# DRAINAGE LETTER

for

# **ROLLING HILLS RANCH ESTATES FILING NO. 3**

525 S. Page Rd. Colorado Springs, CO 80930

# November 2024

PCD File No. SF2423

Prepared for:

Debra Osban

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

Prepared by:

Drexel, Barrell & Co.

101 S. Sahwatch St. #100 Colorado Springs, CO 80903 Contact: Tim McConnell, P.E. (719) 260-0887

# **TABLE OF CONTENTS**

CERTIFICATION STATEMENTS	1
PURPOSE	2
GENERAL SITE DESCRIPTION	2
DRAINAGE CRITERIA	3
EXISTING CONDITION	3
PROPOSED CONDITION	3
PROPOSED DETENTION/WATER QUALITY FACILITIES	4
FOUR-STEP PROCESS	4
DRAINAGE & BRIDGE FEES	4
CONSTRUCTION COST ESTIMATE	5
SUMMARY	5
REFERENCES	5
	PURPOSE

# **APPENDICES**

VICINITY MAP SOILS MAP FLOODPLAIN MAP HYDROLOGY CALCULATIONS MAPS

# **DRAINAGE LETTER**

for

# **ROLLING HILLS RANCH ESTATES FILING NO. 3**

# 1.0 CERTIFICATION STATEMENTS

# **Engineer's Statement**

Conditions:

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.

ermonem erm, je em mijereje em G mme reje em	
Time D. McConnell D.F.	Data
Tim D. McConnell, P.E. Colorado P.E. License No. 33797 For and on Behalf of Drexel, Barrell & Co.	Date
Developer's Statement	
I, the developer have read and will comp drainage report and plan.	oly with all the requirements specified in this
Authorized Signature Debra Osban – Property owner 839 Queride Dr. Colorado Springs, CO 80909	Date
El Paso County	
·	of the Drainage Criteria Manual, Volumes a Manual and Land Development Code a
Joshua Palmer, PE County Engineer/ECM Administrator	Date

## 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 6<sup>th</sup> 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. There is an existing gravel driveway and a gravel pad where the proposed home is to be constructed. 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. There is an existing gravel driveway and a gravel pad where the proposed home is to be constructed. 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)
Α	9.72	3.87%	3.1	19.4

# 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 and surrounding grading. 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)
Α	9.72	3.94%	3.1	19.4

As can be seen, the site remains mostly undisturbed. The percent imperviousness from the existing to proposed condition is an increase of 0.07%. The site runoff does not

increase from the existing condition to the proposed condition, therefore there will be no adverse effect downstream as they sheet flow spread out along the southern site boundary in historic patterns across undeveloped native grasslands to the south approximately 1,800 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 these flows will infiltrate prior to reaching the creek.

# 7.0 PROPOSED DETENTION/WATER QUALITY FACILITIES

There is no proposed detention for this site as the increase in the developed flows is less than 5% 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:
  There is no increase in flows due to this development. 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 there being no 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 3.9% = 0.38 impervious acres

Therefore, the following fees are due:

25% reduction is for drainage fees only and does not apply to bridge fees.

0.38 acres x \$22,973 = \$8,729.74

x 0.75 (25% low density lot fee reduction)= \$6,547.31 drainage fee

0.38 acres x \$273 = \$103.74

X 0.75 (25% low density lot fee reduction)=\$77.81 bridge fee

See appendix for impervious acre calculations.

# 10.0 CONSTRUCTION COST ESTIMATE

No storm sewer improvements are proposed.

# 11.0 SUMMARY

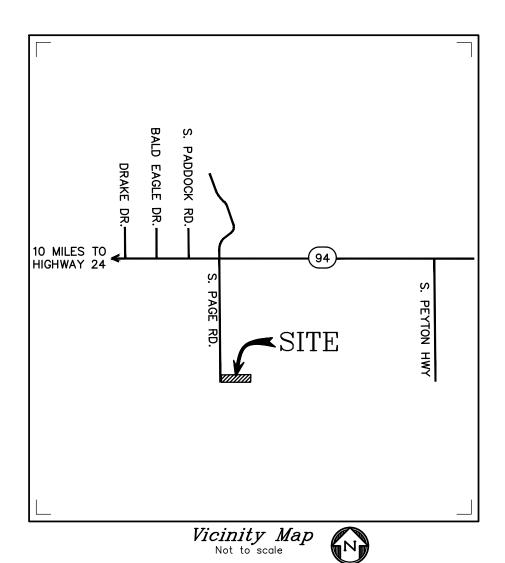
Site runoff associated with the proposed construction of a single-family residence on Rolling Hills Ranch Estates Filing No. 3 is does not increase, therefore will not adversely affect the surrounding or downstream developments. Developed runoff will be safely routed as sheet flow in historic patterns to the south.

### 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**





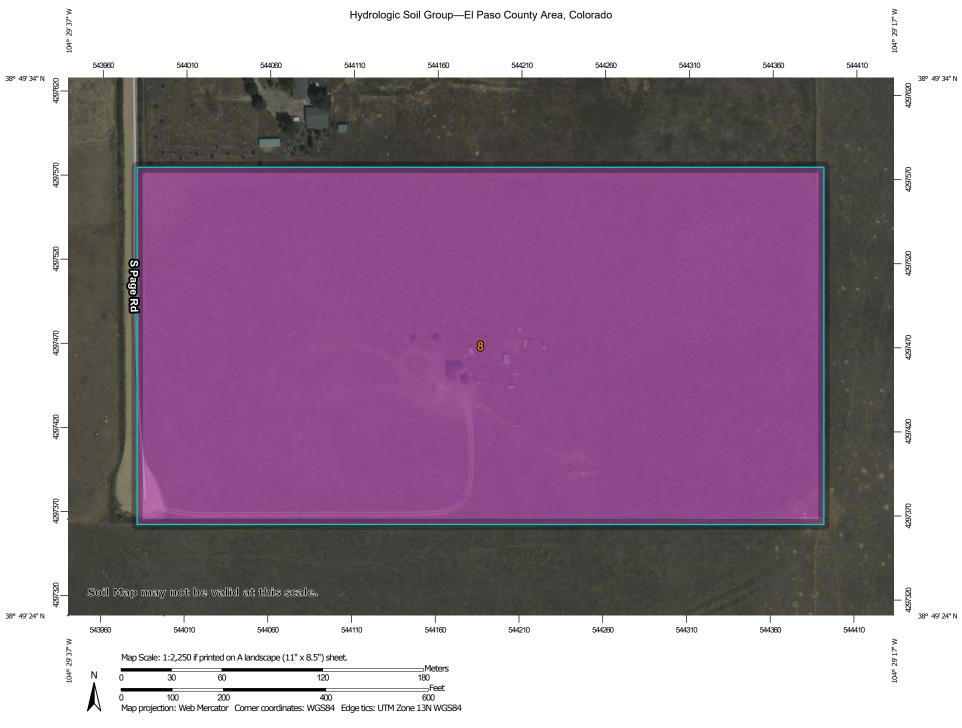
ROLLING HILLS RANCH ESTATES FILING NO. 3 VICINITY MAP Drexel, Barrell & Co.
Engineers • Surveyors

DWG. NO.

DATE:

JOB NO:
21919-01CSCV

**VMAP**SHEET 1 OF 1



### MAP LEGEND MAP INFORMATION The soil surveys that comprise your AOI were mapped at Area of Interest (AOI) С 1:24.000. Area of Interest (AOI) C/D Soils Warning: Soil Map may not be valid at this scale. D Soil Rating Polygons Enlargement of maps beyond the scale of mapping can cause Not rated or not available Α misunderstanding of the detail of mapping and accuracy of soil **Water Features** line placement. The maps do not show the small areas of A/D Streams and Canals contrasting soils that could have been shown at a more detailed В Transportation B/D Rails ---Please rely on the bar scale on each map sheet for map measurements. Interstate Highways C/D Source of Map: Natural Resources Conservation Service **US Routes** Web Soil Survey URL: D Major Roads Coordinate System: Web Mercator (EPSG:3857) Not rated or not available -Local Roads Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts Soil Rating Lines Background distance and area. A projection that preserves area, such as the Aerial Photography 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. B/D 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. Not rated or not available Date(s) aerial images were photographed: Sep 11, 2018—Oct 20. 2018 **Soil Rating Points** The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background A/D imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident. B/D

# **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	А	21.6	100.0%
Totals for Area of Intere	est		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.

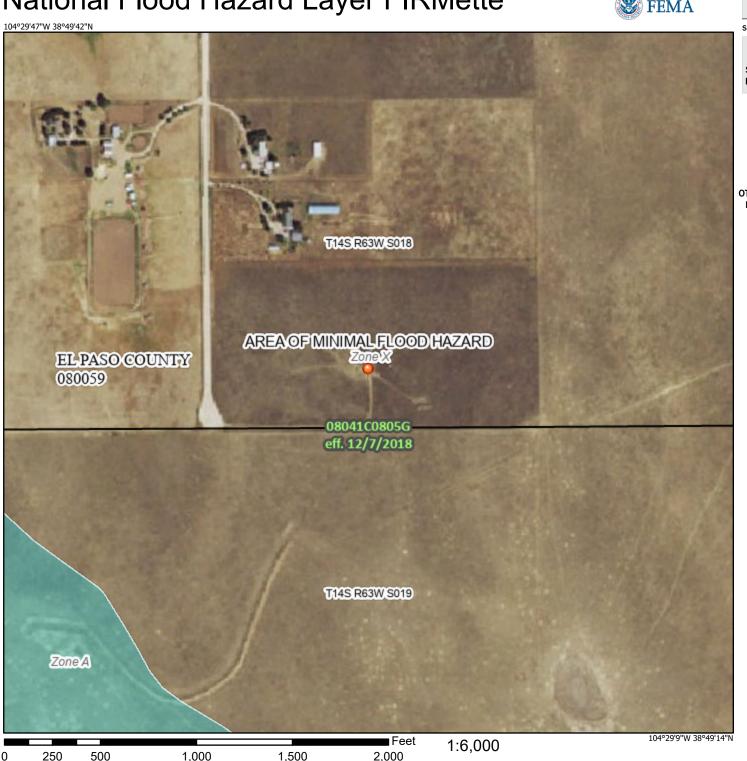
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

# **Rating Options**

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified

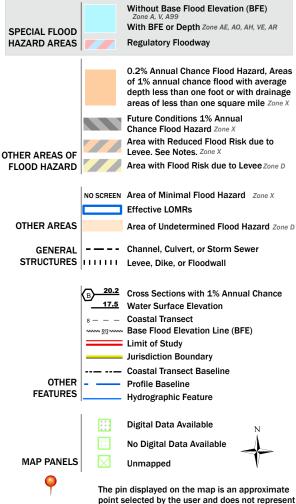
# National Flood Hazard Layer FIRMette





# Legend

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



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

an authoritative property location.

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.

PROJECT INFO	ORMATION	1						
PROJECT:	Rolling Hills	Ranch						
PROJECT NO:	21919-01							
DESIGN BY:	SBN						Drex	el, Barrell & Co.
REV. BY:	TDM							
AGENCY:	El Paso Cou	ınty						
REPORT TYPE:	Final							
DATE:	11/19/2024							
Soil Type: A								
				C2*	C5*	C10*	C100*	% IMPERV
Pasture/Meadow					0.08		0.35	0
Roof					0.73		0.81	90
Gravel					0.59		0.70	80
*C-Values and Basin Imper	niawanaa baaad ay	Table 6.6. Fl.Das	- County "Droine	na Critaria Manual	•			
•	rviousness based or	1 Table 6-6, El Pasi	o County "Draina	ge Criteria Manuai	_			
EXISTING								
SUB-BASIN	SURFACE DE	SIGNATION	AREA	COMPOSITI	E RUNOFF CO	EFFICIENTS		% IMPERV
			ACRE	C2	C5	C10	C100	
Α	Pasture/Meado	DW .	9.25		0.08		0.35	0
	Roof		0.00		0.73		0.81	90
	Gravel		0.47		0.59		0.70	80
	WEIGHTED AV	VERAGE			0.10		0.37	4%
TOTAL A			9.72					
TOTAL SITE			9.72		0.10		0.37	3.87%
I O I AL OIL			V11 &		0.10		0.01	0.01 /0

PROJECT INFORMATION
PROJECT:
PROJECT NO:
DESIGN BY:
REV. BY:
AGENCY: Rolling Hills Ranch 21919-01 SBN #REF! El Paso County Final 11/19/2024 REPORT TYPE: DATE:



# RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

TIME OF CONCENTRATION STANDARD FORM SF-2 EXISTING

		INITIAL/OVERLAND				TRAVEL TIME					TIME OF CONC.		FINAL			
		DATA				TIME (t <sub>i</sub> )				$(\mathbf{t}_{t})$				t <sub>c</sub>		t <sub>c</sub>
BASIN	DESIGN PT:	C <sub>5</sub>	C <sub>100</sub>	AREA	LENGTH	HT	SLOPE	t <sub>i</sub>	LENGTH	HT	SLOPE	VEL.	t <sub>t</sub>	COMP.	MINIMUM	
				Ac	Ft	FT	%	Min	Ft	FT	%	FPS	Min	t <sub>c</sub>	t <sub>c</sub>	Min
A		0.10	0.37	9.72	100	2	2.0	14.8	1240	25	2.0	4.4	4.7	19.5	5	19.5

PROJECT: Rolling Hills Ranch

 PROJECT NO:
 21919-01

 DESIGN BY:
 SBN

 REV. BY:
 #REF!

AGENCY: El Paso County

REPORT TYPE: Final DATE: 11/19/2024

EXISTING	RUNOFF	5	YR STOR	М		P1=		
			DIRECT RUNG	OFF				
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t <sub>c</sub> (MIN)	C * A	I (IN/HR)	Q (CFS)	
A		9.72	0.10	19.5	1.02	3.05	3.1	



PROJECT: Rolling Hills Ranch

PROJECT NO: 21919-01 **DESIGN BY:** SBN REV. BY: TDM

AGENCY: El Paso County

REPORT TYPE: #REF! DATE: 11/19/2024

EXISTING	RUNOFF	10	00 YR STOF	RM		P1=	2.67	
			DIRECT RUNG	OFF				
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t <sub>c</sub> (MIN)	C * A	I (IN/HR)	Q (CFS)	
A		9.72	0.37	19.5	3.57	5.43	19.4	



ORMATION	١						
Rolling Hills	Ranch						
21919-01							
SBN						Drex	el, Barrell & Co.
TDM							
El Paso Cou	unty						
Final	•						
11/19/2024							
			C2*	C5*	C10*	C100*	% IMPERV
				0.08		0.35	0
				0.73		0.81	90
				0.59		0.70	80
erviousness based or	n Table 6-6, El Pas	o County "Draina	ge Criteria Manual	"			
SURFACE DE	SIGNATION	AREA	COMPOSIT	E RUNOFF CO	EFFICIENTS		% IMPERV
		ACRE	C2	C5	C10	C100	
Pasture/Meado	OW	9.25		0.08		0.35	0
Roof		0.07		0.73		0.81	90
Gravel		0.40		0.59		0.70	80
WEIGHTED A	VERAGE			0.11		0.37	4%
		9.72					
		9.72		0.11		0.37	3.94%
	Rolling Hills 21919-01 SBN TDM EI Paso Cou Final 11/19/2024  SURFACE DE Pasture/Meado Roof Gravel	SBN TDM EI Paso County Final 11/19/2024  enviousness based on Table 6-6, El Paso SURFACE DESIGNATION  Pasture/Meadow Roof	Rolling Hills Ranch 21919-01 SBN TDM El Paso County Final 11/19/2024  erviousness based on Table 6-6, El Paso County "Draina  SURFACE DESIGNATION AREA ACRE Pasture/Meadow 9.25 Roof 0.07 Gravel WEIGHTED AVERAGE	Rolling Hills Ranch 21919-01 SBN TDM El Paso County Final 11/19/2024  C2*  C2*  SURFACE DESIGNATION AREA COMPOSITI ACRE Pasture/Meadow 9.25 Roof 0.07 Gravel WEIGHTED AVERAGE	Rolling Hills Ranch   21919-01   SBN   TDM   El Paso County   Final   11/19/2024     C2* C5*   0.08   0.73   0.59	Rolling Hills Ranch   21919-01   SBN   TDM   El Paso County   Final   11/19/2024   C2* C5* C10*   0.08     0.73     0.59	Rolling Hills Ranch   21919-01   SBN   Drex

PROJECT INFORMATION
PROJECT NO:
DESIGN BY:
REV. BY:
AGENCY:
REPORT TYPE:
DATE: Rolling Hills Ranch 21919-01 SBN TDM El Paso County Final 11/19/2024



# RATIONAL METHOD CALCULATIONS FOR STORM WATER RUNOFF

# PROPOSED

SUB-BASIN					INITIAL/OVERLAND			TRAVEL TIME					TIME OF CONC.		FINAL	
		DATA				TIME (t <sub>i</sub> )				$(\mathbf{t}_{t})$				t <sub>c</sub>		t <sub>c</sub>
BASIN	DESIGN PT:	C <sub>5</sub>	C <sub>100</sub>	AREA	LENGTH	HT	SLOPE	t <sub>i</sub>	LENGTH	HT	SLOPE	VEL.	t <sub>t</sub>	COMP.	MINIMUM	
				Ac	Ft	FT	%	Min	Ft	FT	%	FPS	Min	tc	t <sub>c</sub>	Min
A		0.11	0.37	9.72	100	2	2.0	14.8	1240	25	2.0	4.4	4.7	19.5	5	19.5

PROJECT: Rolling Hills Ranch

 PROJECT NO:
 21919-01

 DESIGN BY:
 SBN

 REV. BY:
 TDM

AGENCY: El Paso County

REPORT TYPE: Final DATE: 11/19/2024

# Drexel, Barrell & Co.

PROPOSED	RUNOFF	5	YR STOR	M		P1=	1.50
			DIRECT RUN	OFF			
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t <sub>c</sub> (MIN)	C * A	I (IN/HR)	Q (CFS)
A		9.72	0.11	19.5	1.03	3.05	3.1

PROJECT: Rolling Hills Ranch

 PROJECT NO:
 21919-01

 DESIGN BY:
 SBN

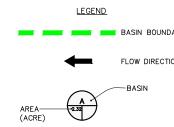
 REV. BY:
 TDM

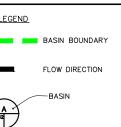
AGENCY: El Paso County

REPORT TYPE: Final DATE: 11/19/2024

# Drexel, Barrell & Co.

PROPOSED	RUNOFF	10	00 YR STOF	RM		P1=	2.67
			DIRECT RUNOFF				
BASIN (S)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	t <sub>c</sub> (MIN)	C * A	I (IN/HR)	Q (CFS)
A		9.72	0.37	19.5	3.57	5.43	19.4







DREXEL, BARRELL & CO.
Engineers Surveyors
1018. SAHWATCH ST. #100
COLORADO SPGS, COLORADO 80903
CONTACT: TIM D. McCONNELL, P.E.
(719)260-0887
COLORADO SPRINGS • LAFAYETIE

CLIENT:

DEBRA OSBAN

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

COLORADO SPRINGS, COLORADO

ISSUE	DATE
INITIAL ISSUE	9/17/24 11/19/24
LATEST ISSUE	11/19/24
DESIGNED BY:	SBN
DRAWN BY:	SBN
CHECKED BY:	TDM
FILE NAME: 210	10_01 DR

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



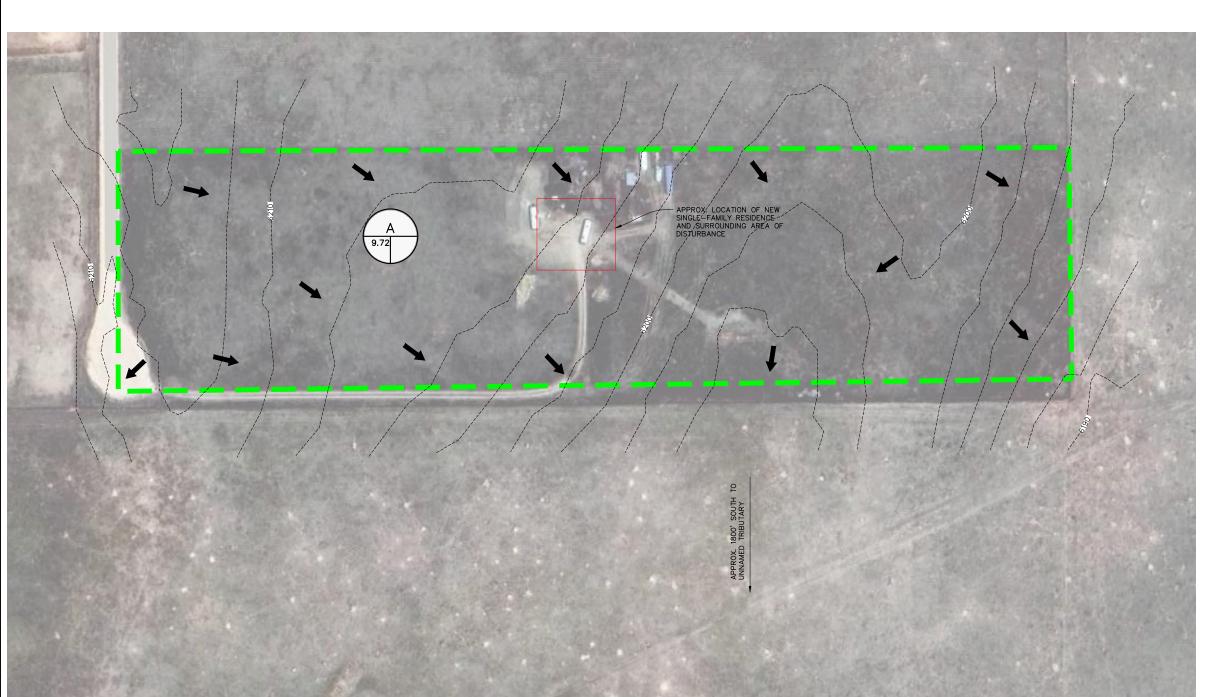
DRAWING SCALE: HORIZONTAL: NTS
VERTICAL: N/A

DRAINAGE MAP

PROJECT NO. 21919-01CSCV DRAWING NO.

DR

SHEET: 1 OF 1

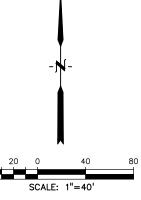


# EXISTING:

BASIN	AREA (AC)	% IMPERV	Q5 (cfs)	Q100 (c	
Α	9.72	3.87%	3.1	19.4	

### PROPOSED:

BASIN	AREA (AC)	% IMPERV	Q5 (cfs)	Q100 (cfs
Α	9.72	3.94%	3.1	19.4



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.

# V2\_Drainage Letter.pdf Markup Summary

# Text Box (1)



Subject: Text Box Page Label: 7 Author: CDurham

Date: 12/5/2024 11:29:36 AM

Status: Color: Layer: Space: 25% reduction is for drainage fees only and does not apply to bridge fees.