SUB-BASIN	SURFACE DESIGNATION	AREA ACRE	COMPOSITE RUNOFF COEFFICIENTS				% IMPERV
			C2	C5	C10	C100	
A	Pasture/Meadow	9.72		0.08		0.35	0
	1 acre Residential	0.00		0.20		0.44	20
	Gravel	0.00		0.59		0.70	80
	WEIGHTED AVERAGE			0.08		0.35	0%
TOTAL A		9.72					
TOTAL SITE		9.72		0.08		0.35	0.0%

PROJECT INFORMATION

PROJECT: Rolling Hills Ranch
 PROJECT NO: 21919-01
 DESIGN BY: SBN
 REV. BY: #REF!
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 9/16/2024



RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

EXISTING TIME OF CONCENTRATION STANDARD FORM SF-2

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t _i)				TRAVEL TIME (t _t)					TIME OF CONC. t _c		FINAL t _c
BASIN	DESIGN PT.	C _s	C ₁₀₀	AREA	LENGTH	HT	SLOPE	t _i	LENGTH	HT	SLOPE	VEL.	t _t	COMP.	MINIMUM	
				Ac	Ft	FT	%	Min	Ft	FT	%	FPS	Min	t _c	t _c	Min
A		0.08	0.35	9.72	100	2	2.0	15.1	1240	25	2.0	4.4	4.7	19.9	5	19.9



Drexel, Barrell & Co.

PROJECT INFORMATION

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 PROJECT NO: 21919-01
 DESIGN BY: SBN
 REV. BY: #REF!
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 9/16/2024

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

EXISTING	RUNOFF		5 YR STORM		P1=		1.50
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A	I (IN/HR)	Q (CFS)
A		9.72	0.08	19.9	0.78	3.02	2.4



Drexel, Barrell & Co.

PROJECT INFORMATION

PROJECT: Rolling Hills Ranch
 PROJECT NO: 21919-01
 DESIGN BY: SBN
 REV. BY: TDM
 AGENCY: El Paso County
 REPORT TYPE: #REF!
 DATE: 9/16/2024

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

EXISTING	RUNOFF	100 YR STORM			P1=	2.67	
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A	I (IN/HR)	Q (CFS)
A		9.72	0.35	19.9	3.40	5.38	18.3

PROJECT INFORMATION

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 PROJECT NO: 21919-01
 DESIGN BY: SBN
 REV. BY: TDM
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 9/16/2024
 Soil Type: A



Drexel, Barrell & Co.

	C2*	C5*	C10*	C100*	% IMPERV
Pasture/Meadow		0.08		0.35	0
1 acre Residential		0.20		0.44	20
Gravel		0.59		0.70	80

*C-Values and Basin Imperviousness based on Table 6-6, El Paso County "Drainage Criteria Manual"

PROPOSED

SUB-BASIN	SURFACE DESIGNATION	AREA ACRE	COMPOSITE RUNOFF COEFFICIENTS				% IMPERV
			C2	C5	C10	C100	
A	Pasture/Meadow	8.79		0.08		0.35	0
	1 acre Residential	0.90		0.20		0.44	20
	Gravel	0.03		0.59		0.70	80
	WEIGHTED AVERAGE			0.09		0.36	2%
TOTAL A		9.72					
TOTAL SITE		9.72		0.09		0.36	2.1%

PROJECT INFORMATION

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 DESIGN BY: SBN
 REV. BY: TDM
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 9/16/2024



**RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF
 PROPOSED**

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t _i)				TRAVEL TIME (t _t)					TIME OF CONC. t _c		FINAL t _c
BASIN	DESIGN PT.	C _s	C ₁₀₀	AREA	LENGTH	HT	SLOPE	t _i	LENGTH	HT	SLOPE	VEL.	t _t	COMP.	MINIMUM	
				Ac	Ft	FT	%	Min	Ft	FT	%	FPS	Min	t _c	t _c	Min
A		0.09	0.36	9.72	100	2	2.0	15.0	1240	25	2.0	4.4	4.7	19.7	5	19.7



Drexel, Barrell & Co.

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 REV. BY: TDM
 AGENCY: El Paso County
 REPORT TYPE: Final
 DATE: 9/16/2024

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

PROPOSED	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)
A		9.72	0.09	19.7	0.90	3.04	2.7



Drexel, Barrell & Co.

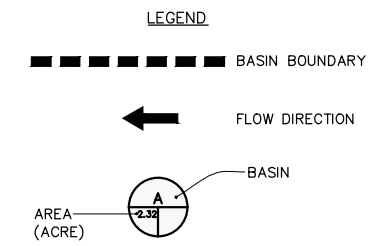
PROJECT INFORMATION

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REV. BY: TDM
AGENCY: El Paso County
REPORT TYPE: Final
DATE: 9/16/2024

RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

PROPOSED	RUNOFF	100 YR STORM			P1=	2.67	
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t _c (MIN)	C * A	I (IN/HR)	Q (CFS)
A		9.72	0.36	19.7	3.49	5.41	18.9

H:\21919-01\CSCV\Reports\Drainage\21919-01_DR.dwg, 9/16/2024, 11:06:12 AM



EXISTING:

BASIN	AREA (AC)	% IMPERV	Q5 (cfs)	Q100 (cfs)
A	9.72	0%	2.4	18.3

PROPOSED:

BASIN	AREA (AC)	% IMPERV	Q5 (cfs)	Q100 (cfs)
A	9.72	2.1%	2.7	18.9



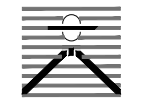
SCALE: NTS



Know what's below. Call before you dig.

CALL 3-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

PREPARED BY:



DREXEL, BARRELL & CO.
Engineers • Surveyors
101 S. SAHWATCH ST. #100
COLORADO SPGS, COLORADO 80903
CONTACT: TIM D. MCCONNELL, P.E.
(719)260-0887
COLORADO SPRINGS • LAFAYETTE

CLIENT:

DEBRA OSBAN

839 QUERIDE DR.
COLORADO SPRINGS, CO 80909
(719) 243-0544

CONSTRUCTION DOCUMENTS
**ROLLING HILLS RANCH
ESTATES FILING NO. 3**
COLORADO SPRINGS, COLORADO

ISSUE	DATE
INITIAL ISSUE	9/17/24
DESIGNED BY:	SBN
DRAWN BY:	SBN
CHECKED BY:	TDM

FILE NAME: 21919-01 DR

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



DRAWING SCALE:
HORIZONTAL: NTS
VERTICAL: N/A

DRAINAGE MAP

PROJECT NO. 21919-01CSCV
DRAWING NO.

DR

SHEET: 1 OF 1