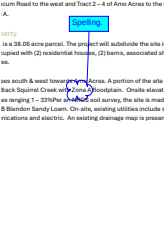
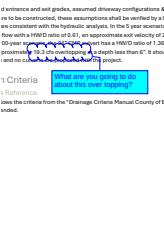
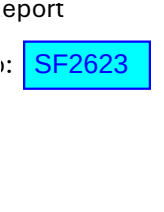


# V1\_Drainage Letter\_comments.pdf Markup Summary

|                                                                                     |                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cloud+ (5)                                                                          |                                                                                                                                                                                                                                                                                                                             |
|    | <div><div><div>Subject: Cloud+</div><div>Page Label: 4</div><div>Author: Jalal Saleh</div><div>Date: 9/22/2026 4:05:55 PM</div><div>Status:</div><div>Color: <span></span></div><div>Layer:</div><div>Space:</div></div><div>Spelling.</div></div>                                                                          |
|    | <div><div><div>Subject: Cloud+</div><div>Page Label: 5</div><div>Author: Jalal Saleh</div><div>Date: 9/22/2026 4:06:57 PM</div><div>Status:</div><div>Color: <span></span></div><div>Layer:</div><div>Space:</div></div><div>Please highlight and make this statement bold because it is of special importance.</div></div> |
|   | <div><div><div>Subject: Cloud+</div><div>Page Label: 5</div><div>Author: Jalal Saleh</div><div>Date: 9/22/2026 4:04:31 PM</div><div>Status:</div><div>Color: <span></span></div><div>Layer:</div><div>Space:</div></div><div>Please verify this value, is it 10.53 from pdf page 34 of 36.</div></div>                      |
|  | <div><div><div>Subject: Cloud+</div><div>Page Label: 5</div><div>Author: Jalal Saleh</div><div>Date: 9/18/2026 2:08:18 PM</div><div>Status:</div><div>Color: <span></span></div><div>Layer:</div><div>Space:</div></div><div>Please verify this value.</div></div>                                                          |
|  | <div><div><div>Subject: Cloud+</div><div>Page Label: 6</div><div>Author: Jalal Saleh</div><div>Date: 9/18/2026 2:46:02 PM</div><div>Status:</div><div>Color: <span></span></div><div>Layer:</div><div>Space:</div></div><div>What are you going to do about this over topping?</div></div>                                  |

|                                                                                     |                                                                                                                                                                                                                                                    |
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| Text Box (3)                                                                        |                                                                                                                                                                                                                                                    |
|  | <div><div><div>Subject: Text Box</div><div>Page Label: 1</div><div>Author: Jalal Saleh</div><div>Date: 9/18/2026 10:55:03 AM</div><div>Status:</div><div>Color: <span></span></div><div>Layer:</div><div>Space:</div></div><div>SF2623</div></div> |

the requirements specified in this drainage

Execute and date this sheet.

**Subject:** Text Box  
**Page Label:** 2  
**Author:** Jalal Saleh  
**Date:** 9/18/2026 10:58:24 AM  
**Status:**  
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**Layer:**  
**Space:**

Execute and date this sheet.

the requirements specified in this drainage

1. Drainage System (Drainage Basin)  
The drainage system (drainage basin) is defined as the area of land that contributes runoff to a specific point of collection. The drainage basin is defined by the topography of the land and the location of the collection point.

2. Drainage System (Drainage Basin)  
The drainage system (drainage basin) is defined as the area of land that contributes runoff to a specific point of collection. The drainage basin is defined by the topography of the land and the location of the collection point.

3. Drainage System (Drainage Basin)  
The drainage system (drainage basin) is defined as the area of land that contributes runoff to a specific point of collection. The drainage basin is defined by the topography of the land and the location of the collection point.

**Subject:** Text Box  
**Page Label:** 7  
**Author:** Jalal Saleh  
**Date:** 9/23/2026 9:39:12 AM  
**Status:**  
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**Layer:**  
**Space:**

Add here a brief paragraph for the Basin Fee and Bridge Fees and add the calculations for the Basin Fee and Bridge Fee.



---

## Amo Acres Subdivision

Final Drainage Report

PCD File No: **SF2623**

ATE: Addressed.

All Terrain Engineering Project No: 24030

August 2026

Prepared for:

Sandra & Deal Wilson

2819 Slocum Road, Peyton CO 80831

[sandraleggett68@gmail.com](mailto:sandraleggett68@gmail.com)

Paul Haggerty

2825 Slocum Road, Peyton CO 80831

haggertyroofing@att.net

Prepared by:

All Terrain Engineering LLC

Contact: Nicholas Q. Jokerst

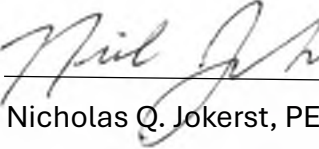
[njokerst@allterraineng.com](mailto:njokerst@allterraineng.com)

(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 applicable 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



08/10/2026

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.

\_\_\_\_\_  
Sandra Wilson

\_\_\_\_\_  
Date

Execute and date this sheet.

ATE: Addressed.

\_\_\_\_\_  
Paul Haggerty

\_\_\_\_\_  
Date

## 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 J. Palmer, P.E.  
County Engineer/ECM Administrator

\_\_\_\_\_  
Date

Conditions:



## Table of Contents

|      |                                               |   |
|------|-----------------------------------------------|---|
| I.   | General Purpose, Location & Description ..... | 2 |
| II.  | Drainage Basins .....                         | 2 |
| III. | Drainage Design Criteria .....                | 3 |
| IV.  | Drainage Facility Design.....                 | 4 |
| V.   | Summary .....                                 | 5 |
| VI.  | References .....                              | 6 |

## Appendices

- A. Vicinity Map, FEMA Map & NRCS Soil Survey
- B. Hydrologic Analysis
- C. Hydraulic Analysis
- D. Water Quality & Detention
- E. Drainage Maps

## I. General Purpose, Location & Description

### a. Purpose & Project Description

The purpose of the Final Drainage Report (FDR) for Amo Acres 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. There will be no proposed site improvements or disturbances associated with this drainage report.

### b. Location

Amo Acres Subdivision, referred to as 'the site' herein, is parcel of land being a portion of the Southwest Quarter of Section 36, Township 13 South, Range 64 West of the 6<sup>th</sup> P.M. The site is bound by unplatted land to the north and east, Slocum Road to the west and Tract 2 – 4 of Amo Acres to the south. A vicinity map is presented in Appendix A.

Spelling.

ATE: Addressed.

### c. Description of Property

- d. Amo Acres Filing No. 1 is a 38.06 acre parcel. The project will subdivide the site into (2) 19.03 acre lots. The existing property is occupied with (2) residential houses, (2) barns, associated sheds and (2) separate gravel driveways to each house.

In general, the site slopes south & west towards Amo Acres. A portion of the site drains directly to an unnamed tributary of Black Squirrel Creek with Zona A floodplain. Onsite elevations range from 6385' – 6435' with approximate slopes ranging 1 – 33%. Per an NRCS soil survey, the site is made up of Type A Truckton Sandy Loam and Type B Blendon Sandy Loam. On-site, existing utilities include services for water, sewer, irrigation, gas, communications and electric. An existing drainage map is presented in Appendix F.

The ultimate receiving waters for the site are Black Squirrel Creek.

### e. Floodplain Statement

Based on FEMA Firm map 08041C0785G dated December 7, 2018, the site is Zone X and Zone A. Zone X are areas determined to be outside the 0.2% annual chance flood hazard. Zone A are areas determined to be within the 1% annual chance of flood. The site's existing buildings are located within Zone X. Zone A portions of the site are designated in a No-Build tract.

## II. Drainage Basins

### a. Major Basin Description

The site is located within the Solberg Ranch Drainage Basin. At the time of this FDR, Solberg Ranch does not have a published Drainage Basin Planning Study.

### b. Existing Subbasin Description

The existing site's drainage patterns are south and west. The site is divided into 9 existing drainage basins. There will be no construction or site disturbance associated with the subdividing of the existing parcel.

Please highlight and make this statement bold because it is of special importance.

Therefore, a proposed conditions subbasin analysis is not included. In the event the developer proposes improvements or disturbances to the site, this FDR shall be amended to account for the proposed condition.

Basin OS1 is 7.36 acres of offsite, undeveloped area. Basin OS1 stormwater ( $Q_5 = 1.7$  cfs  $Q_{100} = 11.4$  cfs) flows onsite at DP1 and continues south through Basin 1 to DP5 ( $Q_5 = 4.3$  cfs  $Q_{100} = 28.6$  cfs). DP5 follows historic drainage patterns offsite to the south.

Basin OS2 is 18.8 acres of offsite, undeveloped area. Basin OS2 stormwater ( $Q_5 = 3.6$  cfs  $Q_{100} = 24.3$  cfs) flows onsite at DP2 and continues south through Basin 3 to DP7 ( $Q_5 = 7.4$  cfs  $Q_{100} = 48.0$  cfs). DP7 follows historic drainage patterns offsite to the south.

Basin OS3 is 3.98 acres of offsite, undeveloped area. Basin OS3 stormwater ( $Q_5 = 0.9$  cfs  $Q_{100} = 5.9$  cfs) flows onsite at DP3 and continues south through Basin 4 to DP9 ( $Q_5 = 11.8$  cfs  $Q_{100} = 76.8$  cfs). DP9 is captured by an unnamed tributary of Black Squirrel Creek and follows historic drainage patterns southeast within the tributary.

Basin OS4 is 42.57 acres of offsite, undeveloped area, Slocum Road and a portion of Blue Sage subdivision. Basin OS4 stormwater ( $Q_5 = 4.8$  cfs  $Q_{100} = 32.1$  cfs) flows onsite at DP4 via an existing 18" HDPE culvert. The culvert conveys flow under an existing gravel driveway and into Basin 5. A hydraulic analysis of the existing culvert is presented in Appendix C. In the 5 year scenario, the existing 18" HDPE culvert has a HW/D ratio of 0.89, an approximate exit velocity of 3.24 ft/s and no overtopping flow. In the 100-year scenario, the existing 18" HDPE culvert has a HW/D ratio of 1.83, an approximate exit velocity of 6.2 ft/s and approximately 21.6 cfs overtopping at a depth less than 6". It should be noted that the basin limits of OS4 were determined using El Paso County's LIDAR topography from 2011. The total flow at DP4 is likely overstated based upon upstream depression storage and infiltration that the Rational Method topography demonstrates that flow in the roadside ditch is paved surface prior to the site. However, for a conservative estimate, the flow is assumed to be the flow in the roadside ditch.

ATE: Addressed. Calcs & map in appendix b & f updated accordingly.

Please verify this value, is it 10.53 from pdf page 34 of 36.

Basin 1 is 9.80 acres of onsite, undeveloped area. Basin 1 stormwater ( $Q_5 = 2.4$  cfs  $Q_{100} = 15.8$  cfs) flows south through the site to DP5 ( $Q_5 = 4.3$  cfs  $Q_{100} = 28.6$  cfs) where it combines with DP1 flow ( $Q_5 = 1.7$  cfs  $Q_{100} = 11.4$  cfs). DP5 follows historic drainage patterns offsite to the south.

Please verify this value.

ATE: Addressed. Calcs & map in appendix b & f updated accordingly.

Basin 2 is 3.86 acres of undeveloped area. Basin 2 stormwater ( $Q_5 = 1.0$  cfs  $Q_{100} = 6.5$  cfs) flows south through the site to DP6 ( $Q_5 = 1.0$  cfs  $Q_{100} = 6.5$  cfs). DP6 follows historic drainage patterns offsite to the south.

Basin 3 is 13.46 acres of existing structures, gravel driveways and undeveloped area. Basin 3 stormwater ( $Q_5 = 3.8$  cfs  $Q_{100} = 22.9$  cfs) flows south through the site to DP7 ( $Q_5 = 7.4$  cfs  $Q_{100} = 48.0$  cfs) where it combines with DP2 flow ( $Q_5 = 3.6$  cfs  $Q_{100} = 24.3$  cfs). DP7 follows historic drainage patterns offsite to the south.

Basin 4 is 10.11 acres of existing structures, gravel driveways, Slocum Road and undeveloped area. Basin 4 stormwater ( $Q_5 = 2.8$  cfs  $Q_{100} = 16.7$  cfs) flows south through the site to DP9 ( $Q_5 = 11.8$  cfs  $Q_{100} = 76.8$  cfs) where it combines with DP3 ( $Q_5 = 0.9$  cfs  $Q_{100} = 5.9$  cfs) and DP8 flow ( $Q_5 = 5.5$  cfs  $Q_{100} = 36.5$  cfs). DP9 is

captured by an unnamed tributary of Black Squirrel Creek and follows historic drainage patterns southeast within the tributary.

Basin 5 is 1.13 acres of Slocum Road, existing driveways and onsite, undeveloped area. Basin 5 stormwater ( $Q_5 = 0.6$  cfs  $Q_{100} = 2.6$  cfs) flows south along Slocum Road to DP8 ( $Q_5 = 5.5$  cfs  $Q_{100} = 36.5$  cfs) where it combines with DP4 flow ( $Q_5 = 4.8$  cfs  $Q_{100} = 32.1$  cfs). Currently, DP8 overtops the existing driveway and flows south to DP9 ( $Q_5 = 11.8$  cfs  $Q_{100} = 76.8$  cfs). In the event further development necessitates the need for a culvert at this existing driveway, a hypothetical culvert design is presented in Appendix C. The culvert analysis was based upon assumed entrance and exit grades, assumed driveway configurations & roadside swale location. If the culvert were to be constructed, these assumptions shall be verified by a licensed engineer to confirm field conditions are consistent with the hydraulic analysis. In the 5 year scenario, a 24" CMP culvert would convey the design flow with a HW/D ratio of 0.61, an approximate exit velocity of 2.32 ft/s and no overtopping flow. In the 100-year scenario, the 24" CMP culvert has a HW/D ratio of 1.36, an approximate exit velocity of 5.9 ft/s and approximately 19.3 cfs overtopping at a depth less than 6". It should be noted that this is a hypothetical analysis and no culverts are proposed with the project.

## Drainage Design Criteria

### a. Development Criteria Reference

The drainage analysis follows the criteria from the "Colorado" Volumes 1 and 2," as amended.

### b. Hydrologic Criteria

Onsite drainage analysis included the 5-year storm calculated per EPCDCM Chapter 5 – Storm Run Hydrology.

### d. Hydraulic Criteria

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

What are you going to do about this over topping?

ATE: Nothing, the over topping condition described herein is a **theoretical** condition. There is no culvert at DP8 currently. Furthermore, per the EPC ECM 3.6.4 overtopping of local roadways is allowed at a depth of 6" when the HW is less than the pipe height.

Colorado"

). Runoff is  
ter 6 –

## III. Drainage Facility Design

### a. General Concept

The proposed site will be subdivided into (2) 19.03 acre lots served by gravel, private driveways. Site stormwater will maintain existing drainage patterns and overland flow through the site to historic outfalls. Water quality and detention will not be provided for the site as the lots exceed the 2.5 acre threshold and no disturbances are proposed.

### b. Water Quality & Detention

Water quality and detention will not be provided for the site as the lots exceed the 2.5 acre threshold and no disturbances are proposed. A PCM Applicability form is included in Appendix D.



c. Inspections & Maintenance

An Inspection and Maintenance Manual will not be provided as the site does not contain any permanent BMPs or PCMs.

d. Grading & Erosion Control Plan

A Grading & Erosion Control Plan will not be provided as no site disturbances are proposed.

e. Four Step Method

*Step 1 – Employ Runoff Reduction Practices:* Existing roof drains discharge to undeveloped areas. Stormwater overland flows through landscaping and open space which will help slow runoff and increase infiltration.

*Step 2 – Stabilize Drainageways:* 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. Refer to Section F for drainage basin fee calculations.

*Step 3 – Provide WQCV:* Water quality treatment is not required for the site.

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

f. Drainage Basin & Bridge Fees

The site is within the Solberg Ranch Drainage Basin. Drainage basin and bridge fees are due at time of platting. The 2026 Solberg Ranch Basin Fee per impervious acre is \$27,282. The total impervious site area is 1.22 acres.

Basin Fee: 1.22 acres x \$27,282/ac = \$33,284

g. Engineer's Opinion of Probable Cost

Add here a brief paragraph for the Basin Fee and Bridge Fees and add the calculations for the Basin Fee and Bridge Fee.

vements are proposed.

IV.

Summary:

ATE: See above.

Base and bridge fee was provided in Section F.

ns consistent with pre-development drainage conditions. The proposed ly affect downstream stormwater infrastructure or surrounding developments. with the latest El Paso County Drainage criteria.



## V. References

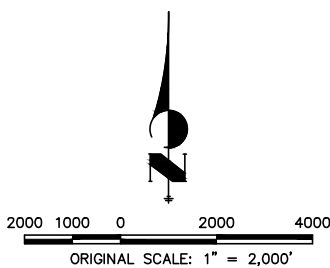
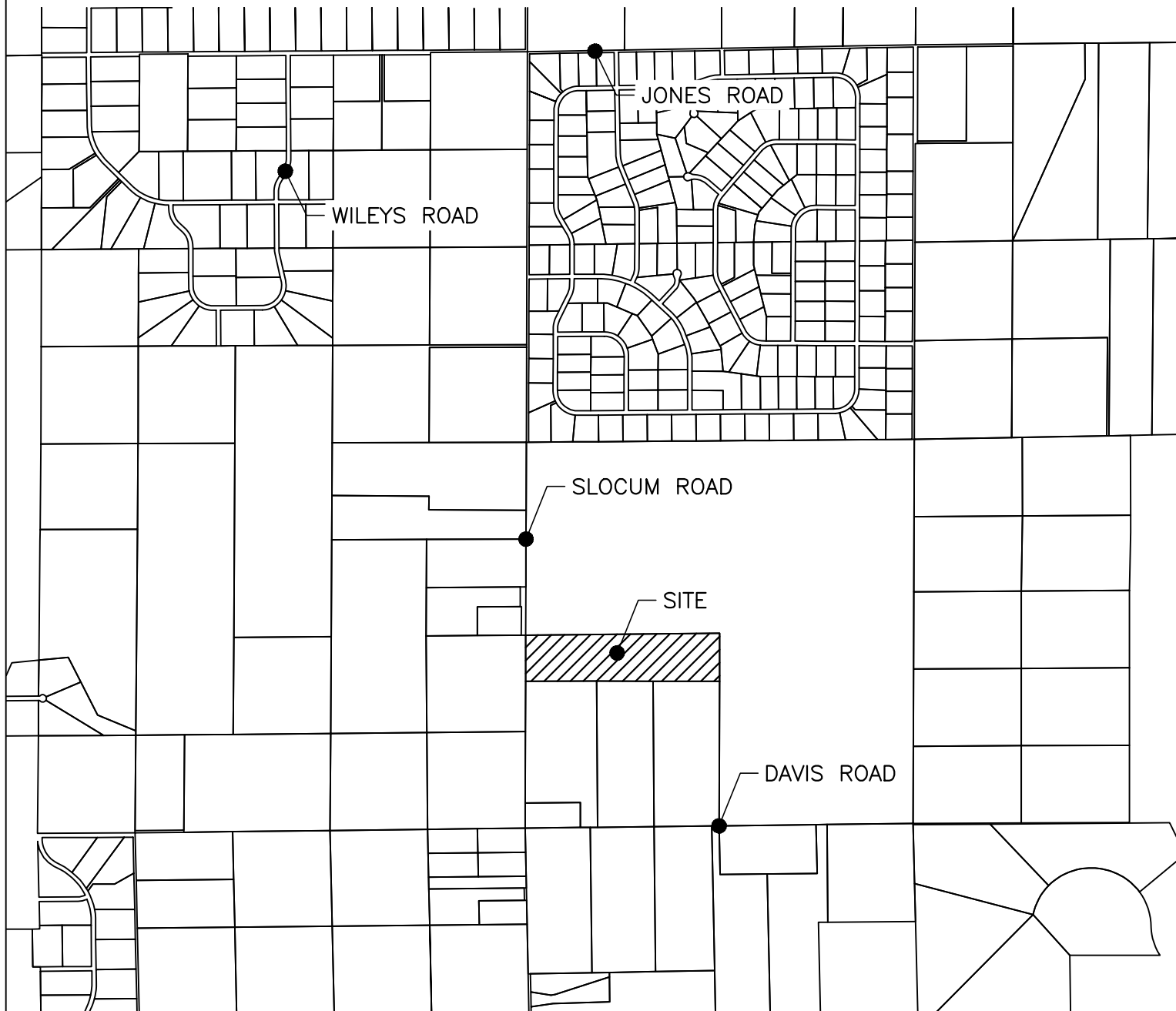
1. El Paso County – Drainage Criteria Manual, 2018 as amended.
2. Urban Storm Drainage Criteria Manual, Mile High Flood District, March 2024.
3. Federal Emergency Management Agency, Flood Map Service Center - <https://msc.fema.gov/portal/home>, September 2024.
4. Web Soil Survey, Natural Resources Conservation Service - <https://websoilsurvey.nrcs.usda.gov/app/>, September 2024.



## **APPENDIX A – VICINITY MAP, FEMA MAP, NRCS WEB SOIL SURVEY**

# AMO ACRES FILING NO. 1

## VICINITY MAP



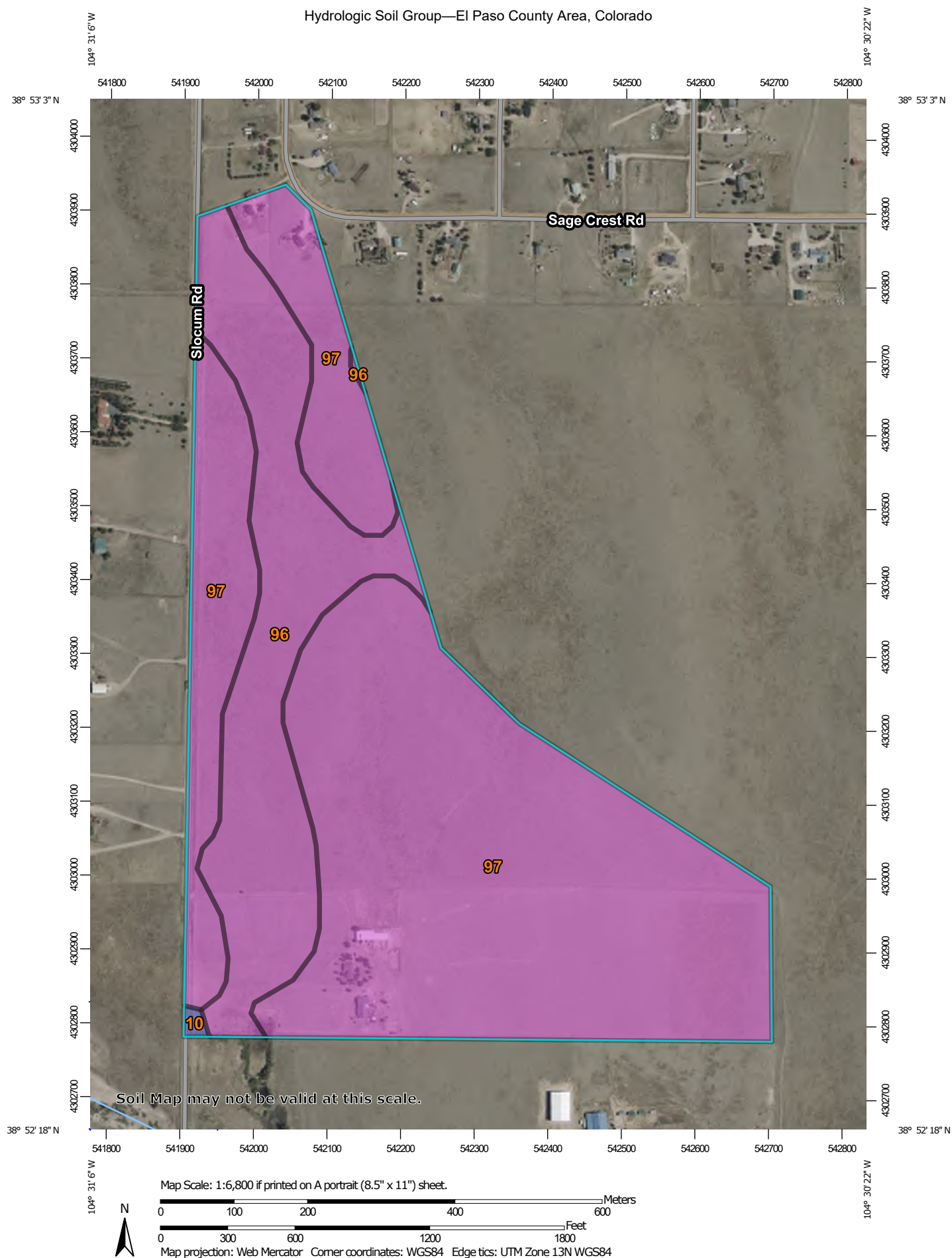
VICINITY MAP

AMO ACRES F1  
JOB NO. 24030  
LOCATION: EPC  
08/10/2026

SHEET  
1



# Hydrologic Soil Group—El Paso County Area, Colorado



**MAP LEGEND****Area of Interest (AOI)**
 Area of Interest (AOI)
**Soils****Soil Rating Polygons**

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

**Soil Rating Lines**

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

**Soil Rating Points**

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

**Water Features**
 Streams and Canals
**Transportation**

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

**Background**
 Aerial Photography
**MAP INFORMATION**

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado  
 Survey Area Data: Version 23, Aug 29, 2025

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

Date(s) aerial images were photographed: May 27, 2024—Jul 28, 2024

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 |
|------------------------------------|--------------------------------------------|--------|--------------|----------------|
| 10                                 | Blendon sandy loam, 0 to 3 percent slopes  | B      | 0.3          | 0.2%           |
| 96                                 | Truckton sandy loam, 0 to 3 percent slopes | A      | 30.0         | 24.6%          |
| 97                                 | Truckton sandy loam, 3 to 9 percent slopes | A      | 91.6         | 75.1%          |
| <b>Totals for Area of Interest</b> |                                            |        | <b>121.9</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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GHSWK OHVV WKDQ RQH  
DUHDV RI OHVV WKDQ RQH

)XWXUH &RGLWLRQV  
&KDQFH )ORRG +D]DUG  
\$UHD ZLWK 5HGXFHG )ORRG  
/HYHH 6HHDRWHV  
\$UHD ZLWK )ORRG 5-LVN

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6758&785(16111 /HYHH 'LNH RU )ORRGZD

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:DWHU 6XUIDFH (OHYDWL  
&RDVWDO 7UDQVHFV  
%DVH )ORRG (OHYDWLRQ  
/LPLW RI 6WXG\  
-XULVGLFWLRQ %RXQGDU  
&RDVWDO 7UDQVHFV %DVH  
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0\$3 3\$1(/6 8QPDSHG

7KH SLQ GLVSODIHG RQ WKH  
SRLQW VHOHFWHG E\ WKH XV  
DQ DXWKRULWDLWH SURSHU

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

7KH IORRG KD]DUG LQIRUPDWLRQ LV GH  
DXWKRULWDLWH 1)+/ ZHE VHU\LFHV S  
ZDV H[SURWHG RQ W 'DQG GRHV QRW  
UHIOHFV 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  
OHJHQ VFDODU PDS 5HDWLQ G  
,50 SDQHO QXPEHU DQG ),50 HIIHFWLY  
1 XQPDSSHG DQG XQPRGHUQLJHG DUHDV  
UHJXODWRU\ XSUSRVH



## **APPENDIX B – HYDROLOGIC CALCULATIONS**

**Subdivision:** Amo Acres  
**Location:** El Paso County  
**Project Name:** Amo Acres  
**Project Number:** 24030  
**Calculated By:** NQJ  
**Checked By:** REB  
**Date:** 8/10/2026

| BASIN SUMMARY TABLE |           |            |                |                  |                      |                         |                           |
|---------------------|-----------|------------|----------------|------------------|----------------------|-------------------------|---------------------------|
| Basin               | Area (ac) | Impervious | C <sub>5</sub> | C <sub>100</sub> | t <sub>c</sub> (min) | Q <sub>5-YR</sub> (cfs) | Q <sub>100-YR</sub> (cfs) |
| OS1                 | 7.36      | 0.0%       | 0.09           | 0.36             | 28.3                 | 1.7                     | 11.4                      |
| OS2                 | 18.80     | 0.0%       | 0.09           | 0.36             | 37.6                 | 3.6                     | 24.3                      |
| OS3                 | 3.98      | 0.0%       | 0.09           | 0.36             | 30.5                 | 0.9                     | 5.9                       |
| OS4                 | 42.57     | 0.2%       | 0.09           | 0.36             | 68.4                 | 4.8                     | 32.1                      |
| 1                   | 9.80      | 2.0%       | 0.09           | 0.36             | 26.5                 | 2.4                     | 15.8                      |
| 2                   | 3.86      | 2.0%       | 0.09           | 0.36             | 24.5                 | 1.0                     | 6.5                       |
| 3                   | 13.46     | 3.7%       | 0.10           | 0.37             | 25.1                 | 3.8                     | 22.9                      |
| 4                   | 10.11     | 3.6%       | 0.10           | 0.37             | 26.4                 | 2.8                     | 16.7                      |
| 5                   | 1.13      | 8.9%       | 0.15           | 0.40             | 15.8                 | 0.6                     | 2.6                       |

| DESIGN POINT SUMMARY TABLE |                   |                     |
|----------------------------|-------------------|---------------------|
| DP#                        | Q <sub>5-YR</sub> | Q <sub>100-YR</sub> |
| 1                          | 1.7               | 11.4                |
| 2                          | 3.6               | 24.3                |
| 3                          | 0.9               | 5.9                 |
| 4                          | 4.8               | 32.1                |
| 5                          | 4.3               | 28.6                |
| 6                          | 1.0               | 6.5                 |
| 7                          | 7.4               | 48.0                |
| 8                          | 5.5               | 36.5                |
| 9                          | 11.8              | 76.8                |

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: Arno Acres  
Location: El Paso County

Project Name: Arno Acres  
Project No.: 24030.00  
Calculated By: NQJ  
Checked By: REB  
Date: 8/10/26

| Basin ID | Total Area (ac) | Gravel Drives  |                  |           |        | Paved          |                  |           |        | Roofs          |                  |           |        | Undeveloped    |                  |           |        | 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> | Area (ac) | % Imp. | C <sub>5</sub>                             | C <sub>100</sub> |                              |
| OS1      | 7.36            | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.00      | 100.0% | 0.73           | 0.81             | 0.00      | 90.0%  | 0.09           | 0.36             | 7.36      | 0.0%   | 0.09                                       | 0.36             | 0.0%                         |
| OS2      | 18.80           | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.00      | 100.0% | 0.73           | 0.81             | 0.00      | 90.0%  | 0.09           | 0.36             | 18.80     | 0.0%   | 0.09                                       | 0.36             | 0.0%                         |
| OS3      | 3.98            | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.00      | 100.0% | 0.73           | 0.81             | 0.00      | 90.0%  | 0.09           | 0.36             | 3.98      | 0.0%   | 0.09                                       | 0.36             | 0.0%                         |
| OS4      | 42.57           | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.02      | 100.0% | 0.73           | 0.81             | 0.05      | 90.0%  | 0.09           | 0.36             | 42.50     | 0.0%   | 0.09                                       | 0.36             | 0.2%                         |
| 1        | 9.80            | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.00      | 100.0% | 0.73           | 0.81             | 0.00      | 90.0%  | 0.09           | 0.36             | 9.80      | 2.0%   | 0.09                                       | 0.36             | 2.0%                         |
| 2        | 3.86            | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.00      | 100.0% | 0.73           | 0.81             | 0.00      | 90.0%  | 0.09           | 0.36             | 3.86      | 2.0%   | 0.09                                       | 0.36             | 2.0%                         |
| 3        | 13.46           | 0.59           | 0.70             | 0.12      | 80.0%  | 0.90           | 0.96             | 0.00      | 100.0% | 0.73           | 0.81             | 0.15      | 90.0%  | 0.09           | 0.36             | 13.19     | 2.0%   | 0.10                                       | 0.37             | 3.7%                         |
| 4        | 10.11           | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.08      | 100.0% | 0.73           | 0.81             | 0.09      | 90.0%  | 0.09           | 0.36             | 9.94      | 2.0%   | 0.10                                       | 0.37             | 3.6%                         |
| 5        | 1.13            | 0.59           | 0.70             | 0.00      | 80.0%  | 0.90           | 0.96             | 0.08      | 100.0% | 0.73           | 0.81             | 0.00      | 90.0%  | 0.09           | 0.36             | 1.05      | 2.0%   | 0.15                                       | 0.40             | 8.9%                         |
| Onsite   | 38.36           |                |                  |           |        |                |                  |           |        |                |                  |           |        |                |                  |           |        |                                            |                  | 3.2%                         |
| Total    | 111.07          |                |                  |           |        |                |                  |           |        |                |                  |           |        |                |                  |           |        |                                            |                  | 1.1%                         |

# STANDARD FORM SF-2 - EXISTING CONDITIONS TIME OF CONCENTRATION

Subdivision: Amo Acres  
Location: El Paso County

Project Name: Amo Acres  
Project No.: 24030.00  
Calculated By: NQJ  
Checked By: REB  
Date: 8/10/26

| 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>5</sub> | Weighted C <sub>100</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) |       |
| OS1       | 7.36      | B                      | 0.09                    | 0.36                      | 0.0%           | 300               | 3.3%               | 21.3                 | 306                 | 6.2%               | 2.5 | 0.6         | 8.2                  | 29.5                       | 606.0             | 28.3                           | 28.3  |
| OS2       | 18.80     | B                      | 0.09                    | 0.36                      | 0.0%           | 300               | 2.6%               | 23.0                 | 1068                | 2.9%               | 2.5 | 0.4         | 41.8                 | 64.9                       | 1368.0            | 37.6                           | 37.6  |
| OS3       | 3.98      | B                      | 0.09                    | 0.36                      | 0.0%           | 300               | 4.0%               | 20.0                 | 326                 | 1.8%               | 2.5 | 0.3         | 16.2                 | 36.2                       | 626.0             | 30.5                           | 30.5  |
| OS4       | 42.57     | B                      | 0.09                    | 0.36                      | 0.2%           | 300               | 5.0%               | 18.5                 | 3247                | 2.0%               | 2.5 | 0.4         | 153.1                | 171.6                      | 3547.0            | 68.4                           | 68.4  |
| 1         | 9.80      | A                      | 0.09                    | 0.36                      | 2.0%           | 300               | 4.3%               | 19.5                 | 492                 | 2.8%               | 7.0 | 1.2         | 7.0                  | 26.5                       | 792.0             | 30.9                           | 26.5  |
| 2         | 3.86      | A                      | 0.09                    | 0.36                      | 2.0%           | 300               | 4.7%               | 19.0                 | 423                 | 3.3%               | 7.0 | 1.3         | 5.5                  | 24.5                       | 723.0             | 29.8                           | 24.5  |
| 3         | 13.46     | A                      | 0.10                    | 0.37                      | 3.7%           | 300               | 5.7%               | 17.6                 | 570                 | 3.3%               | 7.0 | 1.3         | 7.5                  | 25.1                       | 870.0             | 30.9                           | 25.1  |
| 4         | 10.11     | A/B                    | 0.10                    | 0.37                      | 3.6%           | 300               | 5.0%               | 18.3                 | 556                 | 2.7%               | 7.0 | 1.2         | 8.1                  | 26.4                       | 856.0             | 31.3                           | 26.4  |
| 5         | 1.13      | A/B                    | 0.15                    | 0.40                      | 8.9%           | 167               | 5.9%               | 12.4                 | 244                 | 2.9%               | 7.0 | 1.2         | 3.4                  | 15.8                       | 411.0             | 26.8                           | 15.8  |

## NOTES:

$$T_c = t_o + T_t$$

Where:

t<sub>o</sub> = computed time of concentration (minutes)

t<sub>o</sub> = overland (initial) flow time (minutes)

t<sub>o</sub> = channelized flow time (minutes).

$$t_o = \frac{L_o}{60K\sqrt{S_o}} = \frac{L_o}{60V_o}$$

Where:

t<sub>o</sub> = channelized flow time (travel time, min)

L<sub>o</sub> = waterway length (ft)

S<sub>o</sub> = waterway slope (ft/ft)

V<sub>o</sub> = travel time velocity (ft/sec) = K√S<sub>o</sub>

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

$$T_t = \frac{0.395(1.1 - C_1)\sqrt{L_t}}{S_t^{0.333}}$$

Where:

t<sub>o</sub> = overland (initial) flow time (minutes)

C<sub>1</sub> = runoff coefficient for 5-year frequency (from Table 6-4)

L<sub>t</sub> = length of overland flow (ft)

S<sub>t</sub> = average slope along the overland flow path (ft/ft).

$$\text{Equation 6-4 } t_o = 1.77 + \frac{L_o}{60(1.41 + 9)\sqrt{S_o}}$$

K:

t<sub>o</sub> = minimum time of concentration for first design point when less than t<sub>o</sub> from Equation 6-1.

L<sub>t</sub> = length of channelized flow path (ft)

i = imperviousness (expressed as a decimal)

S<sub>o</sub> = slope of the channelized flow path (ft/ft).

Equation 6-3

Table 6-2. NRCS Conveyance factors, K

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

Equation 6-5

Use a minimum t<sub>o</sub> value of 5 minutes for urbanized areas and a minimum t<sub>o</sub> 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: Amo Acres  
Location: El Paso County  
Design Storm: 5-Year

Project Name: Amo Acres  
Project No.: 24030.00  
Calculated By: NOJ  
Checked By: REB  
Date: 8/10/26

| DESCRIPTION | Design Point | DIRECT RUNOFF |           |               |             |          |           |         | TOTAL RUNOFF |          |           |         | OVERLAND             |          |           | 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) | $Q_{overland}$ (cfs) | C*A (ac) | Slope (%) | $Q_{pipe}$ (cfs) | C*A (ac) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | $t_t$ (min) |                                                                      |
|             | 1            | OS1           | 7.36      | 0.09          | 28.3        | 0.66     | 2.57      | 1.7     |              |          |           |         | 1.7                  | 0.66     | 3.6       |                  |          |           |                    | 792         | 1.3            | 9.9         | BASIN OS1 @ DP1, FLOWS SOUTH TO DP5                                  |
|             | 2            | OS2           | 18.80     | 0.09          | 37.6        | 1.69     | 2.14      | 3.6     |              |          |           |         | 3.6                  | 1.69     | 4         |                  |          |           |                    | 870         | 1.4            | 10.4        | BASIN OS2 @ DP2, FLOWS SOUTH TO DP7                                  |
|             | 3            | OS3           | 3.98      | 0.09          | 30.5        | 0.36     | 2.46      | 0.9     |              |          |           |         | 0.9                  | 0.36     | 3.8       |                  |          |           |                    | 856         | 1.4            | 10.5        | BASIN OS3 @ DP3, FLOWS SOUTH TO DP9                                  |
|             | 4            | OS4           | 42.57     | 0.09          | 68.4        | 3.88     | 1.25      | 4.8     |              |          |           |         | 4.8                  | 3.88     | 2.2       |                  |          |           |                    | 270         | 1.0            | 4.3         | BASIN OS4 @ DP4, CAPTURED BY EX 18" HDPE CULVERT, FLOWS SOUTH TO DP8 |
|             | 1            |               | 9.80      | 0.09          | 26.5        | 0.88     | 2.67      | 2.4     |              |          |           |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 1 @ DP5                                                        |
|             | 5            |               |           |               |             |          |           |         | 36.5         | 1.54     | 2.19      | 4.3     |                      |          |           |                  |          |           |                    |             |                |             | COMBINED DP1 & BASIN 1 @ DP5, FOLLOWS HISTORIC PATTERNS SOUTH        |
|             | 6            | 2             | 3.86      | 0.09          | 24.5        | 0.35     | 2.79      | 1.0     |              |          |           |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 2 @ DP6, FOLLOWS HISTORIC PATTERNS SOUTH                       |
|             | 3            |               | 13.46     | 0.10          | 25.1        | 1.37     | 2.75      | 3.8     |              |          |           |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 3 @ DP7                                                        |
|             | 7            |               |           |               |             |          |           |         | 37.6         | 3.06     | 2.14      | 7.4     |                      |          |           |                  |          |           |                    |             |                |             | COMBINED DP2 & BASIN 3 @ DP7, FOLLOWS HISTORIC PATTERNS SOUTH        |
|             | 4            |               | 10.11     | 0.10          | 26.4        | 1.03     | 2.67      | 2.8     |              |          |           |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 4 @ DP9                                                        |
|             | 8            | 5             | 1.13      | 0.15          | 15.8        | 0.17     | 3.44      | 0.6     | 72.7         | 4.05     | 1.15      | 5.5     | 5.5                  | 4.05     | 4.1       |                  |          |           |                    | 430         | 1.4            | 5.1         | BASIN 5 & DP4 @ DP8, CONTINUES SOUTH TO DP9                          |
|             | 9            |               |           |               |             |          |           |         | 41.0         | 5.44     | 2.01      | 11.8    |                      |          |           |                  |          |           |                    |             |                |             | COMBINED DP3, DP8 & BASIN 4 @ DP9, FOLLOWS HISTORIC PATTERNS SOUTH   |
|             |              |               |           |               |             |          |           |         |              |          |           |         |                      |          |           |                  |          |           |                    |             |                |             |                                                                      |

Notes:  
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: Amo Acres  
Location: El Paso County  
Design Storm: 100-Year

Project Name: Amo Acres  
Project No.: 24030.00  
Calculated By: NQJ  
Checked By: REB  
Date: 8/10/26

| STREET | Design Point | DIRECT RUNOFF |           |               |             |          |             |         | TOTAL RUNOFF |          |             |         | OVERLAND             |          |           | 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) | $Q_{OVERLAND}$ (cfs) | C*A (ac) | Slope (%) | $Q_{pipe}$ (cfs) | C*A (ac) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | $t_t$ (min) |                                                                      |
|        | 1            | OS1           | 7.36      | 0.36          | 28.3        | 2.65     | 4.31        | 11.4    |              |          |             |         | 11.4                 | 2.65     | 3.6       |                  |          |           |                    | 792         | 1.3            | 9.9         | BASIN OS1 @ DP1, FLOWS SOUTH TO DP5                                  |
|        | 2            | OS2           | 18.80     | 0.36          | 37.6        | 6.77     | 3.59        | 24.3    |              |          |             |         | 24.3                 | 6.77     | 4         |                  |          |           |                    | 870         | 1.4            | 10.4        | BASIN OS2 @ DP2, FLOWS SOUTH TO DP7                                  |
|        | 3            | OS3           | 3.98      | 0.36          | 30.5        | 1.43     | 4.12        | 5.9     |              |          |             |         | 5.9                  | 1.43     | 3.8       |                  |          |           |                    | 856         | 1.4            | 10.5        | BASIN OS3 @ DP3, FLOWS SOUTH TO DP9                                  |
|        | 4            | OS4           | 42.57     | 0.36          | 68.4        | 15.36    | 2.09        | 32.1    |              |          |             |         | 32.1                 | 15.36    | 2.2       |                  |          |           |                    | 270         | 1.0            | 4.3         | BASIN OS4 @ DP4, CAPTURED BY EX 18" HDPE CULVERT, FLOWS SOUTH TO DP8 |
|        |              | 1             | 9.80      | 0.36          | 26.5        | 3.53     | 4.47        | 15.8    |              |          |             |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 1 @ DP5                                                        |
|        | 5            |               |           |               |             |          |             |         | 36.5         | 6.18     | 3.67        | 28.6    |                      |          |           |                  |          |           |                    |             |                |             | COMBINED DP1 & BASIN 1 @ DP5, FOLLOWS HISTORIC PATTERNS SOUTH        |
|        | 6            | 2             | 3.86      | 0.36          | 24.5        | 1.39     | 4.67        | 6.5     |              |          |             |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 2 @ DP6, FOLLOWS HISTORIC PATTERNS SOUTH                       |
|        |              | 3             | 13.46     | 0.37          | 25.1        | 4.95     | 4.62        | 22.9    |              |          |             |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 3 @ DP7                                                        |
|        | 7            |               |           |               |             |          |             |         | 37.6         | 11.72    | 3.59        | 48.0    |                      |          |           |                  |          |           |                    |             |                |             | COMBINED DP2 & BASIN 3 @ DP7, FOLLOWS HISTORIC PATTERNS SOUTH        |
|        |              | 4             | 10.11     | 0.37          | 26.4        | 3.73     | 4.49        | 16.7    |              |          |             |         |                      |          |           |                  |          |           |                    |             |                |             | BASIN 4 @ DP9                                                        |
|        | 8            | 5             | 1.13      | 0.40          | 15.8        | 0.45     | 5.78        | 2.6     | 72.7         | 15.81    | 1.93        | 36.5    | 36.5                 | 15.81    | 4.1       |                  |          |           |                    | 430         | 1.4            | 5.1         | BASIN 5 & DP4 @ DP8, CONTINUES SOUTH TO DP9                          |
|        | 9            |               |           |               |             |          |             |         | 41.0         | 20.98    | 3.38        | 76.8    |                      |          |           |                  |          |           |                    |             |                |             | COMBINED DP3, DP8 & BASIN 4 @ DP9, FOLLOWS HISTORIC PATTERNS SOUTH   |
|        |              |               |           |               |             |          |             |         |              |          |             |         |                      |          |           |                  |          |           |                    |             |                |             |                                                                      |

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



## **APPENDIX C – HYDRAULIC CALCULATIONS**

# Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Friday, Aug 21 2026

## Ex 18-in HDPE Culvert (DP4 Q5 = 4.8 cfs)

Invert Elev Dn (ft) = 6401.99  
Pipe Length (ft) = 39.91  
Slope (%) = 3.16  
Invert Elev Up (ft) = 6403.25  
Rise (in) = 18.0  
Shape = Circular  
Span (in) = 18.0  
No. Barrels = 1  
n-Value = 0.012  
Culvert Type = Circular Corrugate Metal Pipe  
Culvert Entrance = Projecting  
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

### Embankment

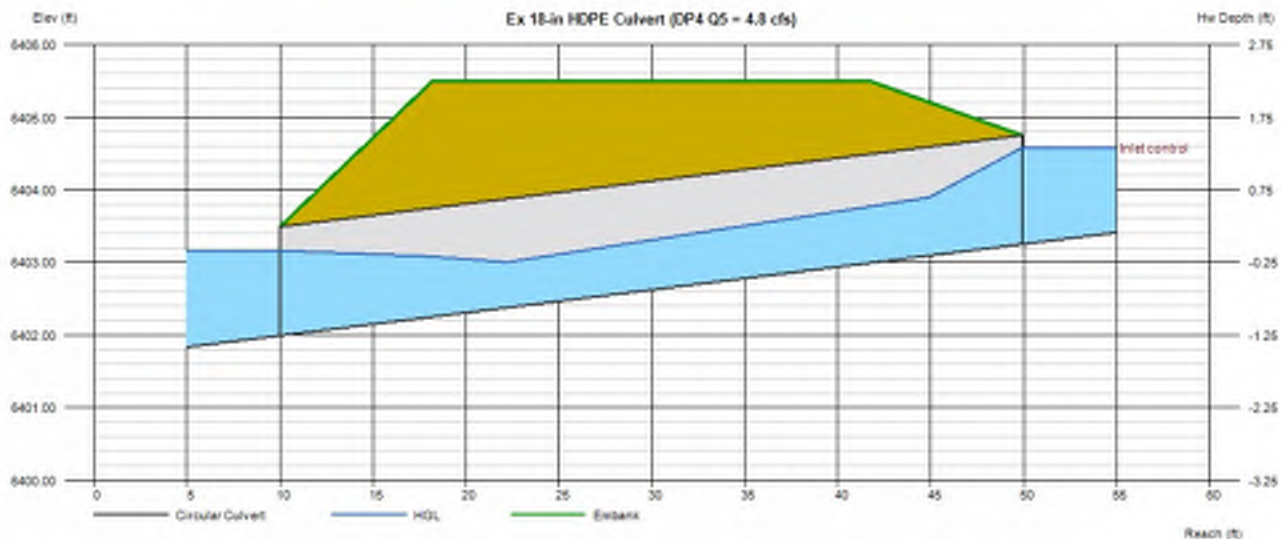
Top Elevation (ft) = 6405.50  
Top Width (ft) = 23.50  
Crest Width (ft) = 20.00

### Calculations

Qmin (cfs) = 4.00  
Qmax (cfs) = 4.90  
Tailwater Elev (ft) =  $(dc+D)/2$

### Highlighted

Qtotal (cfs) = 4.80  
Qpipe (cfs) = 4.80  
Qovertop (cfs) = 0.00  
Veloc Dn (ft/s) = 3.24  
Veloc Up (ft/s) = 4.70  
HGL Dn (ft) = 6403.16  
HGL Up (ft) = 6404.09  
Hw Elev (ft) = 6404.58  
Hw/D (ft) = 0.89  
Flow Regime = Inlet Control



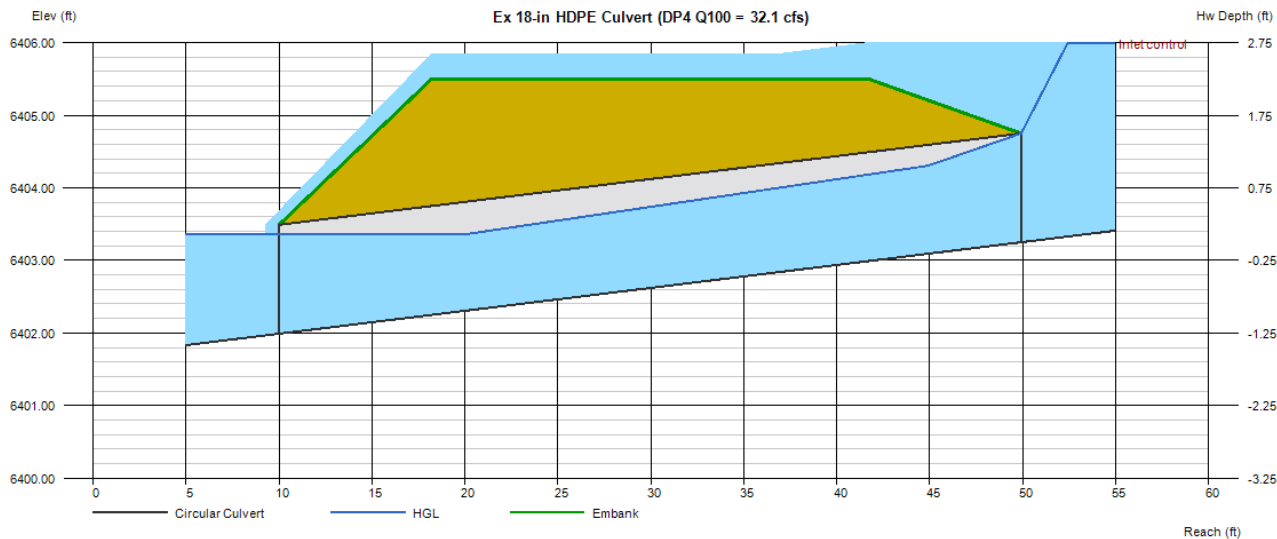
# Culvert Report

## Ex 18-in HDPE Culvert (DP4 Q100 = 32.1 cfs)

|                     |                                 |
|---------------------|---------------------------------|
| Invert Elev Dn (ft) | = 6401.99                       |
| Pipe Length (ft)    | = 39.91                         |
| Slope (%)           | = 3.16                          |
| Invert Elev Up (ft) | = 6403.25                       |
| Rise (in)           | = 18.0                          |
| Shape               | = Circular                      |
| Span (in)           | = 18.0                          |
| No. Barrels         | = 1                             |
| n-Value             | = 0.012                         |
| Culvert Type        | = Circular Corrugate Metal Pipe |
| Culvert Entrance    | = Projecting                    |
| Coeff. K,M,c,Y,k    | = 0.034, 1.5, 0.0553, 0.54, 0.9 |

|                    |           |
|--------------------|-----------|
| <b>Embankment</b>  |           |
| Top Elevation (ft) | = 6405.50 |
| Top Width (ft)     | = 23.50   |
| Crest Width (ft)   | = 20.00   |

|                     |                 |
|---------------------|-----------------|
| <b>Calculations</b> |                 |
| Qmin (cfs)          | = 32.10         |
| Qmax (cfs)          | = 32.40         |
| Tailwater Elev (ft) | = (dc+D)/2      |
| <b>Highlighted</b>  |                 |
| Qtotal (cfs)        | = 32.10         |
| Qpipe (cfs)         | = 10.51         |
| Qovertop (cfs)      | = 21.59         |
| Veloc Dn (ft/s)     | = 6.20          |
| Veloc Up (ft/s)     | = 6.70          |
| HGL Dn (ft)         | = 6403.36       |
| HGL Up (ft)         | = 6404.50       |
| Hw Elev (ft)        | = 6405.99       |
| Hw/D (ft)           | = 1.83          |
| Flow Regime         | = Inlet Control |



### 24-in CMP Culvert (DP8 Q5 = 5.5 cfs)

|                     |   |                               |
|---------------------|---|-------------------------------|
| Invert Elev Dn (ft) | = | 6390.95                       |
| Pipe Length (ft)    | = | 40.00                         |
| Slope (%)           | = | 2.00                          |
| Invert Elev Up (ft) | = | 6391.75                       |
| Rise (in)           | = | 24.0                          |
| Shape               | = | Circular                      |
| Span (in)           | = | 24.0                          |
| No. Barrels         | = | 1                             |
| n-Value             | = | 0.012                         |
| Culvert Type        | = | Circular Corrugate Metal Pipe |
| Culvert Entrance    | = | Projecting                    |
| Coeff. K,M,c,Y,k    | = | 0.034, 1.5, 0.0553, 0.54, 0.9 |

## Embankment

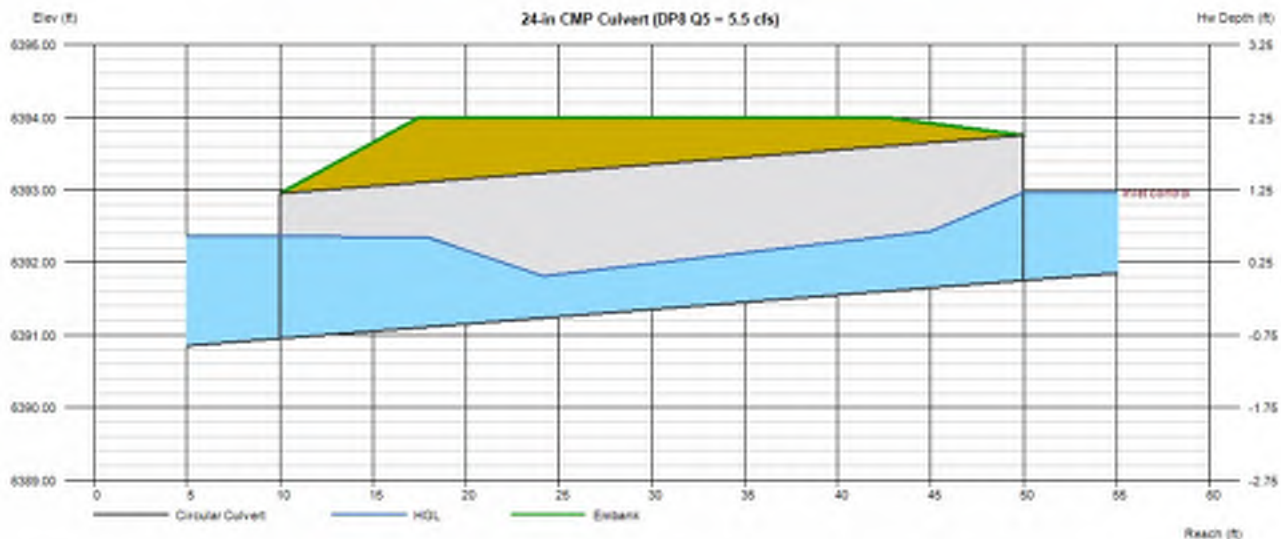
Top Elevation (ft) = 6394.00  
Top Width (ft) = 25.00  
Crest Width (ft) = 20.00

## Calculations

Qmin (cfs) = 5.00  
Qmax (cfs) = 6.00  
Tailwater Elev (ft) = (dc+D)/2

## Highlighted

|                 |                 |
|-----------------|-----------------|
| Qtotal (cfs)    | = 5.50          |
| Qpipe (cfs)     | = 5.50          |
| Qovertop (cfs)  | = 0.00          |
| Veloc Dn (ft/s) | = 2.32          |
| Veloc Up (ft/s) | = 4.48          |
| HGL Dn (ft)     | = 6392.36       |
| HGL Up (ft)     | = 6392.58       |
| Hw Elev (ft)    | = 6392.96       |
| Hw/D (ft)       | = 0.61          |
| Flow Regime     | = Inlet Control |



# Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Friday, Aug 21 2026

## 24-in CMP Culvert (DP8 Q100 = 36.5 cfs)

Invert Elev Dn (ft) = 6390.95  
Pipe Length (ft) = 40.00  
Slope (%) = 2.00  
Invert Elev Up (ft) = 6391.75  
Rise (in) = 24.0  
Shape = Circular  
Span (in) = 24.0  
No. Barrels = 1  
n-Value = 0.012  
Culvert Type = Circular Corrugate Metal Pipe  
Culvert Entrance = Projecting  
Coeff. K,M,c,Y,k = 0.034, 1.5, 0.0553, 0.54, 0.9

### Embankment

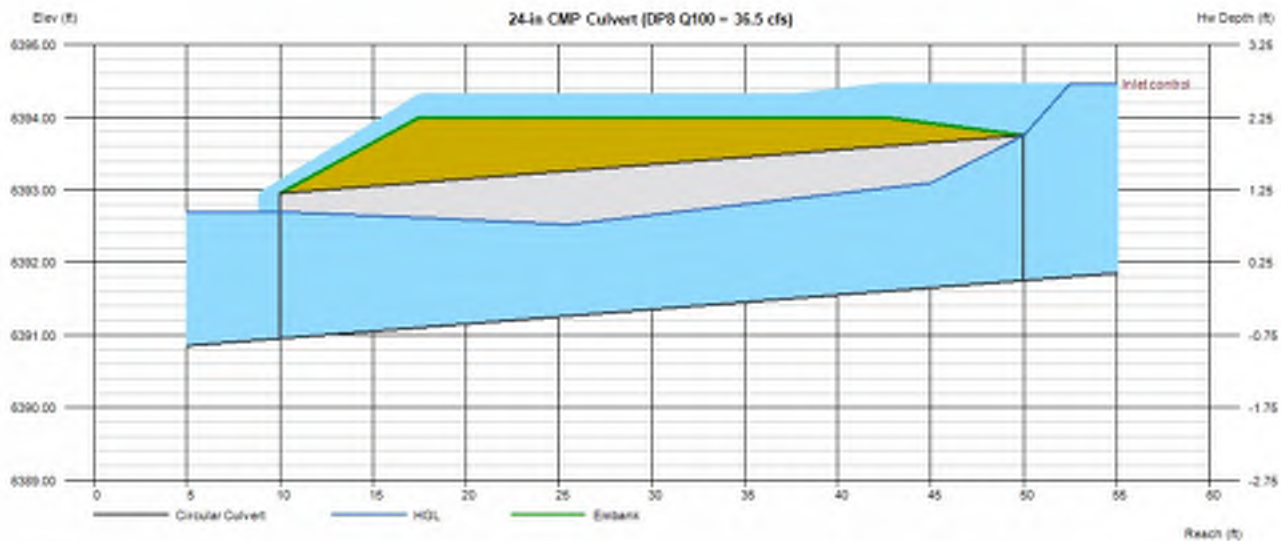
Top Elevation (ft) = 6394.00  
Top Width (ft) = 25.00  
Crest Width (ft) = 20.00

### Calculations

Qmin (cfs) = 36.00  
Qmax (cfs) = 36.60  
Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 36.50  
Qpipe (cfs) = 17.16  
Qovertop (cfs) = 19.34  
Veloc Dn (ft/s) = 5.90  
Veloc Up (ft/s) = 6.83  
HGL Dn (ft) = 6392.70  
HGL Up (ft) = 6393.24  
Hw Elev (ft) = 6394.46  
Hw/D (ft) = 1.36  
Flow Regime = Inlet Control





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



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## EL PASO COUNTY PCM APPLICABILITY FORM

EPC Project Number: \_\_\_\_\_

This form is to be used by the Engineer of Record to determine if the proposed construction activities are eligible for an exclusion to stormwater quality permanent control measure (PCM) requirements. All “applicable construction activity” within El Paso County (EPC) must comply with the post-construction stormwater management criteria. Reference ECM Appendix I for information about PCMs.

Note that this form only addresses stormwater quality for the site. Even if the site is fully excluded from needing a stormwater quality PCM, the site may still need to address stormwater detention (per DCMv1 Chap 1.5 and ECM Chap 3.2.8.B). However, if the site requires stormwater detention, then it must also address stormwater quality (per DCMv2 Chap 4.1 and ECM Appendix I.7.3). Refer to the Reference Information pages below for more guidance.

| Part I. Project Summary                                   |                                                                     |                                                                                                                                             |                                                                     |
|-----------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Project Name:                                             | Amo Acres Subdivision                                               |                                                                                                                                             |                                                                     |
| Is Stormwater Detention Required?                         | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Is Water Quality Treatment Required? (i.e.: non-excluded disturbance >1ac)                                                                  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Is an ESQCP Required?<br>If “No,” Check Applicable Reason | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | <input type="checkbox"/> Not an Applicable Construction Activity<br><input type="checkbox"/> Oil & Gas<br><input type="checkbox"/> R-Factor |                                                                     |
| Engineer of Record Email Address:                         | NJOKERST@ALLTERRAINENG.COM                                          |                                                                                                                                             |                                                                     |

| Part II. PCM Exclusions                                                                                                                                                                                                                                                         |                  |     |                                     |                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Note: Questions A through K directly correlate to Part I.E.4.a.i (A) to (K) on page 27 of the 2016 CDPS Statewide Standard <a href="#">MS4 General Permit COR090000</a> (i.e.: the MS4 Permit), as amended. Document exclusions that apply to the whole project or parts of it. |                  |     |                                     |                                                                                                                                                                                                                                                                                                                         |
| Questions                                                                                                                                                                                                                                                                       | Excluded Acreage | Yes | No                                  | Notes                                                                                                                                                                                                                                                                                                                   |
| A. Is this project a “Pavement Management Site?”                                                                                                                                                                                                                                |                  |     | <input checked="" type="checkbox"/> | This exclusion applies to the maintenance, rehabilitation, and reconstruction of pavement on existing roads, bridges, bike lanes, and parking along roads. Areas used primarily for parking (i.e.: separate lots not along roadway) or access to parking are not included. No increase in impervious area is allowable. |
| B. Review two options below to see if project is an “Excluded Roadway Development.”                                                                                                                                                                                             |                  |     |                                     | Does <u>not</u> include sidewalks. Does include curb & gutter.                                                                                                                                                                                                                                                          |
| • Does the project include improvements to an existing roadway that adds < 1 acre of paved or gravel area per mile of roadway?                                                                                                                                                  |                  |     | <input checked="" type="checkbox"/> | If selected, list the proposed additional acreage per mile in Part IV Notes below.                                                                                                                                                                                                                                      |
| • Does the project include improvements to an existing roadway that adds ≤ 8.25 ft of paved width at any location?                                                                                                                                                              |                  |     | <input checked="" type="checkbox"/> | If selected, list the proposed additional width in Part IV Notes below.                                                                                                                                                                                                                                                 |



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## EL PASO COUNTY PCM APPLICABILITY FORM

EPC Project Number: \_\_\_\_\_

| Part II. PCM Exclusions (continued)                                                                                                                                                                                                                                                                                                                                      |                  |     |    |                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Questions                                                                                                                                                                                                                                                                                                                                                                | Excluded Acreage | Yes | No | Notes                                                                                                                                                                                                                                                                                                                                 |
| C. Does the project include "Excluded Existing Roadway Areas?"                                                                                                                                                                                                                                                                                                           |                  |     | X  | For redevelopment of <u>existing</u> roadways. This exclusion only excludes the original roadway area, it does NOT apply to the entire project. This exclusion applies only when the proposed project will expand the existing roadway width by <2x on average. If selected, list the proposed expanded width in Part IV Notes below. |
| D. Is the project considered an Aboveground or Underground Utilities activity?                                                                                                                                                                                                                                                                                           |                  |     | X  | Activity can <u>not</u> permanently alter the terrain, ground cover, or drainage patterns from existing conditions.                                                                                                                                                                                                                   |
| E. Is the project considered a "Large Lot Single-Family Site"?<br><i>This exclusion only pertains to the lots and does not include roadways.</i>                                                                                                                                                                                                                         | 38.06 ac         | X   |    | Must be a single-family residential lot or agricultural zoned land with $\geq 2.5$ acres per dwelling and total lot impervious area < 10%. If "Yes," notate the percent impervious below in Part IV: Notes.                                                                                                                           |
| F. Do Non-Residential or Non-Commercial Infiltration Conditions exist?<br><i>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, and the 80<sup>th</sup> percentile event must be infiltrated.</i>                                                |                  |     | 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. The proposed development must return the disturbed area to its historical condition. See CDPHE's "Standard MS4 Permit FAQ" for more detail on how this exclusion applies.                                                                        |
| H. Is the project a Stream Stabilization Site?                                                                                                                                                                                                                                                                                                                           |                  |     | X  |                                                                                                                                                                                                                                                                                                                                       |
| I. Is the project a Bike or Pedestrian Trail?                                                                                                                                                                                                                                                                                                                            |                  |     | X  | Bike lanes for roadways are not included in this exclusion but may qualify if attached to a larger roadway activity that is excluded in A, B or C above. Pedestrian trails (e.g. sidewalks) that are attached to a roadway do not apply.                                                                                              |
| 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?                                                                                                                                                                                                                                                                                                                               |                  |     |    | El Paso County does not apply this exclusion.                                                                                                                                                                                                                                                                                         |
| If any exclusions above apply (via a "Yes" for any row), runoff from those areas is excluded from stormwater quality treatment requirements. All runoff from remaining non-excluded disturbed areas will need to be treated by a stormwater quality PCM, unless remaining area is <1ac. If remaining area is >1ac, select at least one Design Standard on the next page. |                  |     |    |                                                                                                                                                                                                                                                                                                                                       |



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## EL PASO COUNTY PCM APPLICABILITY FORM

EPC Project Number: \_\_\_\_\_

| Part III: PCM Information                                                                                                                                                                                                    |     |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|
| Questions                                                                                                                                                                                                                    | Yes | No |
| 1. Which of the following Design Standard(s) will the project utilize?<br><i>(If a PCM is required, you must select at least one. See Control Measure Requirements identified in MS4 Permit Part I.E.4.a.iv on page 29.)</i> |     |    |
| A. Water Quality Capture Volume (WQCV) Standard                                                                                                                                                                              |     |    |
| B. Pollutant Removal Standard - 80% Total Suspended Solids Removal (TSS)<br><i>(must treat runoff to &lt;30mg/L of TSS)</i>                                                                                                  |     |    |
| C. Runoff Reduction Standard                                                                                                                                                                                                 |     |    |
| D. Applicable Development Site Draining to a Regional WQCV Control Measure<br><i>(no conveyance via "Waters of the State")</i>                                                                                               |     |    |
| E. Applicable Development Site Draining to a Regional WQCV Facility<br><i>(conveyance allowable via "Waters of the State," if the 8 conditions in the MS4 permit are met and documented in the drainage report)</i>          |     |    |
| F. Constrained Redevelopment Sites Standard<br><i>(must be pre-approved by ECM Administrator)</i>                                                                                                                            |     |    |
| G. Previous Permit Term Standard                                                                                                                                                                                             |     |    |
| 2. Will any of the PCMs be located within any other jurisdiction besides EPC?                                                                                                                                                |     |    |

| Part IV: Notes                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Provide info regarding all applicable PCM(s) and PCM Exclusion(s) including location, PCM name(s)/number(s), and additional relevant filings or reports or maintenance agreements, etc. Attach an additional sheet if you need more space. Attaching a detailed summary table would replace the need for any notes here. |
| The site area is approximately 38.06 acres. The site will be subdivided into (2) 19.03 rural residential lots. There will be no disturbance or construction activity associated with this subdivision and therefore WQ & detention are not required.                                                                     |



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## EL PASO COUNTY PCM APPLICABILITY FORM

EPC Project Number: \_\_\_\_\_

### Part V: Signatures

Applicant: This PCM Applicability Form was prepared under my direction and supervision and is correct to the best of my knowledge and belief. It was prepared along with the project design, construction plans, drainage report, specifications, and maintenance and access agreements as required. And it has been reviewed for compliance with the Post Construction Stormwater Management criteria and MS4 Permit requirements.

A handwritten signature in black ink, reading "Neil J. Hunt".



Signature and Stamp of Engineer or Recorder

(If the project is not an Applicable Construction Activity, this line can be signed by the Applicant or their rep, they do not have to be an engineer)

07/31/2026

Date

El Paso County: This PCM 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 E – REFENCE MATERIAL**

Douglas County

Elbert County

Teller County

Elbert County

Lincoln County

Lincoln County

Pueblo County

## Drainage Basins

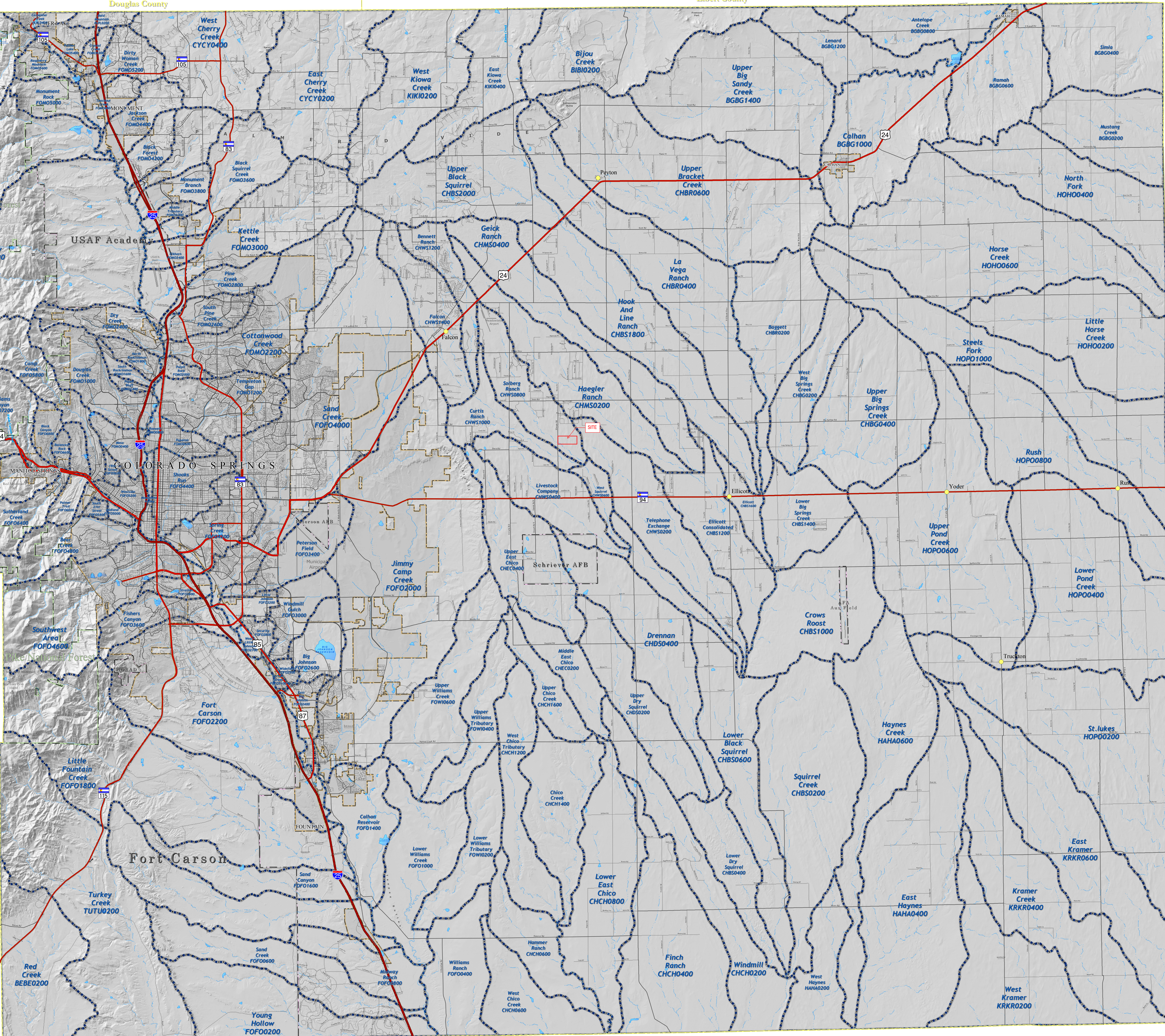
### El Paso County Colorado Legend

- Drainage Basins (Source: Muter Engineering Company 1988)
- US Interstate Highways
- US Highways
- Colorado State Highways
- Major Roadways
- Local Streets & Roads
- Creeks
  - Perennial
  - Intermittent
- Lakes & Reservoirs
- Summits
- Unincorporated Urban Areas
- Incorporated Cities
- Military
- Forest
- County Lines



0 0.5 1 2 3 4 5  
Miles

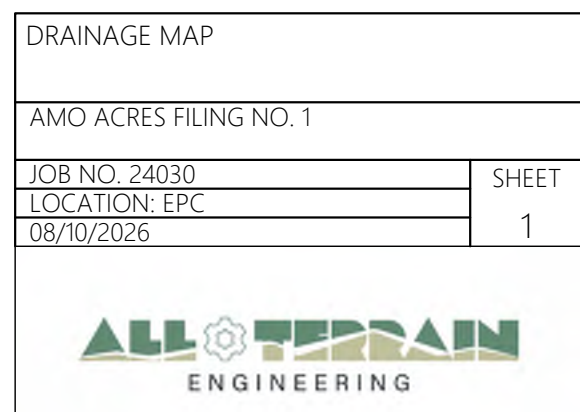
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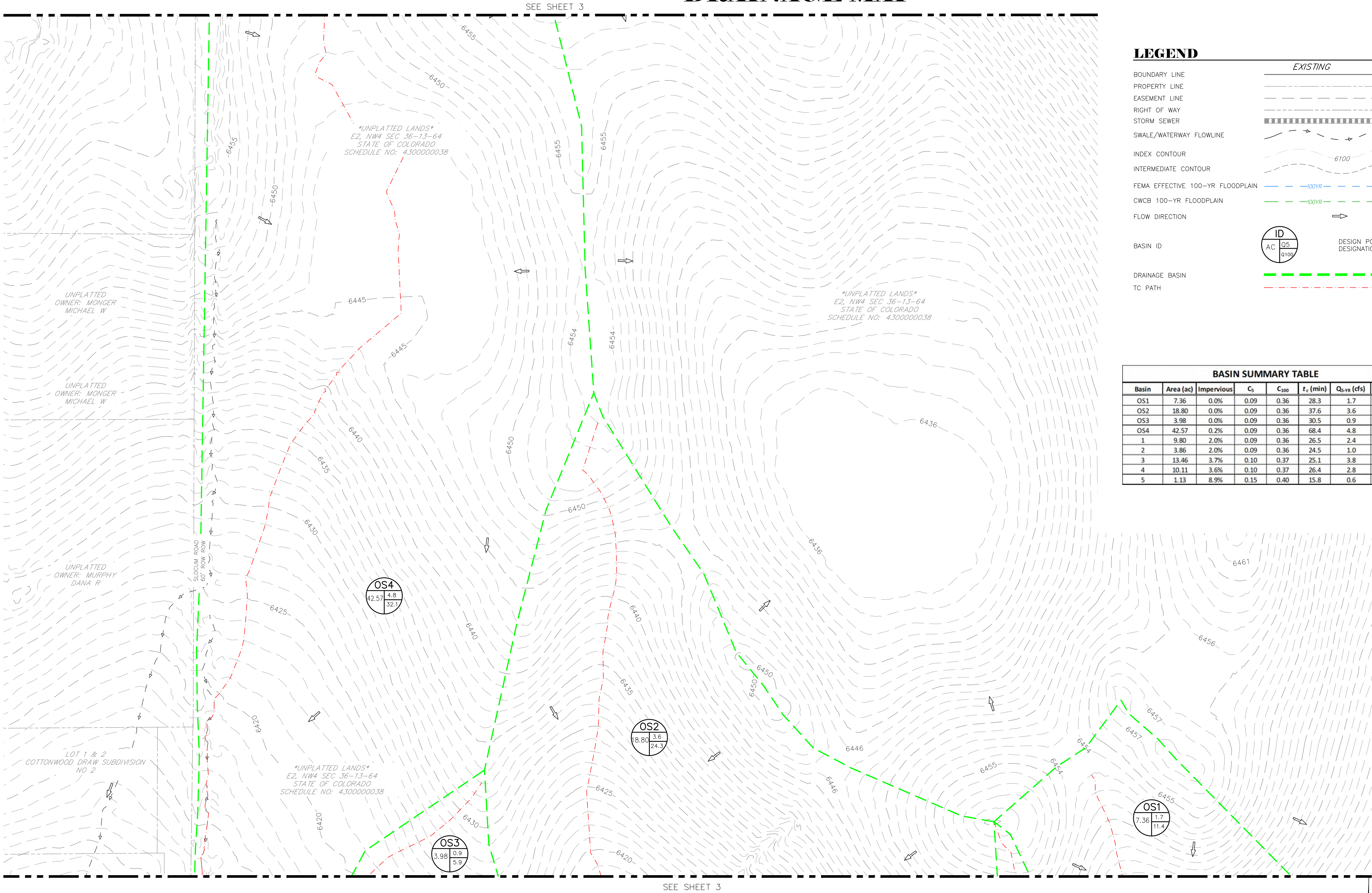
## **APPENDIX F – DRAINAGE MAPS**

SEE SHEET 2

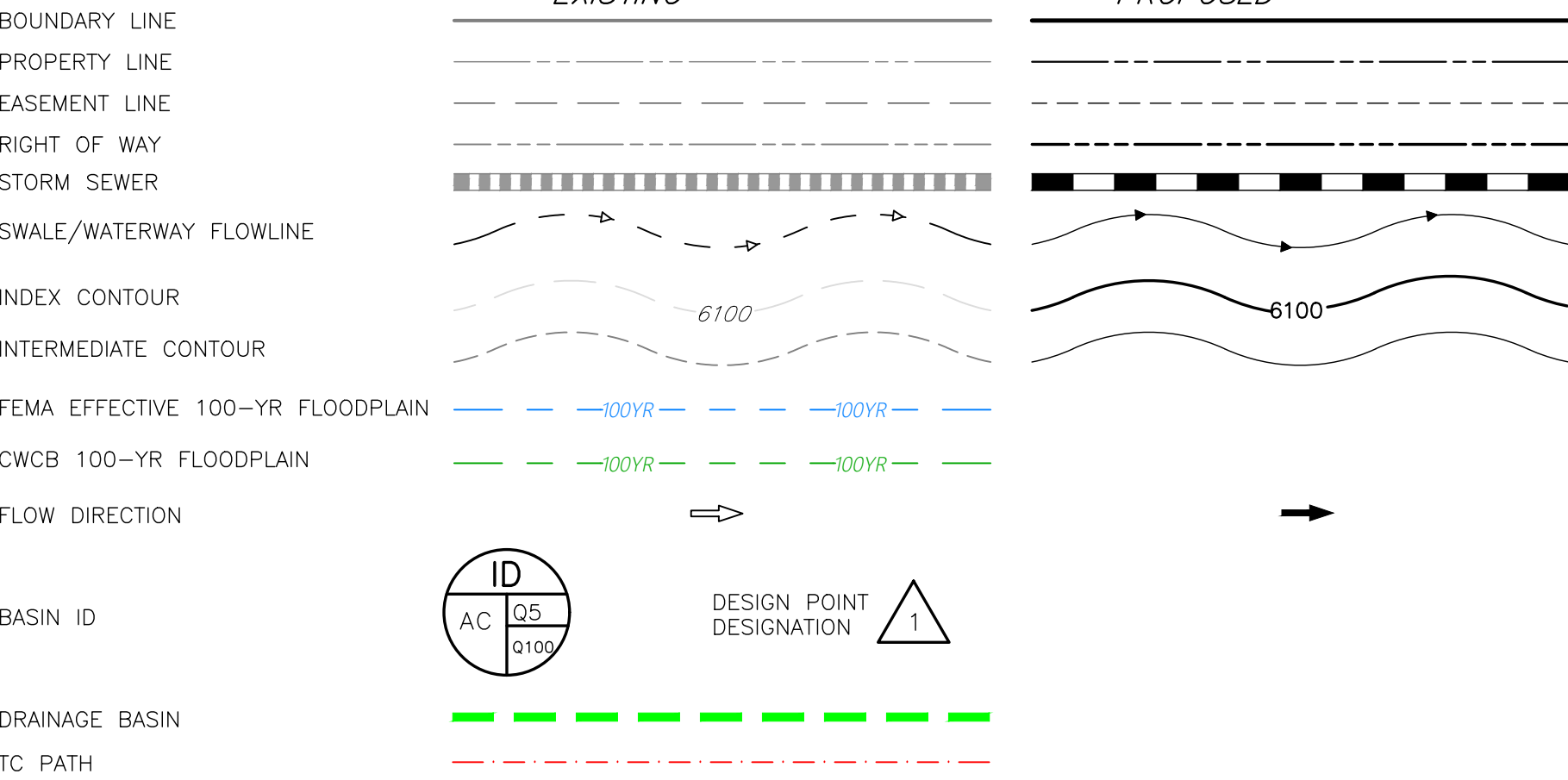


# AMO ACRES FILING NO.1

## DRAINAGE MAP

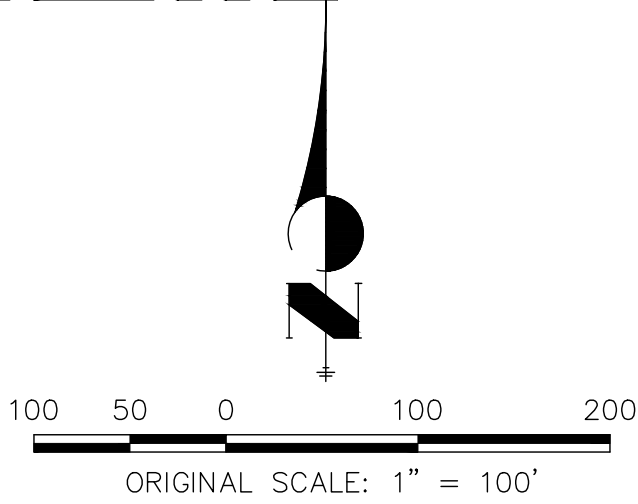


### LEGEND



| BASIN SUMMARY TABLE |           |            |                |                  |                      |                         |                           |
|---------------------|-----------|------------|----------------|------------------|----------------------|-------------------------|---------------------------|
| Basin               | Area (ac) | Impervious | C <sub>s</sub> | C <sub>100</sub> | t <sub>r</sub> (min) | Q <sub>5-YR</sub> (cfs) | Q <sub>100-YR</sub> (cfs) |
| OS1                 | 7.36      | 0.0%       | 0.09           | 0.36             | 28.3                 | 1.7                     | 11.4                      |
| OS2                 | 18.80     | 0.0%       | 0.09           | 0.36             | 37.6                 | 3.6                     | 24.3                      |
| OS3                 | 3.98      | 0.0%       | 0.09           | 0.36             | 30.5                 | 0.9                     | 5.9                       |
| OS4                 | 42.57     | 0.2%       | 0.09           | 0.36             | 68.4                 | 4.8                     | 32.1                      |
| 1                   | 9.80      | 2.0%       | 0.09           | 0.36             | 26.5                 | 2.4                     | 15.8                      |
| 2                   | 3.86      | 2.0%       | 0.09           | 0.36             | 24.5                 | 1.0                     | 6.5                       |
| 3                   | 13.46     | 3.7%       | 0.10           | 0.37             | 25.1                 | 3.8                     | 22.9                      |
| 4                   | 10.11     | 3.6%       | 0.10           | 0.37             | 26.4                 | 2.8                     | 16.7                      |
| 5                   | 1.13      | 8.9%       | 0.15           | 0.40             | 15.8                 | 0.6                     | 2.6                       |

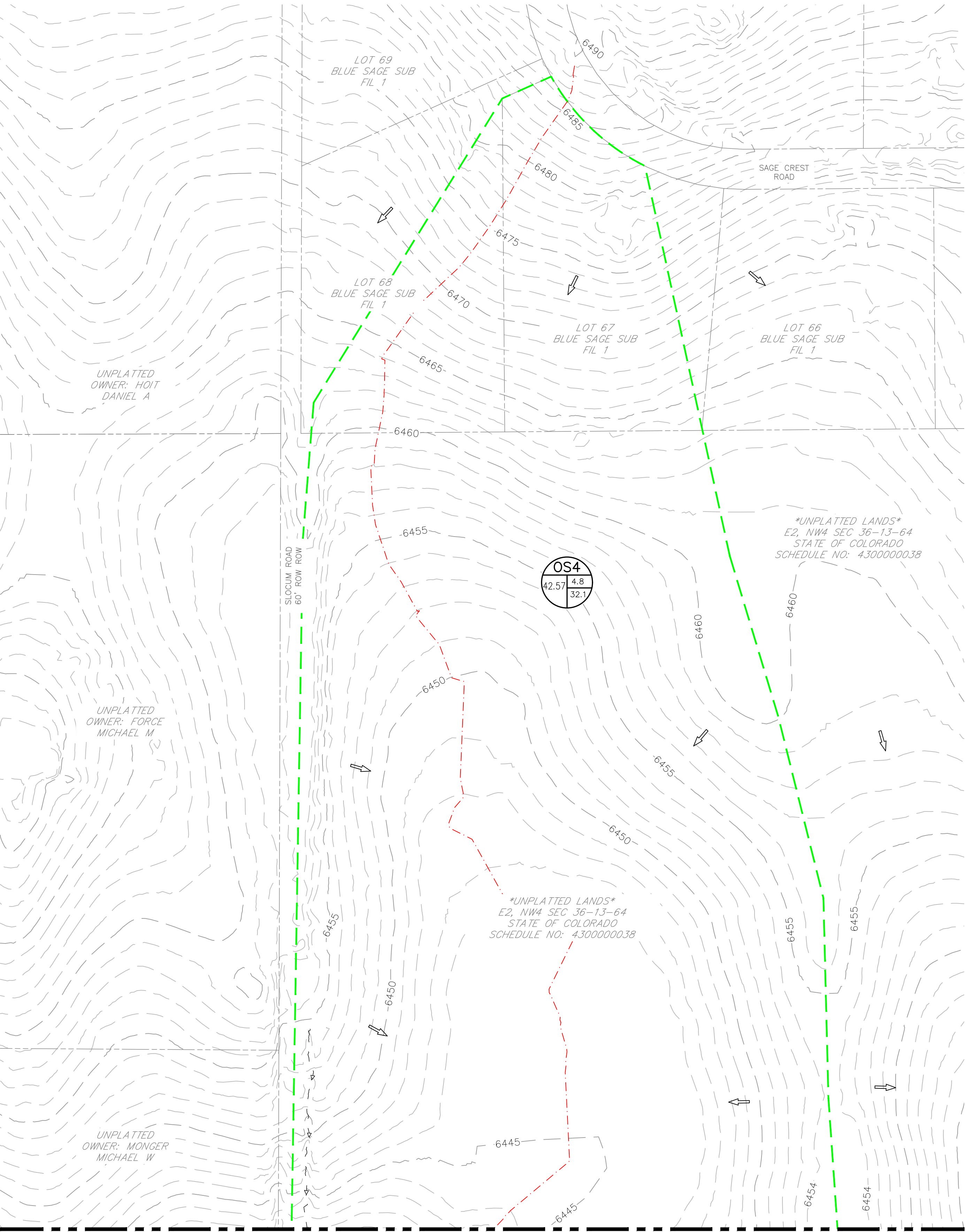
| DESIGN POINT SUMMARY TABLE |                   |                     |
|----------------------------|-------------------|---------------------|
| DP#                        | Q <sub>5-YR</sub> | Q <sub>100-YR</sub> |
| 1                          | 1.7               | 11.4                |
| 2                          | 3.6               | 24.3                |
| 3                          | 0.9               | 5.9                 |
| 4                          | 4.8               | 32.1                |
| 5                          | 4.3               | 28.6                |
| 6                          | 1.0               | 6.5                 |
| 7                          | 7.4               | 48.0                |
| 8                          | 5.5               | 36.5                |
| 9                          | 11.8              | 76.8                |



|                                                                                       |            |  |
|---------------------------------------------------------------------------------------|------------|--|
| DRAINAGE MAP                                                                          |            |  |
| AMO ACRES FILING NO. 1                                                                |            |  |
| JOB NO. 24030                                                                         | SHEET<br>2 |  |
| LOCATION: EPC                                                                         |            |  |
| 08/10/2026                                                                            |            |  |
|  |            |  |

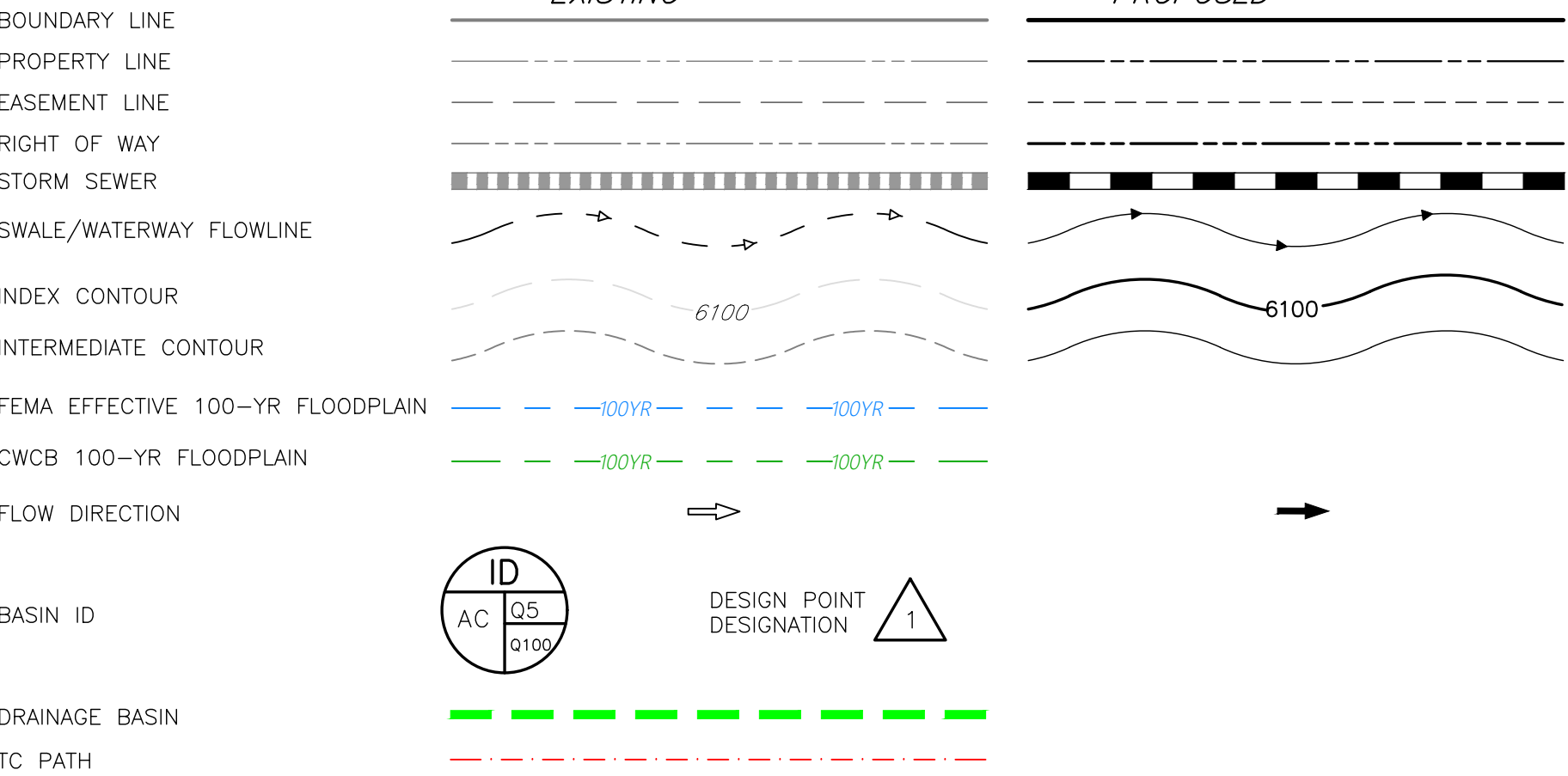
# AMO ACRES FILING NO. 1

## DRAINAGE MAP



SEE SHEET 2

### LEGEND



| BASIN SUMMARY TABLE |           |            |                |                  |                      |                         |                           |
|---------------------|-----------|------------|----------------|------------------|----------------------|-------------------------|---------------------------|
| Basin               | Area (ac) | Impervious | C <sub>s</sub> | C <sub>100</sub> | t <sub>c</sub> (min) | Q <sub>5-YR</sub> (cfs) | Q <sub>100-YR</sub> (cfs) |
| OS1                 | 7.36      | 0.0%       | 0.09           | 0.36             | 28.3                 | 1.7                     | 11.4                      |
| OS2                 | 18.80     | 0.0%       | 0.09           | 0.36             | 37.6                 | 3.6                     | 24.3                      |
| OS3                 | 3.98      | 0.0%       | 0.09           | 0.36             | 30.5                 | 0.9                     | 5.9                       |
| OS4                 | 42.57     | 0.2%       | 0.09           | 0.36             | 68.4                 | 4.8                     | 32.1                      |
| 1                   | 9.80      | 2.0%       | 0.09           | 0.36             | 26.5                 | 2.4                     | 15.8                      |
| 2                   | 3.86      | 2.0%       | 0.09           | 0.36             | 24.5                 | 1.0                     | 6.5                       |
| 3                   | 13.46     | 3.7%       | 0.10           | 0.37             | 25.1                 | 3.8                     | 22.9                      |
| 4                   | 10.11     | 3.6%       | 0.10           | 0.37             | 26.4                 | 2.8                     | 16.7                      |
| 5                   | 1.13      | 8.9%       | 0.15           | 0.40             | 15.8                 | 0.6                     | 2.6                       |

| DESIGN POINT SUMMARY TABLE |                   |                     |
|----------------------------|-------------------|---------------------|
| DP#                        | Q <sub>5-YR</sub> | Q <sub>100-YR</sub> |
| 1                          | 1.7               | 11.4                |
| 2                          | 3.6               | 24.3                |
| 3                          | 0.9               | 5.9                 |
| 4                          | 4.8               | 32.1                |
| 5                          | 4.3               | 28.6                |
| 6                          | 1.0               | 6.5                 |
| 7                          | 7.4               | 48.0                |
| 8                          | 5.5               | 36.5                |
| 9                          | 11.8              | 76.8                |

