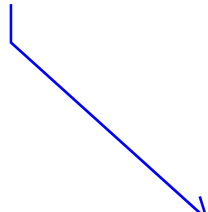


JR Response: addressed.

no comment from
planning

This needs to be a Final Drainage Report unless it is subsequent to another FDR - provide references and excerpts if so.



DRAINAGE LETTER
FOR
STERLING RANCH RECYCLING FACILITY

Prepared For:

SR Land, LLC
20 Boulder Crescent, Suite 200
Colorado Springs, CO 80903
(719) 491-3024

June 2022
Project No. 25188.00
PCD Filing No:

Please update with
"PPR-22-041"

JR Response: addressed.

Prepared By:
JR Engineering, LLC
5475 Tech Center Drive, Suite 235
Colorado Springs, CO 80919
719-593-2593

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 letter 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 omissions on my part in preparing this report.

Mike Bramlett, Colorado P.E. 32314
For and On Behalf of JR Engineering, LLC

DEVELOPER'S STATEMENT:

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

Business Name: SR Land, LLC

By: _____

Title: _____

Address: 20 Boulder Crescent, Suite 200
Colorado Springs, CO 80903

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 Engineering Criteria Manual, as amended.

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

Date

Conditions:

Please remove "Jennifer Irvine, P.E."
- For future submittals the following will be acceptable standalone:
"County Engineer/ECM Administrator
Conditions: "

JR Response: addressed.



Table of Contents

Purpose	1
General Site Description	1
General Location	1
Description of Property	1
Floodplain Statement	1
Existing Drainage Conditions	2
Major Basin Descriptions	2
Existing Sub-basin Drainage	2
Proposed Drainage Conditions.....	3
Proposed Sub-basin Drainage.....	3
Drainage Design Criteria	3
Development Criteria Reference	3
Hydrologic Criteria.....	4
Hydraulic Criteria.....	4
Drainage Facility Design	4
General Concept.....	4
Water Quality.....	4
Drainage and Bridge Fees.....	5
Summary	5
References.....	6

APPENDIX

Appendix A – Vicinity Map, Soil Descriptions, FEMA Floodplain Map

Appendix B – Hydrologic Calculations

Appendix C – Reference Material

Appendix D – Drainage Maps



pre-development

JR Response: addressed.

PURPOSE

This document is the Drainage Letter for Sterling Ranch Recycling Facility. The purpose of this report is to identify on-site and off-site drainage patterns, areas tributary to the site, compare existing and proposed drainage conditions, and to provide information for the eligibility for exclusion to permanent stormwater quality management requirements based on the Post Construction Stormwater Management Applicability Evaluation Form.

If the site previously drained offsite (as shown on 2011 topo) then the exclusion won't apply

GENERAL SITE DESCRIPTION

JR Response: noted.

GENERAL LOCATION

Sterling Ranch Recycling Facility (hereby referred to as the “site”) is a proposed development within the Sterling Ranch master planned community with a total area of approximately 32 acres that is presently used as a concrete and asphalt recycling facility.

The site is located in north half of Section 5, Township 13 South, Range 65 West of the Sixth Principal Meridian in El Paso County, State of Colorado. The site is bounded by Marksheffle Road to the northeast, Pioneer Sand CO to the west, and un platted land borders the site to the south and north. Refer to the vicinity map in Appendix A for additional information.

DESCRIPTION OF PROPERTY

In the existing and proposed condition, the property is used as an asphalt and concrete recycling facility with gravel drives, a staging area and some existing grasslands. The site generally slope(s) to the south at 1 to 6% towards an existing 8’ berm on the southern edge of the property.

Soils for this project are classified as Blakeland Loamy Sand (8) and Columbine Gravelly Sandy Loam (19). These soils are characterized as hydrologic soil types Type A. Group A soils exhibit high infiltration rates when thoroughly wet, and consist mainly of deep, well drained to excessively drained sands or gravelly sands. Refer to the soil survey map in Appendix A for additional information.

There are no known irrigation facilities located on the project site.

FLOODPLAIN STATEMENT

Based on the FEMA FIRM Maps number 08041C0533G, dated December 7, 2018, the entire site lies within Zone X. Zone X is defined as area outside the Special Flood Hazard Area (SFHA) and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood. FIRM Maps have been presented in Appendix A.



EXISTING DRAINAGE CONDITIONS

MAJOR BASIN DESCRIPTIONS

The site lies within the upper Sand Creek Drainage Basin based on the “Sand Creek Drainage Basin Planning Study” (DBPS) completed by Kiowa Engineering Corporation in January 1993, revised March 1996. The Sand Creek Drainage Basin covers approximately 54 square miles and is divided into 7 major sub-basins. The site is within the respective upper basin Sand Creek sub-basin as shown in Appendix C.

The site generally drains from north to southwest. Currently, the site is used as pasture land for cattle. Sand Creek is located west of the site running north to south. This reach of drainage conveyance is not currently improved. Currently, Kiowa is performing studies and plans to address Sand Creek stabilization adjacent to the site.

EXISTING SUB-BASIN DRAINAGE

The existing condition of the site was broken into five major basins. The basin and sub-basin delineation is shown in the existing drainage map in Appendix D and is described as follows:

Sub-basin EX1 ($Q_5= 1.5\text{cfs}$, $Q_{100}=6.6\text{cfs}$) is 7.45 acres and 11 percent impervious and is located offsite southeast of Vollmer Road and southwest of Marksheffel Road. Runoff from this basin sheet flows from the northwest to southeast to the ditch along Marksheffel Road at design point 1.

Sub-basin EX2 ($Q_5= 14.4\text{cfs}$, $Q_{100}=33.2\text{cfs}$) is 9.53 acres and 47 percent impervious and consists of Markshaffel Road. Runoff from this basin sheet flows southeast along the flow lines and is collected in on grade inlets in Markshaffel Road, and piped to the existing detention pond east of Marksheffel Road at design point 2.

Sub-basin EX3 ($Q_5= 1.9\text{cfs}$, $Q_{100}=11.4\text{cfs}$) is 5.06 acres and 4 percent impervious and is located offsite just east of the recycling facility and west of Markshaffel Road. Runoff from this basin sheet flows southeast to design point 3 and is piped east to the existing detention pond east of Marksheffel Road.

Sub-basin EX4 ($Q_5= 7.7\text{cfs}$, $Q_{100}=40.6\text{cfs}$) is 26.07 acres and is 6 percent impervious and is located in the central portion of the site. Runoff from this basin sheet flows south towards the existing 8' berm at design point 4.

Sub-basin EX5 ($Q_5= 2.0\text{cfs}$, $Q_{100}=11.4\text{cfs}$) is 36.46 acres and is 5 percent impervious and is located on the western portion of the site. Runoff from this basin sheet flows southwest to design point 5 located just north of the existing 8' berm.

Hydrological calculations and drainage map show the area of EX5 being 6.19 acres. Please revise if necessary.



PROPOSED DRAINAGE CONDITIONS

PROPOSED SUB-BASIN DRAINAGE

The proposed site was broken into five basins including two onsite basins and three offsite basins. The proposed basin delineation is shown on the drainage basin map within Appendix D and is described as follows.

Basin OS1 ($Q_5= 1.5\text{cfs}$, $Q_{100}=6.6\text{cfs}$) is 7.45 acres and 11 percent impervious and is located offsite southeast of Vollmer Road and southwest of Marksheffel Road. Runoff from this basin sheet flows from the northwest to southeast to the ditch along Marksheffel Road at design point 1.

Basin OS2 ($Q_5= 14.4\text{cfs}$, $Q_{100}=33.2\text{cfs}$) is 9.53 acres and 47 percent impervious and consists of Markshaffel Road. Runoff from this basin sheet flows southeast along the flow lines and is collected in on grade inlets in Markshaffel Road, and piped to the existing detention pond east of Marksheffel Road at design point 2.

Basin OS3 ($Q_5= 1.9\text{cfs}$, $Q_{100}=11.4\text{cfs}$) is 5.06 acres and 4 percent impervious and is located offsite just east of the recycling facility and west of Markshaffel Road. Runoff from this basin sheet flows southeast to design point 3 and is piped east to the existing detention pond east of Marksheffel Road.

Basin A ($Q_5= 7.7\text{cfs}$, $Q_{100}=40.6\text{cfs}$) is 26.07 acres and is 6 percent impervious and is located in the central portion of the site. Runoff from this basin sheet flows south towards the existing 8' berm at design point 4.

Basin B ($Q_5= 2.0\text{cfs}$, $Q_{100}=11.4\text{cfs}$) is 36.46 acres and is 5 percent impervious and is located on the western portion of the site. Runoff from this basin sheet flows southwest to design point 5 located just north of the existing 8' berm.

DRAINAGE DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

Storm drainage analysis and design criteria for this project were taken from the “*City of Colorado Springs/El Paso County Drainage Criteria Manual*” Volumes 1 and 2 (EPCDCM), dated October 12, 1994, the “*Urban Storm Drainage Criteria Manual*” Volumes 1 to 3 (USDCM) and Chapter 6 and Section 3.2.1 of Chapter 13 of the “*Colorado Springs Drainage Criteria Manual*” (CSDCM), dated May 2014, as adopted by El Paso County.



HYDROLOGIC CRITERIA

All hydrologic data was obtained from the “*El Paso Drainage Criteria Manual*” Volumes 1 and 2, and the “*Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual*” Volumes 1, 2, and 3. Onsite drainage improvements were designed based on the 5 year (minor) storm event and the 100-year (major) storm event. Runoff was calculated using the Rational Method, and rainfall intensities for the 5-year and the 100-year storm return frequencies were obtained from Table 6-2 of the CSDCM. One hour point rainfall data for the storm events is identified in the chart below. Runoff coefficients were determined based on proposed land use and from data in Table 6-6 from the CSDCM. Time of concentrations were developed using equations from CSDCM. All runoff calculations and applicable charts and graphs are included in the Appendices.

Table 2 - 1-hr Point Rainfall Data

Storm	Rainfall (in.)
5-year	1.50
100-year	2.52

HYDRAULIC CRITERIA

The Rational Method and USDCM’s SF-2 and SF-3 forms were used to determine the runoff from the minor and major storms on the site.

DRAINAGE FACILITY DESIGN

GENERAL CONCEPT

The proposed drainage patterns for the site will remain as is in the existing conditions. There are no proposed changes to the drainage patterns of the existing site and there are no proposed drainage facilities onsite. A proposed drainage map is presented in Appendix D.

WATER QUALITY

Since the site meets the eligibility requirements for exclusion to permanent stormwater quality management requirements based on the Post Construction Stormwater Management Applicability Evaluation Form, no water quality features have been proposed. The site will remain as is today with a majority of the site consisting of pervious area. The drainage conditions and patterns will remain as existing conditions and do not result in concentrated stormwater flow or surface water discharge that leaves the site during an 80th percentile stormwater runoff event. The Post Construction Stormwater Management Applicability Evaluation Form is provided in Appendix C.



DRAINAGE AND BRIDGE FEES

The site lies within the Sand Creek Drainage Basin. Anticipated drainage and bridge fees are presented below and will be due at time of platting (depending on date of plat submittal):.

2022 DRAINAGE AND BRIDGE FEES – STERLING RANCH RECYCLING FACILITY				
Impervious Acres (ac)	Drainage Fee (Per Imp. Acre)	Bridge Fee (Per Imp. Acre)	Sterling Ranch Drainage Fee	Sterling Ranch Bridge Fee
1.9	\$21,814	\$8,923	\$41,519	\$16,983

SUMMARY

The proposed Sterling Ranch Recycling Facility drainage improvements were designed to meet or exceed the El Paso County Drainage Criteria. The proposed development will not adversely affect the offsite drainage ways or surrounding development. This report is in conformance and meets the latest El Paso County Storm Drainage Criteria requirements for this site.

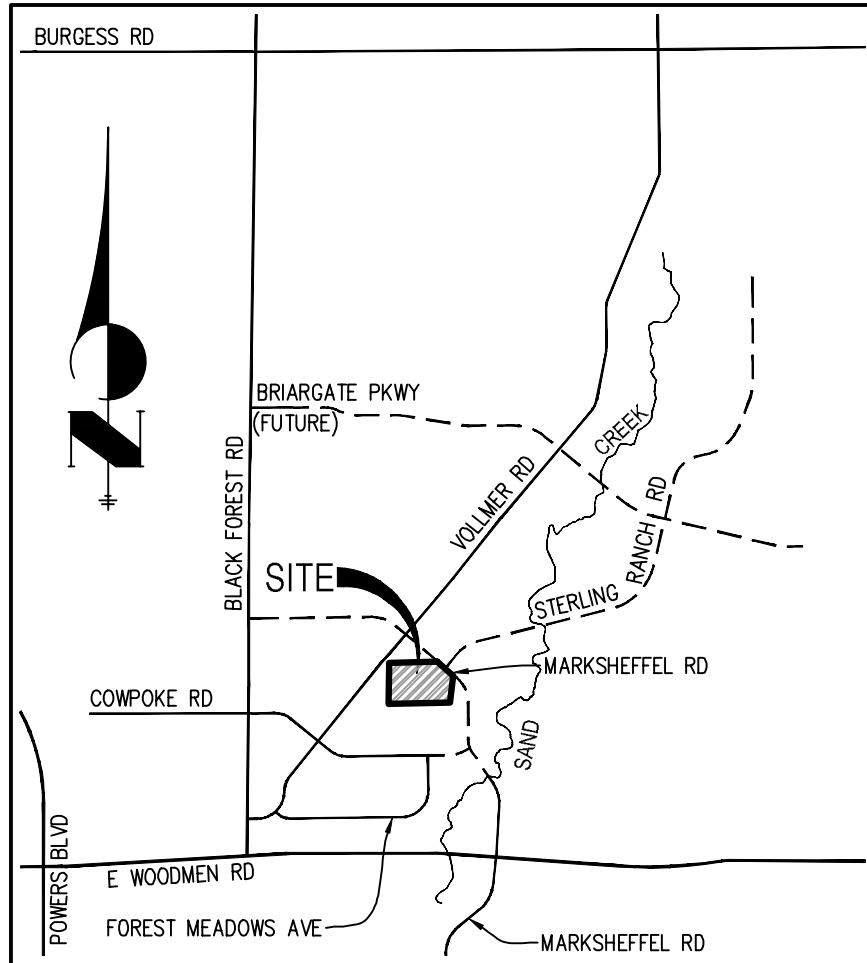


REFERENCES

1. "El Paso County and City of Colorado Springs Drainage Criteria Manual, Vol I & II".
 2. Sand Creek Drainage Basin Planning Study, prepared Kiowa Engineering Corporation, January 1993, revised March 1996.
 3. Urban Storm Drainage Criteria Manual (Volumes 1, 2, and 3), Urban Drainage and Flood Control District, June 2001.
-

Appendix A
Vicinity Map, Soil Descriptions, FEMA Floodplain Map





VICINITY MAP

N.T.S.

STERLING RECYCLING FACILITY
 VICINITY MAP
 JOB NO. 25188.00
 6/3/22
 SHEET 1 OF 1

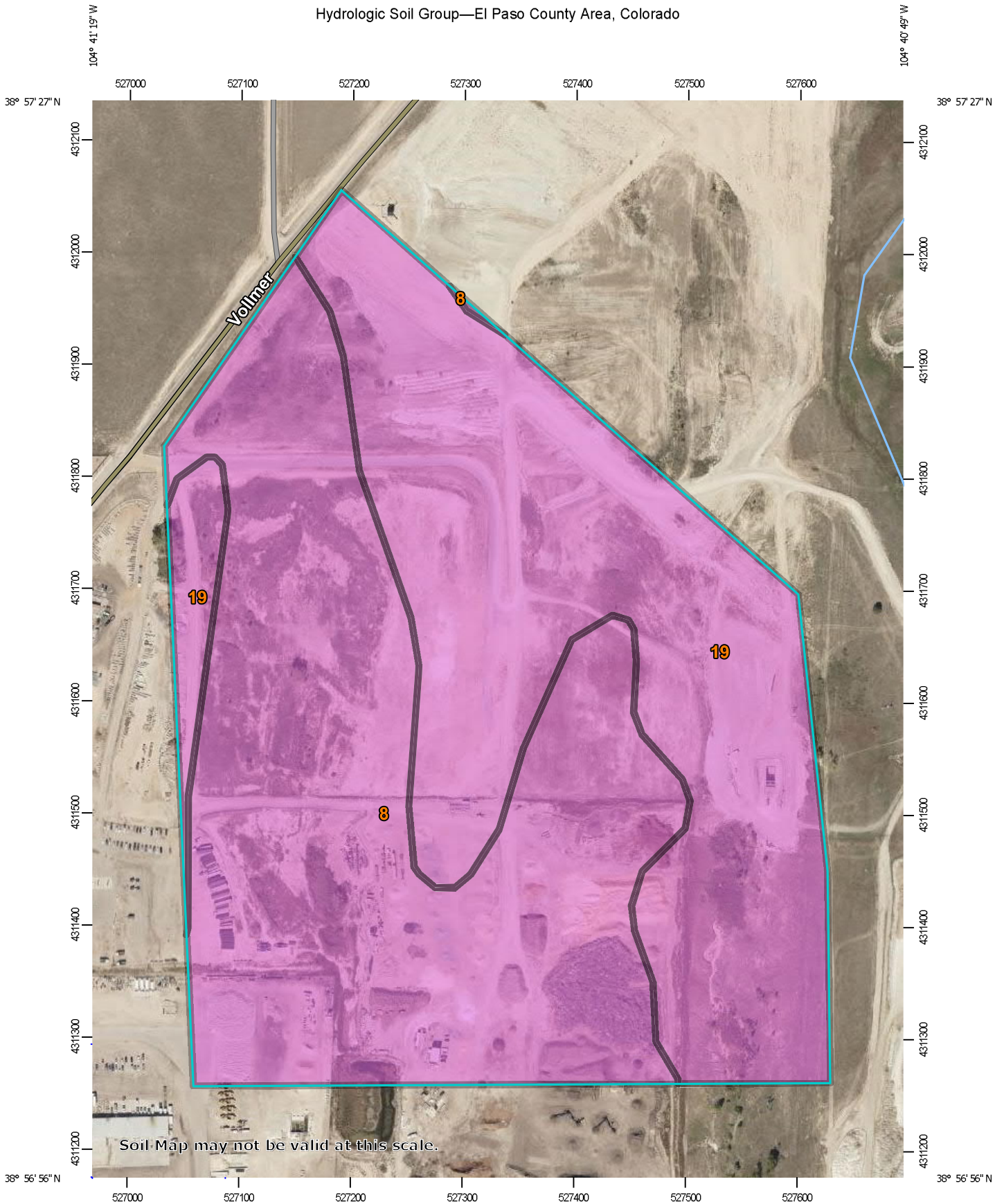


J-R ENGINEERING

A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
 Fort Collins 970-491-9888 • www.jrengineering.com

Hydrologic Soil Group—El Paso County Area, Colorado



Soil Map may not be valid at this scale.

































Map Scale: 1:4,680 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters

0 200 400 800 1200 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)	 C
 Area of Interest (AOI)	 C/D
Soils	 D
Soil Rating Polygons	 Not rated or not available
 A	Water Features
 A/D	 Streams and Canals
 B	Transportation
 B/D	 Rails
 C	 Interstate Highways
 C/D	 US Routes
 D	 Major Roads
 Not rated or not available	 Local Roads
Soil Rating Lines	Background
 A	 Aerial Photography
 A/D	
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	
Soil Rating Points	
 A	
 A/D	
 B	
 B/D	

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
 Survey Area Data: Version 19, Aug 31, 2021

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

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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	46.2	51.5%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	43.6	48.5%
Totals for Area of Interest			89.8	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

Tie-break Rule: Higher

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not constitute a guarantee, warranty, or endorsement of the National Flood Insurance Program or any of its products. The community map repository should be consulted for possible updates or additional flood hazard information.

Flow Direction: Flow direction is indicated by arrows on the map. Flow direction information is used to determine the direction of flow of floodwater from a point on the map. Flow direction information is derived from the Digital Elevation Model (DEM) data. Flow direction information is not to be used as the sole source of flood elevation information. Accordingly, the community map repository should be consulted for additional flood hazard information.

Special Flood Hazard Areas: Special Flood Hazard Areas (SFHAs) are areas that are subject to flooding from a specific source. They are shown on the map with different patterns and colors. The community map repository should be consulted for more information about SFHAs.

Coastal Flood Elevation: Coastal Flood Elevation is the elevation of floodwater from a storm surge. It is shown on the map with a specific pattern and color. The community map repository should be consulted for more information about Coastal Flood Elevation.

Other Flood Hazard Areas: Other Flood Hazard Areas include areas that are subject to flooding from a specific source. They are shown on the map with different patterns and colors. The community map repository should be consulted for more information about Other Flood Hazard Areas.

Vertical Datum: The map uses the North American Vertical Datum of 1988 (NAVD 88) as the vertical datum. The community map repository should be consulted for more information about Vertical Datum.

Scale: The map scale is 1 inch = 1 mile.

North Arrow: The map includes a north arrow pointing towards the top of the page.

Legend: The legend provides information about the symbols and colors used on the map to represent different flood hazard areas and other features.

Map Information: The map information section includes the name of the map, the date of the map, and the organization that produced the map.

Map Data: The map data is derived from the National Flood Insurance Program and other sources. The community map repository should be consulted for more information about the map data.

Map Updates: The map is updated regularly to reflect changes in flood hazard information. The community map repository should be consulted for more information about map updates.

Map Accuracy: The map is intended to provide a general overview of flood hazard information. It is not intended to be used as the sole source of flood elevation information. The community map repository should be consulted for more information about map accuracy.

Map Disclaimer: The map is provided as a public service. It is not intended to be used as the sole source of flood elevation information. The community map repository should be consulted for more information about the map disclaimer.

Map Copyright: The map is copyrighted by the National Flood Insurance Program. The community map repository should be consulted for more information about the map copyright.

Map Contact: For more information about the map, contact the National Flood Insurance Program at 1-800-368-7090. The community map repository should be consulted for more information about the map contact.

Map Acknowledgments: The map is a product of the National Flood Insurance Program. The community map repository should be consulted for more information about the map acknowledgments.

Map Distribution: The map is available for distribution to the public. The community map repository should be consulted for more information about the map distribution.

Map Feedback: If you have any feedback about the map, please contact the National Flood Insurance Program at 1-800-368-7090. The community map repository should be consulted for more information about the map feedback.

Map Disclaimer: The map is provided as a public service. It is not intended to be used as the sole source of flood elevation information. The community map repository should be consulted for more information about the map disclaimer.

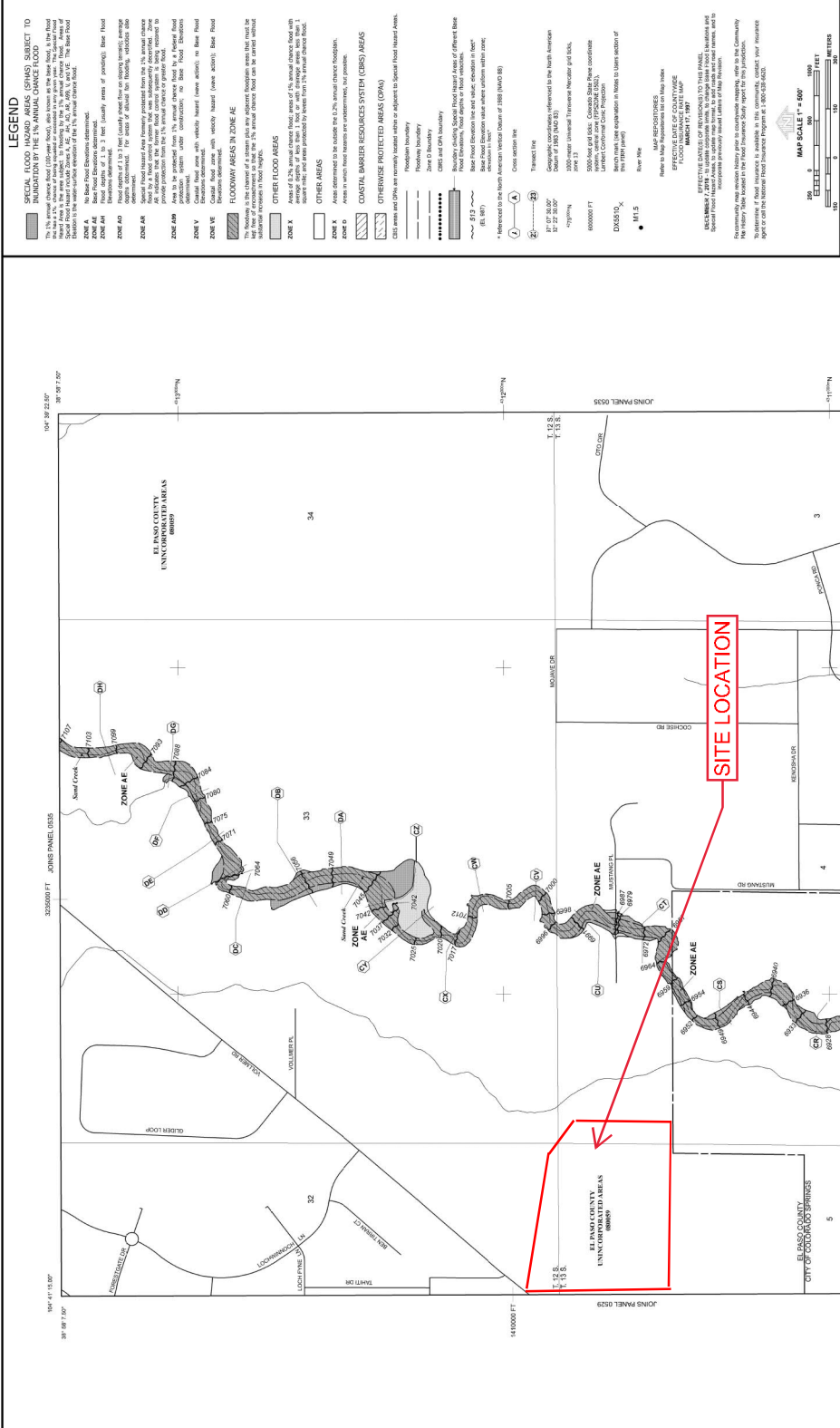
Map Copyright: The map is copyrighted by the National Flood Insurance Program. The community map repository should be consulted for more information about the map copyright.

Map Contact: For more information about the map, contact the National Flood Insurance Program at 1-800-368-7090. The community map repository should be consulted for more information about the map contact.

Map Acknowledgments: The map is a product of the National Flood Insurance Program. The community map repository should be consulted for more information about the map acknowledgments.

Map Distribution: The map is available for distribution to the public. The community map repository should be consulted for more information about the map distribution.

Map Feedback: If you have any feedback about the map, please contact the National Flood Insurance Program at 1-800-368-7090. The community map repository should be consulted for more information about the map feedback.



PANEL 0533G

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

PANEL 533 OF 1300
USE MAP INDEX FOR FIRM PANEL LAYOUT

CONTRIBUTORS: FIRM NUMBER: 08647C6533G
DATE: 12/11/2018
SCALE: 1" = 1 MILE
STATUS: 1:10000

MAP NUMBER: 08647C6533G
MAP REVISED: DECEMBER 7, 2018
Federal Emergency Management Agency



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 65 WEST, AND TOWNSHIP 13 SOUTH, RANGE 66 WEST.

Appendix B

Hydrologic Calculations

COMPOSITE % IMPERVIOUS & COMPOSITE EXISTING RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Sterling Ranch Recycling Facility
 Location: El Paso County

Project Name: Sterling Ranch
 Project No.: 25188.00
 Calculated By: JSC
 Checked By: RAB
 Date: 6/3/22

Basin ID	Total Area (ac)	Streets (100% Impervious)			Historical Analysis (2%)			Gravel (packed) (80%)			Basins Total Weighted C Values		Basins Total Weighted % Imp.			
		C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀					
EX1	7.45	0.90	0.96	0.67	9.0%	0.09	0.36	6.78	1.8%	0.59	0.70	0.03	0.3%	0.17	0.42	11.1%
EX2	9.53	0.90	0.96	4.39	46.1%	0.09	0.36	5.14	1.1%	0.59	0.70	0.02	0.2%	0.46	0.64	47.3%
EX3	5.06	0.90	0.96	0.08	1.6%	0.09	0.36	4.98	2.0%	0.59	0.70	0.00	0.0%	0.10	0.37	3.5%
EX4	26.07	0.90	0.96	0.76	2.9%	0.09	0.36	24.88	1.9%	0.59	0.70	0.43	1.3%	0.12	0.38	6.1%
EX5	6.19	0.90	0.96	0.18	2.9%	0.09	0.36	6.01	1.9%	0.59	0.70	0.00	0.0%	0.11	0.38	4.8%
TOTAL (EX4-EX5)	32.26															5.9%
TOTAL	54.30															13.7%

**EXISTING
STANDARD FORM SF-2
TIME OF CONCENTRATION**

JR Response: addressed.

Charlene - Is Tc high?

Subdivision: Sterling Ranch Recycling Facility
Location: El Paso County

Project Name: Sterling Ranch
Project No.: 25188.00
Calculated By: JSC
Checked By: RAB
Date: 6/3/22

BASIN ID	SUB-BASIN DATA				INITIAL/OVERLAND (T _i)				TRAVEL TIME (T _t)				t _c CHECK (URBANIZED BASINS)			FINAL t _c (min)		
	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C _s	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)		Urbanized t _c (min)	
																		Urbanized t _c (min)
EX1	7.45	A	11%	0.17	0.42	213	1.0%	25.1	1463	0.3%	10.0	0.5	46.1	71.1	1676.0	67.7	67.7	
EX2	9.53	A	47%	0.46	0.64	88	9.0%	5.2	2325	2.3%	20.0	3.0	12.8	18.0	2413.0	34.3	18.0	
EX3	5.06	A	4%	0.10	0.37	140	5.5%	12.2	171	2.3%	10.0	1.5	1.9	14.0	311.0	27.4	14.0	
EX4	26.07	A	6%	0.12	0.38	466	5.6%	21.6	1023	3.2%	10.0	1.8	9.6	31.2	1489.0	34.7	31.2	
EX5	6.19	A	5%	0.11	0.38	245	4.3%	17.2	591	3.3%	10.0	1.8	5.4	22.7	836.0	30.8	22.7	

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes)

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

$$t_i = \frac{L_i}{60K\sqrt{S_o}} = \frac{L_i}{60V_i}$$

Where:

t_i = channelized flow time (travel time, min)

L_i = waterway length (ft)

S_o = waterway slope (ft/ft)

V_i = travel time velocity (ft/sec) = K√S_o

K = NRCS conveyance factor (see Table 6-2)

$$t_t = \frac{0.395(1.1 - C_2)\sqrt{L_t}}{S_a^{0.33}}$$

Where:

t_t = overland (initial) flow time (minutes)

C₂ = runoff coefficient for 3-year frequency (from Table 6-4)

L_t = length of overland flow (ft)

S_a = average slope along the overland flow path (ft/ft)

$$t_c = \frac{L_c}{3.6K\sqrt{S_o}}$$

Equation 6-3

$$t_c = (26 - 17t) + \frac{L_c}{60(14t + 9)\sqrt{S_o}}$$

Where:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.

L_c = length of channelized flow path (ft)

t = travel time velocity (ft/sec) = K√S_o

S_o = slope of the channelized flow path (ft/ft)

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L_c}{3.6K\sqrt{S_o}}$$

Equation 6-5

**STANDARD FORM SF-3 - EXISTING
STORM DRAINAGE SYSTEM DESIGN**
(RATIONAL METHOD PROCEDURE)

Subdivision: Sterling Ranch Recycling Facility
 Location: El Paso County
 Design Storm: 5-Year

Project Name: Sterling Ranch
 Project No.: 25188.00
 Calculated By: JSC
 Checked By: RAB
 Date: 6/3/22

STREET	Design Point	DIRECT RUNOFF						TOTAL RUNOFF				STREET/SWALE			PIPE				TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	f (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	f (in/hr)	Q (cfs)	Q _{street/swale} (cfs)	C*A (ac)	Slope (%)	Q _{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		t_t (min)
	1	EX1	7.45	0.17	67.7	1.23	1.26	1.5															
	2	EX2	9.53	0.46	18.0	4.43	3.25	14.4															
	3	EX3	5.06	0.10	14.0	0.52	3.62	1.9															
	4	EX4	26.07	0.12	31.2	3.18	2.42	7.7															
	5	EX5	6.19	0.11	22.7	0.70	2.90	2.0															

Notes:
 Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.
 All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

**STANDARD FORM SF-3 - EXISTING
STORM DRAINAGE SYSTEM DESIGN**
(RATIONAL METHOD PROCEDURE)

Project Name: Sterling Ranch
 Project No.: 25188.00
 Calculated By: JSC
 Checked By: RAB
 Date: 6/3/22

Subdivision: Sterling Ranch Recycling Facility
 Location: El Paso County
 Design Storm: 100-Year

Description	Design Point	DIRECT RUNOFF						TOTAL RUNOFF			STREET/SWALE			PIPE			TRAVEL TIME			REMARKS			
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	$Q_{street/swale}$ (cfs)	C^*A (ac)	Slope (%)	Q_{pipe} (cfs)	C^*A (ac)	Slope (%)	Pipe Size (inches)		Length (ft)	Velocity (fps)	t_t (min)
	1	EX1	7.45	0.42	67.7	3.11	2.11	6.6															
	2	EX2	9.53	0.64	18.0	6.08	5.45	33.2															
	3	EX3	5.06	0.37	14.0	1.87	6.08	11.4															
	4	EX4	26.07	0.38	31.2	9.99	4.06	40.6															
	5	EX5	6.19	0.38	22.7	2.34	4.87	11.4															

Notes:
 Street and Pipe C^*A values are determined by Q/I using the catchment's intensity value.
 All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

COMPOSITE % IMPERVIOUS & COMPOSITE PROPOSED RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Sterling Ranch Recycling Facility
 Location: El Paso County

Project Name: Sterling Ranch
 Project No.: 25188.00
 Calculated By: JSC
 Checked By: RAB
 Date: 6/3/22

Basin ID	Total Area (ac)	Streets (100% Impervious)			Historical Analysis (2%)			Gravel (packed) (80%)			Basins Total Weighted C Values		Basins Total Weighted % Imp.			
		C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀	Area (ac)	Weighted % Imp.	C ₅	C ₁₀₀					
OS1	7.45	0.90	0.96	0.67	9.0%	0.09	0.36	6.78	1.8%	0.59	0.70	0.03	0.3%	0.17	0.42	11.1%
OS2	9.53	0.90	0.96	4.39	46.1%	0.09	0.36	5.14	1.1%	0.59	0.70	0.02	0.2%	0.46	0.64	47.3%
OS3	5.06	0.90	0.96	0.08	1.6%	0.09	0.36	4.98	2.0%	0.59	0.70	0.00	0.0%	0.10	0.37	3.5%
A	26.07	0.90	0.96	0.76	2.9%	0.09	0.36	24.88	1.9%	0.59	0.70	0.43	1.3%	0.12	0.38	6.1%
B	6.19	0.90	0.96	0.18	2.9%	0.09	0.36	6.01	1.9%	0.59	0.70	0.00	0.0%	0.11	0.38	4.8%
TOTAL (EX4-EX5)	32.26															5.9%
TOTAL	54.30															13.7%

**PROPOSED
STANDARD FORM SF-2
TIME OF CONCENTRATION**

Subdivision: Sterling Ranch Recycling Facility
Location: El Paso County

Project Name: Sterling Ranch
Project No.: 25188.00
Calculated By: JSC
Checked By: RAB
Date: 6/3/22

BASIN ID	SUB-BASIN DATA				INITIAL/OVERLAND (T _i)				TRAVEL TIME (T _t)				t _c CHECK (URBANIZED BASINS)			FINAL t _c (min)	
	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C _s	C ₁₀₀	L (ft)	S _o (%)	t _i (min)	L _t (ft)	S _t (%)	K	VEL (ft/s)	t _t (min)	COMP. t _c (min)	TOTAL LENGTH (ft)		Urbanized t _c (min)
OS1	7.45	A	11%	0.17	0.42	213	1.0%	25.1	1463	0.3%	10.0	0.5	46.1	71.1	1676.0	67.7	67.7
OS2	9.53	A	47%	0.46	0.64	88	9.0%	5.2	2325	2.3%	20.0	3.0	12.8	18.0	2413.0	34.3	18.0
OS3	5.06	A	4%	0.10	0.37	140	5.5%	12.2	171	2.3%	10.0	1.5	1.9	14.0	311.0	27.4	14.0
A	26.07	A	6%	0.12	0.38	466	5.6%	21.6	1023	3.2%	10.0	1.8	9.6	31.2	1489.0	34.7	31.2
B	6.19	A	5%	0.11	0.38	245	4.3%	17.2	591	3.3%	10.0	1.8	5.4	22.7	836.0	30.8	22.7

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes)

$$t_i = \frac{0.395(1.1 - C_s)\sqrt{L}}{S_o^{0.33}}$$

Equation 6-2

Where:

t_i = overland (initial) flow time (minutes)

C_s = runoff coefficient for 5-year frequency (from Table 6-4)

L_t = length of overland flow (ft)

S_o = average slope along the overland flow path (ft/ft)

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60(14 + 9)\sqrt{S_o}}$$

Equation 6-3

Where:

t_c = minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60(14 + 9)\sqrt{S_o}}$$

Where:

t_t = channelized flow time (travel time, min)

L_t = waterway length (ft)

S_o = waterway slope (ft/ft)

K = travel time velocity (ft/sec) = K_c√S_o

K = NRCS conveyance factor (see Table 6-2)

Table 6-2. NRCS Conveyance factors, K

Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_t = \frac{L_t}{60(14 + 9)\sqrt{S_o}}$$

Equation 6-5

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.

L_t = length of channelized flow path (ft)

t_t = imperviousness (expressed as a decimal)

S_o = slope of the channelized flow path (ft/ft)

**STANDARD FORM SF-3 - PROPOSED
STORM DRAINAGE SYSTEM DESIGN**
(RATIONAL METHOD PROCEDURE)

Subdivision: Sterling Ranch Recycling Facility
 Location: El Paso County
 Design Storm: 5-Year

Project Name: Sterling Ranch
 Project No.: 25188.00
 Calculated By: JSC
 Checked By: RAB
 Date: 6/3/22

STREET	Design Point	DIRECT RUNOFF						TOTAL RUNOFF				STREET/SWALE			PIPE				TRAVEL TIME			REMARKS	
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C^*A (Ac)	i (in/hr)	Q (cfs)	t_c (min)	C^*A (ac)	i (in/hr)	Q (cfs)	$Q_{street/swale}$ (cfs)	C^*A (ac)	Slope (%)	Q_{pipe} (cfs)	C^*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)		t_t (min)
	1	OS1	7.45	0.17	67.7	1.23	1.26	1.5															
	2	OS2	9.53	0.46	18.0	4.43	3.25	14.4															
	3	OS3	5.06	0.10	14.0	0.52	3.62	1.9															
	4	A	26.07	0.12	31.2	3.18	2.42	7.7															
	5	B	6.19	0.11	22.7	0.70	2.90	2.0															

Notes:
 Street and Pipe C^*A values are determined by Q/i using the catchment's intensity value.
 All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

**STANDARD FORM SF-3 - PROPOSED
STORM DRAINAGE SYSTEM DESIGN**
(RATIONAL METHOD PROCEDURE)

Project Name: Sterling Ranch
 Project No.: 25188.00
 Calculated By: JSC
 Checked By: RAB
 Date: 6/3/22

Subdivision: Sterling Ranch Recycling Facility
 Location: El Paso County
 Design Storm: 100-Year

Description	Design Point	DIRECT RUNOFF						TOTAL RUNOFF			STREET/SWALE			PIPE			TRAVEL TIME			REMARKS			
		Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C^*A (ac)	I (in/hr)	Q (cfs)	$Q_{street/swale}$ (cfs)	C^*A (ac)	Slope (%)	Q_{pipe} (cfs)	C^*A (ac)	Slope (%)	Pipe Size (inches)		Length (ft)	Velocity (fps)	t_t (min)
	1	OS1	7.45	0.42	67.7	3.11	2.11	6.6															
	2	OS2	9.53	0.64	18.0	6.08	5.45	33.2															
	3	OS3	5.06	0.37	14.0	1.87	6.08	11.4															
	4	A	26.07	0.38	31.2	9.99	4.06	40.6															
	5	B	6.19	0.38	22.7	2.34	4.87	11.4															

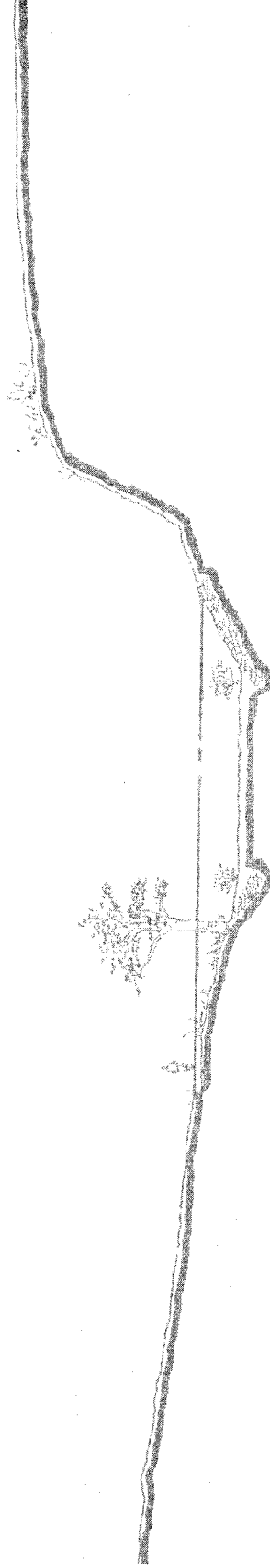
Notes:
 Street and Pipe C^*A values are determined by Q/I using the catchment's intensity value.
 All pipes are private and RCP unless otherwise noted. Pipe size shown in table column.

Appendix C
Reference Materials

SAND CREEK DRAINAGE BASIN PLANNING STUDY

PRELIMINARY DESIGN REPORT

CITY OF COLORADO SPRINGS, EL PASO COUNTY, COLORADO



PREPARED FOR:

City of Colorado Springs
Department of Comprehensive Planning, Development and Finance
Engineering Division
30 S. Nevada
Colorado Springs, Colorado 80903

PREPARED BY:

Kowa Engineering Corporation
1011 North Weber
Colorado Springs, CO 80903

II. STUDY AREA DESCRIPTION

The Sand Creek drainage basin is a left-bank tributary to the Fountain Creek lying in the west-central portions of El Paso County. Sand Creek's drainage area at Fountain Creek is approximately 54 square miles of which approximately 18.8 square miles are inside the City of Colorado Springs corporate limits. The basin is divided into five major sub-basins, the Sand Creek mainstem, the East Fork Sand Creek, the Central Tributary to East Fork, the West Fork, and the East Fork Subtributary. Figure II-1 shows the location of the Sand Creek basin.

Basin Description

The Sand Creek basin covers a total of 54 square miles in unincorporated El Paso County and Colorado Springs, Colorado. Of this total, approximately 28 square miles is encompassed by the Sand Creek basin, and 26 square miles for the East Fork Sand Creek basin. The basin trends in generally a south to southwesterly direction, entering the Fountain Creek approximately two miles upstream of the Academy Boulevard bridge over Fountain Creek. Two main tributaries drain the basin, those being the mainstem of Sand Creek and East Fork Sand Creek. Development presence is most evident along the mainstem. At this time, approximately 25 percent of the basin is developed. This alternative evaluation focuses upon the Sand Creek basin only.

The maximum basin elevation is approximately 7,620 feet above mean sea level, and falls to approximately 5,790 feet at the confluence with Fountain Creek. The headwaters of the basin originate in the conifer covered areas of The Black Forest. The middle eastern portions of the basin are typified by rolling range land with fair to good vegetative cover associated with semi-arid climates.

Climate

This area of El Paso County can be described, in general as high plains, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry. Precipitation ranges from 14 to 16 inches per year, with the majority of this precipitation occurring in spring and summer in the form of rainfall. Thunderstorms are common during the summer months, and are typified by quick-moving low pressure cells which draw moisture from the Gulf of Mexico into the region. Average temperatures range from about 30°F in the winter

to 75° in the summer. The relative humidity ranges from about 25 percent in the summer to 45 percent in the winter.

Soils and Geology

Soils within the Sand Creek basin vary between soil types A through D, as identified by the U. S. Department of Agriculture, Soil Conservation Service. The predominant soil groupings are in the Truckton and Bresser soil associations. The soils consist of deep, well drained soils that formed in alluvium and residuum, derived from sedimentary rock. The soils have high to moderate infiltration rates, and are extremely susceptible to wind and water erosion where poor vegetation cover exists. In undeveloped areas, the predominance of Type A and B soils give this basin a lower runoff per unit area as compared to basins with soils dominated by Types C and D. Presented on Figure II-2 is the Hydrologic Soil distribution map for the Sand Creek basin.

Property Ownership and Impervious Land Densities

Property ownership along the major drainage way within the Sand Creek basin vary from public to private. Along the developed reaches, drainage right-of-ways and greenbelts have been dedicated during the development of the adjacent residential and commercial land. Where development has not occurred, the drainageways remain under private ownership with no delineated drainage right-of-way or easements. There are several public parks which abut the mainstem of Sand Creek. Roadway and utility easements abutting or crossing the major drainageways occur most frequently in the developed portions of the basin.

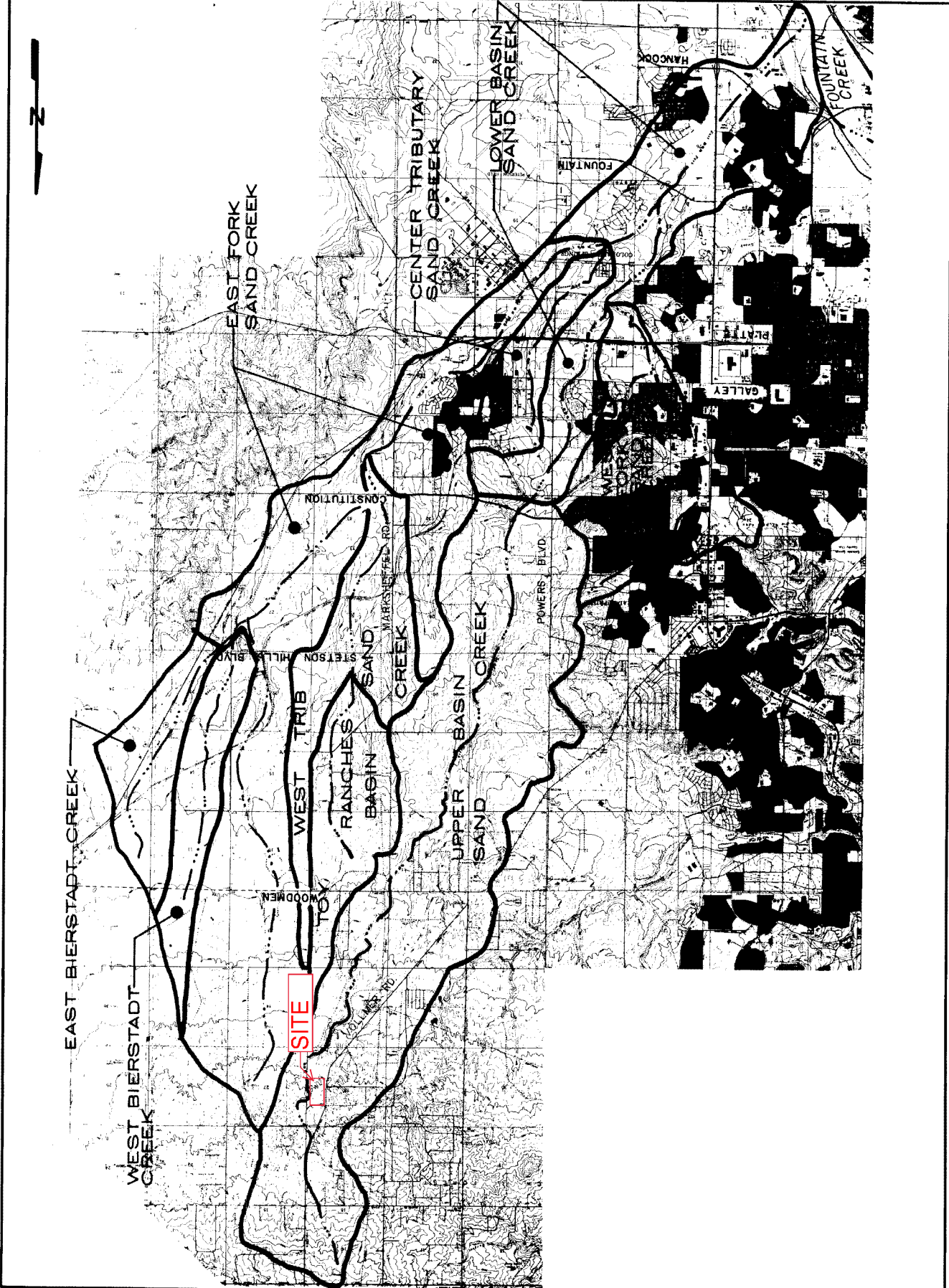
Land use information for the existing and future conditions were reviewed as part of the planning effort. This information is used in the hydrologic analysis to predict runoff rates and volumes for the purposes of facility evaluation. The identification of land uses abutting the drainageways is also useful in the identification of feasible plans for stabilization and aesthetic treatment of the creek. Presented on Figure II-3 is the proposed land use map used in the evaluation of impervious land densities discussed in the hydrologic section of this report. Figure II-3 is not intended to reflect the future zoning or land use policies of the City or the County.

The land use information within the Banning-Lewis Ranch property was obtained from Arics Properties during the time the draft East Fork Sand Creek Drainage Basin Planning Study was being prepared. The land use information was again reviewed with the City of Colorado Springs Department of Planning and was found to be appropriate for use in the estimation of hydrology for the East Fork Basin. The location of future arterial streets and roadways within

Kiowa Engineering Corporation
 419 W. Bijou Street
 Colorado Springs, Colorado
 80905-1308

**SAND CREEK DRAINAGE
 BASIN PLANNING STUDY
 REGIONAL SUB-BASINS**

Project No.	90-04-03
Date	11/90
Design	
Drawn	EAK
Check	
Revision	



Post Construction Stormwater Management Applicability Evaluation Form

This form is to be used by the Engineer of Record to evaluate applicable construction activities to determine if the activities are eligible for an exclusion to permanent stormwater quality management requirements. Additionally Part III of the form is used to identify and document which allowable control measure design standard is used for the structure.

Part I. Project Information	
1. Project Name: STERLING RECYCLING FACILITY	
2. El Paso County Project #:	3. ESQCP #: TBD
4. Project Location: EAST OF VOLLMER, SOUTH OF MARKSHEFFEL EXTENSION, AND SOUTH OF STERLING RANCH DEVELOPMENT	Project Location in MS4 Permit Area (Y or N): Y
5. Project Description: CONCRETE AND ASPHALT RECYCLING FACILITY	
If project is located within the El Paso County MS4 Permit Area, please provide copy of this completed form to the Stormwater Quality Coordinator for reporting purposes; and save completed form with project file.	

Part II. Exclusion Evaluation: Determine if Post-Construction Stormwater Management exclusion criteria are met. Note: Questions A thru K directly correlate to the MS4 permit Part I.E.4.a.i (A) thru (K). If Yes, to any of the following questions, then mark Not Applicable in Part III, Question 2.				
Questions	Yes	No	Not Applicable	Notes:
A. Is this project a "Pavement Management Site" as defined in Permit Part I E.4.a.i.(A)?		X		This exclusion applies to "roadways" only. Areas used primarily for parking or access to parking are not included.
B. Is the project "Excluded Roadway Development"?	NO			
• Does the site add less than 1 acre of paved area per mile?		X		
• Does the site add 8.25 feet or less of paved width at any location to the existing roadway?		X		
C. Does the project increase the width of the existing roadway by less than 2 times the existing width?		X		For redevelopment of existing roadways, only the area of the existing roadway is excluded from post-construction requirements when the site does not increase the width by two times or more. <i>This exclusion only excludes the original roadway area it does NOT apply to entire project.</i>
D. Is the project considered an aboveground and Underground Utilities activity?		X		Activity can NOT permanently alter the terrain, ground cover or drainage patterns from those present prior to the activity
E. Is the project considered a "Large Lot Single-Family Site"?		X		Must be a single-residential lot or agricultural zoned land, ≥ 2.5 acres per dwelling and total lot impervious area < 10 percent.

Questions (cont'd)	Yes	No	Not Applicable	Notes
F. Do Non-Residential or Non-Commercial Infiltration Conditions exist? Post-development surface conditions do not result in concentrated stormwater flow or surface water discharge during an 80 th percentile stormwater runoff event.	X			Exclusion does not apply to residential or commercial sites for buildings. A site specific study is required and must show: rainfall and soil conditions; allowable slopes; surface conditions; and ratios of imperviousness area to pervious area.
G. Is the project land disturbance to Undeveloped Land where undeveloped land remains undeveloped following the activity?	X			Project must be on land with no human made structures such as buildings or pavement.
H. Is the project a Stream Stabilization Site?		X		Standalone stream stabilization projects are excluded.
I. Is the project a bike or pedestrian trail?		X		Bike lanes for roadways are not included in this exclusion, but may qualify if part of larger roadway activity is excluded in A, B or C above.
J. Is the project Oil and Gas Exploration?		X		Activities and facilities associated with oil and gas exploration are excluded.
K. Is the project in a County Growth Area? YES				Note, El Paso County does not apply this exclusion. All Applicable Construction Activity in El Paso County must comply the Post-Construction Stormwater Management criteria.

Part III. Post Construction (Permanent) Stormwater Control Determination		
Questions	Yes	No
1. Is project an Applicable Construction Activity?	X	
2. Do any of the Exclusions (A-K in Part II) apply?	X	
<p>If the project is an Applicable Construction Activity and no Exclusions apply then Post-Construction (Permanent) Stormwater Management is required. Complete the applicable sections of Part IV below and then coordinate signatures for form and place in project file.</p> <p>If the project is not an Applicable Construction Activity, or Exclusion(s) apply then Post-Construction (Permanent) Stormwater Management is NOT required. Coordinate signatures for form and place in project file.</p>		

Part IV: Onsite PWQ Requirements, Documentation and Considerations	Yes	No
1. Check which Design Standard(s) the project will utilize. Standards align with Control Measure Requirements identified in permit Part I.E.4.a.iv.		X
A. Water Quality Capture Volume (WQCV) Standard		X
B. Pollutant Removal/80% Total Suspended Solids Removal (TSS)		X
C. Runoff Reduction Standard		X
D. Applicable Development Site Draining to a Regional WQCV Control Measure		X
E. Applicable Development Site Draining to a Regional WQCV Facility		X
F. Constrained Redevelopment Sites Standard		X
G. Previous Permit Term Standard		X
2. Will any of the project permanent stormwater control measure(s) be maintained by another MS4? If Yes, you must obtain a structure specific maintenance agreement with the other MS4 prior to advertisement.		X
3. Will any of the project permanent stormwater control measures be maintained by a private entity or quasi-governmental agency (e.g. HOA or Special District, respectively)? If Yes, a Private Detention Basin/Stormwater Quality Best Management Practice Maintenance Agreement and Easement must be recorded with the El Paso County Clerk and Recorder.		<u>X</u>

Part V Notes (attach an additional sheet if you need more space)

Project design is complete to include the project design, construction plans, drainage report, specifications, and maintenance and access agreements as required. The engineering, drainage considerations and information used to complete these documents is complete, true, and accurate to the best of my belief and knowledge.

Signature and Stamp of Engineer of Record

Date

Post-Construction Stormwater Management Applicability Form has been reviewed and the project design, construction plans, drainage report, specifications, and maintenance and access agreements as required, have been reviewed for compliance with the Post Construction Stormwater Management process and MS4 Permit requirements.

Signature of El Paso County Project Engineer

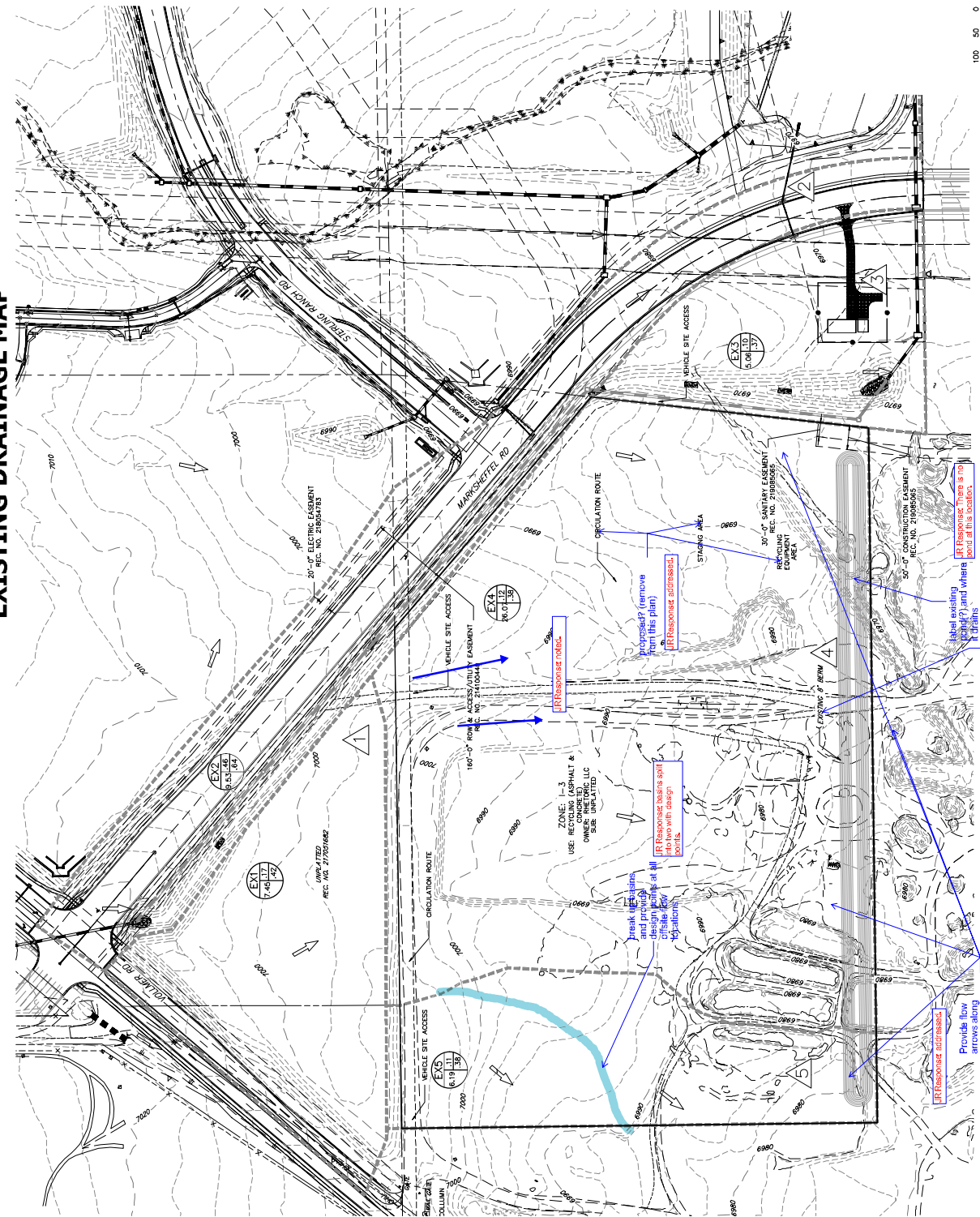
Date

Appendix D

Drainage Maps

STERLING RANCH RECYCLING FACILITY EXISTING DRAINAGE MAP

- LEGEND**
- BASIN ID
 - BASIN LABEL
 - DESIGN POINT
 - EXISTING FLOW DIRECTION
 - BASIN DRAINAGE AREA
 - EXISTING CONTOURS
 - SITE BOUNDARY
 - EXISTING PROPERTY LINE
 - ADJACENT PROPERTY
 - EXISTING SPOWALK
 - SPOWALK EXISTING
 - DRAINAGE ACCESS & MAINTENANCE EASEMENT



DESIGN POINT

DP	CDDO	Area (Acres)	Q ₁ (cfs)	Q ₂ (cfs)	Q ₃ (cfs)
1	1.5	1.5	1.5	1.5	1.5
2	1.4	3.2	3.2	3.2	3.2
3	1.5	1.4	1.4	1.4	1.4
4	7.7	40.6	40.6	40.6	40.6
5	2.0	11.4	11.4	11.4	11.4

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (Acres)	Percent Impervious	C ₁₀₀	L ₁₀₀ (mm)	Q ₁ (cfs)	Q ₂ (cfs)	Q ₃ (cfs)
EX-1	7.26	11%	0.17	0.42	0.77	1.5	6.6
EX-2	8.53	47%	0.66	0.84	1.61	14.8	31.2
EX-3	1.4	4%	0.11	0.26	0.47	0.9	3.6
EX-4	26.07	6%	0.12	0.38	0.72	7.7	46.4
EX-5	6.19	5%	0.11	0.38	0.72	2.0	11.4

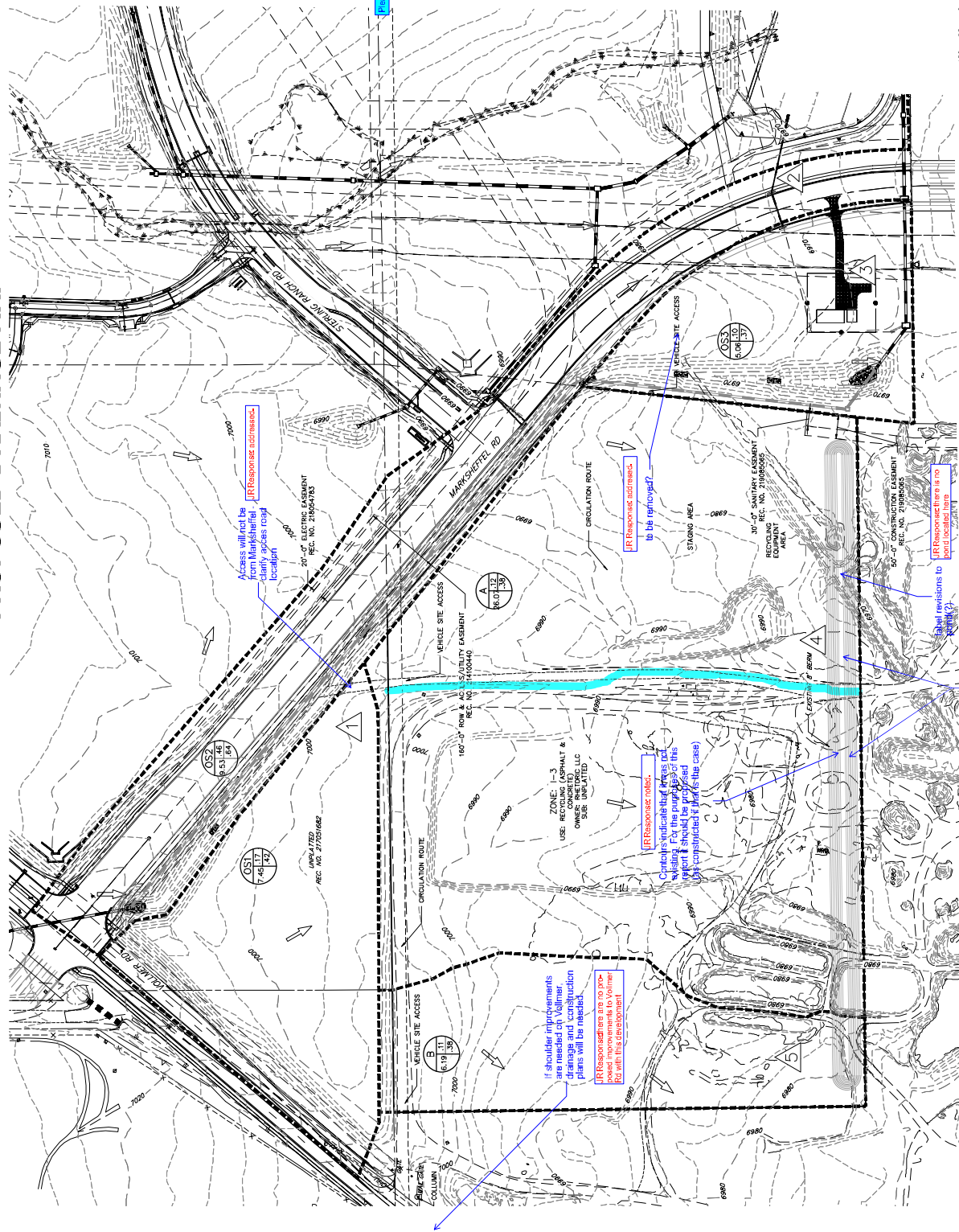
JR Response addresses:
 Please see PCB File #: PR022941
 STERLING RANCH RECYCLING FACILITY
 EXISTING DRAINAGE MAP
 JOB NO. 25188.00
 DATE 03/27/20
 SHEET 1 OF 1

JR ENGINEERING
 A Wetten Company
 1000 S. Main Street, Suite 100
 Colorado Springs, CO 80905
 Phone: 719-594-8888
 Fax: 719-594-8889
 www.jr-engineering.com

100 50 0 100 200
 ORIGINAL SCALE: 1" = 100'

STERLING RANCH RECYCLING FACILITY PROPOSED DRAINAGE MAP

- LEGEND**
- BASIN ID
 - BASIN LABEL
 - DESIGN POINT
 - EXISTING FLOW DIRECTION
 - BASIN DRAINAGE AREA
 - EXISTING CONTOURS
 - SITE BOUNDARY
 - EXISTING PROPERTY LINE
 - EXISTING EASEMENT
 - EXISTING SPOKEWALK
 - EXISTING SIDEWALK
 - EXISTING DRAINAGE ACCESS & MAINTENANCE EASEMENT



DESIGN POINT

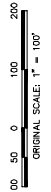
DP	CD	CDSD
1	15.5	10.0
2	14.4	10.2
3	15.9	11.4
4	7.7	40.6
5	2.0	11.4

BASIN SUMMARY TABLE

Tributary	Area (Acres)	Percent Impervious	C ₁₀₀	C ₂	L ₁ (min)	Q ₁ (cfs)	Q ₂ (cfs)
051	7.65	11%	0.17	0.42	67.7	1.5	6.6
052	8.53	47%	0.04	0.04	180.1	14.4	31.2
053	26.07	6%	0.13	0.38	21.2	7.7	48.4
B	6.19	5%	0.13	0.38	22.7	2.0	11.4

Provide pre-development and proposed drainage basins.
 Provide pre-development and proposed drainage basins.
 Provide pre-development and proposed drainage basins.
 Provide pre-development and proposed drainage basins.

STERLING RANCH RECYCLING FACILITY
 EXISTING DRAINAGE MAP
 JOB NO. 25186.00
 DATE 03/27/2011
 SHEET 1 OF 1



Access will not be from Marksheliff. Identify access road location. [R]Response: address.

[R]Response: address. to be improved?.

[R]Response: notes. Contours indicate that areas to be retained for the purpose of this project are not restricted (in this case).

If shoulder improvements are needed on Volkmur, the construction plans will be resubmitted. [R]Response: are no pre-development plans. Ret with this submission.

But revisions to [R]Response: there is no need located here.

[R]Response: DPS, 4a & 4b, split the basin. No have been added.