Early Grading Permit - Final Drainage Report

Trinity Ranch Estates, Filing No. 1
El Paso County, Colorado

Prepared for:
Terry Street
8576 Via Gwynn Way
Fair Oaks, CA 95528

Prepared by:
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Contact: Kevin Kofford, P.E.

Project #: 096726003

PCD Filing No.: XXXX SP268

Prepared: July 31, 2026

Kimley»Horn

CERTIFICATION

DESIGN ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparation of this report.

SIGNATURE (Affix Seal): _____

Kevin Kofford, P.E. Date

OWNER/DEVELOPER'S STATEMENT

I, the developer, have read and will comply with all of the requirements specified in this Drainage Report and Plan.

20165 Howle Street LLC
Name of Developer

_____
Authorized Signature Date

Terence Street
Printed Name

Managing Partner
Title

8576 Via Gwynn Way, Fair Oaks, CA 95528
Address

EL PASO COUNTY

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

_____ _____
Joshua Palmer, P.E. Date
County Engineer/ ECM Administrator

Conditions:

Please enter initial "J.".

Kimley»Horn

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INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The purpose of this Final Drainage Report (FDR) is to document the drainage design in support of the early grading improvements for the proposed Trinity Ranch Estates subdivision, Filing No. 1 ("the Project") on behalf of 20165 Howle Street LLC. The Project is located within the jurisdictional limits of El Paso County ("the County"). Therefore, the hydrologic and hydraulic design is based on the County's criteria which is described in further detail within the report.

LOCATION

The Project Site located along HWY 94 and east of Peyton HWY within El Paso County, Colorado on parcel 3400000455. More specifically, the site is a Portion of the Southeast corner of Section 9, Township 14 South, Range 63 West of the 6th PM, County of El Paso, State of Colorado. To the north, west, and south of the Project is agricultural and rural residential land zoned RR-5 and to the east is Antelope Park Ranchettes zoned RR-5 and Viewpoint Estates, zoned RR-2.5. A vicinity map has been provided in the **Appendix** of this report.

The Site is currently owned by 20165 Howle Street LLC and will be developed by 20165 Howle Street LLC.

DESCRIPTION OF PROPERTY

The entire Trinty Ranch Estates Project is approximately 137.9 acres consisting of vacant, undeveloped land with native vegetation and is classified as Agricultural Grazing Land to be subdivided into 35 total lots. Filing No.1 is approximately 56.79 acres, and consists of 17, 2.5 acre lots, proposed roadways and Tract A and B designated for stormwater treatment and detention and is located just east of Viewpoint Estates. Filing No. 2 is just north of Filing No. 1 and west of Antelope Park Ranchettes, approximately 51.51 acres, and consists of 18, 2.5 acre lots. The remaining 29.60 acres along HWY 94 is proposed to be rezoned as commercial Vegetation within the site is characterized primarily by prairie grasses. The Site does not currently provide water quality or detention for the Project area.

final condition for early grading

Proposed interim conditions for Filing No. 1 will consist of earthwork, roadside ditch, on-site drainage berm, culverts, and two temporary sediment basins.

The existing topography consists of slopes ranging from 1% to 9%. Flows in the existing conditions run off site into the existing CDOT roadside ditch along HWY 94. Majority of the site collects in the roadside ditch and is conveyed to two existing 30" CMP culverts that carry runoff underneath HWY 94, located to the east if the existing access point. Additionally a portion of the site runs further east and eventually collects into three existing 30" CMP culverts that convey runoff underneath HWY 94, located approximately 0.25-miles east of the SE corner of the Site. Runoff ultimately drains into Black Squirrel Creek.

PROJECT CHARACTERISTICS

Make this section specific to early grading

Filing No. 1 development of this site will consist of 17, 2.5-acre residential lots with roadway improvements, roadway grading, two (2) full spectrum detention ponds, roadside ditches, culverts, and drainage swales.

SOILS DATA

According to NRCS soil mapping data, USCS Type A soils are the primary soil type within the site. Type A soils described as 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. Soils mapping information has been provided in the **Appendix.**

FLOODPLAIN STATEMENT

The Site is located outside the 100-year floodplain and within Zone X (an area of minimal flood hazard) as noted on the FEMA FIRM Map No. 08041C0805G revised on December 7, 2018 (See **Appendix**).

DRAINAGE BASINS

EXISTING SUB-BASIN DESCRIPTIONS

Historically, runoff from the Site drains generally from upstream tributary areas toward downstream design points and ultimately contributes to larger off-site drainage systems. Slopes across the Site are variable and support a combination of overland and concentrated drainage patterns. Based on topography and drainage divides, the Site has been delineated into five (5) on-site sub-basins (EX-1 through EX-5) and four (4) off-site sub-basins (OF-1 through OF-4). The off-site basins are located primarily upstream of the Site and contribute flows that enter the on-site drainage system at defined design points.

Under existing conditions, runoff from the sub-basins is conveyed primarily as overland sheet flow in upland areas, transitioning to shallow concentrated flow and localized channelized flow along natural drainage paths. These natural drainage paths collect and convey stormwater through the Site in accordance with historic drainage patterns. The majority of on-site basins exhibit minimal development and low imperviousness, resulting in relatively low runoff rates and limited concentration of flow except near downstream design points.

Sub-Basin EX-1
Existing sub-basin EX-1 is approximately 16.41 acres and consists of undeveloped land with native vegetation and minimal impervious surfaces. Runoff developed within this basin generally occurs as overland sheet flow toward design point EX-1, with minor localized concentration in lower areas. Runoff from EX-1 flows offsite into vacant agricultural land. The weighted imperviousness of sub-basin EX-1 is 2.0%. The existing direct runoff from sub-basin EX-1 is 2.37 cfs for the 5-year event and 15.90 cfs for the 100-year event.

Sub-Basin EX-2
Existing sub-basin EX-2 is approximately 15.87 acres and consists of predominantly undeveloped land with low impervious cover. Runoff within this basin is conveyed primarily as overland sheet flow toward design point EX-2, with some shallow concentrated flow paths developing along natural drainage patterns. Runoff from EX-2 currently flows into subbasin EX-4 at design point EX2. EX-2 ultimately collects at a double 30” RCP culvert that conveys runoff underneath HWY 94. The weighted imperviousness of sub-basin EX-2 is 2.0%. The existing direct runoff from sub-basin EX-2 is 2.36 cfs for the 5-year event and 15.85 cfs for the 100-year event.

Sub-Basin EX-3
Existing sub-basin EX-3 is approximately 17.35 acres and consists of native vegetation and undeveloped terrain. Runoff developed within this basin generally flows as sheet flow transitioning to shallow concentrated flow near the downstream design point EX-3. Runoff from EX-3 flows offsite into Antelope Park Ranchettes and is ultimately collected into a triple barrel 30" RCP culvert that conveys runoff underneath HWY 94. The weighted imperviousness of sub-basin EX-3 is 2.0%. The existing direct runoff from sub-basin EX-3 is 2.82 cfs for the 5-year event and 18.98 cfs for the 100-year event.

Sub-Basin EX-4
Existing sub-basin EX-4 is approximately 52.09 acres and represents the largest on-site basin. The basin consists of undeveloped terrain with natural drainage patterns. Runoff is conveyed as sheet flow over the majority of the basin, with increased concentration into shallow swales or natural low points approaching design point EX-4. EX-4 ultimately collects at a double 30" RCP culvert that conveys runoff underneath HWY 94. The weighted imperviousness of sub-basin EX-4 is 2.0%. The existing direct runoff from sub-basin EX-4 is 7.11 cfs for the 5-year event and 47.80 cfs for the 100-year event.

Sub-Basin EX-5
Existing sub-basin EX-5 is approximately 36.19 acres and consists of undeveloped land with native vegetation. Runoff within this basin generally occurs as overland sheet flow with limited concentrated flow paths, ultimately draining toward design point EX-5. EX-5 flows offsite either into Viewpoint Estates or into the existing roadside ditch along HWY 94. EX-5 ultimately collects into a triple barrel 30" RCP culvert that conveys runoff underneath HWY 94. The weighted imperviousness of sub-basin EX-5 is 2.0%. The existing direct runoff from sub-basin EX-5 is 5.74 cfs for the 5-year event and 38.56 cfs for the 100-year event.

Sub-Basin OF-1
Existing sub-basin OF-1 is approximately 204.29 acres and consists of a large off-site drainage area contributing flow to the project site. Runoff is conveyed primarily as sheet flow in upstream areas, transitioning to concentrated/channelized flow within natural drainageways approaching design point OF-1. OF-1 flows into EX-1 and follows the drainage patterns detailed in EX-1. The weighted imperviousness of sub-basin OF-1 is 3.72%. The existing direct runoff is 18.45 cfs (5-year) and 112.58 cfs (100-year).

Sub-Basin OF-2
Existing sub-basin OF-2 is approximately 290.54 acres and represents the largest contributing off-site basin. Runoff within this basin is conveyed as sheet flow over upstream portions, combining into well-defined concentrated flow paths as it approaches design point OF-2. OF-2 flows into EX-3 and follows the drainage patterns detailed in EX-3. The weighted imperviousness is 3.81%. The existing direct runoff is 25.46 cfs (5-year) and 154.64 cfs (100-year).

Sub-Basin OF-3
Existing sub-basin OF-3 is approximately 18.51 acres and consists of a smaller off-site tributary area. Runoff is primarily conveyed as overland sheet flow with limited concentration, draining toward design point OF-3. OF-3 flows into EX-2 and follows the drainage patterns detailed in EX-2. The weighted imperviousness is 2.0%. The existing direct runoff is 3.41 cfs (5-year) and 22.92 cfs (100-year).

Sub-Basin OF-4

Existing sub-basin OF-4 is approximately 0.96 acres and consists of a very small off-site drainage area. Runoff occurs as localized sheet flow with minimal concentration toward design point OF-4. OF-4 flows into EX-4 and follows the drainage patterns detailed in EX-4. The weighted imperviousness is 2.0%. The existing direct runoff is 0.18 cfs (5-year) and 1.24 cfs (100-year).

Sub-Basin OF-5
Existing sub-basin OF-5 is approximately 6.21 acres and consists of the northern half of HWY 94 and the roadside ditch. Runoff sheet flows off of HWY 94 into the adjacent roadside ditch and is concentrated as it flows towards design point OF-5. As shown in the existing drainage map, design points OF-5 and EX-4 ultimately collect at the double 30" CMP culverts that convey runoff underneath HWY 94. The weighted imperviousness is 30.9%. The existing direct runoff is 3.01 cfs (5-year) and 8.56 cfs (100-year).

Sub-Basin OF-6
Existing sub-basin OF-6 is approximately 0.14 acres and consists of the off-site Golden Eagle Drive public right-of-way. Exisitng conditions consist of packed gravel. Runoff sheet flows southeast towards design point OF6. The weighted imperviousness is 80.0%. The exisiting direct runoff is 0.34 cfs (5-year) and 0.67 cfs (100-year).

Sub-Basin OP-1
Existing sub-basin OP-1 is approximately 0.04 acres and consists of a very small off-site drainage area that includes the area that has been utilized to access the Site via HWY 94. Runoff occurs as localized sheet flow with minimal concentration toward design point OP-1. OP-1 flows into OF-5 and ultimately collects at design point OF-5. The weighted imperviousness is 41.0%. The existing direct runoff is 0.07 cfs (5-year) and 0.18 cfs (100-year).

PROPOSED SUB-BASIN DESCRIPTIONS

Under proposed conditions, stormwater runoff from the Site will generally maintain historic drainage patterns, with localized modifications resulting from the proposed development. The construction of roadways and associated grading will alter some existing flow paths; however, drainage infrastructure has been designed to convey runoff back to its historic flow regime or provide controlled discharge through proposed facilities. The Site has been delineated into multiple on-site sub-basins (PR-1 through PR-9) and off-site contributing basins (OF-1 through OF-4 and OP-1). The off-site basins represent upstream tributary areas that are not altered by the proposed development. No changes to upstream drainage patterns or hydrologic response are anticipated from these off-site areas, and they will continue to contribute flow to the Site consistent with existing conditions.

There are several drainage culverts proposed within the Site. Locations of the proposed culverts were chosen to ensure historic drainage patterns are maintained. Culvert sizing and the outlet protection analysis is included in this report outlet protection will be installed with the culverts as part of the early grading portion of this development. The detail is provided in the **Appendix** of this report.

The two temporary sediment basins (TSB) will be designed to regulate flows to release 97% of the produce runoff in no more than 72 hours to the existing roadside ditch along HWY 94. The full design of these full spectrum extended detention basins are provided will be provided in the Final Drainage Report. A low tailwater stilling basin, based on the design provided by Mile High Flood District (MHFD), Urban Drainage and Flood Control District Drainage Criteria Manuals (UDFCDCM) Volume 2, Figure 9-37, will be installed at the inlet locations of the proposed TSB.

The design helps prevent scour and mitigates the concentrated flow, acting as a level spreader for concentrated flow in an existing drainageway. This is displayed and discussed in text and drainage maps. More detail regarding the proposed TSBs can be found in the detention basin section of this report. The two TSBs will be converted into full spectrum detention ponds in the final condition.

The following sub-basin descriptions should discuss the final condition of the early grading project (roads cut but not paved, no EDBs, no lots to be built on).

Sub-Basin PR-1
Proposed sub-basin PR-1 is approximately 16.17 acres. Runoff within this basin occurs as sheet flow across developed areas, transitioning to shallow concentrated flow toward design point PR-1. PR-1 ultimate flows offsite into undeveloped agricultural land. The proposed roadway within this sub-basin is part of the 1-acre disturb area exclusion detailed later in this report. The weighted imperviousness is 8.12%. The developed runoff is 4.05 cfs (5-year) and 21.02 cfs (100-year). Refer to the Appendix for the Proposed Conditions Drainage Map.

Sub-Basin PR-2
Proposed sub-basin PR-2 is approximately 9.55 acres. Proposed development in PR-2 concsists of low density 2.5 acre lots, roadway, and roadside ditch. Runoff is conveyed as sheet flow from developed surfaces toward design point PR-2. Runoff is collected in the proposed 30” RCP culvert and conveyed into PR-4. The weighted imperviousness is 9.90%. The developed runoff is 2.98 cfs (5-year) and 14.38 cfs (1000-year). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-3
Proposed sub-basin PR-3 is approximately 17.72 acres. Runoff is conveyed as sheet flow transitioning to concentrated flow, ultimately routed to downstream conveyance features at design point PR-3. Runoff from PR-3 flows offsite into Antelope Park Ranchettes and is ultimately collected into a triple barrel 30” RCP culvert that conveys runoff underneath HWY 94. The proposed roadway disturbance in this subbasin is part of the 1-acre disturbance exclusion detailed later in this report. The weighted imperviousness is 8.90%. The developed runoff is 4.98 cfs (5-year) and 24.98 cfs (100-year). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-4
Proposed sub-basin PR-4 is approximately 16.42 acres. Runoff occurs as sheet flow over developed surfaces, concentrating into defined conveyance paths or roadside ditch toward design point PR-4. Runoff is collected into the roadside ditch and conveyed towards double 30” RCP culverts and outfalls into PR-8. Runoff from PR-2 is confined to the roadside ditch as it is conveyed towards design point PR-4. The weighted imperviousness is 11.48%. The developed runoff is 5.99 cfs (5-year) and 27.20 cfs (100-yr). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-5
Proposed sub-basin PR-5 is approximately 2.08 acres. Proposed development consists of low density 2.5 acre lots and roadway, runoff is quickly concentrated and routed through localized roadside ditch toward design point PR-5. Runoff is ultimately collected into a 24” RCP culvert and outfalling into the roadside ditch in subbasin PR-8. The weighted imperviousness is 36.59%. The developed runoff is 2.00 cfs (5-year) and 5.39 cfs (100-year). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-6
Proposed sub-basin PR-6 is approximately 17.78 acres. Proposed development consists of low density 2.5 acre lots and roadway. Runoff occurs as sheet flow transitioning to shallow

concentrated flow with the proposed roadside ditch toward design point PR-6. Runoff is ultimately collected into a 18" RCP culvert and outfalls into subbasin PR-9. The weighted imperviousness is 10.34%. The developed runoff is 5.49 cfs (5-year) and 25.99 cfs (100-year). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-7
Proposed sub-basin PR-7 is approximately 29.21 acres. Proposed development consists of low density 2.5 acre lots, low impact commercial area, and roadway. In the full development of this basin there will be rapidly concentrated runoff that flows toward design point PR-7. Runoff is ultimately collected into double 30" RCP culverts and outfall into the proposed EDB in PR-8. The weighted imperviousness is 42.16%. The developed runoff is 25.51 cfs (5-year) and 68.20 cfs. (100-year). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-8
Proposed sub-basin PR-8 is approximately 11.31 acres. Proposed development consists of low density 2.5 acre lots, low impact commercial area, roadway, and a full spectrum detention basin. Runoff is conveyed as concentrated flow due to high impervious cover, flowing efficiently toward design point PR-8. Runoff from subbasins OF-3, OF-4, PR-2, PR-4, PR-5, PR-7, and PR-8 ultimately collect into the proposed TSB. The total cumulative flow that collects into the TSB.. This pond is designed to over detain the 100-yr even as it will also detain the 100-yr event for the water quality pond constructed in subbasin PR-9. Runoff will be released at less than historic flows and outfall into the existing roadside ditch along HWY 94. Runoff is ultimately routed to the existing double 30" RCP culverts that convey flows underneath HWY 94. The weighted imperviousness is 47.62%. The developed runoff is 11.76 cfs (5-year) and 29.60 cfs (100-year). Refer to the **Appendix** for the Proposed Conditions Drainage Map.

Sub-Basin PR-9
Proposed sub-basin PR-9 is approximately 17.68 acres. Proposed development consists of low density 2.5 acre lots, low impact commercial area, roadway, and a full spectrum detention basin. Runoff is conveyed as concentrated flow due to high impervious cover, flowing efficiently toward design point PR-9. Runoff from subbasins PR-6 and PR-9 ultimately collect into the TSB. Runoff will be released from this pond at less than historic rates and outfall into the existing roadside ditch along HWY 94. Runoff is ultimately routed to the existing triple 30" RCP culverts that convey flows underneath HWY 94. The weighted imperviousness is 40.68%. The developed runoff is 14.37 cfs (5-year) and 38.97 cfs (100-year). Refer to the Appendix for the Proposed Conditions Drainage Map.

Sub-Basin OF-1
Existing sub-basin OF-1 is approximately 204.29 acres and consists of a large off-site drainage area contributing flow to the project site. Runoff is conveyed primarily as sheet flow in upstream areas, transitioning to concentrated/channelized flow within natural drainageways approaching design point OF-1. OF-1 flows into PR-1 and follows the drainage patterns detailed in PR-1. The weighted imperviousness of sub-basin OF-1 is 3.72%. The existing direct runoff is 18.45 cfs (5-year) and 112.58 cfs (100-year).

Sub-Basin OF-2
Existing sub-basin OF-2 is approximately 290.54 acres and represents the largest contributing off-site basin. Runoff within this basin is conveyed as sheet flow over upstream portions, combining into well-defined concentrated flow paths as it approaches design point OF-2. OF-2 flows into PR-3 and follows the drainage patterns detailed in PR-3. The weighted imperviousness is 3.81%. The existing direct runoff is 25.46 cfs (5-year) and 154.64 cfs (100-year).

Sub-Basin OF-3
Existing sub-basin OF-3 is approximately 18.51 acres and consists of a smaller off-site tributary area. Runoff is primarily conveyed as overland sheet flow with limited concentration, draining toward design point OF-3. OF-3 flows into PR-2 and follows the drainage patterns detailed in PR-2. The weighted imperviousness is 2.0%. The existing direct runoff is 3.41 cfs (5-year) and 22.92 cfs (100-year).

Sub-Basin OF-4
Existing sub-basin OF-4 is approximately 0.96 acres and consists of a very small off-site drainage area. Runoff occurs as localized sheet flow with minimal concentration toward design point OF-4. OF-4 flows into PR-7 and follows the drainage patterns detailed in PR-7. The weighted imperviousness is 2.0%. The existing direct runoff is 0.18 cfs (5-year) and 1.24 cfs (100-year).

Sub-Basin OF-5
Existing sub-basin OF-5 is approximately 6.21 acres and consists of the northern half of HWY 94 and the roadside ditch. Runoff sheet flows off of HWY 94 into the adjacent roadside ditch and is concentrated as it flows towards design point OF-5. As shown in the proposed drainage map, design point OF-5 collects at the 18" RCP culvert that conveys flows underneath the Site access point and ultimately discharges at the double 30" CMP culverts that convey runoff underneath HWY 94. The weighted imperviousness is 30.9%. The existing direct runoff is 3.01 cfs (5-year) and 8.56 cfs (100-year).

Sub-Basin OF-6
Proposed sub-basin OF-6 is approximately 0.14 acres and consists of the off-site Golden Eagle Drive public right-of-way. Proposed conditions consist of proposed asphalt road and gravel shoulder. Runoff sheet flows southeast towards design point OF6. This entire basin is part of the proposed disturbed area exclusion. The weighted imperviousness is 84.9%. The proposed direct runoff is 0.42 cfs (5-year) and 0.81 cfs (100-year).

Sub-Basin OP-1
Proposed sub-basin OP-1 is approximately 0.04 acres and consists of a very small off-site drainage area that includes the area that is utilized to access the Site via HWY 94. Runoff occurs as localized sheet flow with minimal concentration toward design point OP-1. OP-1 flows into OF-5 and collects into the proposed 18" RCP culvert that conveys water undeath the proposed access point and ultimately discharges into the existing double 30" CMP culverts underneath HWY 94.. The weighted imperviousness is 46.0%. The existing direct runoff is 0.08 cfs (5-year) and 0.20 cfs (100-year).

DRAINAGE DESI

Please provide a table that provides and compares the 5 - year and the 100 year for the pre-development and post-development flows for the project site and discuss the reductions or increases in flows to come to the conclusion that the post-development flows are lower than the pre-development flows.

DEVELOPMENT

The proposed storm facilities are designed to be in compliance with El Paso County "Drainage Criteria Manual (DCM)" dated October 2018 ("the MANUAL"), El Paso County "Engineering Criteria Manual" ("the Engineering Manual"), Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs Drainage Criteria Manual dated May 2014 ("the Colorado Springs MANUAL"), and Mile High Flood District (MHFD), Urban Drainage and Flood Control District Drainage Criteria Manuals (UDFCDCM), (Volumes 1, 2 and 3), prepared by Wright-McLaughlin Engineers, June 2001, with latest revisions.

Site drainage is not significantly impacted by such constraints as utilities or existing development.

HYDROLOGIC CRITERIA

The 5-year and 100-year design storm events were used in determining rainfall and runoff for the proposed drainage system per chapter 6 of the CRITERIA. Table 6-2 of the CRITERIA is the source for rainfall data for the 5-year and 100-year design storm events. Design runoff was calculated using the Rational Method for developed conditions as established in the CRITERIA and MANUAL. Runoff coefficients for the proposed development were determined using Table 6-6 of the CRITERIA by calculating weighted impervious values for each specific site basin as outlined and shown in the Preliminary Drainage Report.

HYDRAULIC CRITERIA

Applicable design methods were utilized to analyze & size the proposed ponds, culverts, and existing drainage channels which includes the use of the UD-Detention spreadsheet, rational calculations spreadsheet, and FlowMaster, and UD-Culvert.

Proposed Drainage features on-site have been analyzed and sized for the following design storm events:

- Major Storm: 100-year Storm Event

The proposed drainage channels and proposed roadside ditches are designed to carry flows to the proposed EDB and water quality pond. Channel calculations and summary table have been provided in the **Appendix.** Proposed drainage easements have been proposed in locations where flow is being conveyed between properties.

Roadside ditches are provided along the proposed roadways to route flows to the proposed culverts. The roadside ditches are sized to convey the major event flow. The proposed roadside ditches comply with Table 6-1 of the EPC DCM V1. The roadside ditches have been designed to have an average depth of 3 feet, a v-ditch, and side slopes of 4:1. Roadside ditch calculations and summary table has been provided in the **Appendix**.

Culverts were sized to convey flows from the ditches and channels, underneath the sites paved roads. The proposed culverts range from 18” to 30” and have been designed to convey the 100-year storm event. Culvert calculations and summary table has been provided in the **Appendix**.

DETENTION

Design Point PR8

Design Point PR8 is located on the southwest corner of Subbasin PR8 and is at the outfall of Temporary Sediment Basin (TSB) 1 in the interim Early Grading condition and the permanent Full Spectrum Detention Pond 1 in the final condition. In the interim Early Grading condition 4 existing drainageways will be directed to TSB 1. The TSB proposes a standpipe with 1.48 square inch orifice holes to allow for a 72 hour drain time from the TSB. See the Appendix for orifice sizing and spacing of the standpipe. The standpipe will discharge into a low tailwater stilling basin in the southwest corner of the Site, that will be constructed in the same location for the final condition. The low tailwater stilling basin will outfall to the existing 30” CMP culverts (2) within the HWY 94 ROW. A description of the reduced runoff directed into the existing culverts will be provided in the

Final Drainage report comparing existing and proposed conditions. A table summarizing the existing historic flows and proposed flows in the interim and final condition for the 100 year event, at Design Point PR8 are presented here.

Project Phase	Existing Rational Method Peak Inflow 100-YR (cfs)	Detained Outflow – 100-YR (cfs)	Notes
Interim – Early Grading	163.68	~0.1 (Standpipe)	Standpipe allows for 72 hour drain time.
Final Condition	163.68	29.6	Outlet structure will be constructed to regulate flows at less than historic.

Design Point PR9

Design Point PR9 is located on the southeast corner of Subbasin PR9 and is at the outfall of Temporary Sediment Basin (TSB) 2 in the interim Early Grading condition and the permanent Full Spectrum Detention Pond 1 in the final condition. In the interim Early Grading condition 1 existing drainageways will be directed to TSB 2. The TSB proposes a standpipe with 1.23 square inch orifice holes to allow for a 72 hour drain time from the TSB. See the Appendix for orifice sizing and spacing of the standpipe. The standpipe will discharge into a low tailwater stilling basin in the southwest corner of the Site, that will be constructed in the same location for the final condition. The low tailwater stilling basin will outfall to the existing 30" CMP culverts (3) within the HWY 94 ROW. A description of the reduced runoff directed into the existing culverts will be provided in the Final Drainage report comparing existing and proposed conditions. A table summarizing the existing historic flows and proposed flows in the interim and final condition for the 100 year event, at Design Point PR9 are presented here.

Project Phase	Existing Rational Method Peak Inflow 100-YR (cfs)	Detained Outflow – 100-YR (cfs)	Notes
Interim – Early Grading	36.18	~0.1 (Standpipe)	Standpipe allows for 72 hour drain time.
Final Condition	36.18	9.9	Outlet structure will be constructed to regulate flows at less than historic.

THE FOUR STEP PROCESS

The Project was designed in accordance with the four-step process to minimize adverse impacts of urbanization, as outlined in the El Paso County Engineering Manual for BMP selection as noted below:

Step 1. **Employ Runoff Reduction Practices** – The Project is proposing a low-density residential development that will be designed to minimize the impact to the current existing terrain. Per Section I.7.1B of Appendix I of the ECM, the single-family residences fall under the large lot exemption as the total impervious area is less than 10% of the area. Homes are typically placed in the center of the lot and provide long distances for infiltration across natural terrain. The Site's proposed paved roadways will increase the Site's impervious

No permanent ponds will be constructed with this project. Revise to discuss exclusions that prevent the early grading project from requiring WQ treatment.

area; however, roadside ditches and channels will be constructed to slow down the runoff velocity and reduce runoff peaks. The two temporary sediment basins will be used to capture stormwater, provide water quality treatment, and maintain flows discharging off site at or below historic levels during the early grading condition.

Step 2. Provide a Water Quality Capture Volume – Permanent water quality measures and detention facilities will be necessary for the Project. Two (2) Full Spectrum Extended Detention Basins will treat the areas not excluded with either the Large Lot or 20% exclusion. Per ECM Appendix I Section I.7.B.5: Large Lot Single Family exclusion, most of the proposed site will be excluded from water quality, lot imperviousness shall be limited to 10 percent or less. Per ECM Appendix I Section 1.7.C.1.a., 20% of the development site or less than 1 acre can be excluded from providing water quality. As mentioned, 0.96 acres (41,891 SQ FT) of impervious area will not be able to be treated which is less than 20% of the overall site.

Step 3 Stabilize Drainageways– Stabilizing proposed roadside ditches, and channels by designing them with slopes that control the flow rates. Placement of riprap upstream and downstream of culverts to help reduce erosion of the roadside ditches. Additionally, low tailwater stilling basins will be constructed in the place of traditional riprap outlet protection. The design helps prevent downstream scour and mitigates the concentrated flow, acting as a level spreader for concentrated flow in an existing drainageway.

Step 4. Implement Site Specific and Other Source Control BMPs – The erosion control construction BMPs of the Project were designed to reduce contamination. Source control BMPs include the use of vehicle tracking control, culvert protection, stockpile management, and stabilized staging areas.

DRAINAGE FACILITY DESIGN

This project is in the TELEPHONE EXCHANGE basin and the Basin Fee and the Bridge Fee are applicable; the Basin fee is $15,323 and the Bridge fee is $359 per impervious area.

Please indicate the total Basin fee and the total Bridge Fee on the Final Plat document and submit the Final Plat documents.

GENERAL CONCEPT

The proposed drainage patterns will match the his
full spectrum detention ponds are being proposed
proposed development at less than or equal to his

WQCV EXCLUSION AREAS

Areas within the site do not have water quality pr
1.7.C.A, 20% of the development site or less than 1 acre can be excluded from providing water quality. The combined exclusion areas for Phase 1 sum to 0.96 acres (41,891 SQ FT). WQCV exclusion locations are provided in the **Appendix.**

DRAINAGE FEES

FEES

The Project is within the Ellicott Consolidated Drainage Basin (CHBS1200). As such, no drainage fees are due with this Project.

SUMMARY

This report has been prepared in accordance with El Paso County stormwater criteria. It outlines the Site design for the 5-year and 100-year storm events drainage system. The drainage design

presented within this report conforms to the criteria presented in the MANUAL. Additionally, as the proposed temporary sediment basin release rates are to be designed less than historic rates, the Site runoff and storm drain facilities will not adversely affect the downstream and surrounding developments.

REFERENCES

1. El Paso County “Engineering Criteria Manual” Volumes 1 & 2, dated October 31, 2018

2. Natural Resources Conservation Service, Web Soil Survey, dated June 21, 2023.

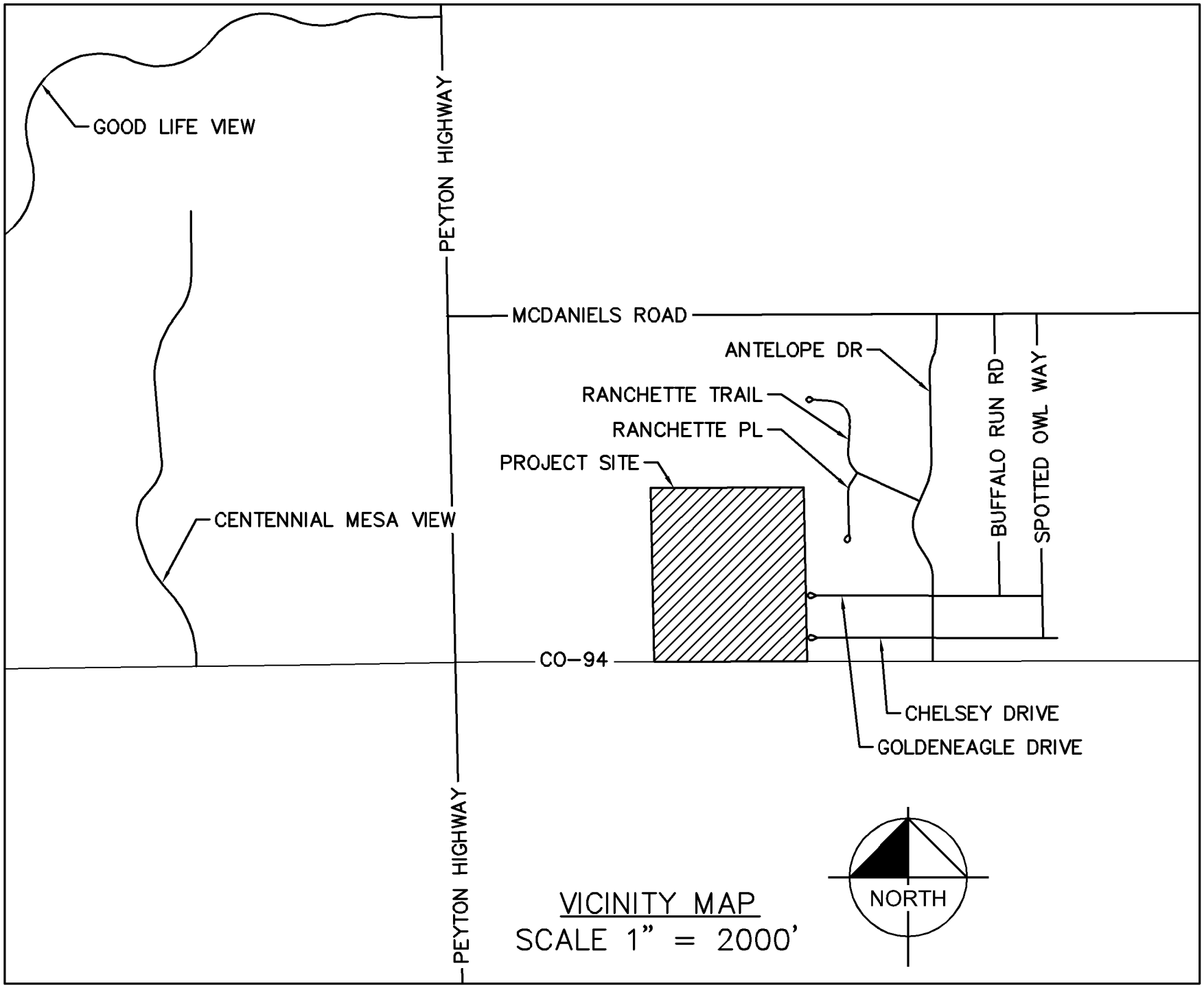
3. Urban Drainage and Flood Control District Drainage Criteria Manuals (UDFCDCM), (Volumes 1, 2 and 3), prepared by Wright-McLaughlin Engineers, June 2001, with latest revisions.

4. Flood Insurance Rate Map, El Paso County, Colorado and Incorporated Areas, Map Number 08041C0805G, Effective Date December 7, 2018, prepared by the Federal Emergency Management Agency (FEMA).

5. Soils and Geology Study Trinty Ranch Estates – Filing No.1 by Entech Engineering, Inc., dater December 7, 2021.

APPENDIX

APPENDIX A: VICINITY MAP



VICINITY MAP
SCALE 1" = 2000'

APPENDIX B: FEMA MAP & SOILS REPORT

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

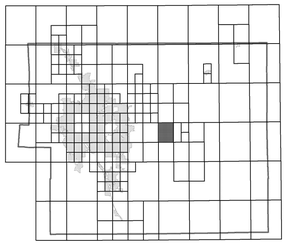
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

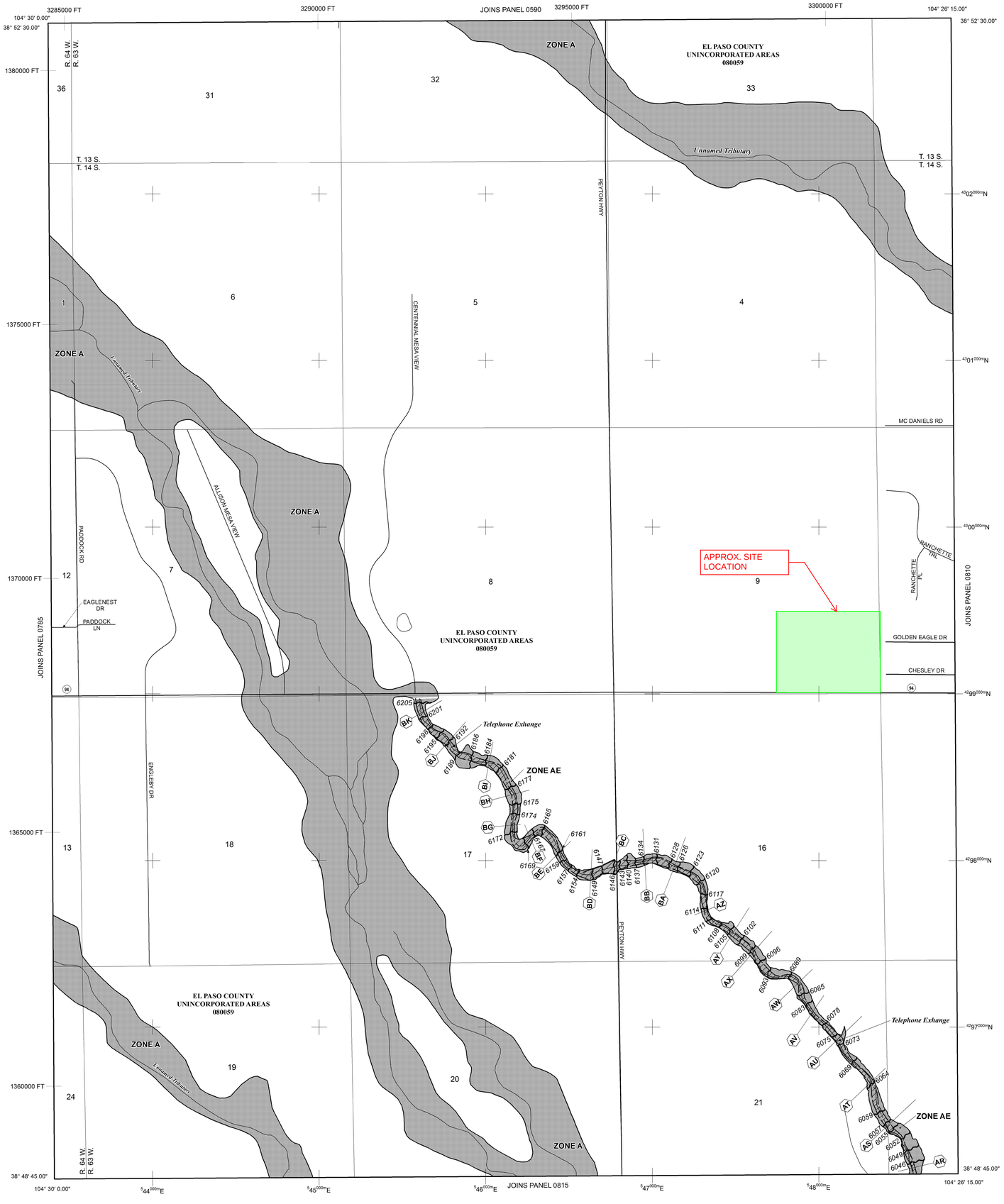
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 — 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 0805G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 805 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0805	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0805G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

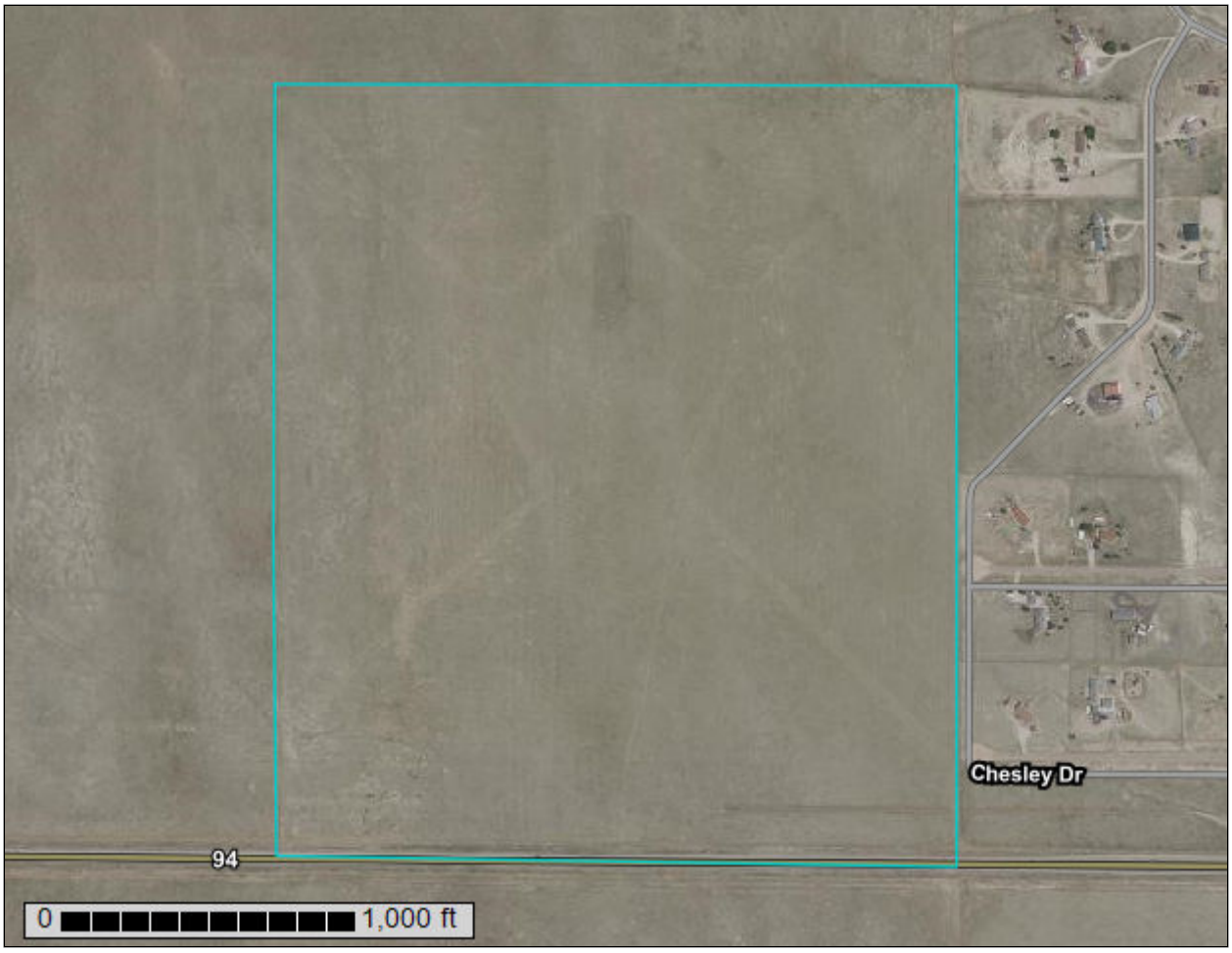
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for El Paso County Area, Colorado



April 24, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:5,500 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	17.6	12.4%
95	Truckton loamy sand, 1 to 9 percent slopes	22.7	16.1%
96	Truckton sandy loam, 0 to 3 percent slopes	35.0	24.8%
97	Truckton sandy loam, 3 to 9 percent slopes	65.9	46.7%
Totals for Area of Interest		**141.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Landscape: Uplands
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Blakeland and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blakeland

Setting

Landscape: Uplands
Landform: Flats, Hills
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

95—Truckton loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2yvrm
Landscape: Uplifted piedmonts
Elevation: 5,800 to 7,100 feet
Mean annual precipitation: 12 to 19 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 90 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Truckton and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Truckton

Setting

Landscape: Uplifted piedmonts
Landform: Interfluves, Fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind re-worked alluvium derived from arkose

Typical profile

A - 0 to 4 inches: loamy sand
Bt1 - 4 to 12 inches: sandy loam
Bt2 - 12 to 19 inches: sandy loam
C - 19 to 80 inches: sandy loam

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 5 percent
Landscape: Uplifted piedmonts
Landform: Interfluves, Low hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Bresser

Percent of map unit: 5 percent
Landscape: Uplifted piedmonts
Landform: Interfluves, Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Urban land

Percent of map unit: 2 percent
Landscape: Uplifted piedmonts
Anthropogenic features: Streets, parking lots, sidewalks, buildings, etc. of urban land, urban or suburban anthroscape
Hydric soil rating: No

Ellicott, occasionally flooded

Percent of map unit: 1 percent
Landscape: Uplifted piedmonts
Landform: Flood plains, Drainageways
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R067BY031CO - Sandy Bottomland
Hydric soil rating: No

96—Truckton sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2yvrd
Landscape: Uplifted piedmonts
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 14 to 23 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 90 to 155 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Truckton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Truckton

Setting

Landscape: Uplifted piedmonts
Landform: Fan remnants, Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind re-worked alluvium derived from arkose

Typical profile

A - 0 to 4 inches: sandy loam
Bt1 - 4 to 12 inches: sandy loam
Bt2 - 12 to 19 inches: sandy loam
C - 19 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill

Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 5 percent
Landscape: Uplifted piedmonts
Landform: Low hills, Interfluves
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Bresser

Percent of map unit: 5 percent
Landscape: Uplifted piedmonts
Landform: Terraces, Interfluves
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Pleasant, frequently ponded

Percent of map unit: 2 percent
Landscape: Uplifted piedmonts
Landform: Closed depressions
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Depression
Hydric soil rating: Yes

Urban land

Percent of map unit: 2 percent
Landscape: Uplifted piedmonts
Anthropogenic features: Streets, parking lots, sidewalks, buildings, etc. of urban land, urban or suburban anthroscape
Hydric soil rating: No

Ellicott, occasionally flooded

Percent of map unit: 1 percent
Landscape: Uplifted piedmonts
Landform: Drainageways, Flood plains
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: R067BY031CO - Sandy Bottomland
Hydric soil rating: No

97—Truckton sandy loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2x0j2
Landscape: Uplifted piedmonts
Elevation: 5,300 to 6,850 feet
Mean annual precipitation: 14 to 19 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 85 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Truckton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Truckton

Setting

Landscape: Uplifted piedmonts
Landform: Backslopes of hillslopes, Sideslopes of interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Re-worked alluvium derived from arkose

Typical profile

A - 0 to 4 inches: sandy loam
Bt1 - 4 to 12 inches: sandy loam
Bt2 - 12 to 19 inches: sandy loam
C - 19 to 80 inches: sandy loam

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 8 percent
Landscape: Uplifted piedmonts
Landform: Shoulders and backslopes of hillslopes, Sideslopes and crests of interfluves
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Bresser

Percent of map unit: 7 percent
Landscape: Uplifted piedmonts
Landform: Toeslopes or footslopes of low hills, Baseslopes of interfluves
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

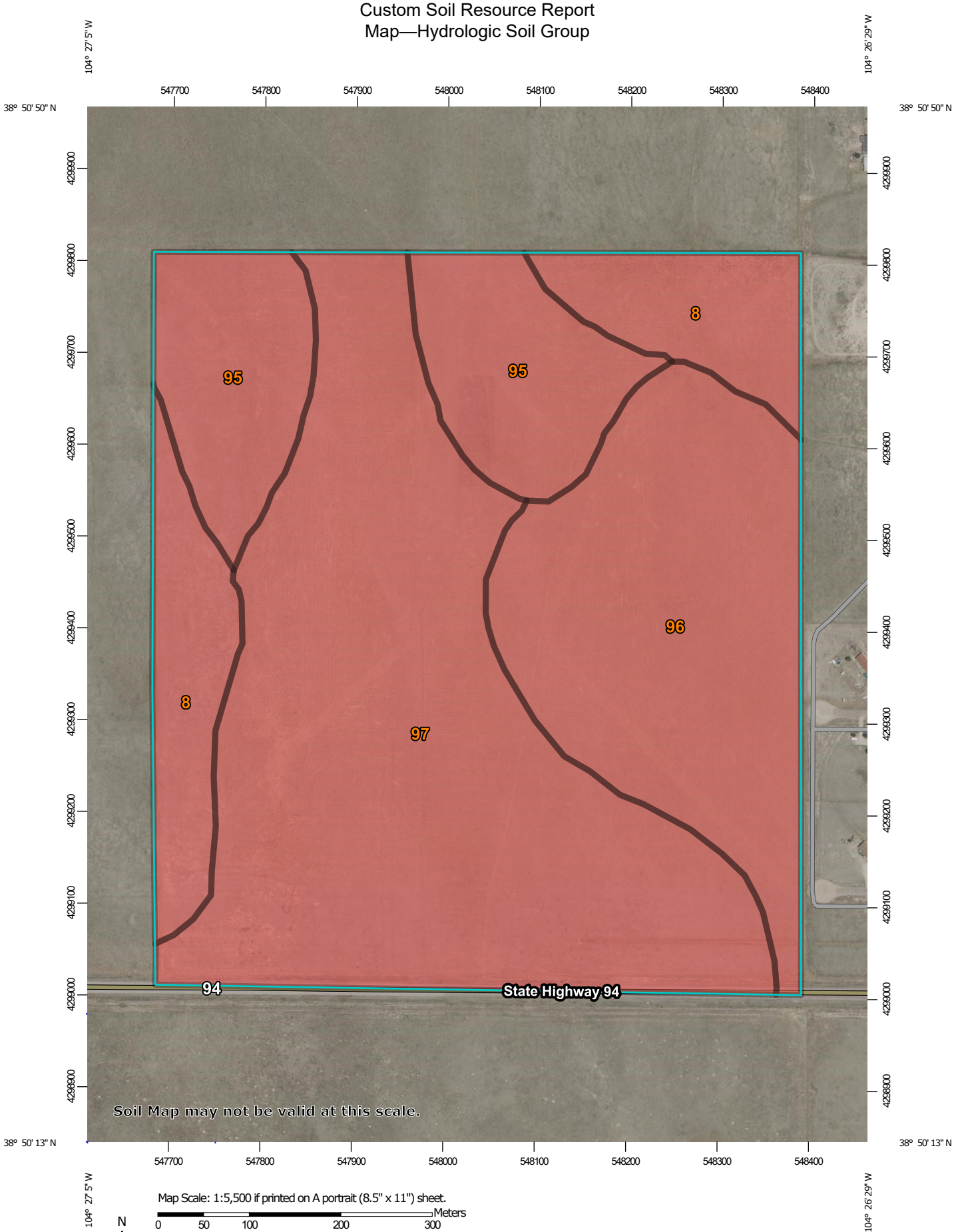
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:5,500 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	17.6	12.4%
95	Truckton loamy sand, 1 to 9 percent slopes	A	22.7	16.1%
96	Truckton sandy loam, 0 to 3 percent slopes	A	35.0	24.8%
97	Truckton sandy loam, 3 to 9 percent slopes	A	65.9	46.7%
Totals for Area of Interest			**141.1**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX C: HYDROLOGY

Kimley»Horn

EXISTING CONDITIONS

Trinity Ranch

DATE: 7/10/2026

PROJECT NUMBER: 096726003

CALCULATED BY: DJS

CHECKED BY: KRK

EXISTING RATIONAL CALCULATIONS SUMMARY

SUBCATCHMENT NAME	DESIGN POINT	TRIBUTARY AREA (AC)	IMPERVIOUSNESS (%)	PEAK FLOWS (CFS)	
				Q5	Q100
EX-1	EX-1	16.42	2.0%	2.37	15.90
EX-2	EX-2	15.87	2.0%	2.36	15.85
EX-3	EX-3	17.35	2.0%	2.82	18.98
EX-4	EX-4	52.09	2.0%	7.11	47.80
EX-5	EX-5	36.19	2.0%	5.74	38.56
OF-1	OF-1	204.29	3.7%	18.45	112.58
OF-2	OF-2	290.54	3.8%	25.46	154.64
OF-3	OF-3	18.51	2.0%	3.41	22.92
OF-4	OF-4	0.96	2.0%	0.19	1.25
OP-1	OP-1	0.04	41.0%	0.07	0.18
OF-5	OF-5	6.21	30.9%	3.01	8.56
OF-6	OF-6	0.14	80.0%	0.34	0.67
CUMMULATIVE FLOWS					
DESIGN POINT	BASINS	TRIBUTARY AREA (AC)	IMPERV. (%)	Q5	Q100
EX1	EX-1, OF-1	220.71	3.6%	19.77	121.43
EX3	OF-2, EX-3	307.90	3.7%	26.80	163.68
EX4	EX-2, EX-4, EX-5, OF-3, OF-4, OF-5, OP-1	129.88	7.7%	15.08	127.17
OF-6	OF-6	0.14	80.0%	0.34	0.67
TOTAL		658.62	4.5%	61.98	412.95

Calculation of Peak Runoff using Rational Method

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch Estates
Location: El Paso County, Colorado

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input
Cells of this color are for optional override values

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

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

Computed $t_c = t_i + t_t$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{c\,minimum}$ = 5 (urban)
$t_{c\,minimum}$ = 10 (non-urban)

Selected $t_c = \max(t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c))$

Provide input for area, soil type, and imperviousness on the Runoff Coeffs worksheet.

Select MHFD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.60	1.19	1.50	1.75	2.00	2.25	2.52	2.91

	a	b	c
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$Q(cfs)$ = CIA

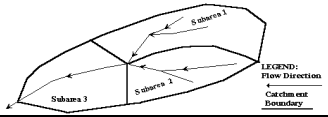
Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group(s)	Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration				Rainfall Intensity, I (in/hr)								Peak Flow, Q (cfs)							
				WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_t (ft/ft)	Overland Flow Time t_t (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	(Optional) Override t_c (min)	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
EX-1	16.42	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	215.00	6176.50	6173.49	0.014	23.93	1614.41			0.010	2.5	0.24	109.85	133.78	55.25	55.25		0.64	1.27	1.60	1.87	2.14	2.40	2.69	3.11	0.32	0.63	2.37	5.22	9.12	12.23	15.90	23.98
EX-2	15.87	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	485.00			0.032	27.36	931.00			0.004	2.5	0.15	100.69	128.04	52.78	52.78		0.66	1.31	1.65	1.93	2.20	2.48	2.77	3.20	0.31	0.62	2.36	5.20	9.08	12.19	15.85	23.89
EX-3	17.35	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	500.00	6166.00	6150.00	0.032	27.78	1142.85		6138.29	0.010	2.5	0.25	75.27	103.05	45.94	45.94		0.72	1.43	1.81	2.11	2.41	2.71	3.04	3.51	0.38	0.75	2.82	6.22	10.88	14.59	18.98	28.61
EX-4	52.09	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	500.00	6166.75	6149.75	0.034	27.23	1872.26	6149.55	6131.52	0.010	2.5	0.25	127.19	154.42	59.93	59.93		0.61	1.20	1.52	1.77	2.02	2.28	2.55	2.94	0.95	1.88	7.11	15.68	27.40	36.75	47.80	72.07
EX-5	36.19	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	500.00	6173.18	6165.18	0.016	34.92	1747.00	6165.00	6130.00	0.020	2.5	0.35	82.28	117.20	47.83	47.83		0.70	1.40	1.76	2.06	2.35	2.64	2.96	3.42	0.77	1.52	5.74	12.64	22.10	29.65	38.56	58.13
OF-1	204.29	A	3.7%	0.04	0.10	0.18	0.27	0.32	0.37	0.48	500.00	6292.32	6279.32	0.026	29.42	7140.85	6279.09	6171.98	0.015	2.5	0.31	388.70	418.12	127.43	127.43		0.36	0.71	0.89	1.04	1.19	1.34	1.50	1.73	3.07	6.09	18.45	38.34	65.37	87.03	112.58	169.21
OF-2	290.54	A	3.8%	0.04	0.10	0.18	0.27	0.32	0.37	0.48	500.00	6286.17	6260.17	0.052	23.39	7341.73	6260.18	6157.40	0.014	2.5	0.30	413.66	437.05	133.82	133.82		0.34	0.68	0.86	1.00	1.15	1.29	1.45	1.67	4.27	8.48	25.46	52.76	89.85	119.58	154.64	232.41
OF-3	18.51	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	270.00			0.008	32.25	1086.50			0.026	2.5	0.40	44.92	77.18	37.76	37.76		0.82	1.62	2.05	2.39	2.73	3.07	3.44	3.97	0.45	0.90	3.41	7.52	13.14	17.62	22.92	34.55
OF-4	0.96	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	239.00			0.006	33.37	493.00			0.009	2.5	0.24	34.64	68.01	34.99	34.99		0.86	1.70	2.15	2.50	2.86	3.22	3.60	4.16	0.02	0.05	0.19	0.41	0.71	0.96	1.25	1.88
OP-1	0.04	A	41.0%	0.30	0.34	0.40	0.46	0.50	0.53	0.67	16.00			0.020	4.37	30.00			0.010	20	2.00	0.25	4.62	19.37	5.00		2.04	4.04	5.09	5.94	6.78	7.63	8.55	9.87	0.02	0.05	0.07	0.09	0.12	0.15	0.18	0.26
OF-5	6.21	A	30.9%	0.25	0.30	0.36	0.43	0.47	0.51	0.61	20.00			0.020	5.14	4444.00			0.010	15	1.50	49.38	54.52	76.32	54.52		0.65	1.28	1.62	1.89	2.16	2.42	2.72	3.14	1.02	2.02	3.01	4.22	5.77	7.09	8.56	11.84
OF-6	0.14	A	80.0%	0.57	0.59	0.63	0.66	0.68	0.70	0.86	116.00			0.010	9.92	1.00			0.010	15	1.50	0.01	9.93	12.41	9.93		1.63	3.23	4.07	4.75	5.43	6.10	6.84	7.89	0.13	0.26	0.34	0.42	0.50	0.58	0.67	0.95

Determination of Runoff Coefficients for Rational Method

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch Estates
Location: El Paso County, Colorado

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input
Cells of this color are for optional override values



Provide subcatchment names on the Rational Calcs worksheet to open up the table below.

Subcatchment Name	# of Subareas	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness				Runoff Coefficient, C							(Optional) Override Runoff Coefficient, C							Comments
				Imperviousness Source	Imperviousness Category	Calculated Imperviousness	(Optional) Override Imperviousness	WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	
EX-1	1	16.42	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		16.42	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
EX-2	1	15.87	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		15.87	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
EX-3	1	17.35	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		17.35	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
EX-4	1	52.09	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		52.09	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
EX-5	1	36.19	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		36.19	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-1	3	204.29	A			6.7%	3.7%	0.02	0.02	0.02	0.03	0.06	0.14	0.28	0.04	0.10	0.18	0.27	0.32	0.37	0.48	
		3.94	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		0.51	A	Surface Type	Roofs	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		199.84	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-2	3	290.54	A			6.8%	3.8%	0.02	0.02	0.02	0.03	0.06	0.14	0.28	0.04	0.10	0.18	0.27	0.32	0.37	0.48	
		6.01	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		0.66	A	Surface Type	Roofs	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		283.87	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-3	1	18.51	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		18.51	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-4	1	0.96	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		0.96	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OP-1	2	0.04	A			42.5%	41.0%	0.32	0.33	0.34	0.35	0.38	0.43	0.52	0.30	0.34	0.40	0.46	0.50	0.53	0.67	
		0.02	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		0.02	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-5	2	6.21	A			34.6%	30.9%	0.24	0.25	0.26	0.27	0.29	0.35	0.45	0.25	0.30	0.36	0.43	0.47	0.51	0.61	
		2.04	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		4.17	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-6	1	0.14	A			80.0%	80.0%	0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		0.14	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	

Combined Peak Runoff Calculations for Inlets and Storm Drains

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch Estates
Location: El Paso County, Colorado

MHFD-Rational, Version 3.00 (August 2025)

5-yr Design Storm Return Period (Note: this worksheet can only evaluate one design storm at a time)

Use 1 column (C, D, E) per row

Obtain Inlet Capacity from MHFD-Inlet (Optional)

Design Point	# of Upstream Runoff Sources	Local Subcatchment Name	Upstream Surface Design Point	Upstream Pipe Design Point	Local Subcatchment Runoff				Surface Runoff to Design Point				Inlet Capacity / Bypass Flow			Total Runoff to Design Point			
					Area (ac)	C	t_c (min)	Local Q (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Surface Runoff (cfs)	(Optional) Inlet Name	Inlet Capacity (cfs)	Bypass Flow (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Total Runoff (cfs)
EX1	2								22.16	127.43	0.89	19.77			19.77	22.16	127.43	0.89	19.77
		EX-1			16.42	0.09	55.25	2.37	1.48	55.25	1.60	16.73				1.48	55.25	1.60	16.73
		OF-1			204.29	0.10	127.43	18.45	20.68	127.43	0.89	19.77				20.68	127.43	0.89	19.77
EX4	6								9.13	52.78	1.65	15.08			15.08	9.13	52.78	1.65	15.08
		OF-3			18.51	0.09	37.76	3.41	1.67	37.76	2.05	14.40				1.67	37.76	2.05	14.40
		EX-2			15.87	0.09	52.78	2.36	1.43	52.78	1.65	15.08				1.43	52.78	1.65	15.08
		EX-4			52.09	0.09	59.93	7.11	4.69	59.93	1.52	14.79				4.69	59.93	1.52	14.79
		OF-4			0.96	0.09	34.99	0.19	0.09	34.99	2.15	14.00				0.09	34.99	2.15	14.00
		OF-5			6.21	0.30	54.52	3.01	1.86	54.52	1.62	15.07				1.86	54.52	1.62	15.07
		OP-1			0.04	0.34	5.00	0.07	0.01	5.00	5.09	4.80				0.01	5.00	5.09	4.80
EX3	2								31.14	133.82	0.86	26.80			26.80	31.14	133.82	0.86	26.80
		OF-2			290.54	0.10	133.82	25.46	29.58	133.82	0.86	26.80				29.58	133.82	0.86	26.80
		EX-3			17.35	0.09	45.94	2.82	1.56	45.94	1.81	21.18				1.56	45.94	1.81	21.18
EX5	1								3.26	47.83	1.76	5.74			5.74	3.26	47.83	1.76	5.74
		EX-5			36.19	0.09	47.83	5.74	3.26	47.83	1.76	5.74				3.26	47.83	1.76	5.74

Combined Peak Runoff Calculations for Inlets and Storm Drains

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch Estates
Location: El Paso County, Colorado

MHFD-Rational, Version 3.00 (August 2025)

100-yr Design Storm Return Period (Note: this worksheet can only evaluate one design storm at a time)

Use 1 column (C, D, E) per row

Obtain Inlet Capacity from MHFD-Inlet (Optional)

Design Point	# of Upstream Runoff Sources	Local Subcatchment Name	Upstream Surface Design Point	Upstream Pipe Design Point	Local Subcatchment Runoff				Surface Runoff to Design Point				Inlet Capacity / Bypass Flow			Total Runoff to Design Point			
					Area (ac)	C	t_c (min)	Local Q (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Surface Runoff (cfs)	(Optional) Inlet Name	Inlet Capacity (cfs)	Bypass Flow (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Total Runoff (cfs)
EX1	2								81.02	127.43	1.50	121.43			121.43	81.02	127.43	1.50	121.43
		EX-1			16.42	0.36	55.25	15.90	5.91	55.25	2.69	103.56				5.91	55.25	2.69	103.56
		OF-1			204.29	0.37	127.43	112.58	75.11	127.43	1.50	121.43				75.11	127.43	1.50	121.43
EX4	6								32.32	52.78	2.77	89.65			89.65	32.32	52.78	2.77	89.65
		OF-3			18.51	0.36	37.76	22.92	6.66	37.76	3.44	86.40				6.66	37.76	3.44	86.40
		EX-2			15.87	0.36	52.78	15.85	5.71	52.78	2.77	89.65				5.71	52.78	2.77	89.65
		EX-4			52.09	0.36	59.93	47.80	18.75	59.93	2.55	88.32				18.75	59.93	2.55	88.32
		OF-4			0.96	0.36	34.99	1.25	0.35	34.99	3.60	84.01				0.35	34.99	3.60	84.01
		OF-5			6.21	0.51	54.52	8.56	3.15	54.52	2.72	89.50				3.15	54.52	2.72	89.50
		OP-1			0.04	0.53	5.00	0.18	0.02	5.00	8.55	28.62				0.02	5.00	8.55	28.62
EX3	2								113.18	133.82	1.45	163.68			163.68	113.18	133.82	1.45	163.68
		OF-2			290.54	0.37	133.82	154.64	106.94	133.82	1.45	163.68				106.94	133.82	1.45	163.68
		EX-3			17.35	0.36	45.94	18.98	6.25	45.94	3.04	130.49				6.25	45.94	3.04	130.49
EX5	1								13.03	47.83	2.96	38.56			38.56	13.03	47.83	2.96	38.56
		EX-5			36.19	0.36	47.83	38.56	13.03	47.83	2.96	38.56				13.03	47.83	2.96	38.56

Kimley»Horn

PROPOSED CONDITIONS

Trinity Ranch

DATE: 7/10/2026

PROJECT NUMBER: 096726003

CALCULATED BY: DJS

CHECKED BY: KRK

PROPOSED RATIONAL CALCULATIONS SUMMARY

SUBCATCHMENT NAME	DESIGN POINT	BASIN AREA (AC)	IMPERVIOUSNESS (%)	PEAK FLOWS (CFS)	
				Q5	Q100
PR-1	PR-1	16.17	8.1%	4.05	21.02
PR-2	PR-2	9.55	9.9%	2.98	14.38
PR-3	PR-3	17.72	8.9%	4.98	24.98
PR-4	PR-4	16.42	11.5%	5.99	27.20
PR-5	PR-5	2.08	36.6%	2.00	5.39
PR-6	PR-6	17.78	10.3%	5.49	25.99
PR-7	PR-7	29.21	42.2%	25.51	68.20
PR-8	PR-8	11.31	47.6%	11.76	29.60
PR-9	PR-9	17.68	40.7%	14.37	38.97
OF-1	OF-1	204.29	3.7%	18.45	112.58
OF-2	OF-2	290.54	3.8%	25.46	154.64
OF-3	OF-3	18.51	2.0%	3.41	22.92
OF-4	OF-4	0.96	2.0%	0.19	1.25
OP-1	OP-1	0.04	46.0%	0.08	0.20
OF-5	OF-5	6.21	30.9%	3.01	8.56
OF-6	OF-6	0.14	84.3%	0.42	0.81
CUMMULATIVE FLOWS					
DESGIN POINT	BASINS	TRIBUTARY AREA (AC)	IMPERV. (%)	Q5	Q100
PR1	PR1+OF1	220.46	4.1%	20.30	122.16
PR3	OF2+PR3	308.26	4.1%	27.50	164.88
PR8	OF3+OF4+PR2+PR4 +PR5+PR7+PR8	88.04	24.6%	49.08	155.00
PR9	PR6+PR9	35.46	25.5%	19.19	61.78
OF5	OF5+OP1	6.25	31.0%	3.04	8.63
OF-6	OF-6	0.14	84.3%	0.42	0.81
TOTAL CUMMULATIVE FLOWS		658.62	8.3%	119.53	513.26

Calculation of Peak Runoff using Rational Method

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch
Location: El Paso County, CO

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input
Cells of this color are for optional override values

$t_t = \frac{0.395\,(1.1 - C_5)\sqrt{L_t}}{S_t^{0.33}}$

Computed $t_c = t_i + t_t$

$t_i = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

$t_{c\ minimum}$ = 5 (urban)
$t_{c\ minimum}$ = 10 (non-urban)

Selected $t_c = \max(t_{c\ minimum}, \min(\text{Computed } t_c, \text{Regional } t_c))$

Select MHFD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	0.60	1.19	1.50	1.75	2.00	2.25	2.52	2.91

Rainfall Intensity Equation Coefficients =	a	b	c
	28.50	10.00	0.786

$I\,(in/hr) = \frac{a * P_1}{(b + t_c)^c}$

$Q(cfs) = CIA$

Provide input for area, soil type, and imperviousness on the Runoff Coeffs worksheet.

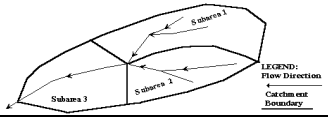
Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group(s)	Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time							Time of Concentration				Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)							
				WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S_t (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	(Optional) Override t_c (min)	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
PR-1	16.17	A	8.1%	0.06	0.13	0.21	0.24	0.29	0.40	0.51	500.00			0.020	31.21	1376.37			0.020	2.5	0.35	64.88	96.10	40.62	40.62		0.78	1.55	1.96	2.28	2.61	2.93	3.29	3.79	0.74	1.48	4.05	7.65	10.01	13.61	21.02	31.00
PR-2	9.55	A	9.9%	0.07	0.14	0.22	0.25	0.30	0.40	0.51	500.00			0.030	26.94	390.24			0.005	7	0.49	13.14	40.08	33.17	33.17		0.89	1.76	2.22	2.59	2.96	3.32	3.72	4.30	0.62	1.22	2.98	5.41	7.03	9.46	14.38	21.10
PR-3	17.72	A	8.9%	0.06	0.13	0.21	0.24	0.29	0.40	0.51	500.00			0.015	34.12	884.52			0.015	7	0.86	17.20	51.32	36.24	36.24		0.84	1.67	2.10	2.45	2.80	3.15	3.53	4.07	0.97	1.92	4.98	9.22	12.03	16.29	24.98	36.75
PR-4	16.42	A	11.5%	0.09	0.15	0.23	0.26	0.31	0.41	0.52	500.00			0.030	26.62	566.64			0.030	2.5	0.43	21.81	48.43	29.19	29.19		0.96	1.90	2.39	2.79	3.19	3.59	4.02	4.64	1.34	2.65	5.99	10.50	13.58	18.12	27.20	39.71
PR-5	2.08	A	36.6%	0.28	0.34	0.39	0.42	0.46	0.54	0.64	16.00			0.020	4.39	1224.91			0.015	10	1.22	16.67	21.06	31.58	21.06		1.15	2.28	2.87	3.35	3.83	4.31	4.82	5.57	0.68	1.34	2.00	2.75	3.38	4.15	5.39	7.41
PR-6	17.78	A	10.3%	0.08	0.14	0.22	0.25	0.30	0.41	0.52	500.00			0.025	28.51	968.52			0.020	2.5	0.35	45.66	74.17	35.17	35.17		0.86	1.70	2.14	2.50	2.85	3.21	3.59	4.15	1.16	2.31	5.49	9.85	12.78	17.16	25.99	38.05
PR-7	29.21	A	42.2%	0.27	0.32	0.38	0.42	0.46	0.51	0.60	500.00			0.030	21.82	731.32			0.030	15	2.60	4.69	26.52	23.55	23.55		1.08	2.14	2.70	3.15	3.60	4.05	4.54	5.24	8.57	17.01	25.51	34.89	44.24	54.24	68.20	91.15
PR-8	11.31	A	47.6%	0.31	0.36	0.41	0.45	0.49	0.54	0.62	500.00			0.015	26.16	530.80			0.040	15	3.00	2.95	29.11	20.73	20.73		1.16	2.30	2.90	3.38	3.86	4.34	4.86	5.62	4.07	8.07	11.76	15.71	19.80	24.03	29.60	39.13
PR-9	17.68	A	40.7%	0.26	0.32	0.37	0.41	0.45	0.51	0.59	500.00			0.015	27.66	880.89			0.022	15	2.22	6.60	34.26	25.82	25.82		1.03	2.04	2.57	2.99	3.42	3.85	4.31	4.98	4.80	9.52	14.37	19.77	25.05	30.79	38.97	52.28
OF-1	204.29	A	3.7%	0.04	0.10	0.18	0.27	0.32	0.37	0.48	500.00	6292.32	6279.32	0.026	29.42	7140.85	6279.09	6171.98	0.015	2.5	0.31	388.70	418.12	127.43	127.43		0.36	0.71	0.89	1.04	1.19	1.34	1.50	1.73	3.07	6.09	18.45	38.34	65.37	87.03	112.58	169.21
OF-2	290.54	A	3.8%	0.04	0.10	0.18	0.27	0.32	0.37	0.48	500.00	6286.17	6260.17	0.052	23.39	7341.73	6260.18	6157.40	0.014	2.5	0.30	413.66	437.05	133.82	133.82		0.34	0.68	0.86	1.00	1.15	1.29	1.45	1.67	4.27	8.48	25.46	52.76	89.85	119.58	154.64	232.41
OF-3	18.51	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	270.00			0.008	32.25	1086.50			0.026	2.5	0.40	44.92	77.18	37.76	37.76		0.82	1.62	2.05	2.39	2.73	3.07	3.44	3.97	0.45	0.90	3.41	7.52	13.14	17.62	22.92	34.55
OF-4	0.96	A	2.0%	0.03	0.09	0.17	0.26	0.31	0.36	0.47	239.00			0.006	33.37	493.00			0.009	2.5	0.24	34.64	68.01	34.99	34.99		0.86	1.70	2.15	2.50	2.86	3.22	3.60	4.16	0.02	0.05	0.19	0.41	0.71	0.96	1.25	1.88
OP-1	0.04	A	46.0%	0.37	0.41	0.46	0.52	0.56	0.59	0.68	16.00			0.020	3.96	30.00			0.010	20	2.00	0.25	4.21	18.50	5.00		2.04	4.04	5.09	5.94	6.78	7.63	8.55	9.87	0.03	0.06	0.08	0.11	0.14	0.17	0.20	0.27
OF-5	6.21	A	30.9%	0.25	0.30	0.36	0.43	0.47	0.51	0.61	20.00			0.020	5.14	4444.00			0.010	15	1.50	49.38	54.52	76.32	54.52		0.65	1.28	1.62	1.89	2.16	2.42	2.72	3.14	1.02	2.02	3.01	4.22	5.77	7.09	8.56	11.84
OF-6	0.14	A	84.3%	0.63	0.65	0.68	0.71	0.73	0.75	0.87	116.00			0.020	6.96	1.00			0.010	20	2.00	0.01	6.97	11.68	6.97		1.85	3.66	4.62	5.39	6.16	6.93	7.76	8.96	0.16	0.32	0.42	0.51	0.61	0.71	0.81	1.09

Determination of Runoff Coefficients for Rational Method

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch
Location: El Paso County, CO

MHFD-Rational, Version 3.00 (August 2025)

Cells of this color are for required user-input
Cells of this color are for optional override values



Provide subcatchment names on the Rational Calcs worksheet to open up the table below.

Subcatchment Name	# of Subareas	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness				Runoff Coefficient, C							(Optional) Override Runoff Coefficient, C							Comments
				Imperviousness Source	Imperviousness Category	Calculated Imperviousness	(Optional) Override Imperviousness	WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	WQE & 2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	
PR-1	3	16.17	A			35.8%	8.1%	0.04	0.04	0.04	0.05	0.09	0.17	0.31	0.06	0.13	0.21	0.24	0.29	0.40	0.51	
		0.20	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.02	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		15.95	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
PR-2	3	9.55	A			37.1%	9.9%	0.05	0.05	0.06	0.07	0.11	0.19	0.32	0.07	0.14	0.22	0.25	0.30	0.40	0.51	
		0.29	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.05	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		9.21	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
PR-3	3	17.72	A			36.4%	8.9%	0.04	0.05	0.05	0.06	0.10	0.18	0.31	0.06	0.13	0.21	0.24	0.29	0.40	0.51	
		0.37	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.04	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		17.31	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
PR-4	3	16.42	A			38.2%	11.5%	0.06	0.07	0.07	0.08	0.12	0.20	0.33	0.09	0.15	0.23	0.26	0.31	0.41	0.52	
		0.78	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.12	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		15.52	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
PR-5	3	2.08	A			56.1%	36.6%	0.28	0.29	0.29	0.31	0.34	0.40	0.49	0.28	0.34	0.39	0.42	0.46	0.54	0.64	
		0.68	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.07	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		1.33	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
PR-6	3	17.78	A			37.4%	10.3%	0.05	0.06	0.06	0.07	0.11	0.19	0.32	0.08	0.14	0.22	0.25	0.30	0.41	0.52	
		0.68	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.04	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		17.06	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
PR-7	4	29.21	A			53.6%	42.2%	0.30	0.31	0.33	0.35	0.39	0.44	0.53	0.27	0.32	0.38	0.42	0.46	0.51	0.60	
		0.63	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.10	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		11.80	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
		16.68	A	Land Use	Commercial - Low Density	65%		0.48	0.50	0.51	0.54	0.58	0.62	0.67	0.41	0.45	0.49	0.54	0.57	0.59	0.65	
PR-8	4	11.31	A			57.0%	47.6%	0.35	0.36	0.37	0.40	0.43	0.48	0.56	0.31	0.36	0.41	0.45	0.49	0.54	0.62	
		0.64	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.06	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		3.68	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
		6.93	A	Land Use	Commercial - Low Density	65%		0.48	0.50	0.51	0.54	0.58	0.62	0.67	0.41	0.45	0.49	0.54	0.57	0.59	0.65	
PR-9	4	17.68	A			53.1%	40.7%	0.29	0.30	0.31	0.34	0.37	0.43	0.52	0.26	0.32	0.37	0.41	0.45	0.51	0.59	
		0.64	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.04	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		7.70	A	Land Use	Single-Family - Rural	35%	7%	0.03	0.03	0.03	0.04	0.08	0.16	0.30	0.05	0.12	0.20	0.23	0.28	0.39	0.50	
		9.30	A	Land Use	Commercial - Low Density	65%		0.48	0.50	0.51	0.54	0.58	0.62	0.67	0.41	0.45	0.49	0.54	0.57	0.59	0.65	
OF-1	3	204.29	A			6.7%	3.7%	0.02	0.02	0.02	0.03	0.06	0.14	0.28	0.04	0.10	0.18	0.27	0.32	0.37	0.48	
		3.94	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		0.51	A	Surface Type	Roofs	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		199.84	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-2	3	290.54	A			6.8%	3.8%	0.02	0.02	0.02	0.03	0.06	0.14	0.28	0.04	0.10	0.18	0.27	0.32	0.37	0.48	
		6.01	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	
		0.66	A	Surface Type	Roofs	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		283.87	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-3	1	18.51	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		18.51	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-4	1	0.96	A			5.0%	2.0%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
		0.96	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OP-1	2	0.04	A			50.0%	46.0%	0.37	0.38	0.39	0.40	0.42	0.47	0.55	0.37	0.41	0.46	0.52	0.56	0.59	0.68	
		0.02	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.02	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-5	2	6.21	A			34.6%	30.9%	0.24	0.25	0.26	0.27	0.29	0.35	0.45	0.25	0.30	0.36	0.43	0.47	0.51	0.61	
		2.04	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		4.17	A	Surface Type	Historic Flow Analysis	5%	2%	0.01	0.01	0.01	0.01	0.04	0.13	0.27	0.03	0.09	0.17	0.26	0.31	0.36	0.47	
OF-6	2	0.14	A			86.4%	84.3%	0.67	0.69	0.71	0.73	0.74	0.77	0.80	0.63	0.65	0.68	0.71	0.73	0.75	0.87	
		0.06	A	Surface Type	Roadways and Paved Streets	95%	90%	0.73	0.75	0.77	0.79	0.79	0.81	0.83	0.71	0.73	0.75	0.78	0.80	0.81	0.89	
		0.08	A	Surface Type	Gravel - High Traffic Areas	80%		0.63	0.65	0.66	0.69	0.71	0.73	0.77	0.57	0.59	0.63	0.66	0.68	0.70	0.86	

Combined Peak Runoff Calculations for Inlets and Storm Drains

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch
Location: El Paso County, CO

MHFD-Rational, Version 3.00 (August 2025)

5-yr Design Storm Return Period (Note: this worksheet can only evaluate one design storm at a time)

Use 1 column (C, D, E) per row

Obtain Inlet Capacity from MHFD-Inlet (Optional)

Design Point	# of Upstream Runoff Sources	Local Subcatchment Name	Upstream Surface Design Point	Upstream Pipe Design Point	Local Subcatchment Runoff				Surface Runoff to Design Point				Inlet Capacity / Bypass Flow			Total Runoff to Design Point			
					Area (ac)	C	t_c (min)	Local Q (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Surface Runoff (cfs)	(Optional) Inlet Name	Inlet Capacity (cfs)	Bypass Flow (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Total Runoff (cfs)
PR1	2								22.75	127.43	0.89	20.30		0.00	20.30	22.75	127.43	0.89	20.30
		OF-1			204.29	0.10	127.43	18.45	20.68	127.43	0.89	20.30				20.68	127.43	0.89	20.30
		PR-1			16.17	0.13	40.62	4.05	2.07	40.62	1.96	16.95				2.07	40.62	1.96	16.95
PR2	2								2.81	33.17	2.22	6.23	PR2	36.20	0.00	2.81	33.17	2.22	6.23
		OF-3			18.51	0.09	37.76	3.41	1.67	37.76	2.05	6.17				1.67	37.76	2.05	6.17
		PR-2			9.55	0.14	33.17	2.98	1.35	33.17	2.22	6.23				1.35	33.17	2.22	6.23
PR4	2								2.50	29.19	2.39	5.99	PR4	30.00	0.00	4.97	29.19	2.39	11.88
		PR-4			16.42	0.15	29.19	5.99	2.50	29.19	2.39	5.99				2.50	29.19	2.39	11.88
				PR2												2.81	33.29	2.21	11.75
PR5	1								0.70	21.06	2.87	2.00	PR5	10.00	0.00	0.70	21.06	2.87	2.00
		PR-5			2.08	0.34	21.06	2.00	0.70	21.06	2.87	2.00				0.70	21.06	2.87	2.00
PR6	1								2.57	35.17	2.14	5.49	PR6	26.00	0.00	2.57	35.17	2.14	5.49
		PR-6			17.78	0.14	35.17	5.49	2.57	35.17	2.14	5.49				2.57	35.17	2.14	5.49
PR7	1								9.44	23.55	2.70	25.51	PR7	70.00	0.00	9.44	23.55	2.70	25.51
		PR-7			29.21	0.32	23.55	25.51	9.44	23.55	2.70	25.51				9.44	23.55	2.70	25.51
PR8	4								4.06	20.73	2.90	11.76		200.00	0.00	18.21	23.66	2.70	49.08
		PR-8			11.31	0.36	20.73	11.76	4.06	20.73	2.90	11.76				4.06	20.73	2.90	47.84
				PR4												4.97	29.33	2.38	45.71
				PR5												0.70	21.27	2.86	48.12
				PR7												9.44	23.66	2.70	49.08
PR9	2								5.60	25.82	2.57	14.37			14.37	7.48	25.82	2.57	19.19
		PR-9			17.68	0.32	25.82	14.37	5.60	25.82	2.57	14.37				5.60	25.82	2.57	19.19
				PR6												2.57	35.30	2.13	17.43
PR3	2								31.95	133.82	0.86	27.50			27.50	31.95	133.82	0.86	27.50
		OF-2			290.54	0.10	133.82	25.46	29.58	133.82	0.86	27.50				29.58	133.82	0.86	27.50
		PR-3			17.72	0.13	36.24	4.98	2.37	36.24	2.10	21.80				2.37	36.24	2.10	21.80
OF5	2								1.88	54.52	1.62	3.04	OF5	10.00	0.00	1.88	54.52	1.62	3.04
		OF-5			6.21	0.30	54.52	3.01	1.86	54.52	1.62	3.04				1.86	54.52	1.62	3.04
		OP-1			0.04	0.41	5.00	0.08	0.02	5.00	5.09	0.95				0.02	5.00	5.09	0.95

Combined Peak Runoff Calculations for Inlets and Storm Drains

Designer: DJS
Company: Kimley-Horn
Date: 7/29/2026
Project: Trinity Ranch
Location: El Paso County, CO

MHFD-Rational, Version 3.00 (August 2025)

100-yr Design Storm Return Period (Note: this worksheet can only evaluate one design storm at a time)

Use 1 column (C, D, E) per row

Obtain Inlet Capacity from MHFD-Inlet (Optional)

Design Point	# of Upstream Runoff Sources	Local Subcatchment Name	Upstream Surface Design Point	Upstream Pipe Design Point	Local Subcatchment Runoff				Surface Runoff to Design Point				Inlet Capacity / Bypass Flow			Total Runoff to Design Point			
					Area (ac)	C	t_c (min)	Local Q (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Surface Runoff (cfs)	(Optional) Inlet Name	Inlet Capacity (cfs)	Bypass Flow (cfs)	Σ(C*A) (acre)	t_c (min)	Intensity (in/hr)	Total Runoff (cfs)
PR1	2								81.51	127.43	1.50	122.16		0.00	122.16	81.51	127.43	1.50	122.16
		OF-1			204.29	0.37	127.43	112.58	75.11	127.43	1.50	122.16				75.11	127.43	1.50	122.16
		PR-1			16.17	0.40	40.62	21.02	6.40	40.62	3.29	99.70				6.40	40.62	3.29	99.70
PR2	2								10.53	37.76	3.44	36.20	PR2	36.20	0.00	10.53	37.76	3.44	36.20
		OF-3			18.51	0.36	37.76	22.92	6.66	37.76	3.44	36.20				6.66	37.76	3.44	36.20
		PR-2			9.55	0.40	33.17	14.38	3.86	33.17	3.72	36.18				3.86	33.17	3.72	36.18
PR4	2								6.77	29.19	4.02	27.20	PR4	30.00	0.00	14.88	29.19	4.02	59.78
		PR-4			16.42	0.41	29.19	27.20	6.77	29.19	4.02	27.20				6.77	29.19	4.02	59.78
				PR2												10.52	37.88	3.43	59.36
PR5	1								1.12	21.06	4.82	5.39	PR5	10.00	0.00	1.12	21.06	4.82	5.39
		PR-5			2.08	0.54	21.06	5.39	1.12	21.06	4.82	5.39				1.12	21.06	4.82	5.39
PR6	1								7.23	35.17	3.59	25.99	PR6	26.00	0.00	7.23	35.17	3.59	25.99
		PR-6			17.78	0.41	35.17	25.99	7.23	35.17	3.59	25.99				7.23	35.17	3.59	25.99
PR7	1								15.02	23.55	4.54	68.20	PR7	70.00	0.00	15.02	23.55	4.54	68.20
		PR-7			29.21	0.51	23.55	68.20	15.02	23.55	4.54	68.20				15.02	23.55	4.54	68.20
PR8	4								6.08	20.73	4.86	29.60		200.00	0.00	34.23	23.66	4.53	155.00
		PR-8			11.31	0.54	20.73	29.60	6.08	20.73	4.86	29.60				6.08	20.73	4.86	150.08
				PR4												14.88	29.33	4.01	148.67
				PR5												1.12	21.27	4.80	151.15
				PR7												15.02	23.66	4.53	155.00
PR9	2								9.04	25.82	4.31	38.97			38.97	14.33	25.82	4.31	61.78
		PR-9			17.68	0.51	25.82	38.97	9.04	25.82	4.31	38.97				9.04	25.82	4.31	61.78
				PR6												7.23	35.30	3.59	58.33
PR3	2								114.02	133.82	1.45	164.88			164.88	114.02	133.82	1.45	164.88
		OF-2			290.54	0.37	133.82	154.64	106.94	133.82	1.45	164.88				106.94	133.82	1.45	164.88
		PR-3			17.72	0.40	36.24	24.98	7.08	36.24	3.53	127.14				7.08	36.24	3.53	127.14
OF5	2								3.18	54.52	2.72	8.63	OF5	10.00	0.00	3.18	54.52	2.72	8.63
		OF-5			6.21	0.51	54.52	8.56	3.15	54.52	2.72	8.63				3.15	54.52	2.72	8.63
		OP-1			0.04	0.59	5.00	0.20	0.02	5.00	8.55	2.67				0.02	5.00	8.55	2.67

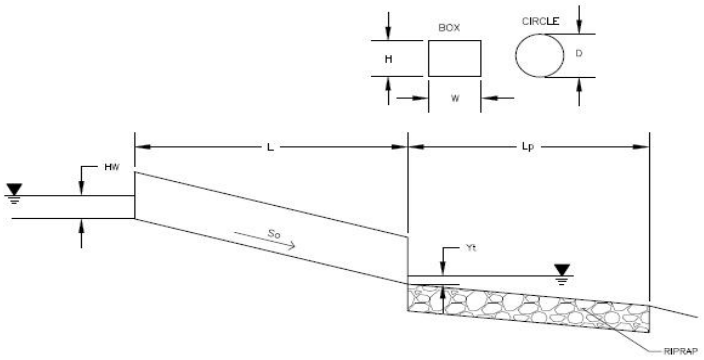
APPENDIX D: HYDRUALICS

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.01 (April 2025)

Project: Trinity Ranch Estates - PDR

ID: P4



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

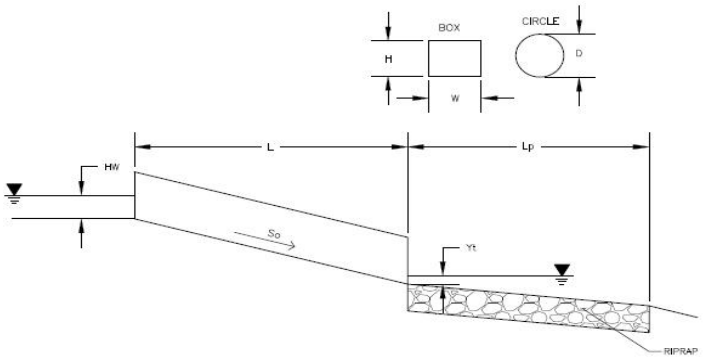
Design Information:			
Design Discharge	Q =	59.78	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	30	inches
Inlet Edge Type (Choose from pull-down list)		Beveled Edge (1:1)	
OR:			
Box Culvert:		OR	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	2	
Inlet Elevation	Elev IN =	6145.12	ft
Outlet Elevation OR Slope	So =	0.005	ft/ft
Culvert Length	L =	79	ft
Manning's Roughness	n =	0.013	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	7	ft/s
Calculated Results:			
Culvert Cross Sectional Area Available	A =	4.91	ft^2
Culvert Normal Depth	Y_n =	2.12	ft
Culvert Critical Depth	Y_c =	1.86	ft
Froude Number	Fr =	0.76	
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	0.72	
Sum of All Loss Coefficients	k_s =	1.92	ft
Headwater:			
Inlet Control Headwater	HW_I =	2.99	ft
Outlet Control Headwater	HW_O =	2.89	ft
Design Headwater Elevation	HW =	6148.11	ft
Headwater/Diameter OR Headwater/Rise Ratio	HW/D =	1.20	
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	3.02	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	1.00	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	4.36	
Flow Area at Max Channel Velocity	A_t =	8.54	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	5.00	ft
Length of Riprap Protection	L_p =	16	ft
Width of Riprap Protection at Downstream End	T =	9	ft
Adjusted Diameter for Supercritical Flow	Da =	-	ft
Minimum Theoretical Riprap Size	d_{50} min=	6	in
Nominal Riprap Size	d_{50} nominal=	9	in
MHFD Riprap Type	Type =	L	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.01 (April 2025)

Project: Trinity Ranch Estates - PDR

ID: P5



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

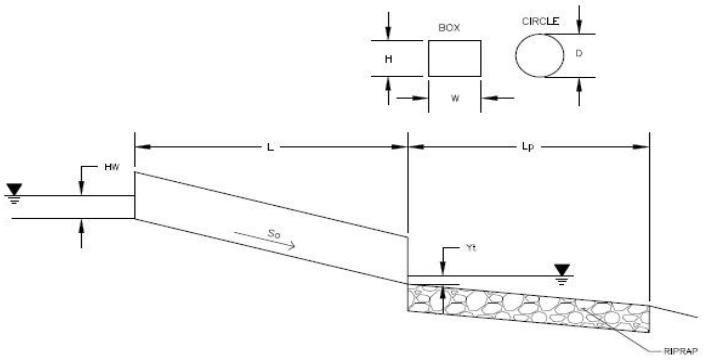
Design Information:			
Design Discharge	Q =	5.39	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	16	inches
Inlet Edge Type (Choose from pull-down list)		Beveled Edge (1:1)	
OR:			
Box Culvert:		OR	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	6148	ft
Outlet Elevation OR Slope	So =	0.005	ft/ft
Culvert Length	L =	49	ft
Manning's Roughness	n =	0.013	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	7	ft/s
Calculated Results:			
Culvert Cross Sectional Area Available	A =	1.40	ft^2
Culvert Normal Depth	Y_n =	1.08	ft
Culvert Critical Depth	Y_c =	0.93	ft
Froude Number	Fr =	0.73	
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	1.04	
Sum of All Loss Coefficients	k_s =	2.24	ft
Headwater:			
Inlet Control Headwater	HW_I =	1.42	ft
Outlet Control Headwater	HW_O =	1.40	ft
Design Headwater Elevation	HW =	6149.42	ft
Headwater/Diameter OR Headwater/Rise Ratio	HW/D =	1.07	
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	2.63	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	0.53	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	4.89	
Flow Area at Max Channel Velocity	A_t =	0.77	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	L_p =	4	ft
Width of Riprap Protection at Downstream End	T =	3	ft
Adjusted Diameter for Supercritical Flow	Da =	-	ft
Minimum Theoretical Riprap Size	d_{50} min =	3	in
Nominal Riprap Size	d_{50} nominal =	6	in
MHFD Riprap Type	Type =	VL	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.01 (April 2025)

Project: Trinity Ranch Estates - PDR

ID: P6



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

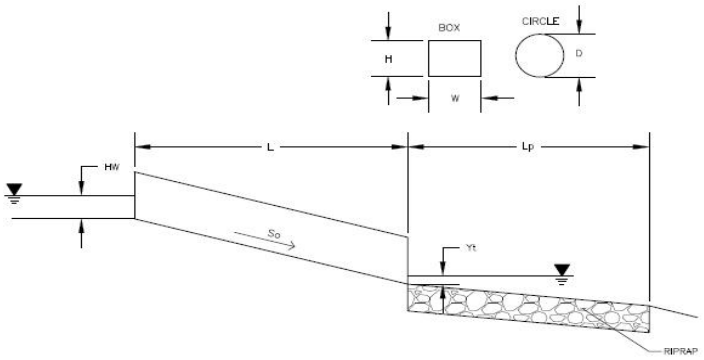
Design Information:				
	Design Discharge	Q =	25.99	cfs
Circular Culvert:				
	Barrel Diameter in Inches	D =	30	inches
	Inlet Edge Type (Choose from pull-down list)		Beveled Edge (1:1)	
OR:				
Box Culvert:			OR	
	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	1	
	Inlet Elevation	Elev IN =	6133.3	ft
	Outlet Elevation OR Slope	So =	0.005	ft/ft
	Culvert Length	L =	49	ft
	Manning's Roughness	n =	0.013	
	Bend Loss Coefficient	k_b =	0	
	Exit Loss Coefficient	k_x =	1	
	Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
	Max Allowable Channel Velocity	V =	7	ft/s
Calculated Results:				
	Culvert Cross Sectional Area Available	A =	4.91	ft^2
	Culvert Normal Depth	Y_n =	1.84	ft
	Culvert Critical Depth	Y_c =	1.74	ft
	Froude Number	Fr =	0.89	
	Entrance Loss Coefficient	k_e =	0.20	
	Friction Loss Coefficient	k_f =	0.45	
	Sum of All Loss Coefficients	k_s =	1.65	ft
Headwater:				
	Inlet Control Headwater	HW_I =	2.67	ft
	Outlet Control Headwater	HW_O =	2.59	ft
	Design Headwater Elevation	HW =	6135.97	ft
	Headwater/Diameter OR Headwater/Rise Ratio	HW/D =	1.07	
Outlet Protection:				
	Flow/(Diameter^2.5)	Q/D^2.5 =	2.63	$ft^{0.5}/s$
	Tailwater Surface Height	Y_t =	1.00	ft
	Tailwater/Diameter	Yt/D =	0.40	
	Expansion Factor	1/(2*tan(Θ)) =	4.88	
	Flow Area at Max Channel Velocity	A_t =	3.71	ft^2
	Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
	Length of Riprap Protection	L_p =	8	ft
	Width of Riprap Protection at Downstream End	T =	5	ft
	Adjusted Diameter for Supercritical Flow	Da =	-	ft
	Minimum Theoretical Riprap Size	d_{50} min=	5	in
	Nominal Riprap Size	d_{50} nominal=	6	in
	MHFD Riprap Type	Type =	VL	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.01 (April 2025)

Project: Trinity Ranch Estates - PDR

ID: P7



Soil Type:
Choose One:
○ Sandy
◉ Non-Sandy

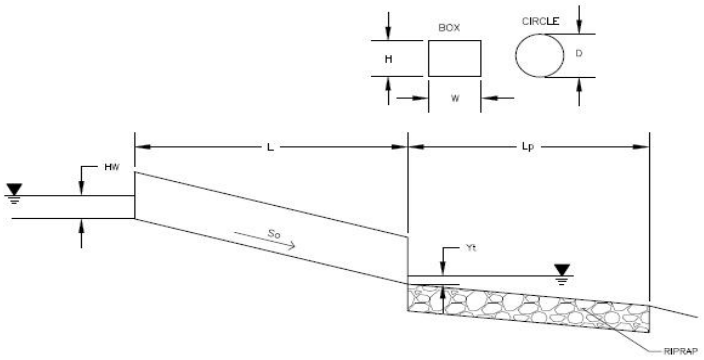
Design Information:				
	Design Discharge	Q =	69.25	cfs
Circular Culvert:				
	Barrel Diameter in Inches	D =	30	inches
	Inlet Edge Type (Choose from pull-down list)		Beveled Edge (1:1)	
	OR:			
Box Culvert:			OR	
	Barrel Height (Rise) in Feet	H (Rise) =		ft
	Barrel Width (Span) in Feet	W (Span) =		ft
	Inlet Edge Type (Choose from pull-down list)			
	Number of Barrels	# Barrels =	2	
	Inlet Elevation	Elev IN =	6132	ft
	Outlet Elevation OR Slope	So =	0.005	ft/ft
	Culvert Length	L =	60	ft
	Manning's Roughness	n =	0.013	
	Bend Loss Coefficient	k_b =	0	
	Exit Loss Coefficient	k_x =	1	
	Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
	Max Allowable Channel Velocity	V =	7	ft/s
Calculated Results:				
	Culvert Cross Sectional Area Available	A =	4.91	ft^2
	Culvert Normal Depth	Y_n =	2.50	ft
	Culvert Critical Depth	Y_c =	2.00	ft
	Froude Number	Fr =	-	Pressure flow!
	Entrance Loss Coefficient	k_e =	0.20	
	Friction Loss Coefficient	k_f =	0.55	
	Sum of All Loss Coefficients	k_s =	1.75	ft
Headwater:				
	Inlet Control Headwater	HW_I =	3.44	ft
	Outlet Control Headwater	HW_O =	3.30	ft
	Design Headwater Elevation	HW =	6135.44	ft
	Headwater/Diameter OR Headwater/Rise Ratio	HW/D =	1.37	
Outlet Protection:				
	Flow/(Diameter^2.5)	Q/D^2.5 =	3.50	$ft^{0.5}/s$
	Tailwater Surface Height	Y_t =	1.00	ft
	Tailwater/Diameter	Yt/D =	0.40	
	Expansion Factor	1/(2*tan(Θ)) =	3.94	
	Flow Area at Max Channel Velocity	A_t =	9.89	ft^2
	Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	5.00	ft
	Length of Riprap Protection	L_p =	20	ft
	Width of Riprap Protection at Downstream End	T =	11	ft
	Adjusted Diameter for Supercritical Flow	Da =	-	ft
	Minimum Theoretical Riprap Size	d_{50} min=	7	in
	Nominal Riprap Size	d_{50} nominal=	9	in
	MHFD Riprap Type	Type =	L	

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.01 (April 2025)

Project: Trinity Ranch - PDR

ID: Bypass Culvert - HWY 94 Ditch



Soil Type:
Choose One:
(●) Sandy
( ) Non-Sandy

Supercritical Flow! Using Adjusted Diameter to calculate protection type.

Design Information:

Design Discharge	Q =	8.76	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	18	inches
Inlet Edge Type (Choose from pull-down list)		Beveled Edge (1:1)	
OR:			
Box Culvert:		OR	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	6132.7	ft
Outlet Elevation OR Slope	Elev OUT =	6132	ft
Culvert Length	L =	44	ft
Manning's Roughness	n =	0.013	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	7	ft/s

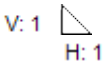
Calculated Results:

Culvert Cross Sectional Area Available	A =	1.77	ft^2
Culvert Normal Depth	Y_n =	0.89	ft
Culvert Critical Depth	Y_c =	1.15	ft
Froude Number	Fr =	1.64	Supercritical!
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	0.80	
Sum of All Loss Coefficients	k_s =	2.00	ft
Headwater:			
Inlet Control Headwater	HW_I =	1.87	ft
Outlet Control Headwater	HW_O =	1.38	ft
Design Headwater Elevation	HW =	6134.57	ft
Headwater/Diameter OR Headwater/Rise Ratio	HW/D =	1.24	
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	3.18	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	0.60	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	4.22	
Flow Area at Max Channel Velocity	A_t =	1.25	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	L_p =	5	ft
Width of Riprap Protection at Downstream End	T =	3	ft
Adjusted Diameter for Supercritical Flow	Da =	1.19	ft
Minimum Theoretical Riprap Size	d_{50} min=	4	in
Nominal Riprap Size	d_{50} nominal=	6	in
MHFD Riprap Type	Type =	VL	

Cross Section for Triangular Channel - 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.030	
Channel Slope	0.002	ft/ft
Normal Depth	11.8	in
Left Side Slope	50.000	H:V
Right Side Slope	4.000	H:V
Discharge	36.00	cfs

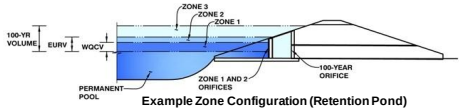


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)

Project: Trinity Ranch Estates - **EG**

Basin ID: TSB 1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	88.04	acres
Watershed Length =	3,705	ft
Watershed Length to Centroid =	1,853	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	24.63%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.980	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	2.051	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.368	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.925	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	2.420	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	3.843	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	5.181	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	6.990	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	10.915	acre-feet		inches
Approximate 2-yr Detention Volume =	1.278	acre-feet		
Approximate 5-yr Detention Volume =	1.714	acre-feet		
Approximate 10-yr Detention Volume =	2.162	acre-feet		
Approximate 25-yr Detention Volume =	2.766	acre-feet		
Approximate 50-yr Detention Volume =	3.256	acre-feet		
Approximate 100-yr Detention Volume =	4.128	acre-feet		

Define Zones and Basin Geometry

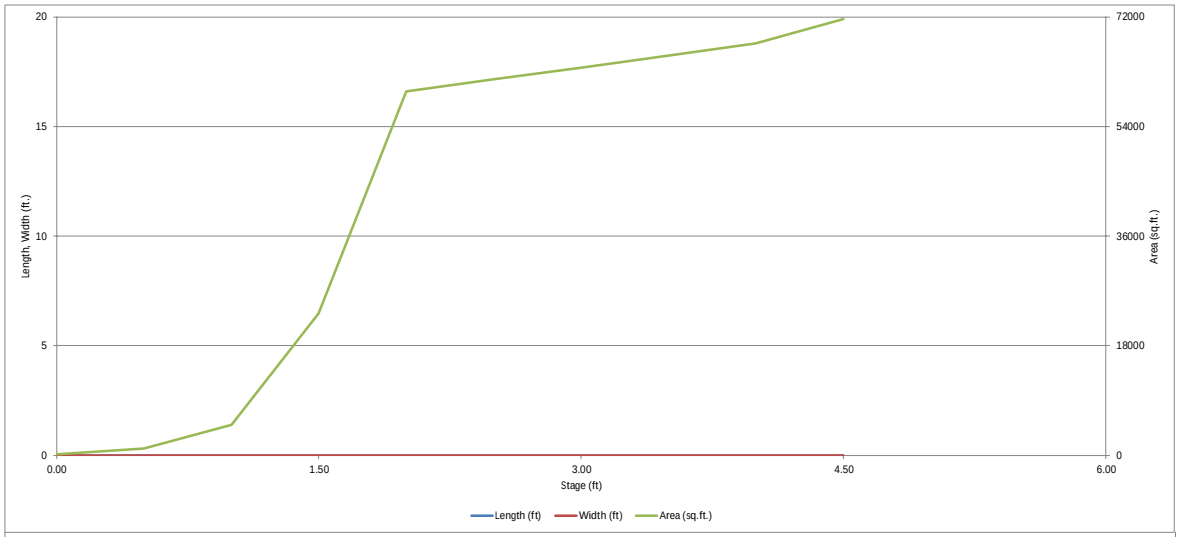
Zone 1 Volume (User Defined) =	0.542	acre-feet	WQCV not provided!
Select Zone 2 Storage Volume (Optional) =		acre-feet	Total detention
Select Zone 3 Storage Volume (Optional) =		acre-feet	volume is less than
Total Detention Basin Volume =	0.542	acre-feet	100-year volume.
Initial Surcharge Volume (ISV) =	user	ft^3	
Initial Surcharge Depth (ISD) =	user	ft	
Total Available Detention Depth (H_{total}) =	user	ft	
Depth of Trickle Channel (H_{TC}) =	user	ft	
Slope of Trickle Channel (S_{TC}) =	user	ft/ft	
Slopes of Main Basin Sides (S_{main}) =	user	H:V	
Basin Length-to-Width Ratio (R_{LW}) =	user		
Initial Surcharge Area (A_{ISV}) =	user	ft^2	
Surcharge Volume Length (L_{ISV}) =	user	ft	
Surcharge Volume Width (W_{ISV}) =	user	ft	
Depth of Basin Floor (H_{FLOOR}) =	user	ft	
Length of Basin Floor (L_{FLOOR}) =	user	ft	
Width of Basin Floor (W_{FLOOR}) =	user	ft	
Area of Basin Floor (A_{FLOOR}) =	user	ft^2	
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3	
Depth of Main Basin (H_{MAIN}) =	user	ft	
Length of Main Basin (L_{MAIN}) =	user	ft	
Width of Main Basin (W_{MAIN}) =	user	ft	
Area of Main Basin (A_{MAIN}) =	user	ft^2	
Volume of Main Basin (V_{MAIN}) =	user	ft^3	
Calculated Total Basin Volume (V_{total}) =	user	acre-feet	

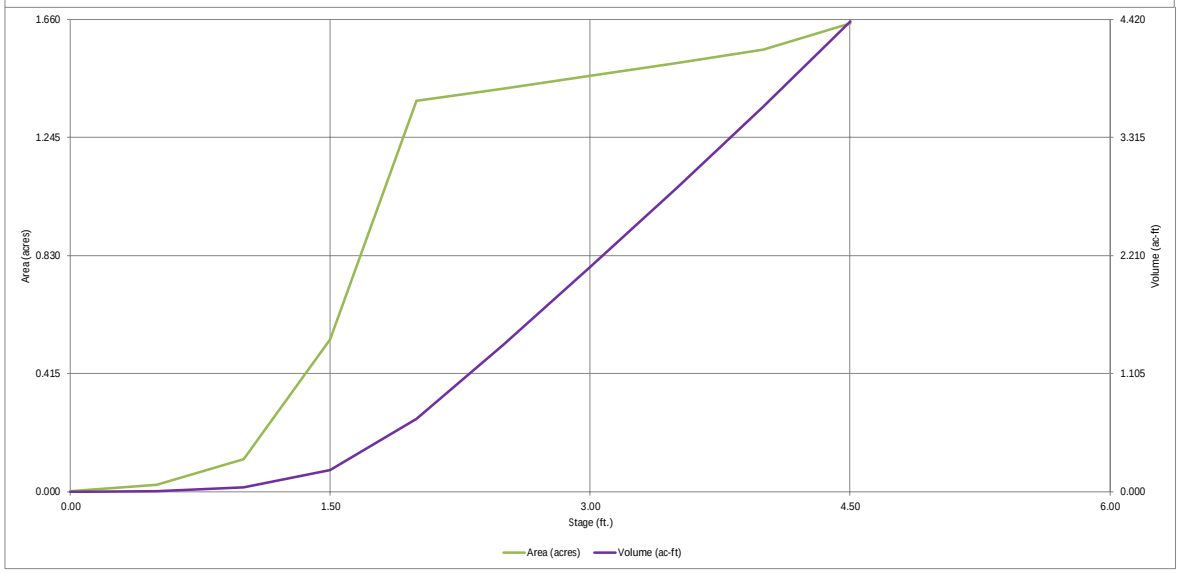
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	150	0.003		
6131	--	0.50	--	--	--	1,040	0.024	297	0.007
6131.5	--	1.00	--	--	--	5,004	0.115	1,808	0.042
6132	--	1.50	--	--	--	23,300	0.535	8,884	0.204
6132.5	--	2.00	--	--	--	59,809	1.373	29,661	0.681
6133	--	2.50	--	--	--	61,750	1.418	60,051	1.379
6133.5	--	3.00	--	--	--	63,704	1.462	91,415	2.099
6134	--	3.50	--	--	--	65,627	1.507	123,747	2.841
6134.5	--	4.00	--	--	--	67,632	1.553	157,062	3.606
6135	--	4.50	--	--	--	71,722	1.647	191,901	4.405

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)



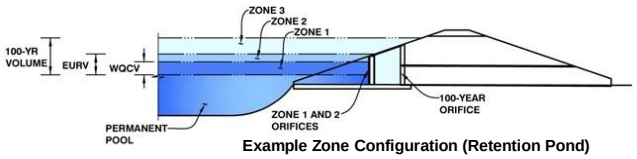


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)

Project: Trinity Ranch Estates - EG

Basin ID: TSB 1



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (User)	1.90	0.542	Orifice Plate
Zone 2			
Zone 3			
Total (all zones)		0.542	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration SCM)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft²
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation SCM)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft²
Depth at top of Zone using Orifice Plate =	1.25	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft²

Specify these orifice elevations in GEC plan

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.10	0.55	0.90					
Orifice Area (sq. inches)	1.48	1.48	1.48					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected		Not Selected	Not Selected
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	
Vertical Orifice Diameter =			inches		

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Not Selected	Not Selected		Not Selected	Not Selected
Overflow Weir Front Edge Height, Ho =			ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	
Overflow Weir Front Edge Length =			feet	Overflow Weir Slope Length =	
Overflow Weir Grate Slope =			H:V	Grate Open Area / 100-yr Orifice Area =	
Horiz. Length of Weir Sides =			feet	Overflow Grate Open Area w/o Debris =	
Overflow Grate Type =				Overflow Grate Open Area w/ Debris =	
Debris Clogging % =			%		

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected		Not Selected	Not Selected
Depth to Invert of Outlet Pipe =			ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	
Circular Orifice Diameter =			inches	Outlet Orifice Centroid =	
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=		ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	feet
Spillway Crest Length =		feet	Stage at Top of Freeboard =	feet
Spillway End Slopes =		H:V	Basin Area at Top of Freeboard =	acres
Freeboard above Max Water Surface =		feet	Basin Volume at Top of Freeboard =	acre-ft

Add spillway dimensions.

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.980	2.051	1.368	1.925	2.420	3.843	5.181	6.990
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.368	1.925	2.420	3.843	5.181	6.990
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.3	2.4	3.3	14.7	26.9	43.0
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.03	0.04	0.17	0.31	0.49
Peak Inflow Q (cfs) =	N/A	N/A	11.6	16.5	20.7	36.7	50.7	69.3
Peak Outflow Q (cfs) =	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.1	0.0	0.0	0.0
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Plate	N/A	N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	72	>120	94	>120	>120	>120	>120	>120
Time to Drain 99% of Inflow Volume (hours) =	76	>120	99	>120	>120	>120	>120	>120
Maximum Ponding Depth (ft) =	2.22	2.97	2.45	2.84	3.17	4.10	4.50	4.50
Area at Maximum Ponding Depth (acres) =	1.39	1.46	1.41	1.45	1.48	1.57	1.65	1.65
Maximum Volume Stored (acre-ft) =	0.985	2.055	1.308	1.851	2.348	3.762	4.405	4.405

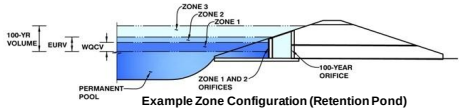
Since the TSBs will be left in during the final condition they should meet the drain time requirements indicated in Senate Bill 15-212. Please revise accordingly.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)

Project: Trinity Ranch Estates - EG

Basin ID: TSB 2



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	35.46	acres
Watershed Length =	2,280	ft
Watershed Length to Centroid =	1,140	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	25.47%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.403	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.862	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.579	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.812	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	1.016	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	1.593	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	2.134	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	2.863	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	4.445	acre-feet	inches
Approximate 2-yr Detention Volume =	0.538	acre-feet	
Approximate 5-yr Detention Volume =	0.721	acre-feet	
Approximate 10-yr Detention Volume =	0.908	acre-feet	
Approximate 25-yr Detention Volume =	1.159	acre-feet	
Approximate 50-yr Detention Volume =	1.360	acre-feet	
Approximate 100-yr Detention Volume =	1.712	acre-feet	

Define Zones and Basin Geometry

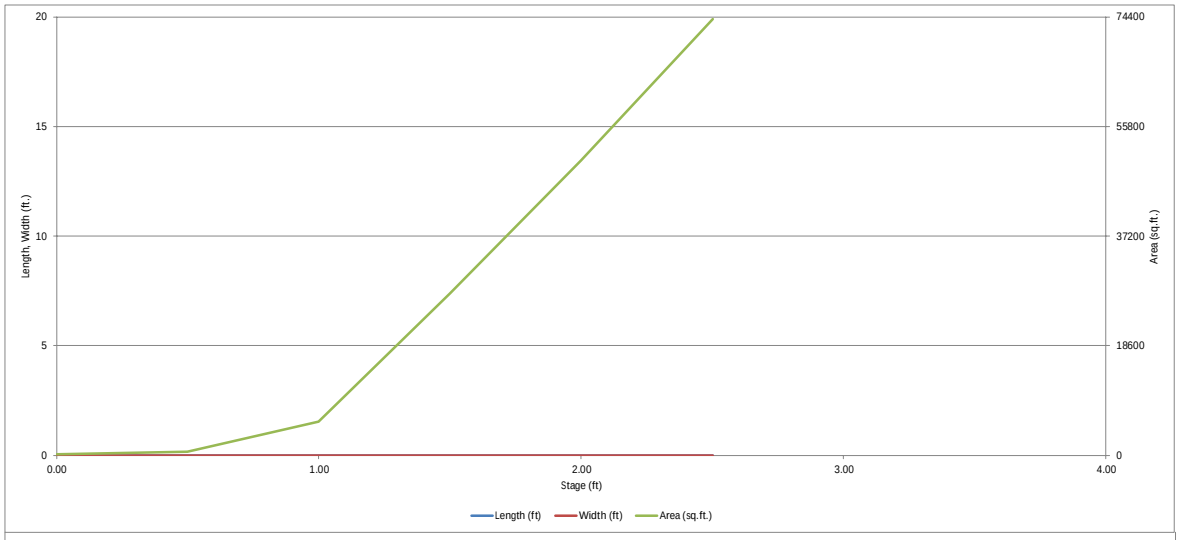
Zone 1 Volume (User Defined) =	0.284	acre-feet	WQCV not provided!
Select Zone 2 Storage Volume (Optional) =		acre-feet	Total detention
Select Zone 3 Storage Volume (Optional) =		acre-feet	volume is less than
Total Detention Basin Volume =	0.284	acre-feet	100-year volume.
Initial Surcharge Volume (ISV) =	user	ft^3	
Initial Surcharge Depth (ISD) =	user	ft	
Total Available Detention Depth (H_{total}) =	user	ft	
Depth of Trickle Channel (H_{TC}) =	user	ft	
Slope of Trickle Channel (S_{TC}) =	user	ft/ft	
Slopes of Main Basin Sides (S_{main}) =	user	H:V	
Basin Length-to-Width Ratio (R_{LW}) =	user		
Initial Surcharge Area (A_{ISV}) =	user	ft^2	
Surcharge Volume Length (L_{ISV}) =	user	ft	
Surcharge Volume Width (W_{ISV}) =	user	ft	
Depth of Basin Floor (H_{FLOOR}) =	user	ft	
Length of Basin Floor (L_{FLOOR}) =	user	ft	
Width of Basin Floor (W_{FLOOR}) =	user	ft	
Area of Basin Floor (A_{FLOOR}) =	user	ft^2	
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3	
Depth of Main Basin (H_{MAIN}) =	user	ft	
Length of Main Basin (L_{MAIN}) =	user	ft	
Width of Main Basin (W_{MAIN}) =	user	ft	
Area of Main Basin (A_{MAIN}) =	user	ft^2	
Volume of Main Basin (V_{MAIN}) =	user	ft^3	
Calculated Total Basin Volume (V_{total}) =	user	acre-feet	

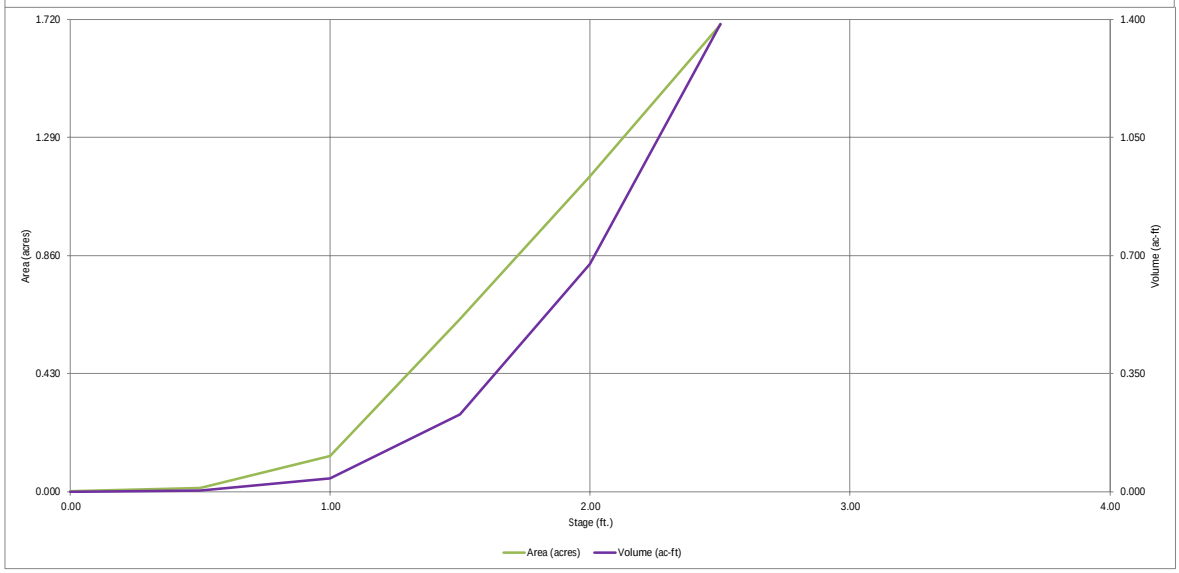
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	150	0.003		
6131.5	--	0.50	--	--	--	622	0.014	193	0.004
6132	--	1.00	--	--	--	5,659	0.130	1,763	0.040
6132.5	--	1.50	--	--	--	27,377	0.628	10,022	0.230
6133	--	2.00	--	--	--	50,038	1.149	29,376	0.674
6133.5	--	2.50	--	--	--	74,164	1.703	60,426	1.387

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)



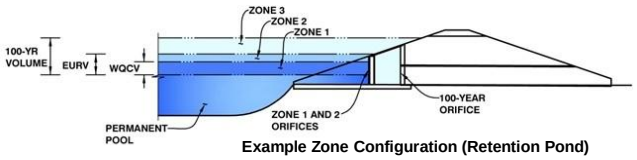


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)

Project: Trinity Ranch Estates - EG

Basin ID: TSB 2



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (User)	1.59	0.284	Orifice Plate
Zone 2			
Zone 3			
Total (all zones)		0.284	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration SCM)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft²
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation SCM)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft²
Depth at top of Zone using Orifice Plate =	0.75	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft²

Calculated Parameters for Plate

Specify these orifice elevations in GEC plan

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.10	0.40	0.70					
Orifice Area (sq. inches)	1.23	1.23	1.23					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =		
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =		
Vertical Orifice Diameter =			inches			

Calculated Parameters for Vertical Orific

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Not Selected	Not Selected			Not Selected	Not Selected
Overflow Weir Front Edge Height, Ho =			ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =		
Overflow Weir Front Edge Length =			feet	Overflow Weir Slope Length =		
Overflow Weir Grate Slope =			H:V	Grate Open Area / 100-yr Orifice Area =		
Horiz. Length of Weir Sides =			feet	Overflow Grate Open Area w/o Debris =		
Overflow Grate Type =				Overflow Grate Open Area w/ Debris =		
Debris Clogging % =			%			

Calculated Parameters for Overflow Wei

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected			Not Selected	Not Selected
Depth to Invert of Outlet Pipe =			ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =		
Circular Orifice Diameter =			inches	Outlet Orifice Centroid =		
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plat

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=		ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=		feet
Spillway Crest Length =		feet	Stage at Top of Freeboard =		feet
Spillway End Slopes =		H:V	Basin Area at Top of Freeboard =		acres
Freeboard above Max Water Surface =		feet	Basin Volume at Top of Freeboard =		acre-ft

Add spillway dimensions.

Calculated Parameters for Spillway

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.403	0.862	0.579	0.812	1.016	1.593	2.134	2.863
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.579	0.812	1.016	1.593	2.134	2.863
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.5	1.0	1.4	6.2	11.3	18.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.03	0.04	0.17	0.32	0.51
Peak Inflow Q (cfs) =	N/A	N/A	5.1	7.3	9.1	15.7	21.6	29.4
Peak Outflow Q (cfs) =	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.1	0.0	0.0	0.0
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	N/A	N/A	N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	74	54	71	85	>120	>120	>120
Time to Drain 99% of Inflow Volume (hours) =	42	77	56	74	88	>120	>120	>120
Maximum Ponding Depth (ft) =	1.74	2.16	1.88	2.08	2.23	2.50	2.50	2.50
Area at Maximum Ponding Depth (acres) =	0.88	1.33	1.01	1.23	1.40	1.70	1.70	1.70
Maximum Volume Stored (acre-ft) =	0.411	0.872	0.534	0.757	0.968	1.387	1.387	1.387

APPENDIX E: DRAINAGE MAPS

FILING NO. 1 AREA

LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

EXISTING FLOW DIRECTION
PROPERTY LINE
EXISTING ADJACENT LOT LINE
DRAINAGE BASIN BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR

NOTE

* SEE SHEET 2 – EXISITNG DRAINAGE MAP FOR EXISTING RATIONAL CALCULATIONS SUMMARY TABLE.

Know what's **below.** **Call** before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NORTH

GRAPHIC SCALE IN FEET
0 100 200 400

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2026 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: DJS
DRAWN BY: MEO
CHECKED BY: KRK
DATE: 7/31/26

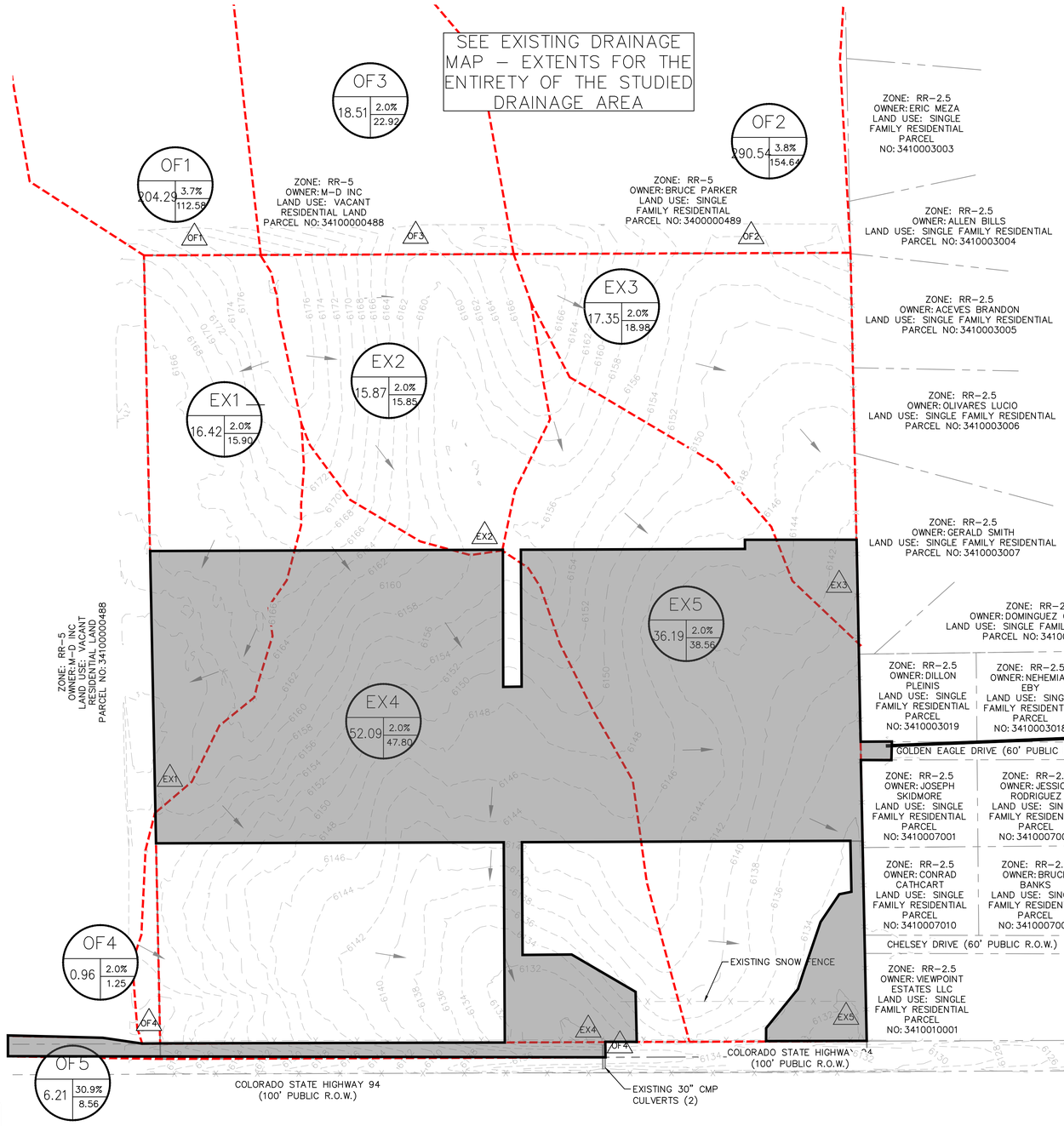
TRINITY RANCH
EL PASO COUNTY, COLORADO
PRELIMINARY PLAN
EXISTING DRAINAGE MAP - FULL BASIN

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn and Associates, Inc.

PROJECT NO.
096726003

SHEET
1

K:\COS_Civil\096726003_Trinity Ranch\CADD\Exhibits\2026-0415_Drainage Maps\EX_DM_Extents.dwg Schwenke, DJ 7/31/2026 10:39 AM



FILING NO. 1 AREA

LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

EXISTING FLOW DIRECTION
PROPERTY LINE
EXISTING ADJACENT LOT LINE
DRAINAGE BASIN BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR

SUMMARY TABLE

EXISTING RATIONAL CALCULATIONS SUMMARY					
SUBCATCHMENT NAME	DESIGN POINT	TRIBUTARY AREA (AC)	IMPERVIOUSNESS (%)	PEAK FLOWS (CFS) Q5	Q100
EX-1	EX-1	16.42	2.0%	2.37	15.90
EX-2	EX-2	15.87	2.0%	2.36	15.85
EX-3	EX-3	17.35	2.0%	2.82	18.98
EX-4	EX-4	52.09	2.0%	7.11	47.80
EX-5	EX-5	36.19	2.0%	5.74	38.56
OF-1	OF-1	204.29	3.7%	18.45	112.58
OF-2	OF-2	290.54	3.8%	25.46	154.64
OF-3	OF-3	18.51	2.0%	3.41	22.92
OF-4	OF-4	0.96	2.0%	0.19	1.25
OP-1	OP-1	0.04	41.0%	0.07	0.18
OF-5	OF-5	6.21	30.9%	3.01	8.56
OF-6	OF-6	0.14	80.0%	0.34	0.67
CUMMULATIVE FLOWS					
DESIGN POINT	**BASINS**	**TRIBUTARY AREA (AC)**	**IMPERV. (%)**	**Q5**	**Q100**
EX1	EX-1, OF-1	220.71	3.6%	19.77	121.43
EX3	OF-2, EX-3	307.90	3.7%	26.80	163.68
EX4	EX-2, EX-4, EX-5, OF-3, OF-4, OF-5, OP-1	129.88	7.7%	15.08	127.17
OF-6	OF-6	0.14	80.0%	0.34	0.67
TOTAL		**658.62**	**4.5%**	**61.98**	**412.95**

811 Know what's below. Call before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
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2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: DJS
DRAWN BY: MEO
CHECKED BY: KRK
DATE: 7/29/26

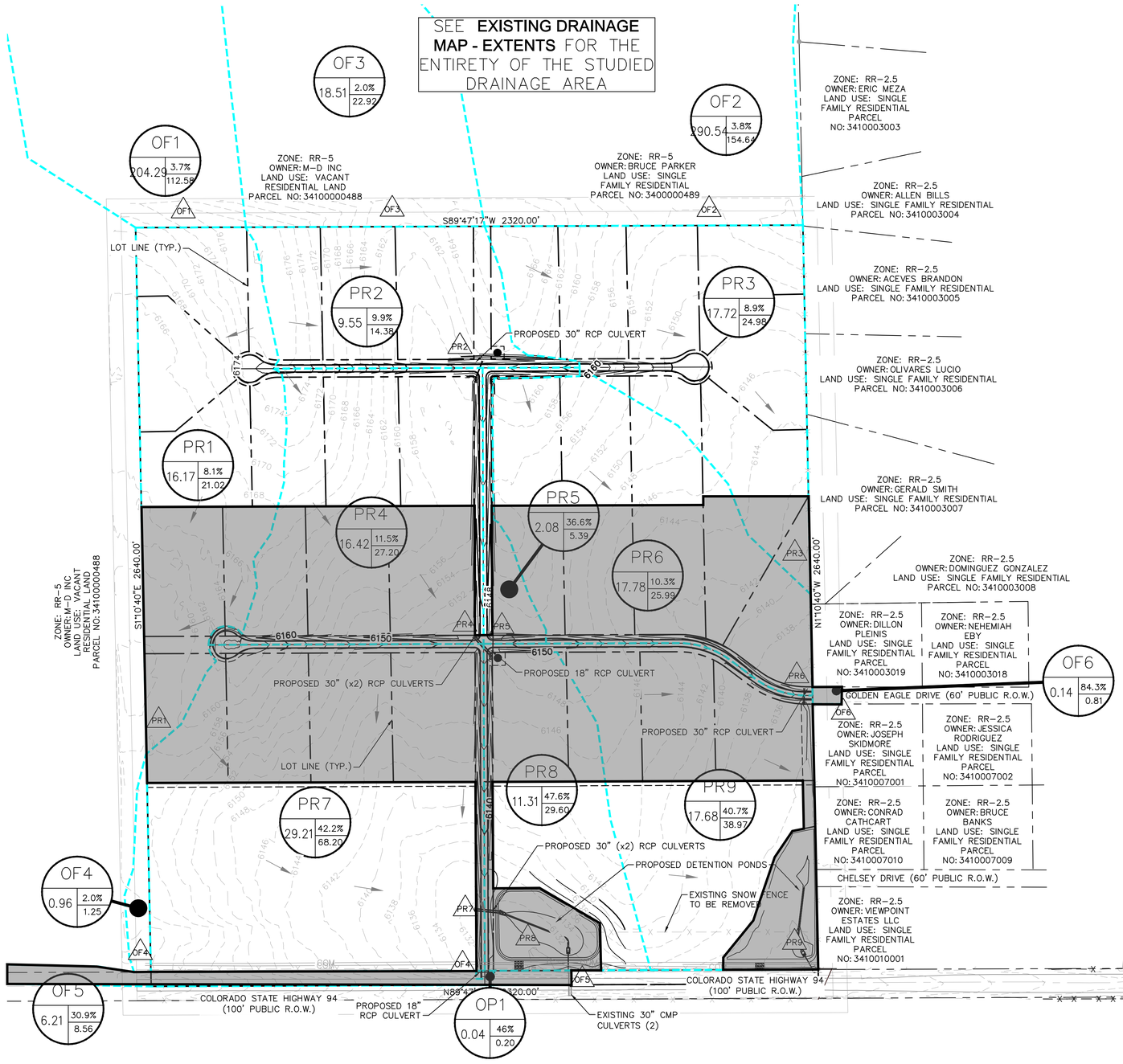
TRINITY RANCH
EL PASO COUNTY, COLORADO
PRELIMINARY PLAN
EXISITNG DRAINAGE MAP

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
096726003

SHEET
2

K:\COS_Civil\096726003_Trinity Ranch\CADD\Exhibits\2026-0415_Drainage Maps\EX_DM.dwg Schwenke, DJ 7/29/2026 11:17 AM



FILING NO. 1 AREA

LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

= DESIGN POINT

EXISTING FLOW DIRECTION
PROPERTY LINE
EXISTING ADJACENT LOT LINE
DRAINAGE BASIN BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR

SUMMARY TABLE

PROPOSED RATIONAL CALCULATIONS SUMMARY

SUBCATCHMENT NAME	DESIGN POINT	BASIN AREA (AC)	IMPERVIOUSNESS (%)	PEAK FLOWS (CFS) Q5	Q100
PR-1	PR-1	16.17	8.1%	4.05	21.02
PR-2	PR-2	9.55	9.9%	2.98	14.38
PR-3	PR-3	17.72	8.9%	4.98	24.98
PR-4	PR-4	16.42	11.5%	5.99	27.20
PR-5	PR-5	2.08	36.6%	2.00	5.39
PR-6	PR-6	17.78	10.3%	5.49	25.99
PR-7	PR-7	29.21	42.2%	25.51	68.20
PR-8	PR-8	11.31	47.6%	11.76	29.60
PR-9	PR-9	17.68	40.7%	14.37	38.97
OF-1	OF-1	204.29	3.7%	18.45	112.58
OF-2	OF-2	290.54	3.8%	25.46	154.64
OF-3	OF-3	18.51	2.0%	3.41	22.92
OF-4	OF-4	0.96	2.0%	0.19	1.25
OP-1	OP-1	0.04	46.0%	0.08	0.20
OF-5	OF-5	6.21	30.9%	3.01	8.56
OF-6	OF-6	0.14	84.3%	0.42	0.81
CUMMULATIVE FLOWS					
DESGIN POINT	**BASINS**	**TRIBUTARY AREA (AC)**	**IMPERV. (%)**	**Q5**	**Q100**
PR1	PR1+OF1	220.46	4.1%	20.30	122.16
PR3	OF2+PR3	308.26	4.1%	27.50	164.88
PR8	OF3+OF4+PR2+PR4+PR5+PR7+PR8	88.04	24.6%	49.08	155.00
PR9	PR6+PR9	35.46	25.5%	19.19	61.78
OF5	OF5+OP1	6.25	31.0%	3.04	8.63
OF-6	OF-6	0.14	84.3%	0.42	0.81
TOTAL CUMMULATIVE FLOWS		**658.62**	**8.3%**	**119.53**	**513.26**

811 Know what's below. Call before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO 1-800-922-1987 CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2026 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

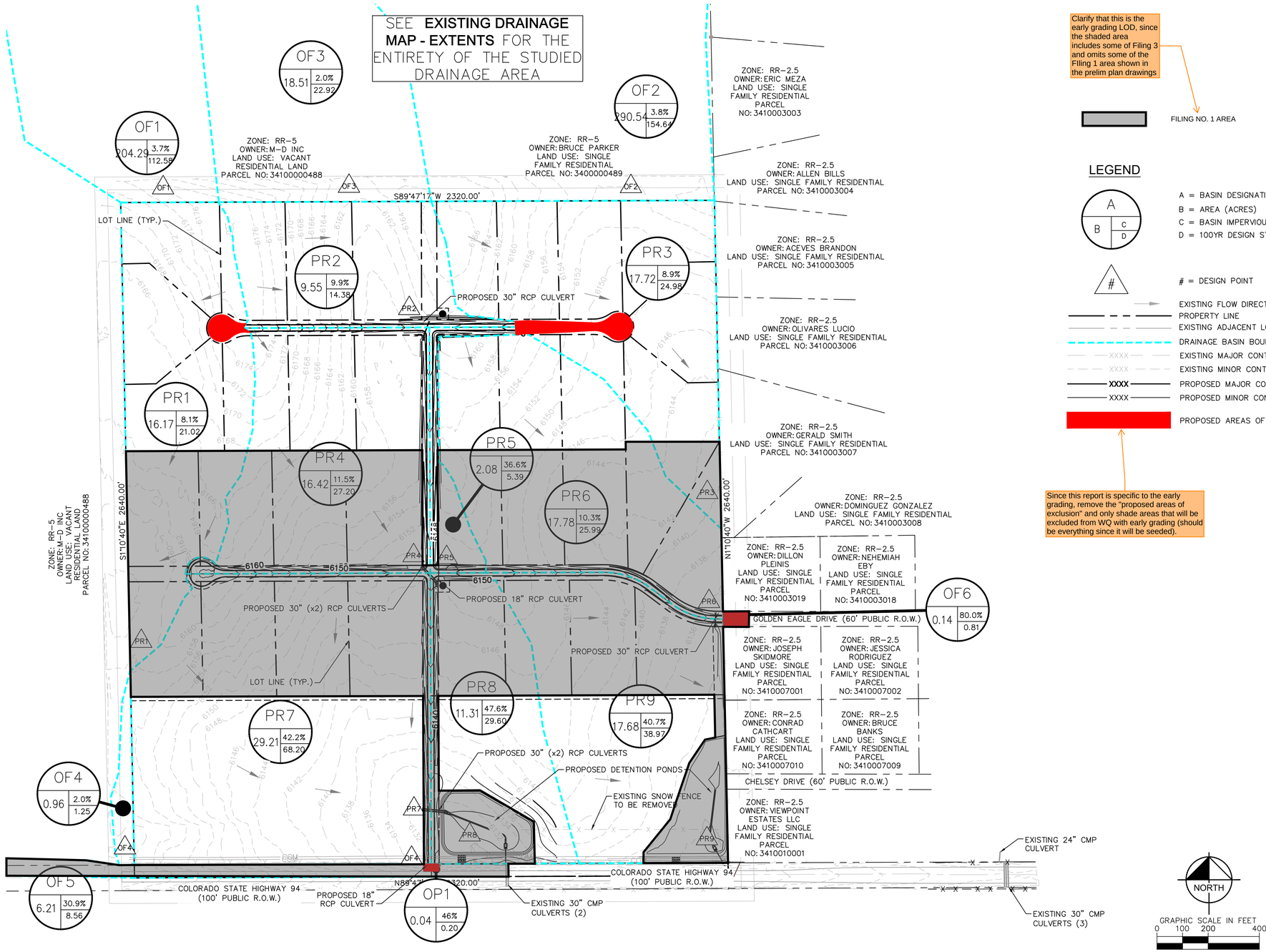
DESIGNED BY: DJS
DRAWN BY: MEO
CHECKED BY: KRK
DATE: 7/31/26

TRINITY RANCH
EL PASO COUNTY, COLORADO
PRELIMINARY PLAN
PROPOSED DRAINAGE MAP

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO. 096726003

SHEET 3



Clarify that this is the early grading LOD, since the shaded area includes some of Filing 3 and omits some of the Filing 1 area shown in the prelim plan drawings

FILING NO. 1 AREA

LEGEND

A = BASIN DESIGNATION
B = AREA (ACRES)
C = BASIN IMPERVIOUSNESS
D = 100YR DESIGN STORM RUNOFF (CFS)

\# = DESIGN POINT

EXISTING FLOW DIRECTION
PROPERTY LINE
EXISTING ADJACENT LOT LINE
DRAINAGE BASIN BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
PROPOSED AREAS OF EXCLUSION

Since this report is specific to the early grading, remove the "proposed areas of exclusion" and only shade areas that will be excluded from WQ with early grading (should be everything since it will be seeded).

Know what's **below.** **Call** before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2026 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: DJS
DRAWN BY: MEO
CHECKED BY: KRK
DATE: 7/29/26

TRINITY RANCH
EL PASO COUNTY, COLORADO
PRELIMINARY PLAN
PROPOSED EXCLUSION AREA MAP

PRELIMINARY
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Kimley»Horn
Kimley-Horn and Associates, Inc.

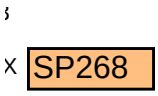
PROJECT NO. 096726003

SHEET 4

K:\COS_Civil\096726003_Trinity Ranch\CADD\Exhibits\2026-0415_Drainage Maps\PR_DM_Exclusion.dwg Schwenke, DJ 7/29/2026 11:17 AM

V1_Drainage Report - Early Grading.pdf Markup Summary

EPC Stormwater- Zachary (19)



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Layer:
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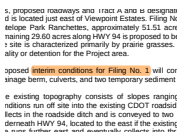
SP268



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Page Label: 3
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:21:50 PM
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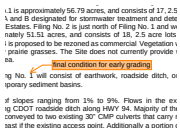
interim conditions for Filing No. 1



Subject: SW - Textbox with Arrow
Page Label: 3
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:22:16 PM
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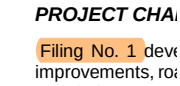
Layer:
Space:

final condition for early grading



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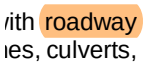
Filing No. 1



Subject: SW - Highlight
Page Label: 3
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:26:11 PM
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Color:
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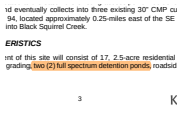
roadway



Subject: SW - Highlight
Page Label: 3
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:26:15 PM
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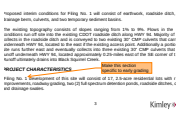
Color:
Layer:
Space:

two (2) full spectrum detention ponds



Subject: SW - Textbox with Arrow
Page Label: 3
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:26:40 PM
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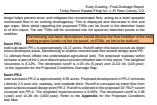
Layer:
Space:

Make this section specific to early grading



Subject: SW - Textbox
Page Label: 7
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:35:03 PM
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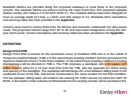
Layer:
Space:

The following sub-basin descriptions should discuss the final condition of the early grading project (roads cut but not paved, no EDBs, no lots to be built on).



Subject: SW - Highlight
Page Label: 10
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:29:37 PM
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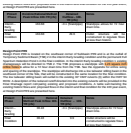
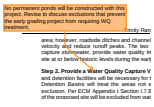
Color:
Layer:
Space:

1.48 square inch orifice holes



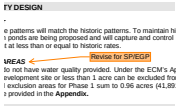
Subject: SW - Highlight
Page Label: 11
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:30:01 PM
Status:
Color:
Layer:
Space:

1.23 square inch orifice holes



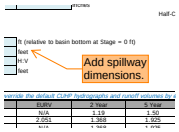
Subject: SW - Textbox with Arrow
Page Label: 12
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:31:22 PM
Status:
Color:
Layer:
Space:

No permanent ponds will be constructed with this project. Revise to discuss exclusions that prevent the early grading project from requiring WQ treatment.



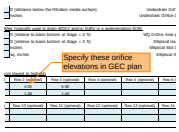
Subject: SW - Textbox with Arrow
Page Label: 12
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:35:38 PM
Status:
Color:
Layer:
Space:

Revise for SP/EGP



Subject: SW - Textbox with Arrow
Page Label: 66
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:38:03 PM
Status:
Color:
Layer:
Space:

Add spillway dimensions.



Subject: SW - Textbox with Arrow
Page Label: 66
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:39:00 PM
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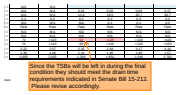
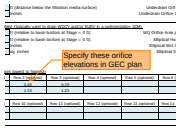
Color:
Layer:
Space:

Specify these orifice elevations in GEC plan



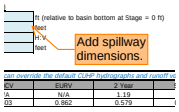
Subject: SW - Textbox with Arrow
Page Label: 66
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:41:32 PM
Status:
Color:
Layer:
Space:

Since the TSBs will be left in during the final condition they should meet the drain time requirements indicated in Senate Bill 15-212. Please revise accordingly.



Subject: SW - Textbox with Arrow
Page Label: 82
Author: EPC Stormwater- Zachary
Date: 9/1/2026 4:39:20 PM
Status:
Color:
Layer:
Space:

Specify these orifice elevations in GEC plan



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Page Label: 82
Author: EPC Stormwater- Zachary
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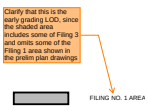
Space:

Add spillway dimensions.



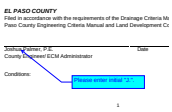
Subject: SW - Textbox with Arrow
Page Label: [4] 4 PROPOSED EXCLUSION AREA MAP
Author: EPC Stormwater- Zachary
Date: 9/1/2026 9:55:07 AM
Status:
Color:
Layer:
Space:

Clarify that this is the early grading LOD, since the shaded area includes some of Filing 3 and omits some of the FIling 1 area shown in the prelim plan drawings

Subject: SW - Textbox with Arrow
Page Label: [4] 4 PROPOSED EXCLUSION AREA MAP
Author: EPC Stormwater- Zachary
Date: 9/1/2026 12:00:58 PM
Status:
Color:
Layer:
Space:

Since this report is specific to the early grading, remove the "proposed areas of exclusion" and only shade areas that will be excluded from WQ with early grading (should be everything since it will be seeded).

Jalal Saleh (3)



Subject: Callout
Page Label: 1
Author: Jalal Saleh
Date: 9/2/2026 6:14:05 PM
Status:
Color:
Layer:
Space:

Please enter initial "J.".

Subject: Callout
Page Label: 9
Author: Jalal Saleh
Date: 9/3/2026 2:38:52 PM
Status:
Color:
Layer:
Space:

Please provide a table that provides and compares the 5 - year and the 100 year for the pre-development and post-development flows for the project site and discuss the reductions or increases in flows to come to the conclusion that the post-development flows are lower than the pre-development flows.

Subject: Cloud+
Page Label: 12
Author: Jalal Saleh
Date: 9/3/2026 3:53:29 PM
Status:
Color:
Layer:
Space:

This project is in the TELEPHONE EXCHANGE basin and the Basin Fee and the Bridge Fee are applicable; the Basin fee is $15,323 and the Bridge fee is $359 per impervious area.

Please indicate the total Basin fee and the total Bridge Fee on the Final Plat document and submit the Final Plat documents.