



ALL TERRAIN:  
ADDRESSED.

## **Deim Subdivision** **SF2515**

### FINAL DRAINAGE REPORT

ALL TERRAIN ENGINEERING PROJECT NO: 24034

MARCH 2025

PREPARED FOR:

CONNIE DEIM

348 GALAXY DRIVE

CASTLE ROCK, COLORADO, 80104

PREPARED BY:

ALL TERRAIN ENGINEERING LLC

CONTACT: NICHOLAS Q. JOKERST

NJOKERST@ALLTERRAINENG.COM

(530) 391-7635

## ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the 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.

Nicholas Q. Jokerst, PE

Date

State of Colorado No. 59273

For and on behalf of All Terrain Engineering LLC

## DEVELOPER'S STATEMENT

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

Connie Diem

Date

348 Galaxy Drive, Castle Rock, Colorado 80104

## EL PASO COUNTY ONLY

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

Joshua Palmer, P.E.

Date \_\_\_\_\_

County Engineer/ECM Administrator

Conditions:



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## I. General Purpose, Location & Description

### a. Purpose

The purpose of this Final Drainage Report (FDR) for the Deim Subdivision is to describe the site's onsite and offsite drainage patterns, existing and proposed storm infrastructure, and to safely route developed stormwater to adequate outfalls.

### b. Location

Deim Subdivision, referred to as 'the site' herein, is in a portion of the northwest quart of Section 30, Township 11 South, Range 66 West of the 6th P.M., El Paso County, Colorado. The site is bound by Hodgen Road to the north, Sundance Ranch Lane to the south and undeveloped land to the west and east. A vicinity map is presented in Appendix A.

Clarify this statement, when homes are built, there will be disturbance. I think this means there will be no disturbances associated with the final plat project, though the development itself will result in future disturbance at the home sites themselves.

### c. Description of Property

The site is approximately 35.05 acres of undeveloped and unplatted land with of prairie grasses. There will be no disturbance associated with this project. The family residential lots (5+ acre). Proposed lot sizes will vary between 5.15 to 15 slopes northeasterly towards the Franktown FPE-2 Reservoir. Onsite elevations slopes ranging 1 – 35%. Per a NRCS soil survey, the site is made up of Type B Peyton-Pring Complex. The NRCS soil survey is presented in Appendix A.

ALL TERRAIN: ADDRESSED. PROJECT HAS BEEN UPDATED TO INDICATE IT IS ONLY THE FINAL PLAT PROJECT. WHETHER OR NOT THE DECIDE TO BUILD HOMES IN THE FUTURE IS BEYOND THE SCOPE OF THIS REPORT.

An unnamed tributary of East Cherry Creek bisects the site. Franktown FPE-2 reservoir is located within this drainageway, just south of Hodgen Road. Franktown FPE-2 reservoir is located within a preservation easement. The reservoir and the dam will not be disturbed or altered by the development. There are no onsite existing utilities.

### d. Floodplain Statement

Based on FEMA Firm map 08041C0305G dated December 7, 2018, the site is Zone A and Zone X. Zone A are areas determined to be within the 1% annual chance flood. Zone X are areas determined to be outside the 0.2% annual chance flood.

## II. Drainage Basins

### a. Major Basin Description

The site is located within the East Cherry Creek Drainage Basin. There is not an approved DBPS available with El Paso County.

The "Flying Horse North Master Development Drainage Report" prepared by HR Green, dated September 9, 2022, (FHN MDDP) is the most recent drainage analysis of the areas surrounding the site. This report is utilized for reference only. Hydrologic data from this report is not utilized. Instead, a FEMA approved LOMR will be utilized for the basis of existing stormwater.

A LOMR was approved for the unnamed tributary of East Cherry Creek that bisects the site. The LOMR was approved with a 100-year flow of 287 cfs. The FHN MDDP greatly overestimates the flow in the tributary compared to the LOMR. Due to the LOMR being accepted by FEMA, LOMR flows will be utilized for the tributary analysis.

#### b. Existing Subbasin Description

The existing site's drainage patterns are northeasterly towards the Franktown FPE-2 reservoir. An unnamed tributary of East Chery Creek conveys onsite stormwater towards the reservoir dam. Additionally, there are offsite basins that drain onto the site from the south and east. It should be noted that the existing unnamed tributary of East Cherry Creek conveys 287 cfs onto the site at the Sundance Ranch Lane crossing (DP1). The 287 cfs includes all areas draining to the tributary and therefore includes the onsite and offsite areas analyzed below. The flows provided in existing basin descriptions are to demonstrate those basin's flow contribution to the total of 287 cfs. Flow routing through the site utilizes basin flows. Total flow comparison at DP6 utilizes calculated basin flows for the 5-year and LOMR flow for the 100-year. The LOMR did not provide 5-year flow values.

Basin A is 25.82 acres of onsite and offsite undeveloped land. Basin A stormwater ( $Q_5 = 2.8$  cfs  $Q_{100} = 19.0$  cfs) is conveyed in the unnamed tributary of East Cherry Creek to DP5 ( $Q_5 = 9.1$  cfs  $Q_{100} = 61$  cfs). At DP5, stormwater passes through the Franktown FPE-2 reservoir outlet structure and onto DP6.

DP1 ( $Q_5 = \text{N/A}$  cfs  $Q_{100} = 287$  cfs) is an existing, private 20" RCP culvert conveys stormwater across Sundance Ranch Lane and into Basin A. The culvert conveys 17.04 cfs and the remaining 256.96 cfs overtops Sundance Ranch Lane. Per a HY-8 analysis of the existing culvert, the HW/D ratio is 1.83 and does not meet the EPC DCM criteria of 1.5. The culvert discharge velocity is 8.20 ft/s and exceeds the limit of 2.5 ft/s established in EPC DCM Table 10-3 for sandy loam soils. The overtopping at DP1 occurs with a maximum depth of 0.59 feet, a velocity of 4.08 ft/s and span of approximately 140.50'. The overtopping depth does not meet the 6" maximum depth criteria from EPCDCM Table 6-4. Additionally, the overtopping velocity of 64.08 ft/s and exceeds the limit of 2.5 ft/s established in EPC DCM Table 10-3 for sandy loam soils. A culvert analysis is presented in Appendix C.

After DP1, stormwater continues in the unnamed tributary of East Cherry Creek to DP5. A no build easement is proposed around the limits of the FEMA 100-year Zone A floodplain that is present in the unnamed tributary.

While the existing culvert does not meet EPC DCM criteria for capacity and overtopping, the existing culvert is not located within the boundary of the Deim Subdivision. The culvert is located on the unplatted land to the southwest of Deim Subdivision and is located within a private, utility easement that is owned and operated by Cherokee Metropolitan District. Therefore, the Deim Subdivision owner does not have jurisdiction or legal authority to make improvements to the culvert or Sundance Ranch Lane. Additionally, Deim Subdivision is located downstream of the culvert and the development will not affect the existing conditions of the culvert.

Basin B is 15.77 acres of onsite, undeveloped land. Basin B stormwater ( $Q_5 = 2.8$  cfs  $Q_{100} = 18.7$  cfs) sheet flows to DP4 ( $Q_5 = 10.5$  cfs  $Q_{100} = 70.4$  cfs). DP4 is in a low point within the Franktown FPE-2 reservoir and is

adjacent to the spillway. Flows can overtop a berm to the west to DP5 or the spillway crest to the east. Both overtop paths outfall to DP6 ultimately.

Basin C is 2.77 acres of onsite, undeveloped land on the downstream end of the reservoir's dam. Basin C stormwater ( $Q_5 = 0.9$  cfs  $Q_{100} = 5.7$  cfs) is conveyed in the reservoir spillway to DP6 ( $Q_5 = 29.5$  cfs  $Q_{100} = 287$  cfs). At DP6, stormwater follows existing drainage patterns east along Hodgen Road.

Basin OS1 is approximately 42.32 acres of offsite, undeveloped land located along the site's southern boundary. Basin OS1 stormwater ( $Q_5 = 7.5$  cfs  $Q_{100} = 50.2$  cfs) sheet flows onto the site at DP2 ( $Q_5 = 7.5$  cfs  $Q_{100} = 50.2$  cfs). DP2 continues northeasterly through the site to DP4 ( $Q_5 = 10.5$  cfs  $Q_{100} = 70.4$  cfs).

Basin OS2 is approximately 23.53 acres of offsite, undeveloped land located along the site's eastern boundary. Basin OS2 stormwater ( $Q_5 = 4.4$  cfs  $Q_{100} = 29.5$  cfs) collects in a low point along the site's eastern boundary and overtops onto the site at DP3 ( $Q_5 = 4.4$  cfs  $Q_{100} = 29.5$  cfs) and continues to DP4 ( $Q_5 = 10.5$  cfs  $Q_{100} = 70.4$  cfs).

Basin OS3 is approximately 4.48 acres of offsite, undeveloped land and Hodgen Road. Basin OS3 stormwater ( $Q_5 = 1.6$  cfs  $Q_{100} = 7.8$  cfs) is collected in the roadside ditch along Hodgen Road and the Franktown FPD-2 reservoir spillway. Basin OS3 stormwater is conveyed to DP6 ( $Q_5 = 29.5$  cfs  $Q_{100} = 287$  cfs) where it follows existing drainage patterns along Hodgen Road.

### c. Proposed Subbasin Description

The proposed conditions analysis utilizes the same drainage basins as the existing conditions. Proposed basin descriptions only address basins that are changed in the proposed condition. A proposed drainage map is presented in Appendix F.

Basin A is 25.82 acres of offsite, undeveloped land and portions of Lots 1-4. To account for future development of Lots 1 & 4, the hydrologic analysis of proposed Basin A includes a 10,000 square foot roof and a 20' driveway. See Basin B for Lots 2 & 3 development. Proposed Basin A stormwater ( $Q_5 = 3.1$  cfs  $Q_{100} = 19.7$  cfs) follows historic patterns and is conveyed in the unnamed tributary of East Cherry Creek to DP5 ( $Q_5 = 9.7$  cfs  $Q_{100} = 62.3$  cfs). At DP5, stormwater passes through the Franktown FPE-2 reservoir outlet structure and onto DP6. Basin A is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. The proposed 100-year flow has a slight increase (Existing:  $Q_5 = 2.8$  cfs  $Q_{100} = 19.0$  cfs & Proposed:  $Q_5 = 3.1$  cfs  $Q_{100} = 19.7$  cfs) and will not adversely affect downstream infrastructure.

Basin B is 15.77 acres of Lots 2-4. To account for future development of Lot 2 & 3, the hydrologic analysis of proposed Basin B includes 10,000 square feet of roof area and a 20' driveway. Proposed Basin B stormwater ( $Q_5 = 3.5$  cfs  $Q_{100} = 19.8$  cfs) follows historic patterns and is conveyed in the unnamed tributary of East Cherry Creek to DP5 ( $Q_5 = 9.7$  cfs  $Q_{100} = 62.3$  cfs). At DP5, stormwater passes through the Franktown FPE-2 reservoir outlet structure and onto DP6. Basin B is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. The proposed 100-year flow has a slight increase

(Existing:  $Q_5 = 2.8$  cfs  $Q_{100} = 18.7$  cfs & Proposed:  $Q_5 = 3.5$  cfs  $Q_{100} = 19.8$  cfs) and will not adversely affect downstream infrastructure.

Basin C is 2.77 acres of onsite, undeveloped land on the downstream end of the reservoir's dam. Basin C stormwater ( $Q_5 = 0.9$  cfs  $Q_{100} = 5.7$  cfs) is conveyed in the reservoir spillway to DP6 ( $Q_5 = 29.5$  cfs  $Q_{100} = 287$  cfs). At DP6, stormwater follows existing drainage patterns east along Hodgen Road. Basin C is located downstream of the dam and no development will occur.

### III. Drainage Design Criteria

#### a. Development Criteria Reference

The drainage analysis, proposed storm sewer system, and proposed private, full spectrum water quality and detention pond follow the criteria from the "City of Colorado Springs Drainage Criteria Manual" Volumes 1 and 2" (CCSDCM, latest revision).

#### b. Hydrologic Criteria

Hydrologic data was obtained from the "City of Colorado Springs Drainage Criteria Manual – Chapter 6 Hydrology". Onsite drainage improvements are designed for the 5-year storm (minor event) and 100-year storm (major event). Runoff is calculated per EPCDCM Chapter 5 – Storm Runoff Method of Analysis.

#### c. Hydraulic Criteria

Hydraulic criteria for channel analysis are obtained from EPCDCM Chapter 9 – Culvert Design & Chapter 10 - Open Channels and Structures.

### IV. Drainage Facility Design

#### a. General Concept

The site will remain in its existing condition. No stormwater improvements will be made in conjunction with this FDR. However, Lots 1 – 4 have been analyzed with future assumptions for development.

#### b. Water Quality & Detention

Basin A - C are comprised of 5+ acre lots and are excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. However, the exclusion does not relinquish detention requirements for the site. The development of the site has a marginal increase on peak flows in the 5-year and 100-year scenarios, 5.94% and 0.38%, respectively. The marginal increase in flows will not adversely affect downstream drainageways and associated facilities.

FLOW COMPARISON - DP6		
Condition	$Q_{5-YR}$	$Q_{100-YR}$
Existing	19	287
Proposed	20.2	288.1
% Increase	5.94%	0.38%

### c. Major Drainageways

An unnamed tributary to East Cherry Creek bisects the site and conveys offsite flow to Franktown FPE-2 reservoir. The unnamed tributary has FEMA Zone A from the ADDRESSED. boundary at Hodgen Road to the site's southern boundary at Sundance Ranch Lane. The site ADDRESSED. with a No Build easement encompassing the 100-year floodplain limits.

add that maintenance of the dam will not be affected by the subdivision

### d. Grading & Erosion Control Plan

The project will not perform any earthwork operations or disturbances. Therefore, a Grading and Erosion Control Plan is not required.

(verify approval of deviations) ADDRESSED.

### e. Four Step Method

*Step 1 – Reducing Runoff Volumes:* Roof drains will route across landscape areas whenever possible to promote infiltration. In addition, the lots are limited to 10% imperviousness to help reduce runoff volumes.

*Step 2 – Treat and slowly release the WQCV:* Deim Subdivision is comprised of 5+ acre lots and is excluded from permanent water quality per the exclusions in Appendix I of the EPC DCM.

*Step 3 – Stabilize stream channels:* All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization with the drainage basin.

reword as applicable

*Step 4 – Consider the need for source controls:* No industrial or commercial use ADDRESSED. within this development and therefore no source controls are proposed.

### f. Drainage Basin & Bridge Fees

Drainage and bridge fees are due at time of platting. However, the site lies within the East Cherry Creek Drainage Basin which has no associated fees.

## V. Summary

Deim Subdivision remains consistent with pre-development drainage conditions with the construction of the recommended drainage improvements. The proposed development will not adversely affect downstream stormwater infrastructure or surrounding developments. This report meets the latest El Paso County Drainage criteria.

ADDRESSED.

add a statement that the project will not affect access across the easement for maintenance of the FPE-2 dam and reservoir in any way



## VI. References

1. Drainage Criteria Manual of El Paso County, Revised October 2018.
2. Urban Storm Drainage Criteria Manual, Urban Drainage Flood Control District, January 2018.
3. Federal Emergency Management Agency, Flood Map Service Center - <https://msc.fema.gov/portal/home>
4. Web Soil Survey, Natural Resources Conservation Service - <https://websoilsurvey.nrcs.usda.gov/app/>
5. Flying Horse North Master Development Drainage Plan, HR Green, September 2022.

and DCM Upd

ADDRESSED.

1991, 2015

Add E

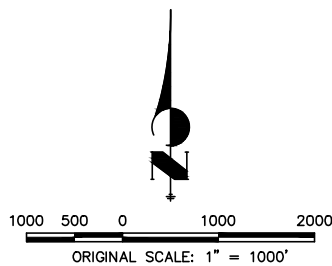
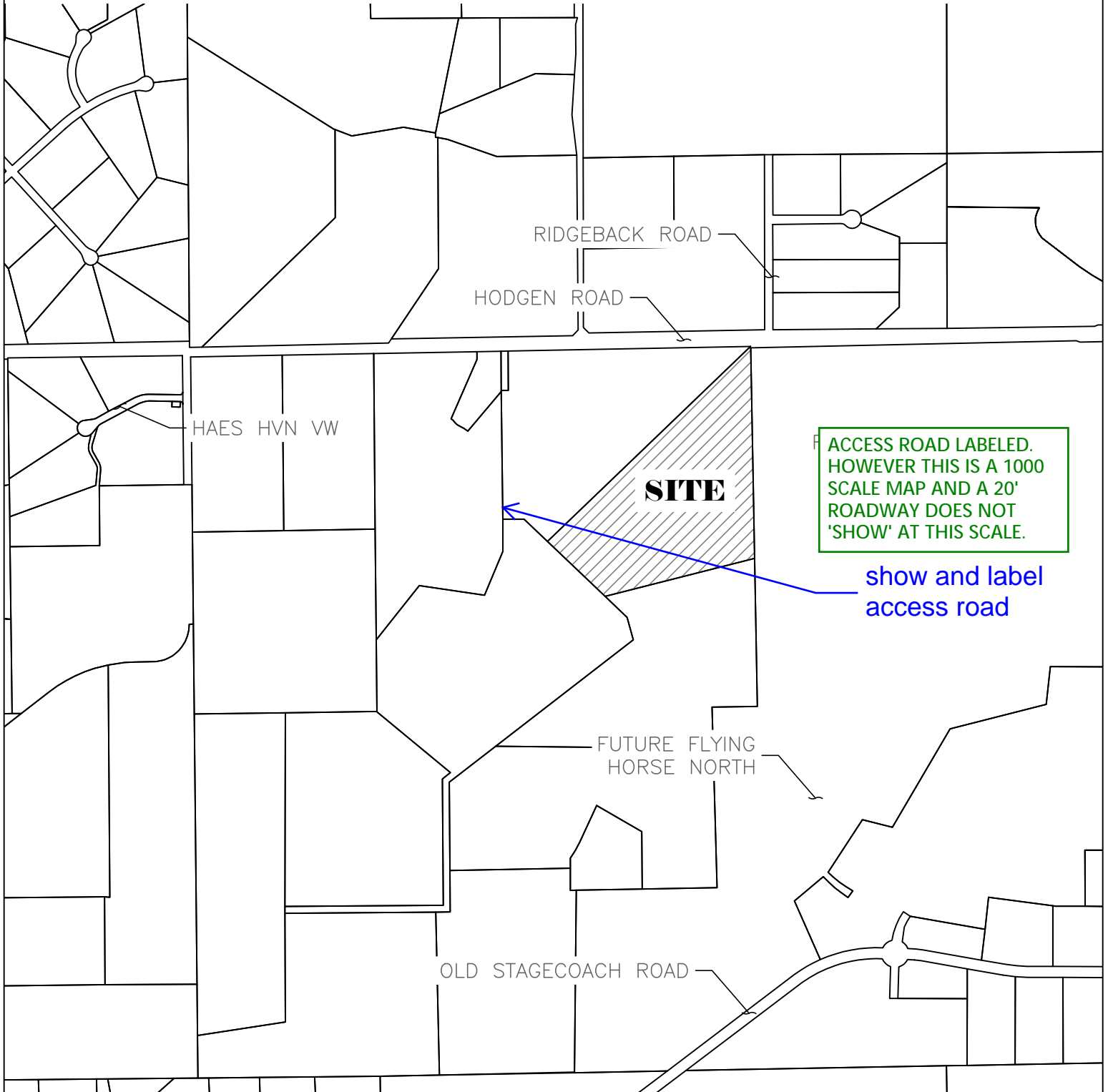
ADDRESSED.



## **APPENDIX A – VICINITY MAP, FEMA MAP, NRCS WEB SOIL SURVEY & NOAA ATLAS 14**

# DEIM SUBDIVISION

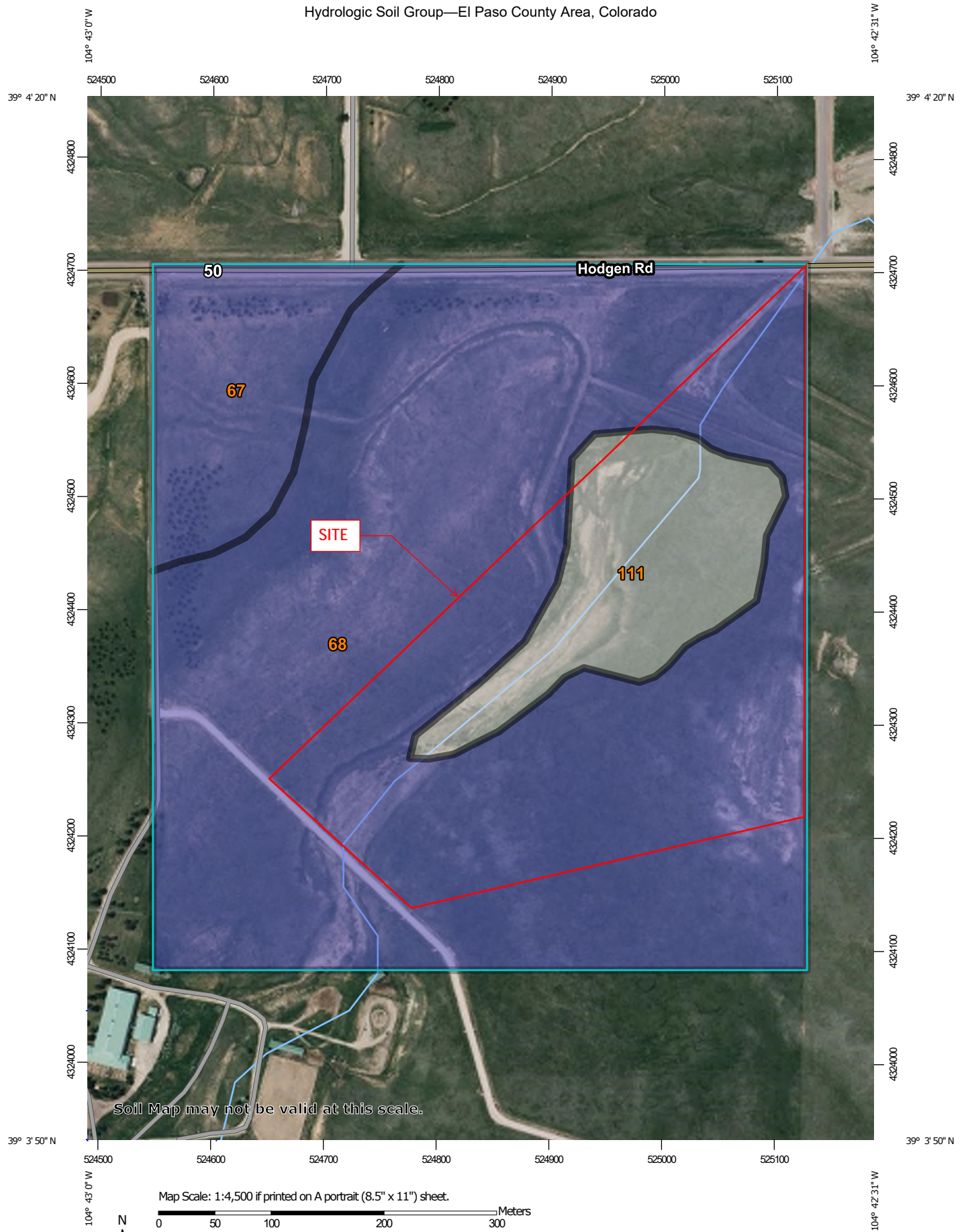
## VICINITY MAP



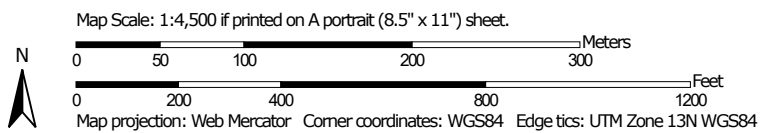
VICINITY MAP	
DEIM SUBDIVISION	
JOB NO. 24034	
LOCATION: EPC	SHEET
03/28/2025	
SHEET: 1	



# Hydrologic Soil Group—El Paso County Area, Colorado



Soil Map may not be valid at this scale.




**Natural Resources  
Conservation Service**









Web Soil Survey  
National Cooperative Soil Survey

1/28/2025  
Page 1 of 4

**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 22, Sep 3, 2024

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

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

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
67	Peyton sandy loam, 5 to 9 percent slopes	B	9.0	10.0%
68	Peyton-Pring complex, 3 to 8 percent slopes	B	70.7	78.7%
111	Water		10.1	11.3%
<b>Totals for Area of Interest</b>			<b>89.8</b>	<b>100.0%</b>

## 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.

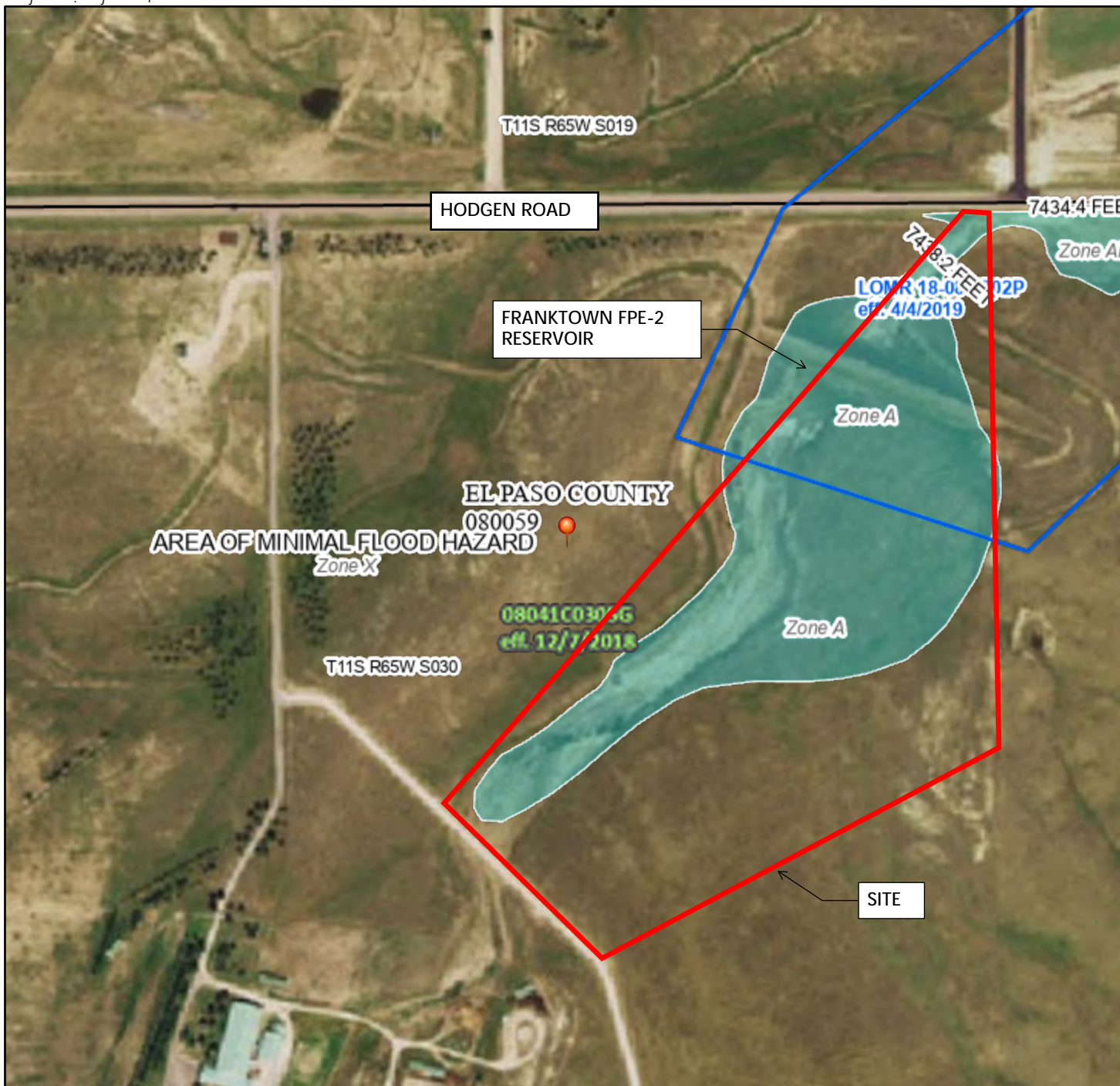
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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.







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63(&,\$/ )/22' +\$=\$5' \$5(

5HJXODWRU\ )ORRGZD\

\$QQXDO &KDQFH )ORRG  
RI DQQXDO FKDQFH IOI  
GHSWK OHVV WKDQ RQH  
DUHDV RI OHVV WKDQ RQH

XWXUH &RQLWLRLQV  
&KDQFH )ORRG +DJDUG  
\$UHD ZLWK 5HGXFHG )ORRG  
/HYHH 6HHRDRWHV  
\$UHD ZLWK )ORRG 5-LVN

12 6&5( (\$UHD RI 0LQLPDO )ORRG  
(IHFWLH /205V  
\$UHD RI 8QGHWHUPLQHG

\*(1(5\$ /- - - &KDQQHO &XOYHUW RU  
6758&785(16111 /HYHH 'LNH RU )ORRGZD

&URVV 6HFWLRQV ZLWK  
:DWHU 6XUIDFH (OHYDWL  
&RDVWDO 7UDQVHFV  
%DVH )ORRG (OHYDWLRQ  
/LPL RI 6WXG\  
-XULVGLFWLRQ %RXQGDU  
&RDVWDO 7UDQVHFV %DVH  
3URILOH %DVHOLQH  
((\$785(6 +\GURJUDSKLF )HDWXUH

'LJLWDO 'DWD \$YDLODEO  
1R 'LJLWDO 'DWD \$YDLODEO  
8QPDSHG

7KH SLQ GLVSOD\HG RQ WKH  
SRLQW VHOHFWHG E\ WKH XV  
DQ DXWKRULWDWLYH SURSHU

7KLV PDS FRPSOLHV ZLWK )(0\$ V VWDQ  
GLJLWDO IORRG PDSV LI LW LV QRW YR  
7KH EDVHPDS VKRZQ FRPSOLHV ZLWK )(0  
DFFXUD\ VWDQGDUGV

7KH IORRG KDJDUG LQIRUPDWLRQ LV GH  
DXWKRULWDWLYH 1)+/ ZHE VHU\LFHV S  
ZDV H[SURWHG RQ W DQG GRHV RY  
UHIOHFW FKDQJHV RU DPHQGPHQWV VX  
WLPH 7KH 1)+/ DQG HIIHFWLYH LQIRUP  
EHFRPH VXSHUVHG E\ QHZ GDWD RYH

7KLV PDS LPDJH LV YRLG LI WKH RQH R  
HOHPHQWV GR QRW DSSHU EDVHPDS  
OHJHQG VFDOH EDU PDS FUNDWLRQ G  
,50 SDQHO QXPEHU DQG ),50 HIIHFWLYH  
XQPDSSHG DQG XQPRGHUQLJHG DUHDV  
UHJXODWRU\ SXUSRVH



## APPENDIX B – HYDROLOGIC CALCULATIONS

Please include design  
rainfall table or reference  
for calculations

ALL TERRAIN: SEE UPDATED MINOR AND  
MAJOR STORM ROUTING SHEETS.  
INTENSITY EQUATIONS ARE SHOWN THAT  
INCLUDE DESIGN RAINFALL.

**Subdivision:** Deim Subdivision  
**Location:** El Paso County  
**Project Name:** Deim Subdivision  
**Project Number:** 24034  
**Calculated By:** NQJ  
**Checked By:** REB  
**Date:** 3/28/2025

EXISTING CONDITIONS - BASIN SUMMARY TABLE							
Tributary Sub-basin	Area (acres)	Percent Impervious	C <sub>5</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
A	25.82	2%	0.09	0.36	69.7	2.8	19.0
B	15.77	2%	0.09	0.36	45.2	2.8	18.7
C	2.77	2%	0.09	0.36	31.4	0.9	5.7
OS1	42.32	2%	0.09	0.36	44.4	7.5	50.2
OS2	23.53	2%	0.09	0.36	39.3	4.4	29.5
OS3	4.48	7%	0.14	0.39	31.9	1.6	7.8

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q <sub>5-YR</sub>	Q <sub>100-YR</sub>
1	N/A	287
2	7.5	50.2
3	4.4	29.5
4	10.5	70.4
5	9.1	61
6 ONSITE	29.5	65.3
6 TOTAL	29.5	287

Please include an explanation of why DP1 and DP6 are the same design flow. Is the peak of the flows generated by the on site basins over before the peak of the off site flow onto the site?

ALL TERRAIN: THERE IS AN EXPLANATION OF THIS CONDITION IN THE BEGINNIGN OF THE EXISTING BASIN DESCRIPTION SECTION. ADDITIONALLY, THERE ARE NOTES ON THE DRAINAGE MAPS REGARDING.

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: Deim Subdivision  
Location: El Paso County

Project Name: Deim Subdivision  
Project No.: 24034.00  
Calculated By: NQJ  
Checked By: REB  
Date: 3/28/25

Basin ID	Total Area (ac)	Dirt Roadway				Paved				Historic Greenbelt				Weighted C <sub>5</sub> & C <sub>100</sub>		Basins Total Weighted % Imp.
		C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.	C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.	C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.	C <sub>5</sub>	C <sub>100</sub>	
														C <sub>5</sub>	C <sub>100</sub>	
A	25.82	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.09	0.36	25.82	2.0%	0.09	0.36	2.0%
B	15.77	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.09	0.36	15.77	2.0%	0.09	0.36	2.0%
C	2.77	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.09	0.36	2.77	2.0%	0.09	0.36	2.0%
OS1	42.32	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.09	0.36	42.32	2.0%	0.09	0.36	2.0%
OS2	23.53	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.09	0.36	23.53	2.0%	0.09	0.36	2.0%
OS3	4.48	0.59	0.70	0.00	80.0%	0.9	0.96	0.25	100.0%	0.09	0.36	4.23	2.0%	0.14	0.39	7.5%
Total	114.69															2.2%

STANDARD FORM SF-2 - EXISTING CONDITIONS  
TIME OF CONCENTRATION

Subdivision: Deim Subdivision  
Location: El Paso County

Project Name: Deim Subdivision  
Project No.: 24034.00  
Calculated By: NQJ  
Checked By: REB  
Date: 3/28/25

SUB-BASIN					INITIAL/OVERLAND			TRAVEL TIME					t <sub>c</sub> CHECK			FINAL
DATA					(T <sub>i</sub> )			(T <sub>t</sub> )					(URBANIZED BASINS)			
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C <sub>s</sub>	Impervious (%)	L (ft)	S <sub>o</sub> (%)	t <sub>i</sub> (min)	L <sub>t</sub> (ft)	S <sub>t</sub> (%)	K	VEL. (ft/s)	t <sub>t</sub> (min)	COMP. t <sub>c</sub> (min)	TOTAL LENGTH (ft)	Urbanized t <sub>c</sub> (min)	t <sub>c</sub> (min)
A	25.82	B	0.09	2.0%	300	4.7%	19.0	2194	0.80%	7.0	0.6	58.4	77.4	2494.0	69.7	69.7
B	15.77	B	0.09	2.0%	300	7.3%	16.4	1375	1.6%	7.0	0.9	25.9	42.3	1675.0	45.2	42.3
C	2.77	B	0.09	2.0%	86	8.0%	8.5	586	3.4%	7.0	1.3	7.6	16.1	672.0	31.4	16.1
OS1	42.32	B	0.09	2.0%	300	6.0%	17.5	1841	3.1%	7.0	1.2	24.9	42.4	2141.0	44.4	42.4
OS2	23.53	B	0.09	2.0%	300	2.7%	22.8	1440	3.6%	7.0	1.3	18.1	40.8	1740.0	39.3	39.3
OS3	4.48	B	0.14	7.5%	260	4.6%	17.0	773	3.2%	7.0	1.3	10.3	27.3	1033.0	31.9	27.3

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).

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Where:

$t_t$  = channelized flow time (travel time, min)

$L_t$  = waterway length (ft)

$S_o$  = waterway slope (ft/ft)

$V_t$  = travel time velocity (ft/sec) =  $K\sqrt{S_o}$

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

Eq 
$$t_i = \frac{0.395(1.1 - C_s)\sqrt{L_i}}{S_o^{0.333}}$$

Where:

$t_i$  = overland (initial) flow time (minutes)

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

$L_i$  = length of overland flow (ft)

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

Equation 6-4 
$$t_c = \frac{16 - 17t_i}{60(14i + 9)\sqrt{S_t}}$$

Eq:

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

$L_o$  = length of channelized flow path (ft)

$i$  = imperviousness (expressed as a decimal)

$S_t$  = 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

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.

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Deim Subdivision  
Location: El Paso County  
Design Storm: 5-Year

Project Name: Deim Subdivision  
Project No.: 24034.00  
Calculated By: NOJ  
Checked By: REB  
Date: 3/28/25

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				SURFACE			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)	$Q_{stream}$ (cfs)	C*A (ac)	Slope (%)	$Q_{pipe}$ (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	$t_t$ (min)	
	1							N/A															CWCB BLE STUDY DOES NOT INCLUDE 5-YEAR FLOW, SEE 100-YEAR SCENARIO
		A	25.82	0.09	69.71	2.32	1.22	2.8															BASIN A FLOW @ DP5
	2	OS1	42.32	0.09	42.38	3.81	1.96	7.5					7.5	3.81	1.60					1375	1.3	18.1	BASIN OS1 FLOW @ DP2, FOLLOWS EXISTING TO DP4
	3	OS2	23.53	0.09	39.29	2.12	2.08	4.4					4.4	2.12	2.40					510	1.5	5.5	BASIN OS2 FLOW @ DP3, FOLLOWS EXISTING TO DP4
		B	15.77	0.09	42.27	1.42	1.97	2.8															BASIN B FLOW @ DP4
	4								60.5	7.35	1.43	10.5	10.5	7.35	0.08					395	0.3	23.3	COMBINED DP2, DP3 & BASIN B FLOW @ DP4, FOLLOW EXISTING TO DP5
	5								83.8	9.67	0.94	9.1											COMBINED BASIN A, DP1 & DP4 @ DP5, PIPED THROUGH DAM TO DP6
		C	2.77	0.09	16.08	0.25	3.42	0.9															BASIN C FLOW @ DP6
		OS3	4.48	0.14	27.26	0.61	2.62	1.6															BASIN OS3 FLOW @ DP6
	6								83.8	10.52	0.94	19.0											COMBINED DP5, BASIN C & BASIN OS3 FLOW @ DP6, FOLLOWS HISTORIC EAST ALONG HODGEN ROAD
<b>Notes:</b> Street and Pipe C*A values are determined by Q/i using the catchment's intensity value.																							

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Deim Subdivision

Location: El Paso County

Design Storm: 100-Year

Project Name: Deim Subdivision

Project No.: 24034.00

Calculated By: NQJ

Checked By: REB

Date: 3/28/25

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				SURFACE			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)	$Q_{stream}$ (cfs)	C*A (ac)	Slope (%)	$Q_{pipe}$ (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	$t_t$ (min)	
	1							287.0															CWCB BLE STUDY FLOW IN UNNAMED TRIBUTARY TO EAST CHERRY CREEK (ALL FLOWS BELOW ARE INCLUDED IN THE 287 CFS)
		A	25.82	0.36	69.71	9.30	2.04	19.0															BASIN A FLOW @ DP5
	2	OS1	42.32	0.36	42.38	15.24	3.29	50.2					50.2	15.24	1.60					1375	1.3	18.1	BASIN OS1 FLOW @ DP2, FOLLOWS EXISTING TO DP4
	3	OS2	23.53	0.36	39.29	8.47	3.48	29.5					29.5	8.47	2.40					510	1.5	5.5	BASIN OS2 FLOW @ DP3, FOLLOWS EXISTING TO DP4
		B	15.77	0.36	42.27	5.68	3.30	18.7															BASIN B FLOW @ DP4
	4								60.5	29.38	2.40	70.4	70.4	29.38	0.08					395	0.3	23.3	COMBINED DP2, DP3 & BASIN B FLOW @ DP4, FOLLOW EXISTING TO DP5
	5								83.8	38.68	1.58	61.0											COMBINED BASIN A, DP1 & DP4 @ DP5, PIPED THROUGH DAM TO DP6
		C	2.77	0.36	16.08	1.00	5.74	5.7															BASIN C FLOW @ DP6
		OS3	4.48	0.39	27.26	1.76	4.41	7.8															BASIN OS3 FLOW @ DP6
	6	ONSITE CONTRIBUTION							83.8	41.44	1.58	65.3											COMBINED DP5, BASIN C & BASIN OS3 FLOW @ DP6, FOLLOWS HISTORIC EAST ALONG HODGEN ROAD
	6	TOTAL FLOW										287.0											CWCB BLE STUDY 100-YEAR FLOW IN UNNAMED TRIBUTARY OF EAST CHERRY CREEK (ALL OTHER BASINS INCLUDED IN THIS FLOW)

Notes:  
Street and Pipe C\*A values are determined by Q/I using the catchment's intensity value.

**Subdivision:** Deim Subdivision  
**Location:** El Paso County  
**Project Name:** Deim Subdivision  
**Project Number:** 24034  
**Calculated By:** NQJ  
**Checked By:** REB  
**Date:** 3/28/2025

PROPOSED CONDITIONS - BASIN SUMMARY TABLE							
Tributary Sub-basin	Area (acres)	Percent Impervious	C <sub>5</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
A	25.82	3%	0.10	0.37	68.8	3.1	19.7
B	15.77	5%	0.11	0.38	43.9	3.5	19.8
C	2.77	2%	0.09	0.36	31.4	0.9	5.7
OS1	43.32	2%	0.09	0.36	44.4	7.7	51.4
OS2	23.53	2%	0.09	0.36	39.3	4.4	29.5
OS3	4.48	7%	0.14	0.39	31.9	1.6	7.8

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q <sub>5-YR</sub>	Q <sub>100-YR</sub>
1	NA	287
2	7.7	51.4
3	4.4	29.5
4	11.1	72
5	9.7	62.3
6	20.2	288.1

FLOW COMPARISON - DP6		
Condition	Q <sub>5-YR</sub>	Q <sub>100-YR</sub>
Existing	19	287
Proposed	20.2	288.1
% Increase	5.94%	0.38%

COMPOSITE % IMPERVIOUS CALCULATIONS - PROPOSED CONDITIONS

Subdivision: Deim Subdivision  
Location: El Paso County

Project Name: Deim Subdivision  
Project No.: 24034.00  
Calculated By: NQJ  
Checked By: REB  
Date: 3/28/25

		Dirt Roadway				Paved				Roofs				Historic Greenbelt				Weighted C <sub>5</sub> & C <sub>100</sub>		Basins Total Weighted % Imp.
Basin ID	Total Area (ac)	C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.	C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.	C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.	C <sub>5</sub>	C <sub>100</sub>	Area (ac)	% Imp.			
																		C <sub>5</sub>	C <sub>100</sub>	
A	25.82	0.59	0.70	0.10	80.0%	0.9	0.96	0.00	100.0%	0.73	0.81	0.22	90.0%	0.09	0.36	25.72	2.0%	0.10	0.37	3.1%
B	15.77	0.59	0.70	0.33	80.0%	0.9	0.96	0.00	100.0%	0.73	0.81	0.22	90.0%	0.09	0.36	15.44	2.0%	0.11	0.38	4.9%
C	2.77	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	2.77	2.0%	0.09	0.36	2.0%
OS1	43.32	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	43.32	2.0%	0.09	0.36	2.0%
OS2	23.53	0.59	0.70	0.00	80.0%	0.9	0.96	0.00	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	23.53	2.0%	0.09	0.36	2.0%
OS3	4.48	0.59	0.70	0.00	80.0%	0.9	0.96	0.25	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	4.23	2.0%	0.14	0.39	7.5%
Total	115.69																			2.8%



STANDARD FORM SF-2 - PROPOSED CONDITIONS  
TIME OF CONCENTRATION

Subdivision: Deim Subdivision  
Location: El Paso County

Project Name: Deim Subdivision  
Project No.: 24034.00  
Calculated By: NQJ  
Checked By: REB  
Date: 3/28/25

SUB-BASIN					INITIAL/OVERLAND			TRAVEL TIME					t <sub>c</sub> CHECK			FINAL
DATA					(T <sub>i</sub> )			(T <sub>t</sub> )					(URBANIZED BASINS)			
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C <sub>s</sub>	Impervious (%)	L (ft)	S <sub>o</sub> (%)	t <sub>i</sub> (min)	L <sub>t</sub> (ft)	S <sub>t</sub> (%)	K	VEL. (ft/s)	t <sub>t</sub> (min)	COMP. t <sub>c</sub> (min)	TOTAL LENGTH (ft)	Urbanized t <sub>c</sub> (min)	t <sub>c</sub> (min)
A	25.82	B	0.10	3.1%	300	4.7%	18.8	2194	0.80%	7.0	0.6	58.4	77.2	2494.0	68.8	68.8
B	15.77	B	0.11	4.9%	300	7.3%	16.1	1375	1.6%	7.0	0.9	25.9	41.9	1675.0	43.9	41.9
C	2.77	B	0.09	2.0%	86	8.0%	8.5	586	3.4%	7.0	1.3	7.6	16.1	672.0	31.4	16.1
OS1	43.32	B	0.09	2.0%	300	6.0%	17.5	1841	3.1%	7.0	1.2	24.9	42.4	2141.0	44.4	42.4
OS2	23.53	B	0.09	2.0%	300	2.7%	22.8	1440	3.6%	7.0	1.3	18.1	40.8	1740.0	39.3	39.3
OS3	4.48	B	0.14	7.5%	260	4.6%	17.0	773	3.2%	7.0	1.3	10.3	27.3	1033.0	31.9	27.3

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).

$$t_t = \frac{L_t}{60K\sqrt{S_o}} = \frac{L_t}{60V_t}$$

Where:

$t_t$  = channelized flow time (travel time, min)

$L_t$  = waterway length (ft)

$S_o$  = waterway slope (ft/ft)

$V_t$  = travel time velocity (ft/sec) =  $K\sqrt{S_o}$

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

Eq

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_o^{0.333}}$$

Where:

$t_i$  = overland (initial) flow time (minutes)

$C_5$  = runoff coefficient for 5-year frequency (from Table 6-4)

$L_i$  = length of overland flow (ft)

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

Equation 6-4

$$t_c = \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

Equation 6-5

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

$L_o$  = length of channelized flow path (ft)

$i$  = imperviousness (expressed as a decimal)

$S_t$  = 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

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.

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

**Subdivision:** Deim Subdivision  
**Location:** El Paso County  
**Design Storm:** 5-Year

**Project Name:** Deim Subdivision  
**Project No.:** 24034.00  
**Calculated By:** NOJ  
**Checked By:** REB  
**Date:** 3/28/25

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				SURFACE			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)	$Q_{stream}$ (cfs)	C*A (ac)	Slope (%)	$Q_{pipe}$ (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	$t_t$ (min)	
	1							N/A															CWCB BLE STUDY DOES NOT INLCUDE 5-YEAR FLOW, SEE 100-YEAR SCENARIO
		A	25.82	0.10	68.83	2.53	1.24	3.1															BASIN A FLOW @ DP5
	2	OS1	43.32	0.09	42.38	3.90	1.96	7.7					7.7	3.90	1.60					1375	1.3	18.1	BASIN OS1 FLOW @ DP2, FOLLOW EXISTING TO DP4
	3	OS2	23.53	0.09	39.29	2.12	2.08	4.4					4.4	2.12	2.40					510	1.5	5.5	BASIN OS2 FLOW @ DP3, FOLLOW EXISTING TO DP4
		B	15.77	0.11	41.94	1.74	1.98	3.5															BASIN B FLOW@ DP4
	4								60.5	7.76	1.43	11.1	11.1	7.76	0.08					395	0.3	23.3	COMBINED DP2, DP3 & BASIN B FLOW @ DP4, FOLLOW EXISTING TO DP5
	5								83.8	10.30	0.94	9.7	9.7	10.30	1.00					455	1.0	7.6	COMBINED BASIN A, DP1 & DP4 @ DP5, PIPED THROUGH DAM TO TDP6
		C	2.77	0.09	16.08	0.25	3.42	0.9															BASIN C FLOW @ DP6
		OS3	4.48	0.14	27.26	0.61	2.62	1.6															BASIN OS3 FLOW @ DP6
	6								83.8	11.15	0.94	20.2											COMBINED DP5, BASIN C & BASIN OS3 @ DP6, FOLLOWS HISTORIC EAST ALONG HODGEN ROAD

**Notes:**  
Street and Pipe C\*A values are determined by Q/i using the catchment's intensity value.

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

Subdivision: Deim Subdivision  
Location: El Paso County  
Design Storm: 100-Year

Project Name: Deim Subdivision  
Project No.: 24034.00  
Calculated By: NQJ  
Checked By: REB  
Date: 3/28/25

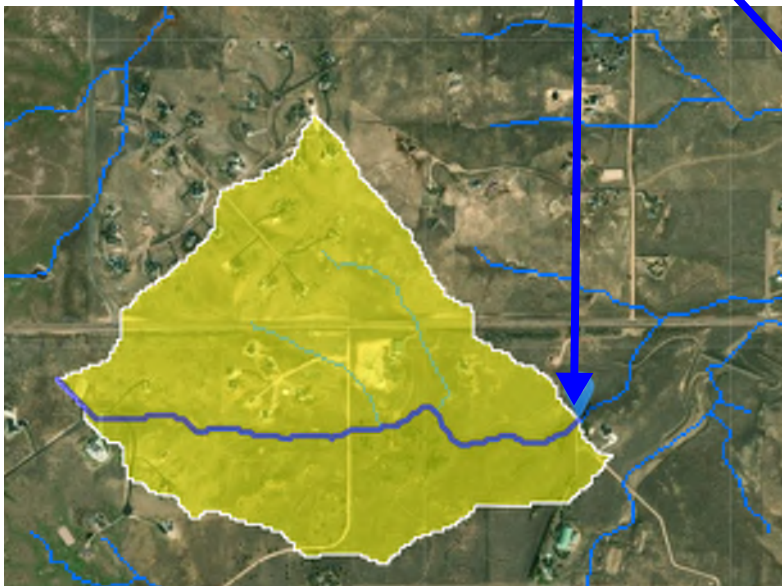
STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				SURFACE			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (ac)	Runoff Coeff.	$t_c$ (min)	C*A (ac)	I (in/hr)	Q (cfs)	$t_c$ (min)	C*A (ac)	I (in/hr)	Q (cfs)	$Q_{stream}$ (cfs)	C*A (ac)	Slope (%)	$Q_{pipe}$ (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	$t_t$ (min)	
	1							287.0															CWCB BLE STUDY FLOW IN UNNAMED TRIBUTARY TO EAST CHERRY CREEK (ALL FLOWS BELOW ARE INCLUDED IN THE 287 CFS)
		A	25.82	0.37	68.83	9.51	2.07	19.7															BASIN A FLOW @ DP5
	2	OS1	43.32	0.36	42.38	15.60	3.29	51.4					51.4	15.60	1.60					1375	1.3	18.1	BASIN OS1 FLOW @ DP2, FOLLOW EXISTING TO DP4
	3	OS2	23.53	0.36	39.29	8.47	3.48	29.5					29.5	8.47	2.40					510	1.5	5.5	BASIN OS2 FLOW @ DP3, FOLLOW EXISTING TO DP4
		B	15.77	0.38	41.94	5.97	3.32	19.8															BASIN B FLOW@ DP4
	4								60.5	30.03	2.40	72.0	72.0	30.03	0.08					395	0.3	23.3	COMBINED DP2, DP3 & BASIN B FLOW @ DP4, FOLLOW EXISTING TO DP5
	5								83.8	39.54	1.58	62.3	62.3	39.54	1.00					455	1.0	7.6	COMBINED BASIN A, DP1 & DP4 @ DP5, PIPED THROUGH DAM TO TDP6
		C	2.77	0.36	16.08	1.00	5.74	5.7															BASIN C FLOW @ DP6
		OS3	4.48	0.39	27.26	1.76	4.41	7.8															BASIN OS3 FLOW @ DP6
	6	ONSITE CONTRIBUTION							83.8	42.30	1.58	66.7											COMBINED DP5, BASIN C & BASIN OS3 @ DP6, FOLLOWS HISTORIC EAST ALONG HODGEN ROAD
	6	TOTAL FLOW										288.1											CWCB BLE STUDY 100-YEAR FLOW IN UNNAMED TRIBUTARY OF EAST CHERRY CREEK (ALL OTHER BASINS INCLUDED IN THIS FLOW)

Notes:  
Street and Pipe C\*A values are determined by Q/i using the catchment's intensity value.

## APPENDIX C – HYDRAULIC CALCULATIONS

Address the culvert capacity and overtopping criteria on the north-south portion of the private road as well. Streamstats may be used for basic basin information:  
<https://streamstats.usgs.gov/ss/>

ADDRESSED. SEE  
UPDATED DRAINAGE  
MAPS, REPORT TEXT AND  
ROADWAY OVERTOPPING  
ANALYSIS.

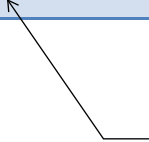


# HY-8 Culvert Analysis Report

---

**Table 1 - Project Headwater Table**

Crossing Name	Culvert Name	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Outlet Velocity (ft/s)
Ex 20" RCP	Culvert 1	287.00	17.04	8052.02	592.21	464.337	354.62	1.67	1.67	1.67	131.03



REMAINING 256.96 CFS  
OVERTOPS SUNDANCE RANCH LANE  
SEE OVERTOPPING ANALYSIS

### Crossing Input: Ex 20" RCP

Parameter	Value	Units
<b>DISCHARGE DATA</b>		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	285.000	cfs
Design Flow	287.000	cfs
Maximum Flow	290.000	cfs
<b>TAILWATER DATA</b>		
Channel Type	Irregular Channel	
Irregular Channel	Define...	
Rating Curve	View...	
<b>ROADWAY DATA</b>		
Roadway Profile Shape	Irregular	
Irregular Shape	Define...	
Roadway Surface	Paved	
Top Width	12.000	ft

### Culvert Input: Ex 20" RCP

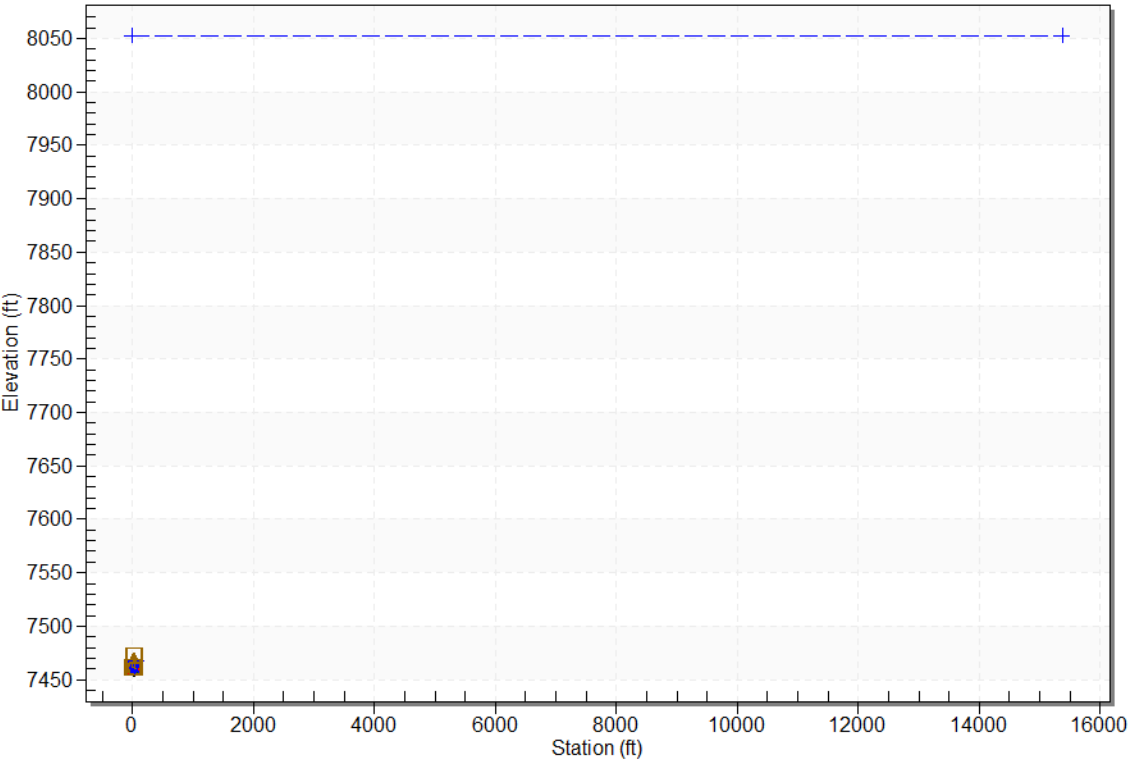
Parameter	Value	Units
<b>CULVERT DATA</b>		
Name	Culvert 1	
Shape	Circular	
Material	Concrete	
Diameter	1.670	ft
Embedment Depth	0.000	in
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Grooved End Projecting (Ke=0.2)	
Inlet Depression?	No	
<b>SITE DATA</b>		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	7459.810	ft
Outlet Station	40.130	ft
Outlet Elevation	7459.400	ft
Number of Barrels	1	
Computed Culvert Slope	0.010217	ft/ft

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
285.00	17.02	7462.86	3.05	2.768	1.83	7-M2c	1.67	1.50	1.50	0.87	8.19	4.84
285.50	17.03	7462.86	3.05	2.769	1.83	7-M2c	1.67	1.50	1.50	0.87	8.19	4.85
286.00	17.03	7462.87	3.06	2.770	1.83	7-M2c	1.67	1.50	1.50	0.87	8.19	4.85
286.50	17.03	7462.87	3.06	2.771	1.83	7-M2c	1.67	1.51	1.51	0.87	8.20	4.85
287.00	17.04	8052.02	592.21	464.337	354.62	6-FFc	1.67	1.67	1.67	0.87	131.03	4.85
287.50	17.04	7462.87	3.06	2.772	1.83	7-M2c	1.67	1.51	1.51	0.87	8.20	4.86
288.00	17.04	7462.87	3.06	2.773	1.83	7-M2c	1.67	1.51	1.51	0.87	8.20	4.86
288.50	17.05	7462.87	3.06	2.774	1.83	7-M2c	1.67	1.51	1.51	0.87	8.20	4.86
289.00	17.05	7462.87	3.06	2.775	1.83	7-M2c	1.67	1.51	1.51	0.87	8.20	4.86
289.50	17.06	7462.87	3.06	2.775	1.83	7-M2c	1.67	1.51	1.51	0.87	8.20	4.87
290.00	17.06	7462.87	3.06	2.776	1.83	7-M2c	1.67	1.51	1.51	0.87	8.21	4.87
290.00	17.06	7462.87	3.06	2.776	1.83	7-M2c	1.67	1.51	1.51	0.87	8.21	4.87

Water Surface Profile Plot for Culvert: Culvert 1

Crossing - Ex 20" RCP, Design Discharge - 287.0 cfs  
Culvert - Culvert 1, Culvert Discharge - 17.0 cfs





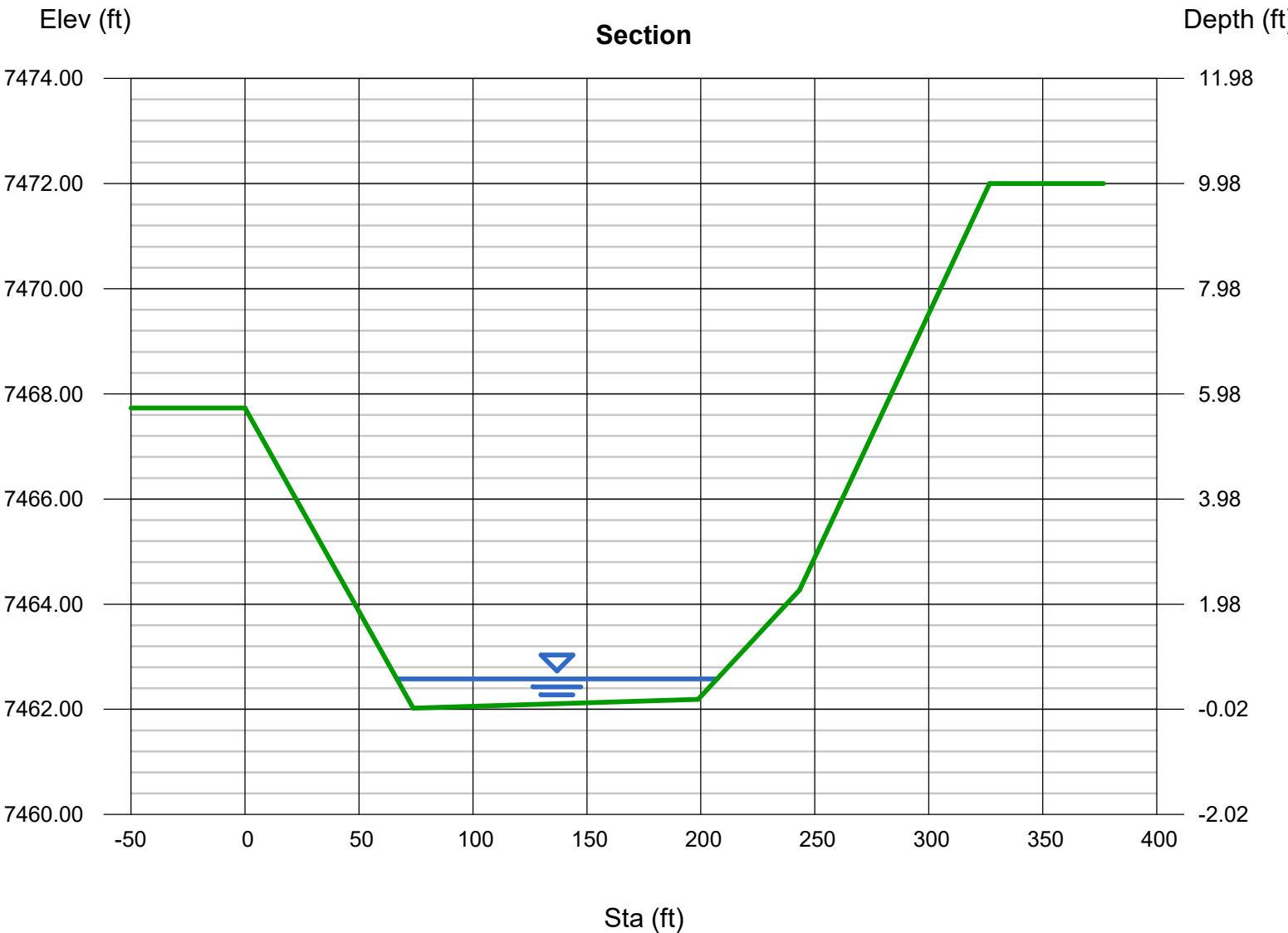
# Channel Report

## Sundance Ranch Lane Overtopping (Q100: DP1 - Culvert Flow = 257 cfs)

User-defined		Highlighted	
Invert Elev (ft)	= 7462.02	Depth (ft)	= 0.56
Slope (%)	= 2.00	Q (cfs)	= 257.00
N-Value	= 0.030	Area (sqft)	= 62.99
<b>Calculations</b>		Velocity (ft/s)	= 4.08
		Wetted Perim (ft)	= 140.53
		Crit Depth, Yc (ft)	= 0.59
		Top Width (ft)	= 140.50
		EGL (ft)	= 0.82
Compute by: Known Q			
Known Q (cfs) = 257.00			

(Sta, El, n)-(Sta, El, n)...

( 0.00, 7467.73)-(73.85, 7462.02, 0.030)-(198.73, 7462.19, 0.030)-(243.38, 7464.27, 0.030)-(326.64, 7472.00, 0.030)





## **APPENDIX D – WATER QUALITY & DETENTION**

## 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: Deim Subdivision	
2. El Paso County Project #: TBD	3. ESQCP #: N/A
4. Project Location: El Paso County	Project Location in MS4 Permit Area (Y or N): N
5. Project Description: An existing ~35 acre parcel to be subdivided into four 5+ acre lots.	
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"?				
• 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. <b><i>This exclusion only excludes the original roadway area it does NOT apply to entire project.</i></b>
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, $\geq 2.5$ acres per dwelling and total lot impervious area < 10 percent.

Questions (cont'd)	Yes	No	Not Applicable	Notes
<b>F. Do Non-Residential or Non-Commercial Infiltration Conditions exist?</b> Post-development surface conditions do not result in concentrated stormwater flow or surface water discharge during an 80 <sup>th</sup> 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.
<b>G. Is the project land disturbance to Undeveloped Land where undeveloped land remains undeveloped following the activity?</b>			X	Project must be on land with no human made structures such as buildings or pavement.
<b>H. Is the project a Stream Stabilization Site?</b>			X	Standalone stream stabilization projects are excluded.
<b>I. Is the project a bike or pedestrian trail?</b>			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.
<b>J. Is the project Oil and Gas Exploration?</b>			X	Activities and facilities associated with oil and gas exploration are excluded.
<b>K. Is the project in a County Growth Area?</b>				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.			
A. Water Quality Capture Volume (WQCV) Standard			
B. Pollutant Removal/80% Total Suspended Solids Removal (TSS)			
C. Runoff Reduction Standard			
D. Applicable Development Site Draining to a Regional WQCV Control Measure			
E. Applicable Development Site Draining to a Regional WQCV Facility			
F. Constrained Redevelopment Sites Standard			
G. Previous Permit Term Standard			
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.			
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.			

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

The project will not perform any earthwork or ground disturbing activities & the lots will meet the size minimum for the Large Lot Single Family sites exclusion per EPC DCM Appendix I. Therefore, no permanent water quality is required.

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



03/28/2025

Date

Post-Construction Stormwater Management applicability 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 E – REFERENCE MATERIAL**





# Federal Emergency Management Agency Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	El Paso County Colorado (Unincorporated Areas)	NO PROJECT	HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 080039		
IDENTIFIER	Severe Subdivision	APPROXIMATE LATITUDE AND LONGITUDE: 38.372, -104.767 SOURCE: USGS QUADRANGLE    DATUM: NAD 83	
ANNOTATED MAPPING ENCLOSURES		ANNOTATED STUDY ENCLOSURES	
TYPE: FIRM    NO.: 08047C0005G    DATE: December 7, 2018		DATE OF EFFECTIVE FLOOD INSURANCE STUDY: December 7, 2018 PROFILE: 450P SUMMARY OF DISCHARGES TABLE: 4	

Enclosures reflect changes to flooding sources affected by this revision.  
\* FIRM - Flood Insurance Rate Map

### FLOODING SOURCE AND REVISED REACH

Unnamed Tributary to East Cherry Creek - From approximately 2,330 feet downstream of Hodgen Road to approximately 1,630 feet upstream of Hodgen Road

### SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Unnamed Tributary to East Cherry Creek	Zone A	Zone A	NONE	YES
	No BFEs*	BFEs	YES	NONE
	Zone A	Zone AE	YES	YES

\* BFEs - Base Flood Elevations

### DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information Exchange toll free at 1-877-336-2627 (1-877-FEMA-MAP) or by letter addressed to the LOMR Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>

  
Patrick 'Rock' F. Seabolt, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



**Federal Emergency Management Agency**  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**COMMUNITY INFORMATION**

**APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION**

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

**COMMUNITY REMINDERS**

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive study of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA-MAP) or by letter addressed to the LOMR Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

  
Patrick "Rock" F. Seebit, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration





**Federal Emergency Management Agency**  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Jeanine D. Peterson  
Director, Mitigation Division  
Federal Emergency Management Agency, Region VIII  
Denver Federal Center, Building 710  
P.O. Box 25267  
Denver, CO 80225-0267  
(303) 235-4830

**STATUS OF THE COMMUNITY NFIP MAPS**

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA.MAP) or by letter addressed to the LOMR Clearinghouse, 3001 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

  
Patrick "Rock" F. Sacchi, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration



**Federal Emergency Management Agency**  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**PUBLIC NOTIFICATION OF REVISION**

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at [https://www.floodmaps.fema.gov/fha/bfc\\_status/bfc\\_main.asp](https://www.floodmaps.fema.gov/fha/bfc_status/bfc_main.asp)

**LOCAL NEWSPAPER**

Name: *Colorado Springs Gazette*

Dates: November 28, 2018 and December 5, 2018

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA-MAP) or by letter addressed to the LOMC Clearinghouse, 3001 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional information about the NFIP is available on our website at <https://www.fema.gov/national-flood-insurance-program>

  
Patrick "Pete" P. Sackel, P.E., Branch Chief  
Engineering Services Branch  
Federal Insurance and Mitigation Administration

# Flooding Source and Location

Drainage Area  
(Square Miles)

Peak Discharges (Cubic Feet Per Second)

10-Year

50-Year

100-Year

Unnamed Tributary to Black Squirrel Creek No. 2

At US Highway 24

At Rolling Thunder Way

At Woodmen Road

3.66  
3.60  
3.23

--  
--  
--

--  
--  
--

1,225  
1,717  
1,482

Upper East Tributary to Chico Creek

At Barbwire Road

4.6

--

--

705

Upper Fountain Creek (see Fountain Creek)

West Fork Black Squirrel Creek - Solberg Ranch East Tributary

At confluence with West Fork Black Squirrel Creek - Solberg Ranch Tributary

1.63

--

--

784

West Fork Black Squirrel Creek - Solberg Ranch Tributary

Above Shocum Road

At confluence with West Fork Black Squirrel Creek - Solberg Ranch East Tributary

7.22  
5.59

--  
--

--  
--

2,184  
1,847

West Fork Squirrel Creek - Solberg Ranch - West Unnamed Tributary

1.5

--

--

1,935

West Tributary to Black Squirrel Creek

At confluence with Black Squirrel Creek

0.59

--

--

55

Widfield Creek

At confluence with Fountain Creek

15.1

4,660

7,700

10,000

Williams Canyon

At confluence with Fountain Creek

2.68

1,930

3,640

4,710

Unnamed Tributary to East Cherry Creek

Above confluence with Unnamed Tributary

At Hodgen Road

2.95  
2.07

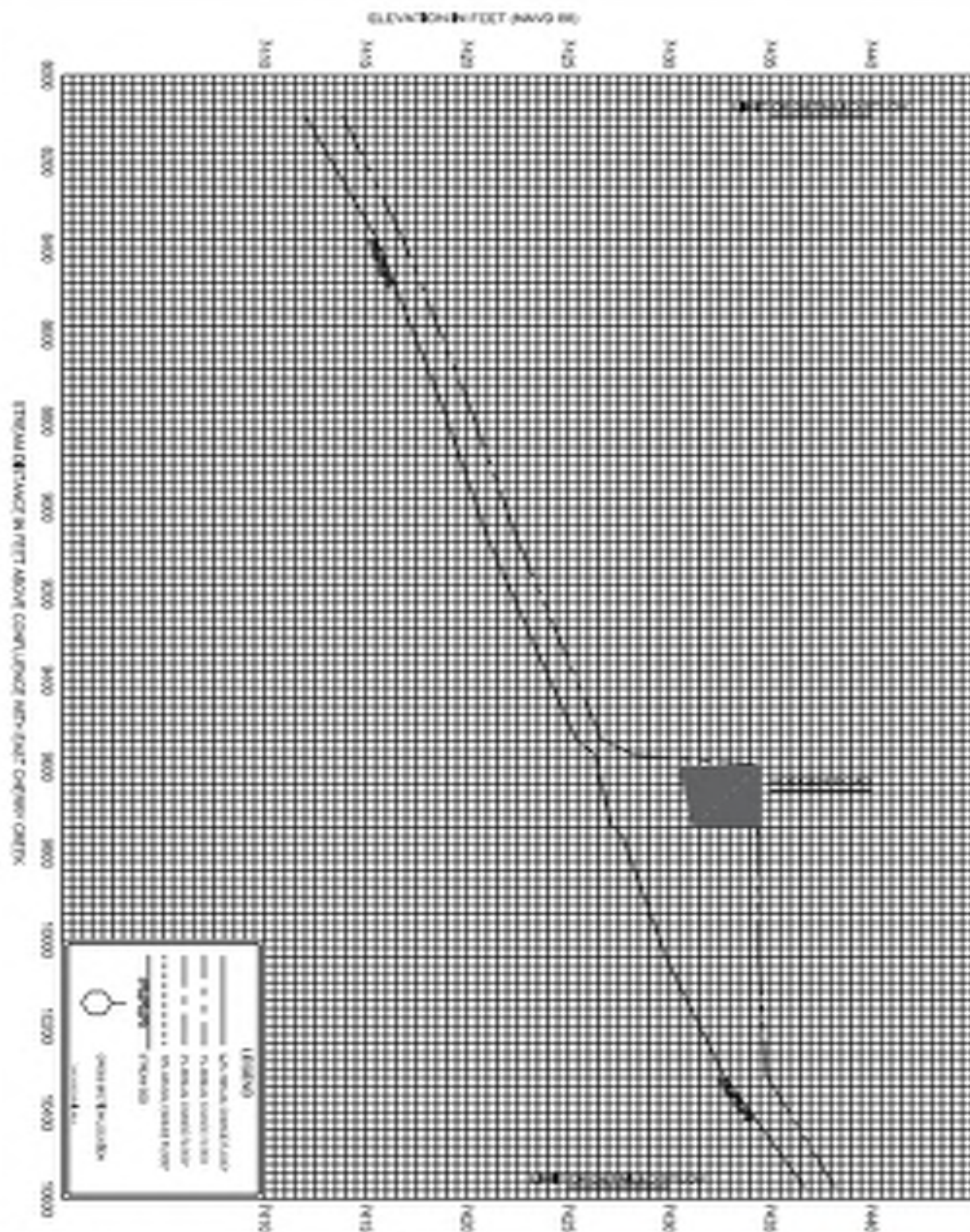
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357  
287

Data not available

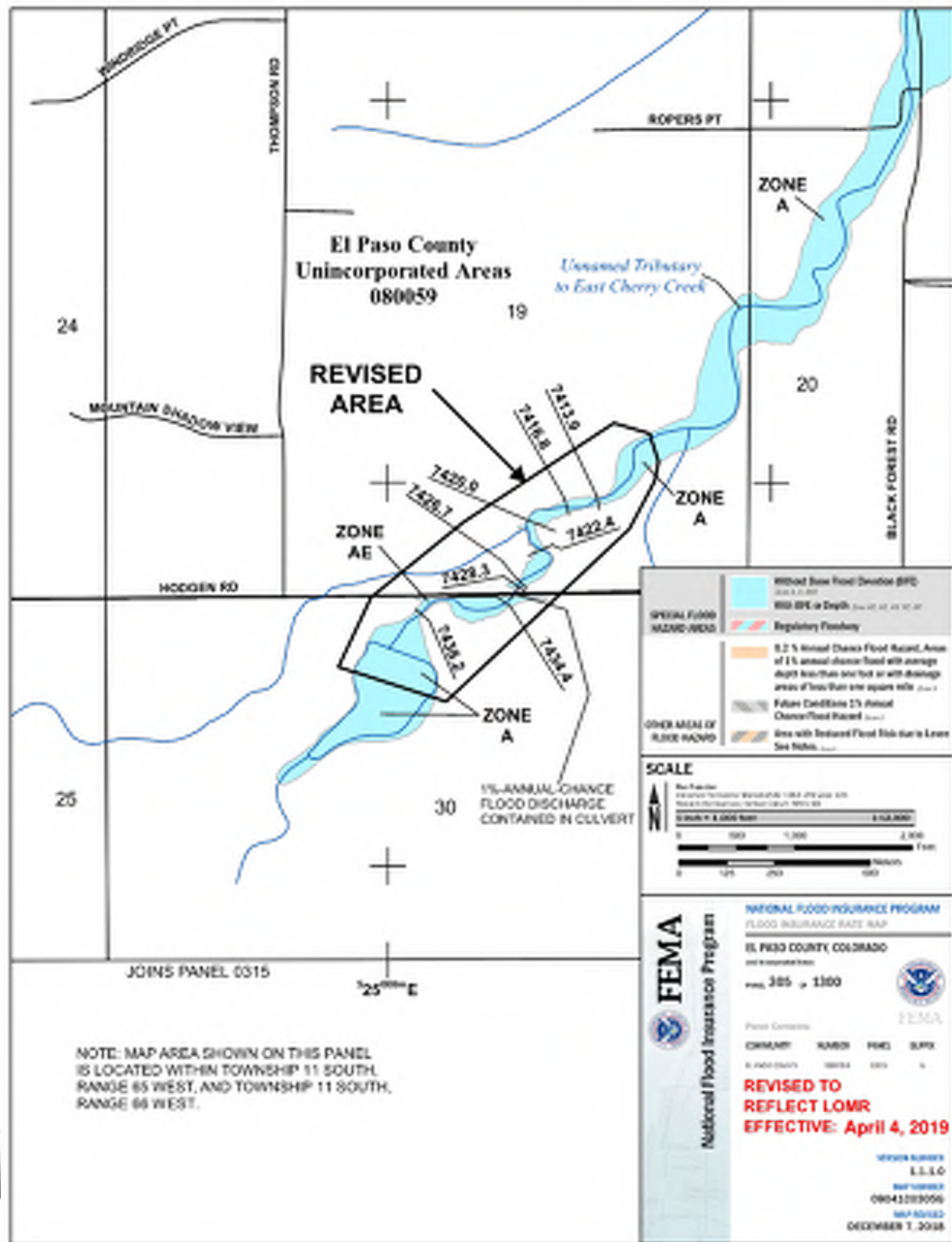




450P

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**EL PASO COUNTY, CO**  
 (AND INCORPORATED AREAS)

**FLOOD PROFILES**  
 UNNAMED TRIBUTARY TO EAST CHERRY CREEK  
 REVISED TO REFLECT LATEST EFFECTIVE: April 4, 2019



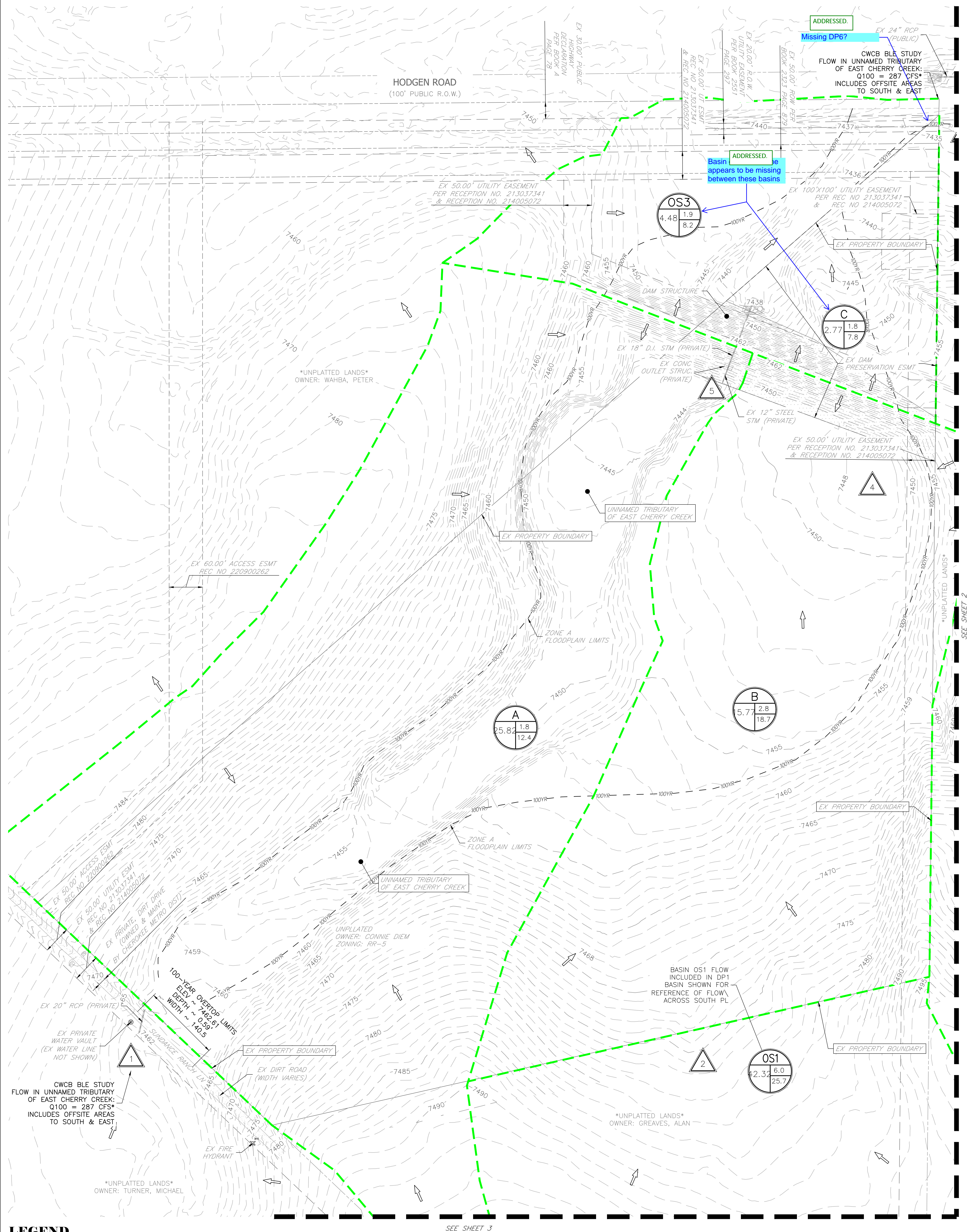


## **APPENDIX F – DRAINAGE MAPS**



# DEIM SUBDIVISION

## EXISTING DRAINAGE MAP



## LEGEND

Diagram illustrating the difference between existing and proposed drainage basins.

**EXISTING**

**PROPOSED**

BOUNDARY LINE

PROPERTY LINE

EASEMENT LINE

RIGHT OF WAY

STORM SEWER

SWALE/WATERWAY FLOWLINE

INDEX CONTOUR

INTERMEDIATE CONTOUR

FLOW DIRECTION

BASIN ID

DESIGN POINT DESIGNATION

DRAINAGE BASIN

Tributary Sub-basin	Area (acres)	Percent Impervious	C <sub>s</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
A	25.82	2%	0.09	0.36	69.7	2.8	19.0
B	15.77	2%	0.09	0.36	45.2	2.8	18.7
C	2.77	2%	0.09	0.36	31.4	0.9	5.7
OS1	42.32	2%	0.09	0.36	44.4	7.5	50.2
OS2	23.53	2%	0.09	0.36	39.3	4.4	29.5
OS3	4.48	7%	0.14	0.39	31.9	1.6	7.8

### DRAINAGE MAP NOTES

1. THE CWCW BLE STUDY HAS ESTABLISHED THE EXISTING 100-YEAR FLOW IN THE UNNAMED TRIBUTARY OF EAST CHERRY CREEK. THE FLOW (287 CFS) INCLUDES ALL ONSITE AND OFFSITE AREAS TRIBUTARY TO DP6.
2. BASIN FLOW ANALYSIS IS TO DEMONSTRATE ONSITE & ADJACENT AREA CONTRIBUTION TO TOTAL FLOW OF 287 CFS & TO PROVIDE A PROPOSED CONDITION INCREASE TO ONSITE FLOW.

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q <sub>5-YR</sub>	Q <sub>100-YR</sub>
1	N/A	287
2	7.5	50.2
3	4.4	29.5
4	10.5	70.4
5	9.1	61
6 ONSITE	29.5	65.3
6 TOTAL	29.5	287



EXISTING DRAINAGE MAP

DEIM SUBDIVISION

JOB NO. 24034
LOCATION: EPC
03/28/2025

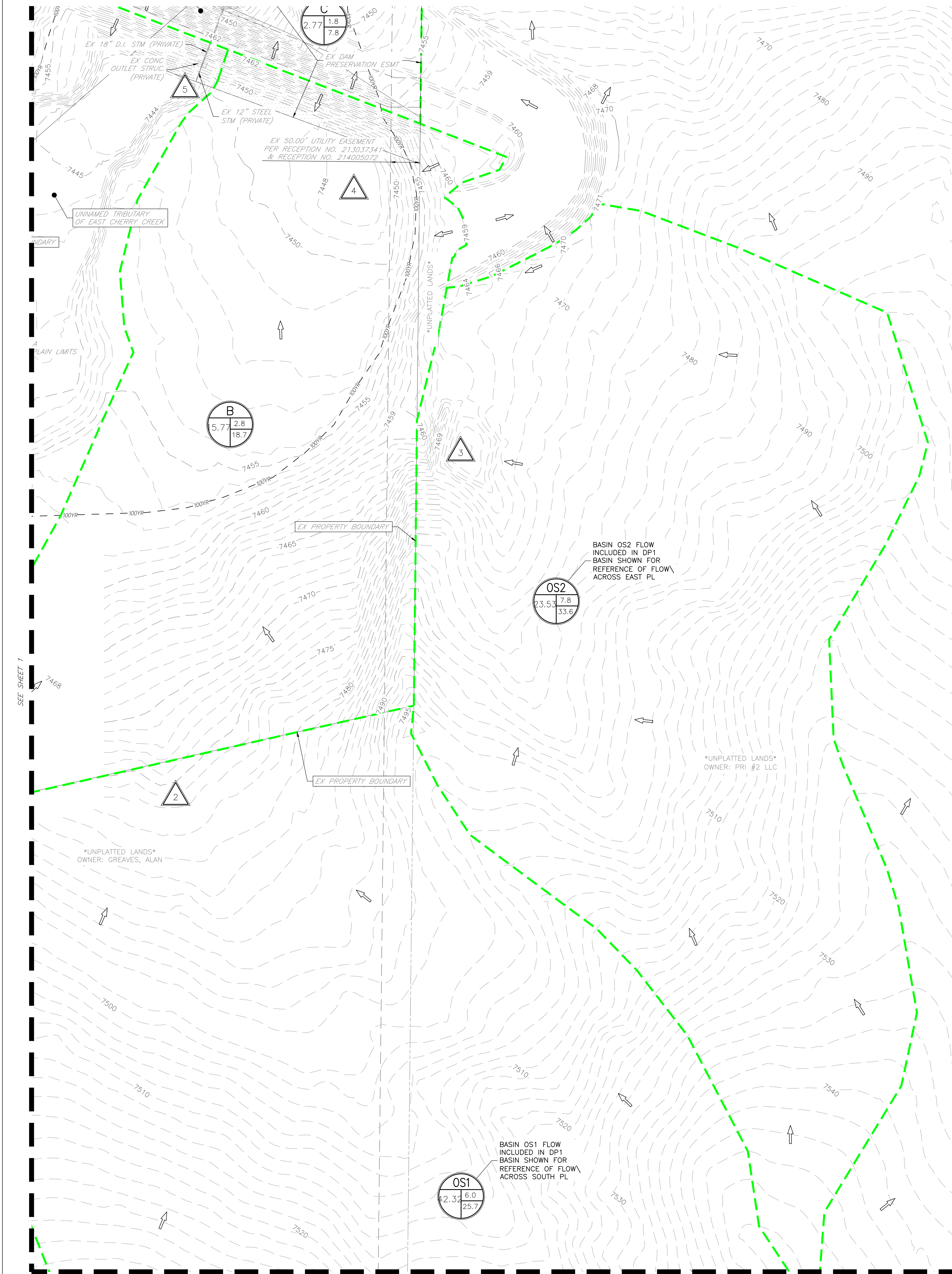
SHEET  
1





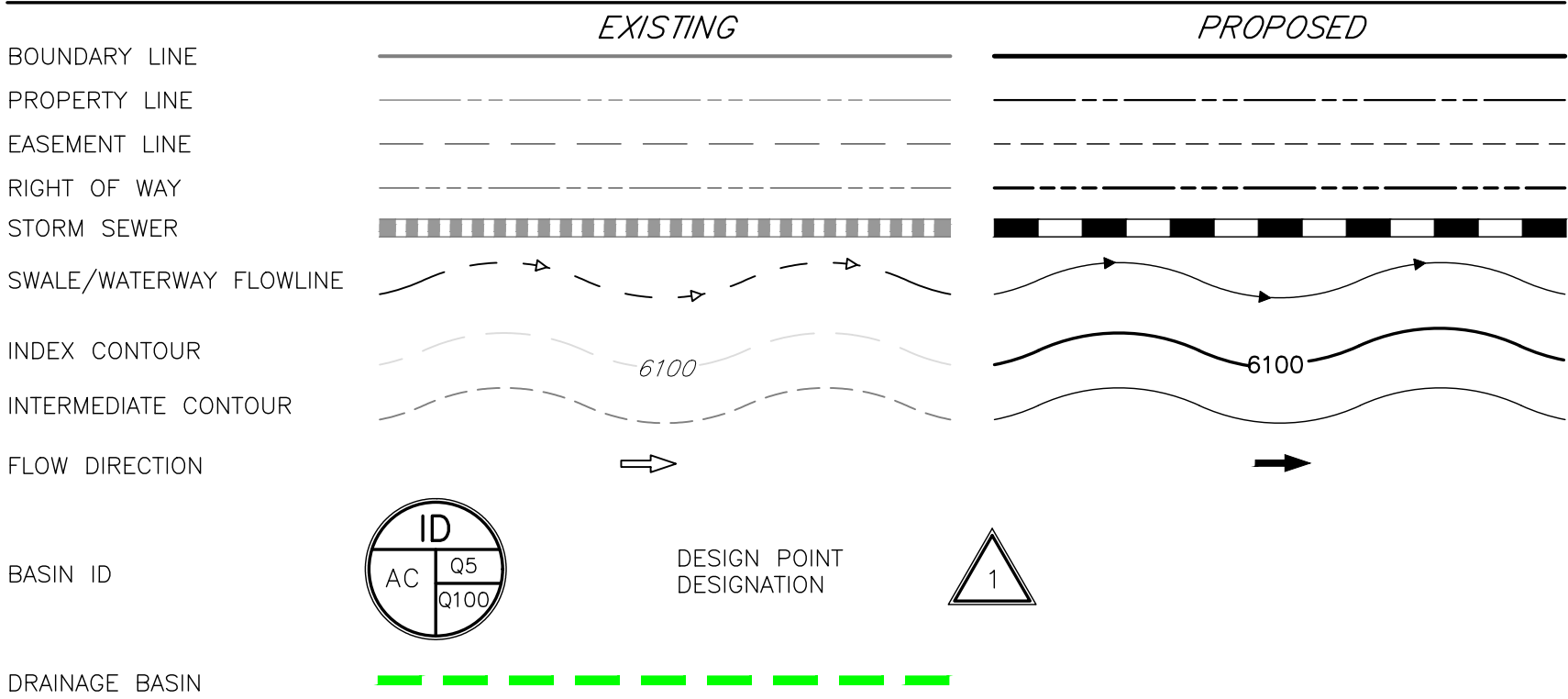
# DEIM SUBDIVISION

## EXISTING DRAINAGE MAP



SEE SHEET 3

### LEGEND

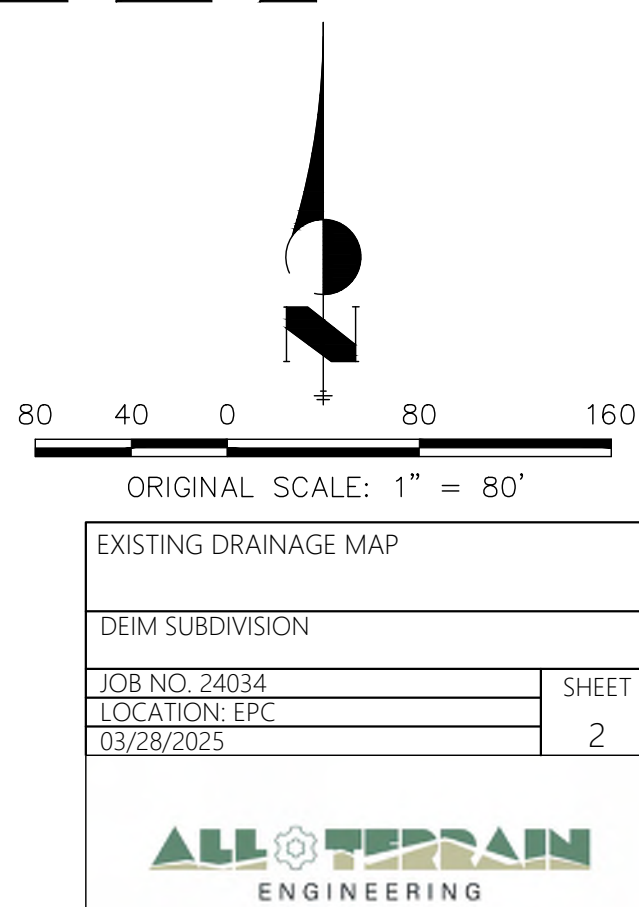


EXISTING CONDITIONS - BASIN SUMMARY TABLE							
Tributary Sub-basin	Area (acres)	Percent Impervious	C <sub>s</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
A	25.82	2%	0.09	0.36	69.7	2.8	19.0
B	15.77	2%	0.09	0.36	45.2	2.8	18.7
C	2.77	2%	0.09	0.36	31.4	0.9	5.7
OS1	42.32	2%	0.09	0.36	44.4	7.5	50.2
OS2	23.53	2%	0.09	0.36	39.3	4.4	29.5
OS3	4.48	7%	0.14	0.39	31.9	1.6	7.8

### DRAINAGE MAP NOTES

- THE CWCB BLE STUDY HAS ESTABLISHED THE EXISTING 100-YEAR FLOW IN THE UNNAMED TRIBUTARY OF EAST CHERRY CREEK. THE FLOW (287 CFS) INCLUDES ALL ONSITE AND OFFSITE AREAS TRIBUTARY TO DP6.
- BASIN FLOW ANALYSIS IS TO DEMONSTRATE ONSITE & ADJACENT AREA CONTRIBUTION TO TOTAL FLOW OF 287 CFS & TO PROVIDE A PROPOSED CONDITION INCREASE TO ONSITE FLOW.

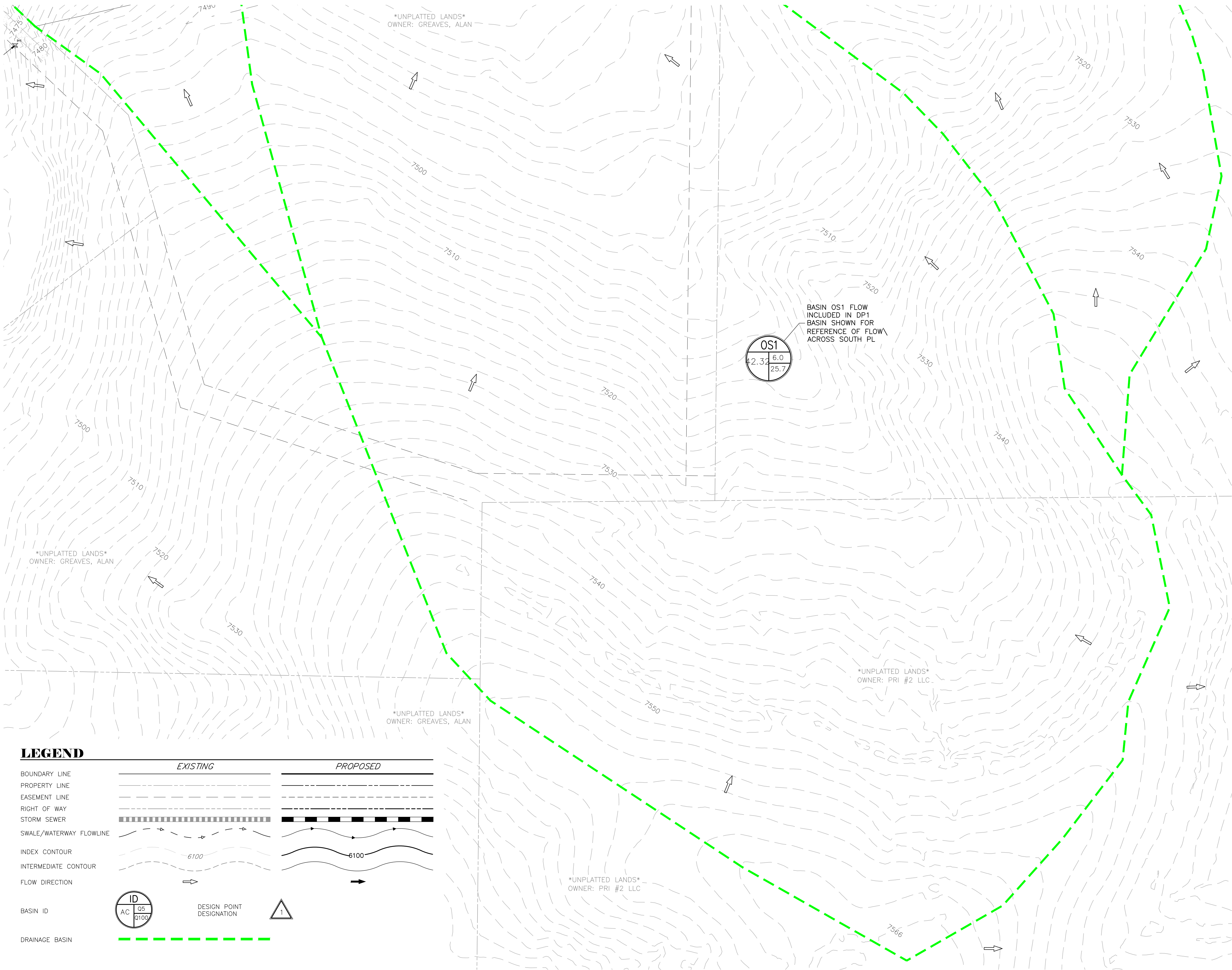
EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q <sub>s</sub> -YR	Q <sub>100</sub> -YR
1	N/A	287
2	7.5	50.2
3	4.4	29.5
4	10.5	70.4
5	9.1	61
6 ONSITE	29.5	65.3
6 TOTAL	29.5	287





# DEIM SUBDIVISION

## EXISTING DRAINAGE MAP



EXISTING CONDITIONS - BASIN SUMMARY TABLE								
Tributary Sub-basin	Area (acres)	Percent Impervious	C <sub>s</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)	
A	25.82	2%	0.09	0.36	69.7	2.8	19.0	
B	15.77	2%	0.09	0.36	45.2	2.8	18.7	
C	2.77	2%	0.09	0.36	31.4	0.9	5.7	
OS1	42.32	2%	0.09	0.36	44.4	7.5	50.2	
OS2	23.53	2%	0.09	0.36	39.3	4.4	29.5	
OS3	4.48	7%	0.14	0.39	31.9	1.6	7.8	

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q <sub>s</sub> -YR	Q <sub>100</sub> -YR
1	N/A	287
2	7.5	50.2
3	4.4	29.5
4	10.5	70.4
5	9.1	61
6 ONSITE	29.5	65.3
6 TOTAL	29.5	287

- DRAINAGE MAP NOTES**
1. THE CWCB BLE STUDY HAS ESTABLISHED THE EXISTING 100-YEAR FLOW IN THE UNNAMED TRIBUTARY OF EAST CHERRY CREEK. THE FLOW (287 CFS) INCLUDES ALL ONSITE AND OFFSITE AREAS TRIBUTARY TO DP6.
  2. BASIN FLOW ANALYSIS IS TO DEMONSTRATE ONSITE & ADJACENT AREA CONTRIBUTION TO TOTAL FLOW OF 287 CFS & TO PROVIDE A PROPOSED CONDITION INCREASE TO ONSITE FLOW.

### LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR		
INTERMEDIATE CONTOUR		
FLOW DIRECTION		
BASIN ID		
DESIGN POINT DESIGNATION		
DRAINAGE BASIN		

ORIGINAL SCALE: 1" = 80'

EXISTING DRAINAGE MAP

DEIM SUBDIVISION

JOB NO. 24034

LOCATION: EPC

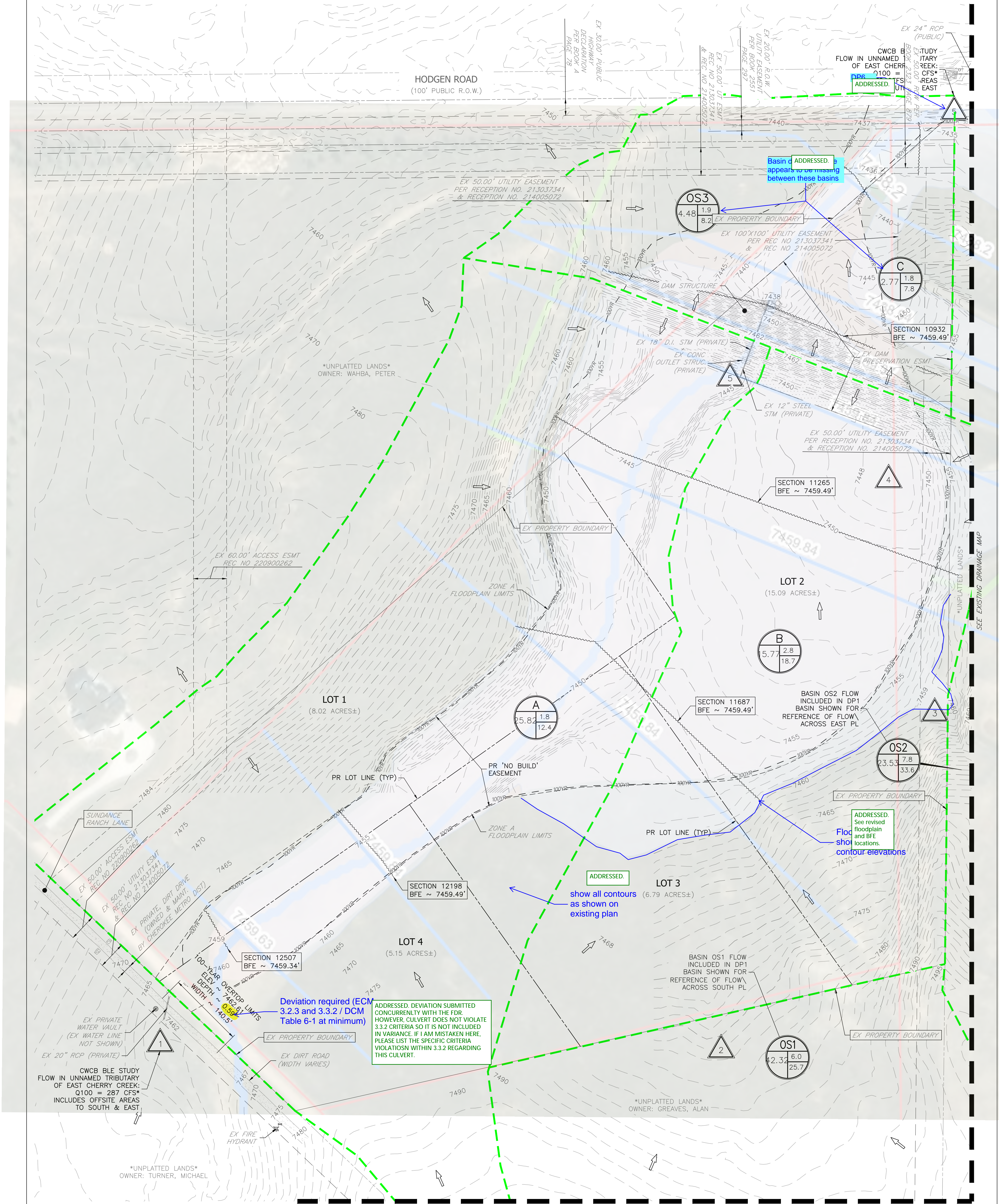
03/28/2025

SHEET 3



# DEIM SUBDIVISION

## PROPOSED DRAINAGE MAP



### LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE	---	---
PROPERTY LINE	---	---
EASEMENT LINE	---	---
RIGHT OF WAY	---	---
STORM SEWER	---	---
SWALE/WATERWAY FLOWLINE	---	---
INDEX CONTOUR	---	---
INTERMEDIATE CONTOUR	---	---
FLOW DIRECTION	---	---
BASIN ID	---	---
DRAINAGE BASIN	---	---

PROPOSED CONDITIONS - BASIN SUMMARY TABLE								
Tributary Sub-basin	Area (acres)	Percent Impervious	C <sub>s</sub>	C <sub>100</sub>	t <sub>c</sub> (min)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)	Q <sub>100</sub> (cfs)
A	25.82	3%	0.10	0.37	68.8	3.1	19.7	
B	15.77	5%	0.11	0.38	43.9	3.5	19.8	
C	2.77	2%	0.09	0.36	31.4	0.9	5.7	
OS1	43.32	2%	0.09	0.36	44.4	7.7	51.4	
OS2	23.53	2%	0.09	0.36	39.3	4.4	29.5	
OS3	4.48	7%	0.14	0.39	31.9	1.6	7.8	

### DRAINAGE MAP NOTES

- THE CWCB BLE STUDY HAS ESTABLISHED THE EXISTING 100-YEAR FLOW IN THE UNNAMED TRIBUTARY OF EAST CHERRY CREEK. THE FLOW (287 CFS) INCLUDES ALL ONSITE AND OFFSITE AREAS TRIBUTARY TO DP6.
- BASIN FLOW ANALYSIS IS TO DEMONSTRATE ONSITE & ADJACENT AREA CONTRIBUTION TO TOTAL FLOW OF 287 CFS & TO PROVIDE A PROPOSED CONDITION INCREASE TO ONSITE FLOW.

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE		
DP#	Q <sub>s</sub> -YR	Q <sub>100</sub> -YR
1	NA	287
2	7.7	51.4
3	4.4	29.5
4	11.1	72
5	9.7	62.3
6	20.2	288.1

FLOW COMPARISON - DP6		
Condition	Q <sub>s</sub> -YR	Q <sub>100</sub> -YR
Existing	19	287
Proposed	20.2	288.1
% Increase	5.94%	0.38%



### PROPOSED DRAINAGE MAP

DEIM SUBDIVISION	
JOB NO. 24034	SHEET
LOCATION: EPC	1
03/28/2025	






# ENG-SF25015-R1-FDR.pdf Markup Summary


1 (1)

SF2515

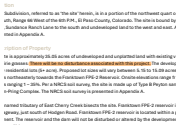
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**Page Index:** 1  
**Date:** 5/16/2025 1:35:57 PM  
**Author:** Bret  
**Color:**   
**Layer:**  
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**Page Label:** 1


4 (2)



**Subject:** SW - Textbox with Arrow  
**Page Index:** 4  
**Date:** 5/19/2025 8:35:14 AM  
**Author:** Mikayla Hartford  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 4

Clarify this statement, when homes are built, there will be disturbance. I think this means there will be no disturbances associated with the final plat project, though the development itself will result in future disturbance at the home sites themselves.




**Subject:** SW - Highlight  
**Page Index:** 4  
**Date:** 5/19/2025 8:35:23 AM  
**Author:** Mikayla Hartford  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 4

There will be no disturbance associated with this project.


8 (5)



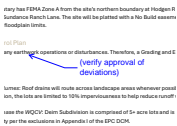
**Subject:** Callout  
**Page Index:** 8  
**Date:** 5/8/2025 9:35:33 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 8


add a statement that the project will not affect access across the easement for maintenance of the FPE-2 dam and reservoir in any way



**Subject:** Callout  
**Page Index:** 8  
**Date:** 5/8/2025 9:36:52 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 8

add that maintenance of the dam will not be affected by the subdivision



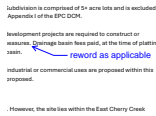
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**Page Index:** 8  
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**Author:** Jeff Rice - EPC Engineering Review  
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**Space:**  
**Page Label:** 8

(verify approval of deviations)



**Subject:**  
**Page Index:** 8  
**Date:** 5/8/2025 10:44:39 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**    
**Layer:**  
**Space:**  
**Page Label:** 8

All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization with the drainage basin.



**Subject:** Callout  
**Page Index:** 8  
**Date:** 5/8/2025 10:45:00 AM  
**Author:** Jeff Rice - EPC Engineering Review  
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**Space:**  
**Page Label:** 8

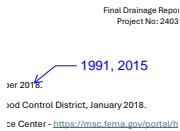
reword as applicable

9 (4)



**Subject:** Callout  
**Page Index:** 9  
**Date:** 5/8/2025 10:50:52 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**    
**Layer:**  
**Space:**  
**Page Label:** 9

and DCM Update



**Subject:** Callout  
**Page Index:** 9  
**Date:** 5/8/2025 10:56:16 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**    
**Layer:**  
**Space:**  
**Page Label:** 9

1991, 2015



**Subject:** Callout  
**Page Index:** 9  
**Date:** 5/8/2025 10:55:06 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**    
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**Page Label:** 9

Add ECM (2023)

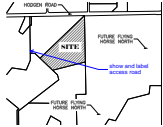



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**Page Index:** 9  
**Date:** 5/8/2025 10:57:29 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**    
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**Page Label:** 9

Flying Horse North Master Development Drainage Plan, HR Green, September 2022.

---

11 (1)



**Subject:** Callout  
**Page Index:** 11  
**Date:** 5/8/2025 10:58:14 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
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**Space:**  
**Page Label:** [1] 8.5x11\_Vert


show and label access road

---

17 (1)

APPENDIX B – HYDROLOGIC C

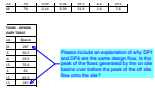
Please include design rainfall table or reference for calculations


**Subject:** Engineer  
**Page Index:** 17  
**Date:** 5/19/2025 9:20:30 AM  
**Author:** Bret  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 12

Please include design rainfall table or reference for calculations

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18 (1)




**Subject:** Engineer  
**Page Index:** 18  
**Date:** 5/19/2025 11:45:56 AM  
**Author:** Bret  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 13

Please include an explanation of why DP1 and DP6 are the same design flow. Is the peak of the flows generated by the on site basins over before the peak of the off site flow onto the site?

---


28 (5)

APPENDIX C – HYDRAULIC CALCULATIONS  
Address the culvert capacity and overtopping criteria on the north-south portion of the private road as well. Streamstats may be used for basic basin information: <https://streamstats.usgs.gov/ss/>


**Subject:** Text Box  
**Page Index:** 28  
**Date:** 5/8/2025 11:18:16 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
**Layer:**  
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**Page Label:** 23

Address the culvert capacity and overtopping criteria on the north-south portion of the private road as well. Streamstats may be used for basic basin information: <https://streamstats.usgs.gov/ss/>




**Subject:** Image  
**Page Index:** 28  
**Date:** 5/8/2025 11:17:38 AM  
**Author:** Jeff Rice - EPC Engineering Review  
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**Subject:** Arrow  
**Page Index:** 28  
**Date:** 5/8/2025 11:17:50 AM  
**Author:** Jeff Rice - EPC Engineering Review  
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**Subject:** Image  
**Page Index:** 28  
**Date:** 5/8/2025 11:17:33 AM  
**Author:** Jeff Rice - EPC Engineering Review  
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**Space:**  
**Page Label:** 23



**Subject:** Arrow  
**Page Index:** 28  
**Date:** 5/8/2025 11:18:01 AM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** 23


47 (4)



**Subject:** Engineer  
**Page Index:** 47  
**Date:** 5/16/2025 1:58:18 PM  
**Author:** Bret  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** [1] Ex\_Drainage Map-Ex Drn Map


Missing DP6?




**Subject:** Engineer  
**Page Index:** 47  
**Date:** 5/16/2025 1:59:16 PM  
**Author:** Bret  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** [1] Ex\_Drainage Map-Ex Drn Map


Basin delineation line appears to be missing between these basins


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----


**Subject:** Engineer  
**Page Index:** 47  
**Date:** 5/16/2025 2:03:59 PM  
**Author:** Bret  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** [1] Ex\_Drainage Map-Ex Drn Map


EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE			
DP#	Q <sub>10</sub>	Q <sub>25</sub>	Q <sub>50</sub>
1	10.0	10.0	10.0
2	10.0	10.0	10.0
3	10.0	10.0	10.0
4	10.0	10.0	10.0

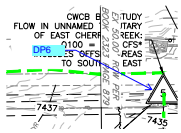
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**Page Index:** 47  
**Date:** 5/16/2025 2:04:04 PM  
**Author:** Bret  
**Color:**   
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**Space:**  
**Page Label:** [1] Ex\_Drainage Map-Ex Drn Map

**Subject:** Callout  
**Page Index:** 50  
**Date:** 5/7/2025 5:04:33 PM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
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**Page Label:** [1] Pr Drn Map

**Subject:** Callout  
**Page Index:** 50  
**Date:** 5/7/2025 5:12:10 PM  
**Author:** Jeff Rice - EPC Engineering Review  
**Color:**   
**Layer:**  
**Space:**  
**Page Label:** [1] Pr Drn Map

**Subject:** Callout  
**Page Index:** 50  
**Date:** 5/7/2025 5:30:40 PM  
**Author:** Jeff Rice - EPC Engineering Review  
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**Space:**  
**Page Label:** [1] Pr Drn Map

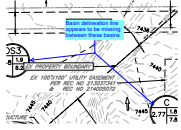
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**Subject:** Engineer  
**Page Index:** 50  
**Date:** 5/16/2025 2:05:09 PM  
**Author:** Bret  
**Color:** ■  
**Layer:**  
**Space:**  
**Page Label:** [1] Pr Drn Map

DP6



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**Subject:** Engineer  
**Page Index:** 50  
**Date:** 5/16/2025 2:05:52 PM  
**Author:** Bret  
**Color:** ■  
**Layer:**  
**Space:**  
**Page Label:** [1] Pr Drn Map

Basin delineation line appears to be missing between these basins