IRON RIDGE SUBDIVISION

PRELIMINARY DRAINAGE REPORT

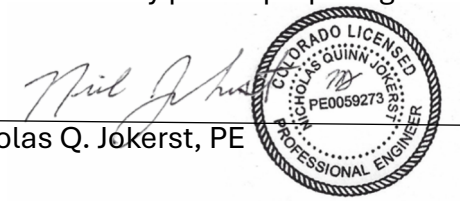
PCD FILE NO: SP253
ALL TERRAIN ENGINEERING PROJECT NO: 25009
JANUARY 2026

PREPARED FOR:
ATTICUS LAND, LLC
CONTACT: JAKE DECOTO
PO BOX 88010
COLORADO SPRINGS, CO 80908

PREPARED BY:
ALL TERRAIN ENGINEERING LLC
CONTACT: NICHOLAS Q. JOKERST
NJOKERST@ALLTERRAINENG.COM
(530) 391-7635

ENGINEER'S STATEMENT

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



01/06/2026

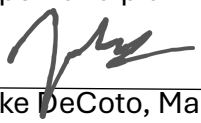
Nicholas Q. Jokerst, PE — Date

State of Colorado No. 59273

For and on behalf of All Terrain Engineering LLC

DEVELOPER'S STATEMENT

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



01-07-2026

Jake DeCoto, Manager — Date

Atticus Land, LLC

PO Box 88010, Colorado Springs, CO 80908

EL PASO COUNTY ONLY

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

Daniel Torres, P.E.

Digitally signed by Daniel Torres, P.E.
Reason: Authorized signatory as County Engineer designee
Date: 2026.04.29 14:32:13-06'00'

4/29/26

Joshua Palmer, P.E. — Date

County Engineer/ECM Administrator

Conditions:

Table of Contents

Appendices

I. General Purpose, Location & Description

a. Purpose

The purpose of this Preliminary Drainage Report (PDR) for IRON RIDGE SUBDIVISION is to describe the site's onsite and offsite drainage patterns, existing and proposed storm infrastructure, and to safely route developed stormwater to adequate outfalls.

b. Location

IRON RIDGE SUBDIVISION, referred to as 'the site' herein, is in a portion of southeast quarter of Section 13, Township 11 South, Range 66 West of the 6th P.m., County of El Paso, State of Colorado. The site is bound by Walker Road to the north, Equine Meadows Subdivision to the east and undeveloped parcels to the west and south. A vicinity map is presented in Appendix A.

c. Description of Property

The site is comprised of (3) existing Parcels. Parcel 1 is 43.68 acres, Parcel 2 is 35.14 acres and Parcel 3 is 42.52 acres for a total of approximately 121.34 acres of undeveloped land. The development of Iron Ridge Subdivision will occur on Parcel 1 and 2. Parcel 3 will remain undeveloped. Existing vegetation consists of prairie grasses based upon aerial imagery. The approximate disturbed area is 8.29 acres. The development will plat (29) 2.5+ acre single family residential lots.

In general, Parcel 1 slopes southeasterly towards an unnamed tributary of East Cherry Creek. East Cherry Creek is the ultimate receiving water for the site. The confluence of the unnamed tributary and East Cherry Creek is approximately 3.2 miles northeast of the site. Parcel 2 drains northwesterly towards the same tributary. Onsite elevations range from 7,450' – 7,560' with slopes ranging 1 – 80%. Per a NRCS soil survey, the site is made up of Type B Peyton sandy loam, Type B Peyton-Pring complex, Type B Tomah-Crowfoot loamy sands. The NRCS soil survey is presented in Appendix A.

An unnamed tributary of East Cherry Creek bisects the site and flows northeasterly. This tributary will be referred to as Tributary #1 from herein. There are no existing utilities located on site. An existing drainage map is presented in Appendix F.

d. Floodplain Statement

Based on FEMA Firm map 08041C0305Gdated December 7, 2018, the site is Zone X, which are areas determined to be outside the 0.2% annual chance flood.

II. Drainage Basins

a. Major Basin Description

The site is located within the East Cherry Creek Drainage Basin. There is not a Drainage Basin Planning Study available for the East Cherry Creek Drainage Basin.

b. Existing Subbasin Description

The existing site's drainage patterns are relatively uniform. Tributary #1 bisects the site and conveys stormwater northeasterly towards Walker Road. An existing impoundment structure, The "Franktown Parker Reservoir FPE-5" is located approximately 850' upstream of Walker Road. The proposed development will not have impacts on the impoundment structure. A portion of the site in the southeast area drains easterly to a separate tributary. An existing drainage map is presented in Appendix F.

Basin OS1 is 723.2 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS1 hydrologic parameters. Existing stormwater from this basin (Q_5 = 33.9 cfs Q_{100} = 199 cfs) is collected offsite in Tributary #1 and flows onsite at DPOS1 (Q_5 = 33.9 cfs Q_{100} = 199 cfs).

Basin OS2 is 38.4 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS2 hydrologic parameters. Existing stormwater from this basin (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) is collected offsite in Tributary #2 and flows onsite at DPOS2 (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs).

Basin OS3 is 53.9 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS3 hydrologic parameters. Existing stormwater from this basin (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs) is collected offsite in Tributary #3 and flows onsite at DPOS3 (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs).

Basin EX1 is 14.49 acres of undeveloped land and Walker Road. Existing stormwater from this basin (Q_5 = 3.4 cfs Q_{100} = 10.7 cfs) is collected in Tributary#1 at DP1 (Q_5 = 3.4 cfs Q_{100} = 10.7 cfs).

Basin EX2 is 6.91 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 1.9 cfs Q_{100} = 12.6 cfs) is collected in Tributary#1 at DP2 (Q_5 = 3.8 cfs Q_{100} = 20.4 cfs).

Basin EX3 is 17.73 acres of undeveloped land and Walker Road. Existing stormwater from this basin (Q_5 = 4.4 cfs Q_{100} = 27.0 cfs) is collected in Tributary#1 at DP3 (Q_5 = 11.5 cfs Q_{100} = 73.8 cfs).

Basin EX4 is 6.94 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 4.4 cfs Q_{100} = 27.0 cfs) is collected in Tributary#1 at DP4 (Q_5 = 12.4 cfs Q_{100} = 80.2 cfs). Flows at DP4, pass through the "Franktown Parker Reservoir FPE-5" via a concrete outlet structure and outfall pipe. It is assumed flows pass through the reservoir unrestricted for the purposes of hydrologic routing.

Basin EX5 is 39.65 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 9.1 cfs Q_{100} = 61.2 cfs) is collected in Tributary#1 at DP4 (Q_5 = 12.4 cfs Q_{100} = 80.2 cfs).

Basin EX6 is 1.43 acres of undeveloped land and Walker Road. Existing stormwater from this basin (Q_5 = 1.2 cfs Q_{100} = 4.3 cfs) is collected in a swale along Walker Road before discharging into Tributary#1 at DP5 (Q_5 = 14.0 cfs Q_{100} = 88.4 cfs).

Basin EX7 is 3.54 acres of undeveloped land adjacent to Walker Road. Existing stormwater from this basin (Q_5 = 0.9 cfs Q_{100} = 6.3 cfs) is collected in Tributary#1 at DP5 (Q_5 = 14.0 cfs Q_{100} = 88.4 cfs).

Basin EX8 is 26.47 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 5.5 cfs Q_{100} = 34.6 cfs) is collected in Tributary#1 at DP5 (Q_5 = 14.0 cfs Q_{100} = 88.4 cfs).

Basin EX9 is 12.23 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 2.8 cfs Q_{100} = 18.9 cfs) is collected in Tributary#3 at DP6 (Q_5 = 2.8 cfs Q_{100} = 18.9 cfs).

Basin EX10 is 2.15 acres of undeveloped land. Existing stormwater from this basin (Q_5 = 0.7 cfs Q_{100} = 4.5 cfs) is collected in Tributary#3 at DP7 (Q_5 = 3.4 cfs Q_{100} = 21.6 cfs).

Basin EX11 is 2.84 acres of undeveloped land and Colt Court. Existing stormwater from this basin (Q_5 = 1.2 cfs Q_{100} = 6.2 cfs) is collected in Tributary#3 at DP7 (Q_5 = 3.4 cfs Q_{100} = 21.6 cfs).

c. Proposed Subbasin Description

The proposed site has been divided into 24 subbasins for analysis. Areas designated 'no-build' have been analyzed as 'historic' in the proposed condition. Basin OS1 – OS3 are excluded from the design point flows presented in Basin A – Basin V descriptions. However, Basin OS1 - OS3 flows will be included in the stability analysis of Tributary #1 - #3. The offsite flows are analyzed separately to accurately quantify the change in onsite flow from the existing to proposed condition. Culvert sizes presented below are preliminary. Hydraulic

analysis of channels and culvert sizing will be presented during the Final Drainage Report stage, per the El Paso County Preliminary Drainage Report Checklist.

Basin OS1 is 723.2 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS1 hydrologic parameters. Existing stormwater from this basin (Q_5 = 33.9 cfs Q_{100} = 199 cfs) is collected offsite in Tributary #1 and flows onsite at DPOS1 (Q_5 = 33.9 cfs Q_{100} = 199 cfs). There will be no development or disturbance occurring in Basin OS1.

Basin OS2 is 38.4 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS2 hydrologic parameters. Existing stormwater from this basin (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs) is collected offsite in Tributary #2 and flows onsite at DPOS2 (Q_5 = 3.5 cfs Q_{100} = 16.4 cfs). There will be no development or disturbance occurring in Basin OS2.

Basin OS3 is 53.9 acres of offsite land. Due to the size and proximity to the site, Streamstats was used for Basin OS3 hydrologic parameters. Existing stormwater from this basin (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs) is collected offsite in Tributary #3 and flows onsite at DPOS3 (Q_5 = 4.3 cfs Q_{100} = 20.4 cfs). There will be no development or disturbance occurring in Basin OS3.

Basin A is 17.41 acres of proposed 2.5+ acres lots and Walker Road. Basin A stormwater (Q_5 = 4.8 cfs Q_{100} = 25.9 cfs) follows historic drainage patterns and is collected in Tributary #2 at DP1 (Q_5 = 34.8 cfs Q_{100} = 2.9 cfs). Basin A will not be detained in Pond 1. Basin A is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin B is 7.10 acres of proposed 2.5+ acres lots, Road 1 roadside swale and Walker Road. Basin B stormwater (Q_5 = 3.4 cfs Q_{100} = 15.4 cfs) is captured in Roadside Swale B and conveyed to DP2 (Q_5 = 5.6 cfs Q_{100} = 25.2 cfs). At DP2, an 18" RCP culvert (public) conveys stormwater under Road 1 to DP3. Basin B will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin C is 4.54 acres of proposed 2.5+ acres lots, Road 1 roadside swale and Walker Road. Basin C stormwater (Q_5 = 2.7 cfs Q_{100} = 12.1 cfs) is captured in Roadside Swale C and conveyed to DP2 (Q_5 = 5.6 cfs Q_{100} = 25.2 cfs). At DP2, an 18" RCP culvert (public) conveys stormwater under Road 1 to DP3. Basin C will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin D is 0.90 acres of Road 1 and roadside swale. Basin D stormwater (Q_5 = 1.4 cfs Q_{100} = 4.2 cfs) is captured in Roadside Swale D and conveyed to DP3 (Q_5 = 7.4 cfs Q_{100} = 29.7 cfs). DP3 is conveyed to Pond 1 in a grass lined swale. Basin D will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin E is 0.58 acres of Road 1 and roadside swale. Basin E stormwater (Q_5 = 1.1 cfs Q_{100} = 2.7 cfs) is captured in Roadside Swale E and conveyed to DP3 (Q_5 = 7.4 cfs Q_{100} = 29.7 cfs). DP3 is conveyed to Pond 1 in a grass lined swale. Basin E will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin F is 2.83 acres of proposed 2.5+ acres lots and Pond 1. Basin F stormwater (Q_5 = 1.1 cfs Q_{100} = 5.7 cfs) overland flows to Pond 1 at DP4 (Q_5 = 8.0 cfs Q_{100} = 33.4 cfs). Basin F will be captured and detained in Pond 1 for full spectrum water quality and detention.

Basin G is 3.91 acres of proposed 2.5+ acres lots and undevelopable land within Tributary #1. Basin G stormwater (Q_5 = 1.3 cfs Q_{100} = 7.8 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP5 (Q_5 = 3.9 cfs Q_{100} = 49.6 cfs). Basin G will not be detained in Pond 1. Basin G is excluded from permanent

water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin H is 9.15 acres of 2.5+ acre lots and undevelopable land within Tributary #1. Basin H stormwater (Q_5 = 2.6 cfs Q_{100} = 17.8 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP6 (Q_5 = 10.3 cfs Q_{100} = 89.4 cfs). Flows at DP6, pass through the "Franktown Parker Reservoir FPE-5" via an existing, concrete outlet structure and outfall pipe. It is assumed flows pass through the reservoir unrestricted for the purposes of hydrologic routing. Basin H will not be detained in Pond 1. Basin H is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin I is 3.54 acres of undevelopable land within Tributary #1. Basin I stormwater (Q_5 = 0.9 cfs Q_{100} = 6.1 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP15 (Q_5 = 7.6 cfs Q_{100} = 71.2 cfs). Basin I will remain undeveloped and will not be detained in Pond 1.

Basin J is 1.33 acres of Walker Road and undevelopable land within Tributary #1. Basin J stormwater (Q_5 = 0.5 cfs Q_{100} = 3.0 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP15 (Q_5 = 6.3 cfs Q_{100} = 68.6 cfs). Basin J will remain undeveloped and will not be detained in Pond 1.

Basin K is 0.89 acres of proposed 2.5+ acres lots. Basin K stormwater (Q_5 = 1.5 cfs Q_{100} = 4.4 cfs) flows offsite and is captured in Tributary #1 and conveyed to DP5 (Q_5 = 3.9 cfs Q_{100} = 49.6 cfs). Basin K will not be detained in Pond 1. Basin K is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates

Basin L is 11.99 acres of proposed 2.5+ acres lots. Basin L stormwater (Q_5 = 3.5 cfs Q_{100} = 20.0 cfs) follows historic drainage patterns and is collected in Tributary #3 at DP7 (Q_5 = 3.5 cfs Q_{100} = 20 cfs). Basin L will not be detained in Pond 2. Basin L is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin M is 2.04 acres of proposed 2.5+ acres lots. Basin M stormwater (Q_5 = 0.8 cfs Q_{100} = 4.8 cfs) follows historic drainage patterns to the east and offsite at DP8 (Q_5 = 0.8 cfs Q_{100} = 4.8 cfs). Basin M will not be detained in Pond 2. Basin M is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin N is 2.18 acres of existing residential area and Colt Court. Basin N stormwater (Q_5 = 1.5 cfs Q_{100} = 6.5 cfs) follows historic drainage patterns to DP9 along Colt Court (Q_5 = 1.5 cfs Q_{100} = 6.5 cfs). There is no proposed development within Basin N, however; Colt Court will be extended to Iron Ridge. Therefore, an 18" RCP culvert is proposed at DP9 to convey the existing stormwater under the Colt Court extension and to its historic outfall within Tributary #3. Per EPC ECM Section I.7.1.C.1.A, the developed area within Basin N will be excluded from permanent water quality management. The total excluded area is 0.15 acres encompassing the paved portion of Colt Court. Colt Court is within the Equine Meadows subdivision and the existing topography directs stormwater away from Iron Ridge Pond 2. Water quality for the remaining 2.03 acres is excluded under EPC ECM Section 1.7.1.B.5. Coordination is ongoing with the property owners along Colt Court to facilitate the improvements at DP9.

Basin O is 0.73 acres of existing Colt Court. Basin O stormwater (Q_5 = 0.9 cfs Q_{100} =2.8 cfs) follows historic drainage patterns to DP10 along Colt Court (Q_5 = 2.3 cfs Q_{100} = 9.0 cfs). There is no proposed development within Basin O, however; Colt Court will be extended through Basin O to Iron Ridge. Roadside swales will be constructed along the Colt Court to convey stormwater to the historic outfall within Tributary #3. Per EPC

ECM Section I.7.1.C.1.A, the developed area within Basin O will be excluded from permanent water quality management. The total excluded area is 0.15 acres encompassing the paved portion of Colt Court. Colt Court is within the Equine Meadows subdivision and the existing topography directs stormwater away from Iron Ridge Pond 2. During the FDR stage, the outfall from DP10 to DP11 will be evaluated for capacity and stability. Necessary improvements, if required, will be designed with the FDR. Coordination is ongoing with the property owners along Colt Court to facilitate the improvements at DP10 & DP11.

Basin P is 5.02 acres of proposed 2.5+ acres lots, Colt Court and roadside swale. Basin P stormwater (Q_5 = 2.9 cfs Q_{100} = 11.9 cfs) is captured in Roadside Swale P and conveyed to DP12 (Q_5 = 2.9 cfs Q_{100} = 11.5 cfs). At DP12, an 18" RCP culvert (public) conveys stormwater under Colt Court to DP13. Basin P will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin Q is 1.18 acres of proposed 2.5+ acres lots, Colt Court and roadside swale. Basin Q stormwater (Q_5 = 1.1 cfs Q_{100} = 3.6 cfs) is captured in Roadside Swale Q and conveyed to DP12 (Q_5 = 2.9 cfs Q_{100} = 11.5 cfs). At DP12, an 18" RCP culvert (public) conveys stormwater under Colt Court to DP13. Basin Q will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin R is 1.81 acres of proposed 2.5+ acres lots, Colt Court and roadside swale. Basin R stormwater (Q_5 = 1.9 cfs Q_{100} = 5.8 cfs) is captured in Roadside Swale R and conveyed to DP13 (Q_5 = 4.6 cfs Q_{100} = 16.6 cfs). DP13 flow is conveyed to Pond 2 in a grass lined swale. Basin R will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin S is 0.59 acres of proposed 2.5+ acres lots, Colt Court and roadside swale. Basin R stormwater (Q_5 = 0.9 cfs Q_{100} = 2.4 cfs) is captured in Roadside Swale S and conveyed to DP13 (Q_5 = 4.6 cfs Q_{100} = 16.6 cfs). DP13 flow is conveyed to Pond 2 in a grass lined swale. Basin S will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin T is 0.87 acres of proposed 2.5+ acres lots and Pond 2. Basin F stormwater (Q_5 = 0.5 cfs Q_{100} = 2.3 cfs) overland flows to Pond 1 at DP14 (Q_5 = 4.8 cfs Q_{100} = 17.5 cfs). Basin T will be captured and detained in Pond 2 for full spectrum water quality and detention.

Basin U is 31.9 acres of proposed 2.5+ acres lots, offsite area and undevelopable land within Tributary #1. Basin U stormwater (Q_5 = 7.9 cfs Q_{100} = 46.6 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP5 (Q_5 = 3.9 cfs Q_{100} = 49.6 cfs). Basin U will not be detained in Pond 1. Basin U is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

Basin V is 25.02 acres of proposed 2.5+ acres lots, offsite 2.5+ acre lots and undevelopable land within Tributary #1. Basin V stormwater (Q_5 = 6.1 cfs Q_{100} = 37.1 cfs) follows historic drainage patterns and is collected in Tributary #1 at DP15 (Q_5 = 7.6 cfs Q_{100} = 71.2 cfs). Basin V will not be detained in Pond 1. Basin U is excluded from permanent water quality treatment per the Large Lot Single Family Sites exclusion in Appendix I of the EPC DCM. See end of *Proposed Basin Description* section for a comparison of existing and proposed 100-year discharge rates.

TABLE 1: EXISTING V. PROPOSED DESIGN POINT COMPARISON

Ex/Pr DP	Ex Q_5 (cfs)	Ex Q_{100} (cfs)	Pr Q_5 (cfs)	Pr Q_{100} (cfs)	Q_5 Change	Q_{100} Change
5/15	14	88.4	12.7	92.5	-9.3%	4.6%
7/11	3.4	21.6	4.2	22.3	23.5%	3.2%

Existing Design Point 5 and Proposed Design Point 15 represent the site's outfall within Tributary #1. Existing Design Point 7 and Proposed Design Point 11 represent the site's outfall within Tributary #3. See below for flow change descriptions. It should be noted while some onsite basins demonstrate a peak flow increase in the proposed condition, the site's overall peak discharge is less than historic at DP15.

- The decrease in 5-year flow at DP5/15 can be attributed to the decrease in 5-year discharge occurring at Pond 1 and Pond 2. The 5-year discharge is 0.1 cfs, which is less than historic.
- The increase in 100-year flow at DP5/15 can be attributed to the undetained release of Basins A, G and H. However, the flow increase is minor (4.6%) and will not negatively affect downstream infrastructure. An analysis of the existing 72" CMP culvert at DP5/15 will be provided with the FDR to demonstrate the culvert functions within EPC DCM criteria with the increased flow. Additionally, a downstream stability analysis will be provided for Tributary #1 to demonstrate channel flow meets EPC DCM criteria.
- The increase in 5-year and 100-year at DP7/11 can be attributed to the extension of Colt Court. The flow increase is less than 1 cfs in both scenarios and is negligible. A stability analysis of the DP10 outfall and Tributary #3 will be provided with the FDR to verify the outfall is stable and adequate.

III. Drainage Design Criteria

a. Development Criteria Reference

The drainage analysis follows the criteria from the "Drainage Criteria Manual County of El Paso, Colorado" Volumes 1 and 2," as amended.

b. Hydrologic Criteria

Hydrologic criteria and runoff calculations are per the "Drainage Criteria Manual County of El Paso, Colorado Volume 1 Update" – Chapter 6 Hydrology. Onsite drainage improvements are designed for the 5-year storm (minor event) and 100-year storm (major event). 1-hr duration rainfall depths from NOAA Atlas 14 are utilized for pond sizing. Private, full spectrum pond design was completed using the latest version of Mile High Flood District's (MHFD) UD-Detention. The detention pond allowable release rates will be limited to historic rates.

d. Hydraulic Criteria

Hydraulic criteria for storm sewer and open channel sizing were obtained from the "Drainage Criteria Manual County of El Paso, Colorado" Chapter 9 Culvert Design and Chapter 10 Open Channels and Structures.

IV. Drainage Facility Design

a. General Concept

Proposed roadway stormwater will be captured and conveyed with roadside swales to onsite, full spectrum water quality and detention ponds (Pond and Pond 2). In areas where existing topography makes it feasible, 2.5+ acre lots are captured and detained in Pond 1 and Pond 2. Pond 1 and Pond 2 will discharge at less than historic rates to Tributary #1.

b. Water Quality & Detention

Pond 1

Water quality and detention for Basins B-F is provided in Pond 1: a private, full spectrum detention pond south of Road 1 along Tributary #1. A total of 15.95 acres at 13.1% imperviousness will be detained in Pond 1. The WQCV is 0.111 ac-ft, the EURV is 0.089 ac-ft, and the 100-year volume is 0.456 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 55 and 59 hours, respectively. A riprap low tailwater basin will be located at the swale outfall into Pond 1. A 4.0' riprap trickle channel conveys flow towards the outlet structure. A 10' access and maintenance road is provided to the bottom of the pond to facilitate future maintenance of the pond facilities. A 10' riprap lined, emergency overflow spillway is provided that conveys

the developed, peak 100-yr flow rate with 1.0' of freeboard towards Tributary #1. Final pond sizing and pond appurtenance sizing will be provided with the Final Drainage Report.

Pond 2
Water quality and detention for Basins P-T is provided in Pond 2: a private, full spectrum detention pond north of Colt Court. A total of 9.47 acres at 17.1% imperviousness will be detained in Pond 2. The WQCV is 0.081 ac-ft, the EURV is 0.077 ac-ft, and the 100-year volume is 0.288 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 58 and 56 hours, respectively. A riprap low tailwater basin will be located at the swale outfall into Pond 2. A 4.0' riprap trickle channel conveys flow towards the outlet structure. A 10' access and maintenance road is provided to the bottom of the pond to facilitate future maintenance of the pond facilities. A 10' riprap lined, emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Tributary #1. Final pond sizing and pond appurtenance sizing will be provided with the Final Drainage Report.

c. Major Drainageways
Tributary #1, an unnamed tributary to East Cherry Creek, bisects the site and conveys stormwater. A stability analysis of Tributary #1 will be provided with the Final Drainage Report.

d. Operations & Maintenance
An Operations and Maintenance Manual for Pond 1 and Pond 2 will be provided with the Final Drainage Report.

e. Grading & Erosion Control Plan
Due to the project disturbance area, a separate Grading and Erosion Control plan is required. The Grading and Erosion Control Plan will be provided during the Final Plat phase.

f. Four Step Method
Step 1 – Reducing Runoff Volumes: Roof drains will route across landscape areas whenever possible to promote infiltration. In addition, grass lined drainage swales are used as the primary stormwater conveyance.

Step 2 – Treat and slowly release the WQCV: Onsite, private full spectrum detention ponds provide water quality treatment for the site. The WQCV is released over a period of 40 hours.

Step 3 – Stabilize stream channels: All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization with the drainage basin. Drainage channels will be lined with non-erosive soils and permanently seeded to provide stabilization. If required due to erosive velocities, additional protection will be provided in the form of riprap lining and drop structures to reduce stormwater velocities and provide stabilization. Stormwater discharge points will be adequately stabilized.

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

g. Drainage Basin & Bridge Fees
The site is located within the East Cherry Creek Drainage Basin. There is not an established basin and bridge fee for East Cherry Creek.

h. Engineer's Opinion of Probable Cost
An engineer's opinion of probable will be provided with the Final Drainage Report.

V. Summary

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

VI. References

I. El Paso County – Drainage Criteria Manual, 2018 as amended.

II. Urban Storm Drainage Criteria Manual, Mile High Flood District, March 2024.

III. USGS - Colorado StreamStats, https://www.usgs.gov/streamstats/colorado-streamstats.

IV. TopoZone – Topo Map of Stream in El Paso County, Colorado, https://www.topozone.com/colorado/el-paso-co/stream.

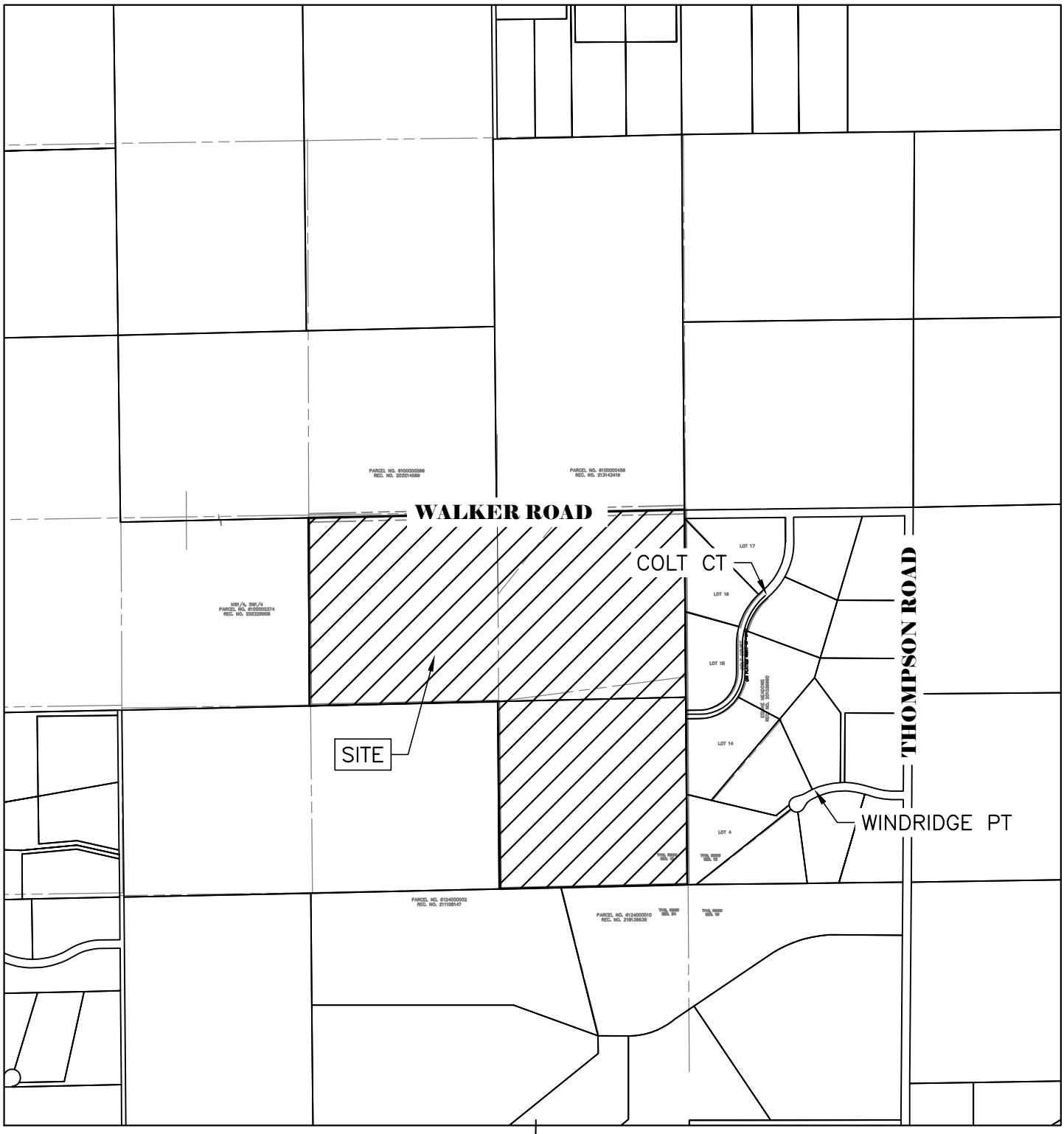
V. Federal Emergency Management Agency, Flood Map Service Center - https://msc.fema.gov/portal/home, September 2024.

VI. Web Soil Survey, Natural Resources Conservation Service - https://websoilsurvey.nrcs.usda.gov/app/, September 2024.

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

IRON RIDGE SUBDIVISION

VICINITY MAP



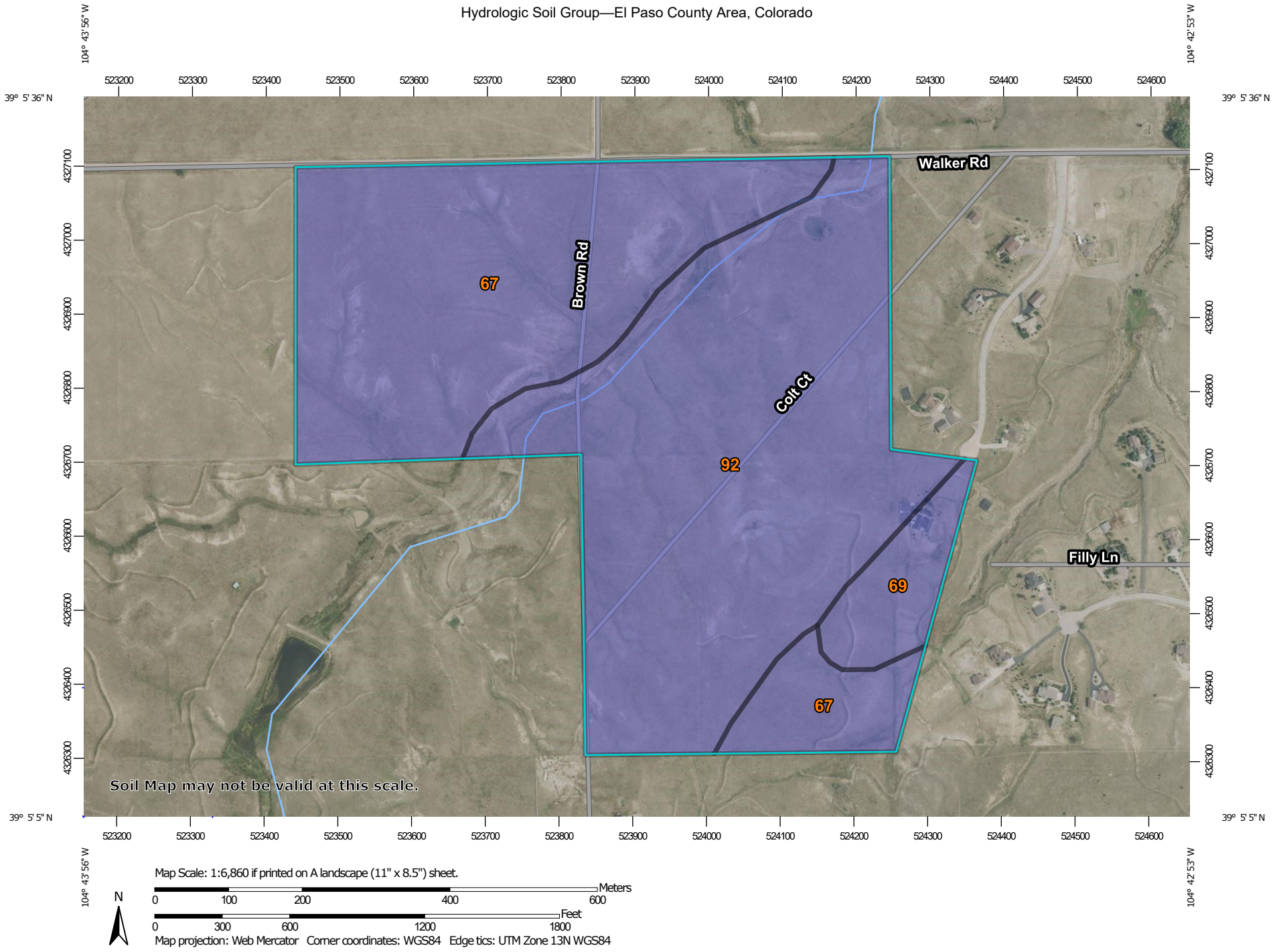
N

1000 500 0 1000 2000

ORIGINAL SCALE: 1" = 1000'

VICINITY MAP	
IRON RIDGE SUB.	
JOB NO. 25009	
LOCATION: EPC	SHEET
09/17/2025	
SHEET: 1	

ALL TERRAIN ENGINEERING
1004 WEST VAN BUREN STREET
COLORADO SPRINGS, CO 80907



Map Scale: 1:6,860 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

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 22, Sep 3, 2024

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

Date(s) aerial images were photographed: Jul 23, 2024—Aug 4, 2024

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
67	Peyton sandy loam, 5 to 9 percent slopes	B	54.2	42.4%
69	Peyton-Pring complex, 8 to 15 percent slopes	B	6.8	5.3%
92	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	B	67.0	52.3%
Totals for Area of Interest			**127.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

NOAA Atlas 14, Volume 8, Version 2
Location name: Colorado Springs, Colorado, USA*
Latitude: 39.0884°, Longitude: -104.7191°
Elevation: 7510 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.237** (0.195-0.291)	**0.286** (0.235-0.351)	**0.372** (0.304-0.457)	**0.448** (0.364-0.553)	**0.560** (0.442-0.722)	**0.653** (0.502-0.849)	**0.750** (0.556-0.999)	**0.855** (0.606-1.17)	**1.00** (0.680-1.40)	**1.12** (0.737-1.58)
10-min	**0.347** (0.285-0.425)	**0.419** (0.344-0.514)	**0.544** (0.445-0.669)	**0.656** (0.533-0.809)	**0.820** (0.648-1.06)	**0.956** (0.735-1.24)	**1.10** (0.814-1.46)	**1.25** (0.887-1.71)	**1.47** (0.996-2.05)	**1.64** (1.08-2.31)
15-min	**0.423** (0.348-0.519)	**0.511** (0.420-0.627)	**0.664** (0.543-0.816)	**0.800** (0.650-0.987)	**1.00** (0.790-1.29)	**1.16** (0.896-1.52)	**1.34** (0.993-1.78)	**1.53** (1.08-2.08)	**1.79** (1.22-2.50)	**2.00** (1.32-2.82)
30-min	**0.609** (0.501-0.746)	**0.734** (0.603-0.900)	**0.952** (0.779-1.17)	**1.15** (0.932-1.41)	**1.43** (1.13-1.85)	**1.67** (1.28-2.17)	**1.92** (1.42-2.55)	**2.19** (1.55-2.98)	**2.56** (1.74-3.58)	**2.86** (1.88-4.04)
60-min	**0.772** (0.635-0.946)	**0.923** (0.758-1.13)	**1.20** (0.978-1.47)	**1.44** (1.17-1.78)	**1.82** (1.44-2.35)	**2.13** (1.64-2.79)	**2.47** (1.84-3.30)	**2.84** (2.02-3.89)	**3.36** (2.29-4.72)	**3.78** (2.50-5.34)
2-hr	**0.935** (0.773-1.14)	**1.11** (0.919-1.36)	**1.44** (1.18-1.76)	**1.74** (1.42-2.13)	**2.20** (1.76-2.84)	**2.60** (2.02-3.38)	**3.03** (2.26-4.02)	**3.49** (2.50-4.76)	**4.16** (2.86-5.81)	**4.71** (3.13-6.61)
3-hr	**1.02** (0.844-1.24)	**1.20** (0.996-1.46)	**1.55** (1.28-1.88)	**1.88** (1.54-2.29)	**2.39** (1.92-3.09)	**2.84** (2.21-3.69)	**3.33** (2.50-4.42)	**3.86** (2.78-5.26)	**4.64** (3.20-6.47)	**5.28** (3.52-7.38)
6-hr	**1.18** (0.985-1.42)	**1.38** (1.15-1.66)	**1.76** (1.46-2.12)	**2.13** (1.75-2.58)	**2.72** (2.21-3.50)	**3.24** (2.55-4.20)	**3.82** (2.89-5.06)	**4.47** (3.24-6.06)	**5.42** (3.76-7.51)	**6.20** (4.16-8.61)
12-hr	**1.39** (1.16-1.66)	**1.61** (1.34-1.92)	**2.02** (1.69-2.43)	**2.44** (2.02-2.94)	**3.10** (2.52-3.96)	**3.68** (2.91-4.73)	**4.33** (3.30-5.68)	**5.05** (3.68-6.79)	**6.11** (4.27-8.41)	**6.98** (4.72-9.63)
24-hr	**1.63** (1.37-1.94)	**1.90** (1.60-2.26)	**2.40** (2.01-2.86)	**2.86** (2.39-3.43)	**3.60** (2.94-4.54)	**4.23** (3.35-5.37)	**4.92** (3.76-6.39)	**5.67** (4.15-7.55)	**6.77** (4.76-9.23)	**7.66** (5.21-10.5)
2-day	**1.90** (1.60-2.24)	**2.25** (1.90-2.66)	**2.87** (2.42-3.40)	**3.42** (2.86-4.06)	**4.24** (3.45-5.26)	**4.91** (3.90-6.16)	**5.63** (4.31-7.22)	**6.39** (4.69-8.41)	**7.47** (5.27-10.1)	**8.33** (5.70-11.3)
3-day	**2.09** (1.77-2.45)	**2.47** (2.09-2.90)	**3.14** (2.65-3.70)	**3.73** (3.13-4.41)	**4.59** (3.75-5.66)	**5.30** (4.22-6.60)	**6.04** (4.64-7.71)	**6.84** (5.03-8.94)	**7.94** (5.62-10.7)	**8.82** (6.06-12.0)
4-day	**2.24** (1.91-2.63)	**2.64** (2.24-3.10)	**3.33** (2.82-3.92)	**3.94** (3.32-4.65)	**4.83** (3.96-5.94)	**5.57** (4.44-6.92)	**6.34** (4.88-8.06)	**7.16** (5.28-9.34)	**8.30** (5.89-11.1)	**9.21** (6.35-12.5)
7-day	**2.64** (2.26-3.08)	**3.06** (2.61-3.57)	**3.79** (3.22-4.43)	**4.44** (3.75-5.21)	**5.39** (4.43-6.58)	**6.17** (4.94-7.62)	**6.99** (5.41-8.83)	**7.86** (5.84-10.2)	**9.08** (6.48-12.1)	**10.0** (6.97-13.5)
10-day	**2.98** (2.55-3.46)	**3.43** (2.94-3.99)	**4.21** (3.59-4.90)	**4.90** (4.15-5.72)	**5.90** (4.86-7.17)	**6.72** (5.40-8.26)	**7.58** (5.88-9.54)	**8.49** (6.32-11.0)	**9.76** (6.99-12.9)	**10.8** (7.50-14.4)
20-day	**3.94** (3.39-4.54)	**4.52** (3.88-5.21)	**5.48** (4.69-6.34)	**6.30** (5.37-7.32)	**7.48** (6.18-8.99)	**8.42** (6.80-10.2)	**9.39** (7.32-11.7)	**10.4** (7.78-13.3)	**11.8** (8.48-15.5)	**12.9** (9.01-17.1)
30-day	**4.74** (4.09-5.44)	**5.43** (4.68-6.23)	**6.56** (5.64-7.56)	**7.52** (6.42-8.69)	**8.84** (7.31-10.5)	**9.87** (7.98-11.9)	**10.9** (8.53-13.5)	**12.0** (8.99-15.2)	**13.4** (9.68-17.5)	**14.5** (10.2-19.2)
45-day	**5.74** (4.97-6.56)	**6.59** (5.70-7.54)	**7.95** (6.85-9.11)	**9.06** (7.77-10.4)	**10.6** (8.73-12.5)	**11.7** (9.46-14.0)	**12.8** (10.0-15.7)	**13.9** (10.5-17.6)	**15.4** (11.1-19.9)	**16.4** (11.6-21.7)
60-day	**6.61** (5.73-7.53)	**7.58** (6.57-8.65)	**9.13** (7.89-10.4)	**10.4** (8.91-11.9)	**12.0** (9.94-14.1)	**13.2** (10.7-15.8)	**14.4** (11.3-17.6)	**15.5** (11.7-19.5)	**16.9** (12.3-21.8)	**18.0** (12.7-23.6)

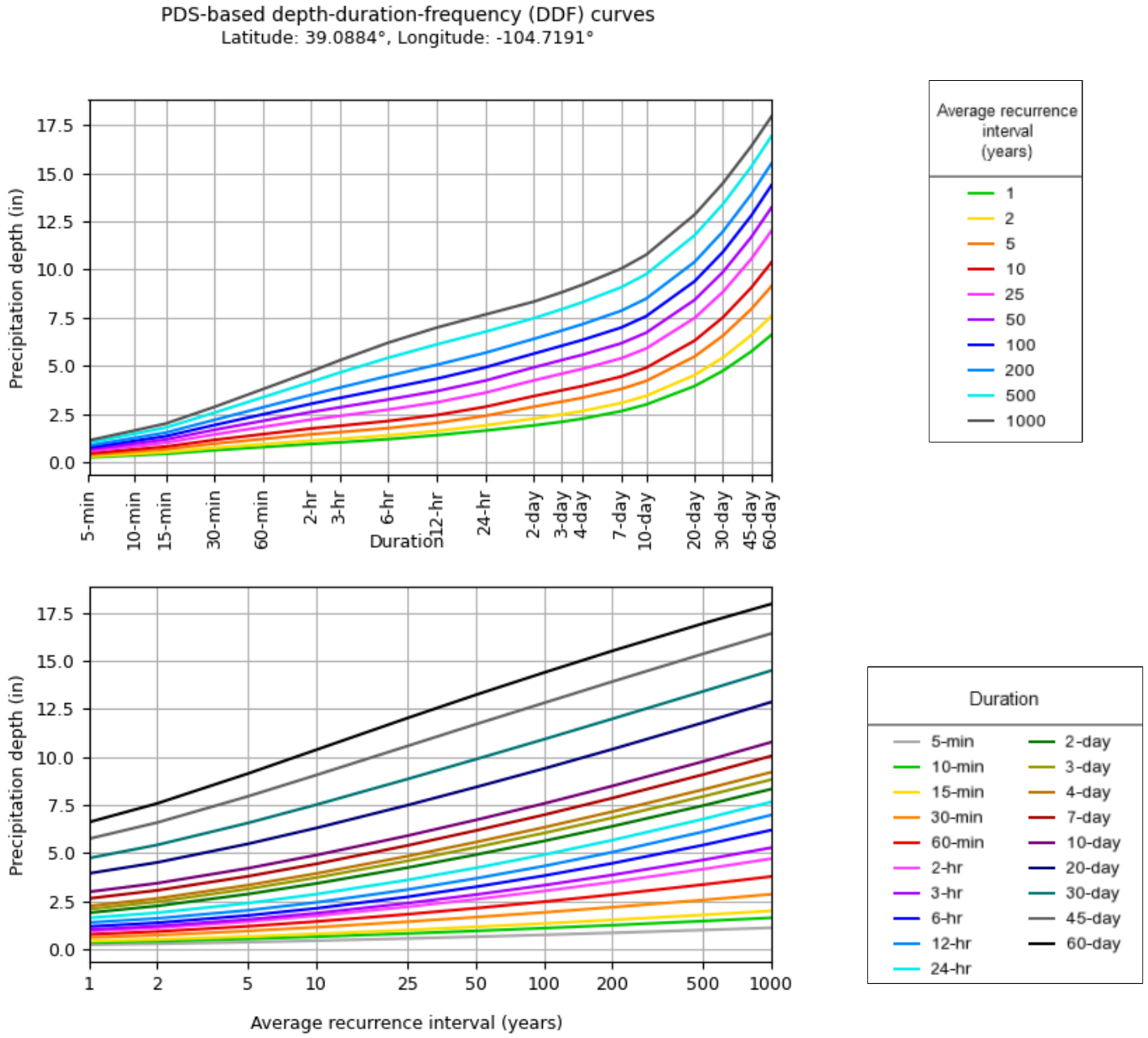
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



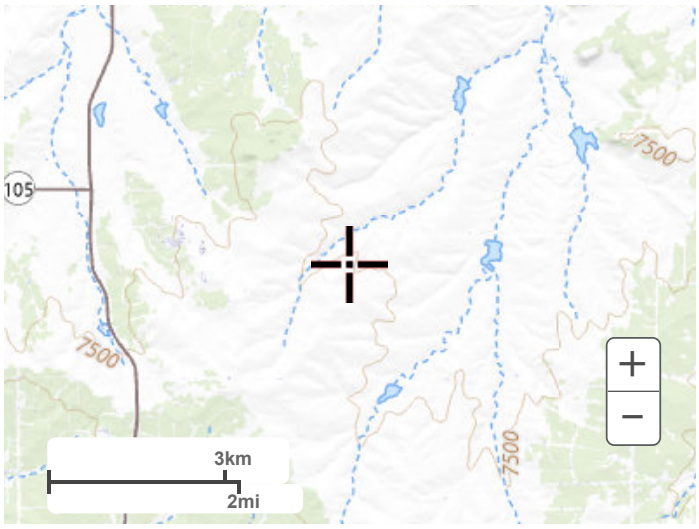
NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Thu Jun 19 01:06:57 2025

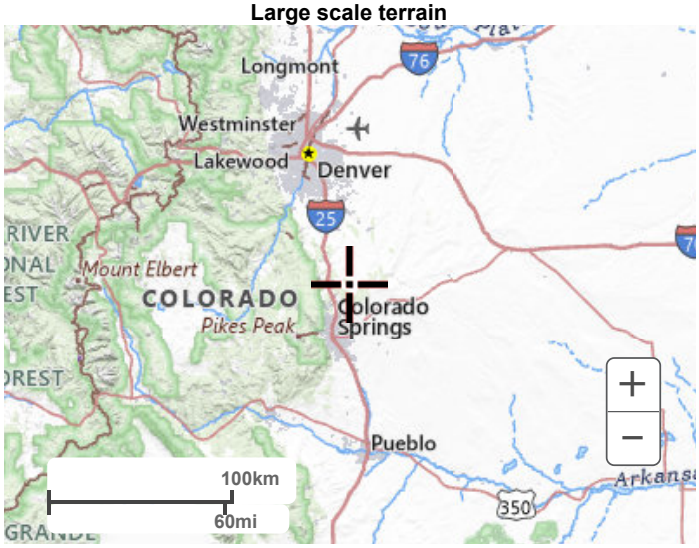
Back to Top

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map

Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

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 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, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

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/.

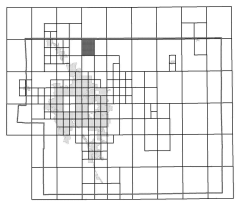
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

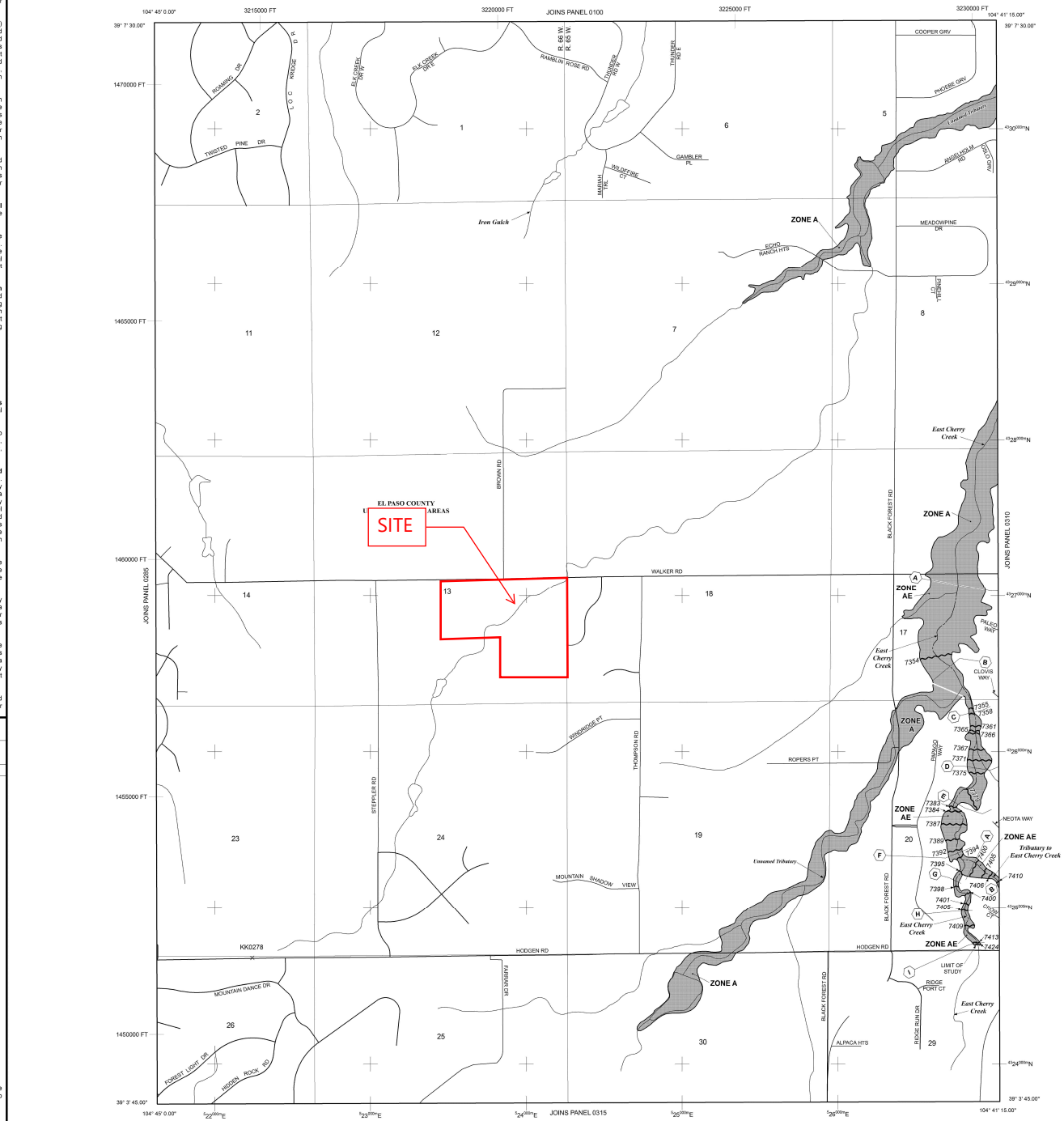
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

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.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 11 SOUTH, RANGE 65 WEST, AND TOWNSHIP 11 SOUTH, RANGE 66 WEST.

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)
4779000mN — 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 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 0305G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 305 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0305	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
08041C0305G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B – HYDROLOGIC CALCULATIONS

Subdivision:	Iron Ridge Subdivision
Location:	El Paso County
Project Name:	Iron Ridge Subdivision
Project Number:	25009
Calculated By:	NQJ
Checked By:	REB
Date:	9/17/2025

EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	13.4
OS3	53.90	-	-	-	41.4	4.3	20.4
EX1	14.49	3.5%	0.10	0.37	33.7	3.4	20.7
EX2	6.91	2.0%	0.09	0.36	21.1	1.9	12.6
EX3	17.73	3.4%	0.10	0.37	30.3	4.4	27.0
EX4	6.91	2.0%	0.09	0.36	19.5	1.9	13.1
EX5	39.65	2.0%	0.09	0.36	28.5	9.1	61.2
EX6	1.43	22.2%	0.22	0.45	11.1	1.2	4.3
EX7	3.54	2.0%	0.09	0.36	21.7	0.9	6.3
EX8	26.47	3.3%	0.10	0.37	38.3	5.5	34.6
EX9	12.23	2.0%	0.09	0.36	28.5	2.8	18.9
EX10	2.15	2.0%	0.09	0.36	15.9	0.7	4.5
EX11	2.84	6.6%	0.12	0.38	16.2	1.2	6.2

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	33.9	199.0
OS2	3.5	13.4
OS3	4.3	20.4
1	3.4	20.7
2	3.8	24.0
3	11.5	73.8
4	12.4	80.2
5 (ONSITE)	14.0	88.4
5 (TOTAL)	51.4	300.8
6	2.8	18.9
7 (ONSITE)	3.4	21.6
7 (TOTAL)	7.7	42.0

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		Gravel Drives				Paved				2.5+ Acre Lots				Historic				Weighted C_5 & C_{100}		Basins Total Weighted % Imp.
Basin ID	Total Area (ac)	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	
OS1	723.20	See Basin OS1 Streamstats data in Appendix B																		-
OS2	38.40	See Basin OS2 Streamstats data in Appendix B																		-
OS3	53.90	See Basin OS3 Streamstats data in Appendix B																		-
EX1	14.49	0.59	0.70	0.00	80.0%	0.90	0.96	0.22	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	14.27	2.0%	0.10	0.37	3.5%
EX2	6.91	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	6.91	2.0%	0.09	0.36	2.0%
EX3	17.73	0.59	0.70	0.00	80.0%	0.90	0.96	0.25	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	17.48	2.0%	0.10	0.37	3.4%
EX4	6.91	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	6.91	2.0%	0.09	0.36	2.0%
EX5	39.65	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	39.65	2.0%	0.09	0.36	2.0%
EX6	1.43	0.59	0.70	0.37	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	1.06	2.0%	0.22	0.45	22.2%
EX7	3.54	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	3.54	2.0%	0.09	0.36	2.0%
EX8	26.47	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	7.10	7.0%	0.09	0.36	19.37	2.0%	0.10	0.37	3.3%
EX9	12.23	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	12.23	2.0%	0.09	0.36	2.0%
EX10	2.15	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	2.15	2.0%	0.09	0.36	2.0%
EX11	2.84	0.59	0.70	0.08	80.0%	0.90	0.96	0.07	100.0%	0.12	0.39	0.00	7.0%	0.09	0.36	2.69	2.0%	0.12	0.38	6.6%
EX1-EX9	**134.35**																			**2.9%**

STANDARD FORM SF-2 - EXISTING CONDITIONS
TIME OF CONCENTRATION

Subdivision: Iron Ridge Subdivision
Location: El Paso County

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (NON-URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C_5	Weighted C_{100}	Impervious (%)	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
OS1	723.20	See Basin OS1 Streamstats data in Appendix B															129.0
OS2	38.40	See Basin OS2 Streamstats data in Appendix B															62.4
OS3	53.90	See Basin OS3 Streamstats data in Appendix B															41.4
EX1	14.49	B	0.10	0.37	3.5%	300	6.6%	16.7	1490	4.4%	7.0	1.5	16.9	33.7	1790.0	37.9	33.7
EX2	6.91	B	0.09	0.36	2.0%	300	10.0%	14.8	1142	4.0%	15.0	3.0	6.3	21.1	1442.0	35.9	21.1
EX3	17.73	B	0.10	0.37	3.4%	300	8.3%	15.5	1390	5.0%	7.0	1.6	14.8	30.3	1690.0	36.4	30.3
EX4	6.91	B	0.09	0.36	2.0%	300	10.0%	14.8	520	6.9%	7.0	1.8	4.7	19.5	820.0	29.2	19.5
EX5	39.65	B	0.09	0.36	2.0%	300	5.0%	18.6	2064	5.3%	15.0	3.5	10.0	28.5	2364.0	41.8	28.5
EX6	1.43	B	0.22	0.45	22.2%	20	2.0%	5.7	1388	7.9%	15.0	4.2	5.5	11.1	1408.0	29.0	11.1
EX7	3.54	B	0.09	0.36	2.0%	200	10.0%	12.1	870	1.0%	15.0	1.5	9.7	21.7	1070.0	41.3	21.7
EX8	26.47	B	0.10	0.37	3.3%	300	2.7%	22.6	1600	4.8%	7.0	1.5	17.4	40.0	1900.0	38.3	38.3
EX9	12.23	B	0.09	0.36	2.0%	265	3.8%	19.1	890	5.1%	7.0	1.6	9.4	28.5	1155.0	32.7	28.5
EX10	2.15	B	0.09	0.36	2.0%	155	4.9%	13.4	254	5.9%	7.0	1.7	2.5	15.9	409.0	27.5	15.9
EX11	2.84	B	0.12	0.38	6.6%	205	7.3%	13.1	257	3.9%	7.0	1.4	3.1	16.2	462.0	27.1	16.2

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

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

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-3

Table 6-2. NRCS Conveyance factors, K

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

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

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Equation 6-4 $$t_c = \frac{(26 - 17i) + L_t}{60(14i + 9)\sqrt{S_t}}$$

Where:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Equation 6-5

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

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
DESCRIPTION	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C* A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C* A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C* A (ac)	Slope (%)	Q_{pipe} (cfs)	C* A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	-	-	33.9															BASIN OS1 @ DPOS1
	OS2	OS2	38.40	-	62.4	-	-	3.5					3.5	-	3					661	1.2	9.1	BASIN OS1 @ DPOS2
	1	EX1	14.49	0.10	33.7	1.48	2.31	3.4	33.7	1.48	2.31	3.4	3.4	1.48	2.8					905	1.2	12.9	BASIN EX1 @ DP1, DRAINAGEWAY FLOW TO DP2
		EX2	6.91	0.09	21.1	0.62	3.01	1.9															BASIN EX2 @ DP2
	2								46.5	2.10	1.82	3.8	3.8	2.10	2.2					610	1.0	9.8	DP1 & BASIN EX2 COMBINED @ DP2, DRAINAGEWAY TO DP3
		EX3	17.73	0.10	30.3	1.80	2.46	4.4															BASIN EX3 @ DP3
		EX5	39.65	0.09	28.5	3.57	2.56	9.1															BASIN EX5 @ DP3
	3								56.3	7.47	1.54	11.5	11.5	7.47	0.9					476	0.7	11.9	DP2, BASIN EX3 & EX5 COMBINED @ DP3, DRAINAGEWAY FLOW TO DP4
		EX4	6.91	0.09	19.5	0.62	3.13	1.9															BASIN EX4 @ DP4
	4								56.3	8.09	1.54	12.4	12.4	8.09	2					750	1.0	12.6	DP3 & BASIN EX4 COMBINED @ DP4, DRAINAGEWAY FLOW TO DP5
		EX6	1.43	0.22	11.1	0.31	3.97	1.2															BASIN EX6 @ DP5
		EX7	3.54	0.09	21.7	0.32	2.97	0.9															BASIN EX7 @ DP5
		EX8	26.47	0.10	38.3	2.60	2.12	5.5															BASIN EX8 @ DP5
	5								68.9	11.32	1.23	14.0											TOTAL SITE FLOW @ DP5 (EXLUDES BASIN OS1 & OS2)
	5											51.4											TOTAL SITE & OFFSITE FLOW @ DP5 (INCLUDES BASIN OS1 & OS2)

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
DESCRIPTION	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C* A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C* A (ac)	Slope (%)	Q_{pipe} (cfs)	C* A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS3	OS3	-	-	-	-	-	4.3															BASIN OS3 FLOW @ DPOS3
	6	EX9	12.23	0.09	28.5	1.10	2.56	2.8					2.8	1.10	4.4					1010	1.5	11.5	BASIN EX9 FLOW @ DP6, DRAINAGEWAY FLOW TO DP5
		EX10	2.15	0.09	15.9	0.19	3.43	0.7															BASIN EX10 @ DP7
		EX11	2.84	0.12	16.2	0.35	3.41	1.2															BASIN EX11 @ DP7
	7								40.0	1.65	2.05	3.4											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (EXCLUDES BASIN OS3)
	7											7.7											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (INCLUDES BASIN OS3)

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

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	-	-	199.0															BASIN OS1 @ DPOS1
	OS2	OS2	38.40	-	62.4	-	-	13.4					3.5	-	3					661	1.2	9.1	BASIN OS1 @ DPOS2
	1	EX1	14.49	0.37	33.7	5.35	3.87	20.7	33.7	5.35	3.87	20.7	20.7	5.35	2.8					905	1.2	12.9	BASIN EX1 @ DP1, DRAINAGEWAY FLOW TO DP2
		EX2	6.91	0.36	21.1	2.49	5.05	12.6															BASIN EX2 @ DP2
	2								46.5	7.84	3.06	24.0	24.0	7.84	2.2					610	1.0	9.8	DP1 & BASIN EX2 COMBINED @ DP2, DRAINAGEWAY TO DP3
		EX3	17.73	0.37	30.3	6.53	4.14	27.0															BASIN EX3 @ DP3
		EX5	39.65	0.36	28.5	14.27	4.29	61.2															BASIN EX5 @ DP3
	3								56.3	28.64	2.58	73.8	73.8	28.64	0.9					476	0.7	11.9	DP2, BASIN EX3 & EX5 COMBINED @ DP3, DRAINAGEWAY FLOW TO DP4
		EX4	6.91	0.36	19.5	2.49	5.25	13.1															BASIN EX4 @ DP4
	4								56.3	31.13	2.58	80.2	80.2	31.13	2					750	1.0	12.6	DP3 & BASIN EX4 COMBINED @ DP4, DRAINAGEWAY FLOW TO DP5
		EX6	1.43	0.45	11.1	0.64	6.66	4.3															BASIN EX6 @ DP5
		EX7	3.54	0.36	21.7	1.27	4.98	6.3															BASIN EX7 @ DP5
		EX8	26.47	0.37	38.3	9.74	3.55	34.6															BASIN EX8 @ DP5
	5								68.9	42.79	2.07	88.4											TOTAL SITE FLOW @ DP5 (EXLUDES BASIN OS1 & OS2)
	5											300.8											TOTAL SITE & OFFSITE FLOW @ DP5 (INCLUDES BASIN OS1 & OS2)

STANDARD FORM SF-3 - EXISTING CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge Subdivision
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge Subdivision
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS3	OS3	-	-	-	-	-	20.4															BASIN OS3 FLOW @ DPOS3
	6	EX9	12.23	0.36	28.5	4.40	4.29	18.9					18.9	4.40	4.4					1010	1.5	11.5	BASIN EX9 FLOW @ DP6, DRAINAGEWAY FLOW TO DP5
		EX10	2.15	0.36	15.9	0.77	5.76	4.5															BASIN EX10 @ DP7
		EX11	2.84	0.38	16.2	1.09	5.72	6.2															BASIN EX11 @ DP7
	7								40.0	6.27	3.44	21.6											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (EXCLUDES BASIN OS3)
	7											42.0											DP6, BASIN EX10 & EX11 @ DP7, HISTORIC DRAINAGE EAST IN DRAINAGEWAY (INCLUDES BASIN OS3)

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

Subdivision:	Iron Ridge
Location:	El Paso County
Project Name:	Iron Ridge
Project Number:	25009
Calculated By:	NQJ
Checked By:	REB
Date:	9/17/2025

PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	17.41	6.2%	0.12	0.38	33.4	4.8	25.9
B	7.10	10.9%	0.15	0.41	19.5	3.4	15.4
C	4.54	11.0%	0.15	0.41	12.2	2.7	12.1
D	0.90	40.3%	0.40	0.58	6.7	1.7	4.2
E	0.58	38.1%	0.38	0.57	5.9	1.1	2.7
F	2.83	8.3%	0.13	0.40	20.7	1.1	5.7
G	3.91	4.8%	0.11	0.37	18.8	1.3	7.8
H	9.15	4.2%	0.10	0.37	19.1	3.0	17.8
I	3.54	2.0%	0.09	0.35	22.2	0.9	6.1
J	1.33	27.4%	0.30	0.51	12.2	1.5	4.4
K	0.89	7.0%	0.12	0.39	9.6	0.4	2.4
L	11.99	5.5%	0.11	0.38	27.2	3.5	20.0
M	2.04	5.5%	0.11	0.38	13.4	0.8	4.8
N	2.18	12.7%	0.16	0.42	9.2	1.5	6.5
O	0.73	23.9%	0.25	0.48	6.2	0.9	2.8
P	5.02	13.3%	0.17	0.43	17.4	2.9	11.9
Q	1.18	20.3%	0.23	0.46	11.5	1.1	3.6
R	1.81	24.3%	0.27	0.49	11.5	1.9	5.8
S	0.59	34.2%	0.35	0.54	8.1	0.9	2.4
T	0.87	7.6%	0.13	0.38	9.5	0.5	2.3
U	31.90	4.4%	0.10	0.37	32.5	7.9	46.6
V	25.02	3.9%	0.10	0.37	31.2	6.1	37.1
OS1	723.20	-	-	-	129.0	34.0	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.0	199.0
OS2	3.5	16.4
OS3	4.3	20.4
1	4.8	25.9
2	5.6	25.2
3	7.4	29.7
4	8.0	33.4
5	3.9	49.6
6	10.3	89.4
7	3.5	20
8	0.8	4.8
9	1.5	6.5
10	2.3	9
11 (ONSITE)	4.2	22.3
11 (TOTAL)	8.5	42.7
12	2.9	11.5
13	4.6	16.6
14	4.8	17.5
15 (ONSITE)	12.7	92.5
15 (TOTAL)	50.2	294.9

EXISTING V. PROPOSED DESIGN POINT COMPARISON						
Ex/Pr DP	Ex Q_5 (cfs)	Ex Q_{100} (cfs)	Pr Q_5 (cfs)	Pr Q_{100} (cfs)	Q_5 Change	Q_{100} Change
5/15	14	88.4	12.7	92.5	-9.3%	4.6%
7/11	3.4	21.6	4.2	22.3	23.5%	3.2%

COMPOSITE % IMPERVIOUS CALCULATIONS - PROPOSED CONDITIONS

Subdivision: Iron Ridge
Location: El Paso County

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By:
Date: 9/17/25

		Gravel				Paved				Pasture/Meadow				2.5+ Large Lots				Historic				Weighted C_5 & C_{100}		Basins Total Weighted % Imp.
Basin ID	Total Area (ac)	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	Area (ac)	% Imp.	C_5	C_{100}	
OS1	723.20	See Basin OS1 Streamstats data in Appendix B																						-
OS2	38.40	See Basin OS2 Streamstats data in Appendix B																						-
OS3	53.90	See Basin OS3 Streamstats data in Appendix B																						-
A	17.41	0.59	0.70	0.00	80.0%	0.90	0.96	0.22	100.0%	0.09	0.35	6.81	2.0%	0.12	0.39	10.38	7.0%	0.09	0.35	0.00	2.0%	0.12	0.38	6.2%
B	7.10	0.59	0.70	0.04	80.0%	0.90	0.96	0.30	100.0%	0.09	0.35	0.60	2.0%	0.12	0.39	6.16	7.0%	0.09	0.35	0.00	2.0%	0.15	0.41	10.9%
C	4.54	0.59	0.70	0.03	80.0%	0.90	0.96	0.19	100.0%	0.09	0.35	0.34	2.0%	0.12	0.39	3.98	7.0%	0.09	0.35	0.00	2.0%	0.15	0.41	11.0%
D	0.90	0.59	0.70	0.04	80.0%	0.90	0.96	0.32	100.0%	0.09	0.35	0.54	2.0%	0.12	0.39	0.00	7.0%	0.09	0.35	0.00	2.0%	0.40	0.58	40.3%
E	0.58	0.59	0.70	0.03	80.0%	0.90	0.96	0.19	100.0%	0.09	0.35	0.36	2.0%	0.12	0.39	0.00	7.0%	0.09	0.35	0.00	2.0%	0.38	0.57	38.1%
F	2.83	0.59	0.70	0.03	80.0%	0.90	0.96	0.03	100.0%	0.09	0.35	0.27	2.0%	0.12	0.39	2.50	7.0%	0.09	0.35	0.00	2.0%	0.13	0.40	8.3%
G	3.91	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	1.70	2.0%	0.12	0.39	2.21	7.0%	0.09	0.35	0.00	2.0%	0.11	0.37	4.8%
H	9.15	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	5.18	2.0%	0.12	0.39	3.97	7.0%	0.09	0.35	0.00	2.0%	0.10	0.37	4.2%
I	3.54	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	0.00	7.0%	0.09	0.35	3.54	2.0%	0.09	0.35	2.0%
J	1.33	0.59	0.70	0.00	80.0%	0.90	0.96	0.34	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	0.10	7.0%	0.09	0.35	0.89	2.0%	0.30	0.51	27.4%
K	0.89	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	0.89	7.0%	0.09	0.35	0.00	2.0%	0.12	0.39	7.0%
L	11.99	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	3.60	2.0%	0.12	0.39	8.39	7.0%	0.09	0.35	0.00	2.0%	0.11	0.38	5.5%
M	2.04	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.61	2.0%	0.12	0.39	1.43	7.0%	0.09	0.35	0.00	2.0%	0.11	0.38	5.5%
N	2.18	0.59	0.70	0.08	80.0%	0.90	0.96	0.07	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	2.03	7.0%	0.09	0.35	0.00	2.0%	0.16	0.42	12.7%
O	0.73	0.59	0.70	0.08	80.0%	0.90	0.96	0.07	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	0.58	7.0%	0.09	0.35	0.00	2.0%	0.25	0.48	23.9%
P	5.02	0.59	0.70	0.04	80.0%	0.90	0.96	0.34	100.0%	0.09	0.35	0.54	2.0%	0.12	0.39	4.10	7.0%	0.09	0.35	0.00	2.0%	0.17	0.43	13.3%
Q	1.18	0.59	0.70	0.03	80.0%	0.90	0.96	0.17	100.0%	0.09	0.35	0.45	2.0%	0.12	0.39	0.53	7.0%	0.09	0.35	0.00	2.0%	0.23	0.46	20.3%
R	1.81	0.59	0.70	0.04	80.0%	0.90	0.96	0.34	100.0%	0.09	0.35	0.66	2.0%	0.12	0.39	0.77	7.0%	0.09	0.35	0.00	2.0%	0.27	0.49	24.3%
S	0.59	0.59	0.70	0.03	80.0%	0.90	0.96	0.17	100.0%	0.09	0.35	0.39	2.0%	0.12	0.39	0.00	7.0%	0.09	0.35	0.00	2.0%	0.35	0.54	34.2%
T	0.87	0.59	0.70	0.05	80.0%	0.90	0.96	0.01	100.0%	0.09	0.35	0.81	2.0%	0.12	0.39	0.00	7.0%	0.09	0.35	0.00	2.0%	0.13	0.38	7.6%
U	31.90	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	15.29	7.0%	0.09	0.35	16.59	2.0%	0.10	0.37	4.4%
V	25.02	0.59	0.70	0.00	80.0%	0.90	0.96	0.00	100.0%	0.09	0.35	0.00	2.0%	0.12	0.39	9.58	7.0%	0.09	0.35	15.44	2.0%	0.10	0.37	3.9%
A-V TOTAL	**135.51**																							**7.0%**
Pond 1 (B-F)	**15.95**																							**13.1%**
Pond 2 (P-T)	**9.47**																							**17.1%**

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: Iron Ridge
Location: El Paso County

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By:
Date: 9/17/25

SUB-BASIN DATA					INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C_5	Impervious (%)	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
OS1	723.20	B	See Basin OS1 Streamstats data in Appendix B													129.0
OS2	38.40	B	See Basin OS2 Streamstats data in Appendix B													62.4
OS3	53.90	B	See Basin OS3 Streamstats data in Appendix B													41.4
A	17.41	B	0.12	6.2%	300	6.6%	16.5	1490	4.4%	7.0	1.5	16.9	33.4	1790.0	36.9	33.4
B	7.10	B	0.15	10.9%	300	6.6%	15.9	747	5.3%	15.0	3.5	3.6	19.5	1047.0	29.3	19.5
C	4.54	B	0.15	11.0%	170	11.6%	9.9	397	3.8%	15.0	2.9	2.3	12.2	567.0	27.4	12.2
D	0.90	B	0.40	40.3%	31	25.0%	2.4	836	4.8%	15.0	3.3	4.2	6.7	867.0	23.5	6.7
E	0.58	B	0.38	38.1%	11	25.0%	1.5	624	2.4%	15.0	2.3	4.5	5.9	634.5	24.2	5.9
F	2.83	B	0.13	8.3%	240	4.1%	17.0	476	9.5%	7.0	2.2	3.7	20.7	716.0	27.1	20.7
G	3.91	B	0.11	4.8%	300	8.3%	15.4	410	8.5%	7.0	2.0	3.3	18.8	710.0	27.6	18.8
H	9.15	B	0.10	4.2%	184	7.1%	12.8	658	6.1%	7.0	1.7	6.3	19.1	842.0	29.9	19.1
I	3.54	B	0.09	2.0%	300	10.0%	14.8	665	1.0%	15.0	1.5	7.4	22.2	965.0	37.6	22.2
J	1.33	B	0.30	27.4%	18	2.0%	4.9	1331	4.1%	15.0	3.0	7.3	12.2	1349.0	29.9	12.2
K	0.89	B	0.12	7.0%	60	8.3%	6.8	270	5.5%	7.0	1.6	2.7	9.6	330.0	26.7	9.6
L	11.99	B	0.11	5.5%	264	3.8%	18.7	865	5.8%	7.0	1.7	8.6	27.2	1129.0	31.2	27.2
M	2.04	B	0.11	5.5%	125	8.0%	10.1	272	3.7%	7.0	1.3	3.4	13.4	397.0	27.5	13.4
N	2.18	B	0.16	12.7%	110	9.1%	8.6	120	4.2%	15.0	3.1	0.7	9.2	230.0	24.8	9.2
O	0.73	B	0.25	23.9%	30	10.0%	3.9	400	4.0%	15.0	3.0	2.2	6.2	430.0	24.6	6.2
P	5.02	B	0.17	13.3%	300	6.6%	15.5	385	5.5%	15.0	3.5	1.8	17.4	685.0	26.2	17.4
Q	1.18	B	0.23	20.3%	150	13.3%	8.2	375	1.6%	15.0	1.9	3.3	11.5	525.0	26.7	11.5
R	1.81	B	0.27	24.3%	62	6.0%	6.6	950	4.5%	15.0	3.2	5.0	11.5	1012.0	27.9	11.5
S	0.59	B	0.35	34.2%	26	10.0%	3.2	575	1.7%	15.0	2.0	4.9	8.1	601.0	25.5	8.1
T	0.87	B	0.13	7.6%	50	5.0%	7.3	244	6.9%	7.0	1.8	2.2	9.5	294.0	26.2	9.5
U	31.90	B	0.10	4.4%	300	8.3%	15.5	1600	5.0%	7.0	1.6	17.0	32.5	1900.0	37.7	32.5
V	25.02	B	0.10	3.9%	300	10.0%	14.6	1379	3.9%	7.0	1.4	16.6	31.2	1679.0	37.5	31.2

NOTES:

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: Iron Ridge
Location: El Paso County

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By:
Date: 9/17/25

SUB-BASIN DATA					INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Weighted C_5	Impervious (%)	*L* (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	*K*	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

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

Where:

t_t = channelized flow time (travel time, min)
L_t = waterway length (ft)
S_o = waterway slope (ft/ft)
V_t = travel time velocity (ft/sec) = $K\sqrt{S_o}$
K = NRCS conveyance factor (see Table 6-2).

Eq

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

Equation 6-3

Where:

t_i = overland (initial) flow time (minutes)
C_5 = runoff coefficient for 5-year frequency (from Table 6-4)
L_i = length of overland flow (ft)
S_o = average slope along the overland flow path (ft/ft).

Equation 6-4 $(26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

Equation 6-5

:

t_c = minimum time of concentration for first design point when less than t_c from Equation 6-1.
L_t = length of channelized flow path (ft)
i = imperviousness (expressed as a decimal)
S_t = slope of the channelized flow path (ft/ft).

Table 6-2. NRCS Conveyance factors, K

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

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

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	116.00	0.29	34.0					34.02	116.00	0.8					2300	0.6	61.2	BASIN OS1 FLOW @ DPOS1,CONTINUES TO DP15
	OS2	OS2	38.40	-	62.4	2.50	1.38	3.5					3.5	2.50	3					661	1.2	9.1	BASIN OS1 FLOW @ DPOS2, CONTINUES TO DP15
	1	A	17.41	0.12	33.4	2.06	2.32	4.8	33.4	2.06	2.32	4.8	4.8	2.06	1.8					1369	0.9	24.3	BASIN A FLOW @ DP1, DRAINAGEWAY FLOW TO DP5
		B	7.10	0.15	19.5	1.09	3.13	3.4															BASIN B FLOW @ DP2
		C	4.54	0.15	12.2	0.70	3.83	2.7															BASIN C FLOW @ DP2
	2								19.5	1.78	3.13	5.6				5.6	1.78	1.0	18	50	6.0	0.1	BASIN B & C @ DP2, CULVERT FLOW TO DP3
		D	0.90	0.40	6.7	0.36	4.74	1.7															BASIN D FLOW @ DP3
		E	0.58	0.38	5.9	0.22	4.91	1.1															BASIN E FLOW @ DP3
	3								19.6	2.37	3.12	7.4	7.4	2.37	4.3					230	1.5	2.6	DP2, BASIN E & D @ DP3, SWALE FLOW TO DP4 (POND 1)
		F	2.83	0.13	20.7	0.37	3.04	1.1															BASIN F FLOW @ DP4
	4								22.3	2.73	2.93	8.0											COMBINED DP3 & BASIN F @ DP4 (POND 1)
		G	3.91	0.11	18.8	0.42	3.18	1.3															BASIN G FLOW @ DP5
		H	9.15	0.10	19.1	0.94	3.16	3.0															BASIN H FLOW @ DP6
		I	3.54	0.09	22.2	0.32	2.94	0.9															BASIN I FLOW @ DP15
		J	1.33	0.30	12.2	0.40	3.83	1.5															BASIN J FLOW @ DP15
		K	0.89	0.12	9.6	0.11	4.20	0.4					0.4	0.11	5.7					1902	1.7	19.0	BASIN K @ DP5
		U	31.90	0.10	32.5	3.33	2.36	7.9															BASIN U FLOW @ DP6
	5								57.7	2.58	1.50	3.9	3.9	2.58	1					576	0.7	13.7	DP1, BASIN G, BASIN K & POND 1 DISCHARGE @ DP5, DRAINAGEWAY FLOW TO DP6
	6								57.7	6.85	1.50	10.3	10.3	6.85	2					600	1.0	10.1	DP5, BASIN H, BASIN U & POND 2 DISCHARGE @ DP6, DRAINAGEWAY FLOW TO DP15

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 5-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	OS3	OS3	-	-	41.4	-	-	4.3															BASIN OS3 @ DPOS3, DRAINAGEWAY TO DP11
	7	L	11.99	0.11	27.2	1.33	2.63	3.5					3.5	1.33	2.5					900	1.1	13.6	BASIN L @ DP7, OFFSITE FLOW EAST TO DP11
	8	M	2.04	0.11	13.4	0.23	3.69	0.8					0.8	0.23	6					715	1.7	6.9	BASIN M @ DP8, OFFSITE FLOW EAST TO DP11
	9	N	2.18	0.16	9.2	0.35	4.25	1.5								1.5	0.35	1.0	18	50	4.1	0.2	BASIN N @ DP9, CULVERT FLOW UNDER COLT COURT TO DP10
		O	0.73	0.25	6.2	0.18	4.85	0.9															BASIN O @ DP10
	10								9.4	0.53	4.22	2.3	2.3	0.53	10					350	2.2	2.6	DP9 & BASIN O @ DP10, SWALE FLOW TO DP11
	11								40.8	2.09	2.02	4.2											DP7, DP8 & DP10 COMBINED @ DP11 (EXCLUDES BASIN OS3)
	11											8.5											DP7, DP8, DP10 & DPOS3 COMBINED @ DP11 (INCLUDES BASIN OS3)
		P	5.02	0.17	17.4	0.87	3.30	2.9															BASIN P FLOW @ DP12
		Q	1.18	0.23	11.5	0.27	3.93	1.1															BASIN Q FLOW @ DP12
	12								28.8	1.15	2.54	2.9				2.9	1.15	1.0	18	50	5.1	0.2	BASIN P & Q @ DP12, CULVERT UNDER COLT COURT TO DP13
		R	1.81	0.27	11.5	0.48	3.91	1.9															BASIN R FLOW @ DP13
		S	0.59	0.35	8.1	0.21	4.44	0.9															BASIN S FLOW @ DP13
	13								29.0	1.83	2.53	4.6	4.6	1.83	10					185	2.2	1.4	DP12, BASIN R & S @ DP13, SWALE FLOW TO DP14 (POND 2)
		T	0.87	0.13	9.5	0.11	4.20	0.5															BASIN T FLOW @ DP14
	14								30.4	1.94	2.46	4.8											COMBINED DP13 & BASIN T FLOW @ DP14 (POND 2)
		V	25.02	0.10	31.2	2.54	2.42	6.1															BASIN V @ DP15
	15								67.8	10.11	1.26	12.7											TOTAL SITE FLOW @ DP15 (EXCLUDES BASIN OS1 & OS2)
												50.2											TOTAL SITE & OFFSITE FLOW @ DP15 (INCLUDES BASIN OS1 & OS2)

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

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	OS1	OS1	723.20	-	129.0	407.50	0.49	199.0															BASIN OS1 FLOW @ DPOS1
	OS2	OS2	38.40	-	62.4	7.08	2.32	16.4					3.5	-	3					661	1.2	9.1	BASIN OS1 FLOW @ DPOS2
									129.0	414.58	0.49	202.4											COMBINED DPOS1 & DPOS2 @ DP15
	1	A	17.41	0.38	33.4	6.64	3.89	25.9	33.4	6.64	3.89	25.9	25.9	6.64	1.8					1369	0.9	24.3	BASIN A FLOW @ DP1, DRAINAGEWAY FLOW TO DP5
		B	7.10	0.41	19.5	2.93	5.25	15.4															BASIN B FLOW @ DP2
		C	4.54	0.41	12.2	1.87	6.43	12.1															BASIN C FLOW @ DP2
	2								19.5	4.80	5.25	25.2				25.2	4.80	1.0	18	50	14.3	0.1	BASIN B & C @ DP2, CULVERT FLOW TO DP3
		D	0.90	0.58	6.7	0.52	7.95	4.2															BASIN D FLOW @ DP3
		E	0.58	0.57	5.9	0.33	8.25	2.7															BASIN E FLOW @ DP3
	3								19.6	5.66	5.24	29.7	29.7	5.66	4.3					230	1.5	2.6	DP2, BASIN E & D @ DP3, SWALE FLOW TO DP4 (POND 1)
		F	2.83	0.40	20.7	1.12	5.10	5.7															BASIN F FLOW @ DP4
	4								22.2	6.78	4.92	33.4											COMBINED DP3 & BASIN F @ DP4 (POND 1)
		G	3.91	0.37	18.8	1.46	5.34	7.8															BASIN G FLOW @ DP5
		H	9.15	0.37	19.1	3.36	5.30	17.8															BASIN H FLOW @ DP6
		I	3.54	0.35	22.2	1.24	4.93	6.1															BASIN I FLOW @ DP15
		J	1.33	0.51	12.2	0.68	6.43	4.4															BASIN J FLOW @ DP15
		K	0.89	0.39	9.6	0.35	7.05	2.4					2.4	0.35	5.7					1902	1.7	19.0	BASIN K @ DP5
		U	31.90	0.37	32.5	11.77	3.96	46.6															BASIN U FLOW @ DP6

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 100-Year

Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	t_{tc} (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	5								57.7	8.45	2.52	49.6	49.6	19.69	1					576	0.7	13.7	DP1, BASIN G, BASIN K & POND 1 DISCHARGE @ DP5, DRAINAGEWAY FLOW TO DP6
	6								71.4	23.58	1.98	89.4	89.4	45.15	2					600	1.0	10.1	DP5, BASIN H, BASIN U & POND 2 DISCHARGE @ DP6, DRAINAGEWAY FLOW TO DP15
	OS3	OS3	-	-	41.4	-	-	20.4															BASIN OS3 @ DPOS3, DRAINAGEWAY TO DP11
	7	L	11.99	0.38	27.2	4.53	4.41	20.0					20.0	4.53	2.5					900	1.1	13.6	BASIN L @ DP7, OFFSITE FLOW EAST TO DP11
	8	M	2.04	0.38	13.4	0.77	6.19	4.8					4.8	0.77	6					715	1.7	6.9	BASIN M @ DP8, OFFSITE FLOW EAST TO DP11
	9	N	2.18	0.42	9.2	0.91	7.14	6.5								6.5	0.91	1.0	18	50	6.2	0.1	BASIN N @ DP9, CULVERT FLOW UNDER COLT COURT TO DP10
		O	0.73	0.48	6.2	0.35	8.15	2.8															BASIN O @ DP10
	10								9.4	1.26	7.10	9.0	9.0	1.26	10					350	2.2	2.6	DP9 & BASIN O @ DP10, SWALE FLOW TO DP11
	11								40.8	6.57	3.39	22.3											DP7, DP8 & DP10 COMBINED @ DP11 (EXCLUDES BASIN OS3)
	11											42.7											DP7, DP8, DP10 & DPOS3 COMBINED @ DP11 (INCLUDES BASIN OS3)
		P	5.02	0.43	17.4	2.14	5.54	11.9															BASIN P FLOW @ DP12
		Q	1.18	0.46	11.5	0.55	6.59	3.6															BASIN Q FLOW @ DP12
	12								28.8	2.69	4.26	11.5				11.5	2.69	1.0	18	50	6.5	0.1	BASIN P & Q @ DP12, CULVERT UNDER COLT COURT TO DP13
		R	1.81	0.49	11.5	0.89	6.57	5.8															BASIN R FLOW @ DP13
		S	0.59	0.54	8.1	0.32	7.45	2.4															BASIN S FLOW @ DP13
	13								29.0	3.90	4.25	16.6	16.6	3.90	10					185	2.2	1.4	DP12, BASIN R & S @ DP13, SWALE FLOW TO DP14 (POND 2)
		T	0.87	0.38	9.5	0.33	7.06	2.3															BASIN T FLOW @ DP14
	14								30.3	4.23	4.13	17.5											COMBINED DP13 & BASIN T FLOW @ DP14 (POND 2)
		V	25.02	0.37	31.2	9.14	4.06	37.1															BASIN V @ DP15

STANDARD FORM SF-3 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Iron Ridge
Location: El Paso County
Design Storm: 100-Year

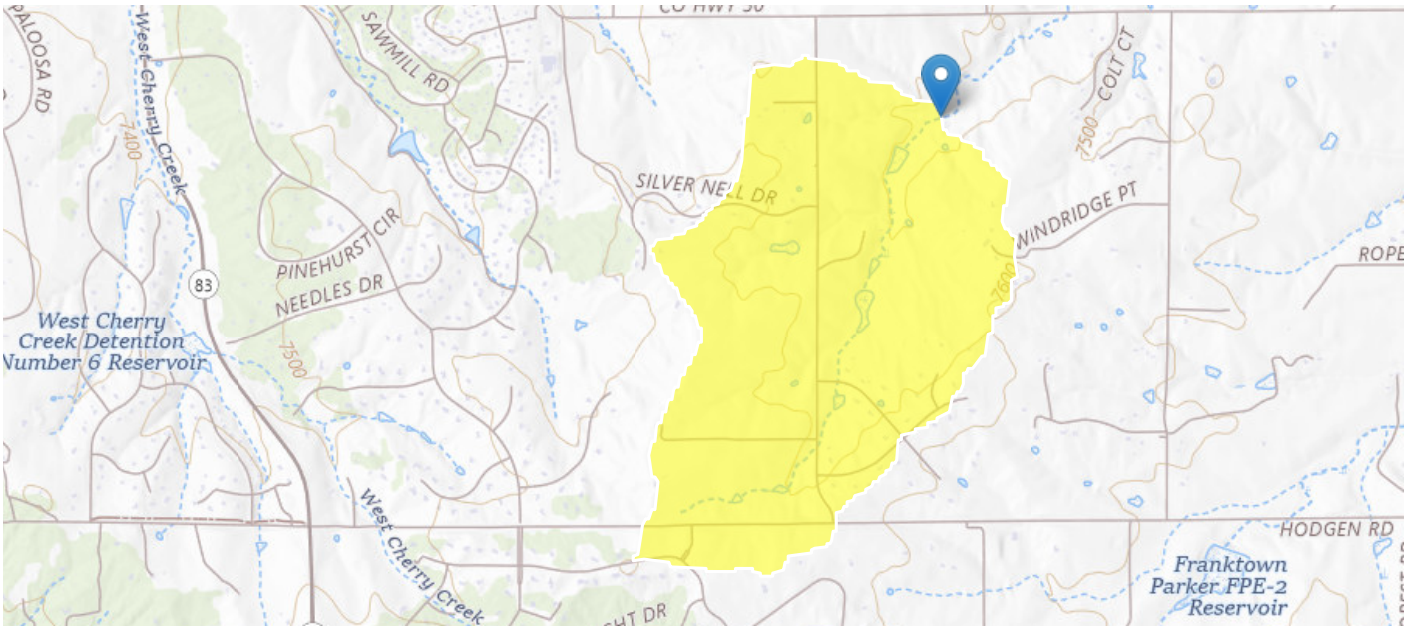
Project Name: Iron Ridge
Project No.: 25009.00
Calculated By: NQJ
Checked By: REB
Date: 9/17/25

		DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			
STREET	Design Point	Basin ID	Area (ac)	Runoff Coeff.	t_c (min)	C*A (ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	Q_{street} (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	15								81.5	56.21	1.65	92.5											TOTAL SITE FLOW @ DP15 (EXCLUDES BASIN OS1 & OS2)
	15											294.9											TOTAL SITE & OFFSITE FLOW @ DP15 (INCLUDES BASIN OS1 & OS2)

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

Iron Ridge Subdivision - DPOS1 - Offsite Drainage Basin South

Region ID: CO
Workspace ID: CO20250911180450987000
Clicked Point (Latitude, Longitude): 39.08832, -104.72674
Time: 2025-09-11 12:05:15 -0600



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	7	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	99.4	feet per mi
DRNAREA	Area that drains to a point on a stream	1.13	square miles
EL7500	Percent of area above 7500 ft	97	percent
ELEV	Mean Basin Elevation	7588	feet
ELEVMAX	Maximum basin elevation	7700	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.96	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.92	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3.83	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.088337	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	3.9	percent

Parameter Code	Parameter Description	Value	Unit
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	0.6	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	69	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	4	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	26.5	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0	percent
LFPLENGTH	Length of longest flow path	1.96	miles
LONG_OUT	Longitude of Basin Outlet	-104.726713	degrees
MINBELEV	Minimum basin elevation	7470	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7474	feet
PRECIP	Mean Annual Precipitation	21.75	inches
RCN	Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	61.76	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.25	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	100	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	0	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	1.1	percent
TOC	Time of concentration in hours	2.15	hours

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.13	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3.83	inches	2.38	4.89
OUTLETELEV	Elevation of Gage	7474	feet	4290	8270
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5

Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	ASEp
50-percent AEP flood	11.8	ft^3/s	117
20-percent AEP flood	33.9	ft^3/s	87

Statistic	Value	Unit	ASEp
10-percent AEP flood	57.6	ft^3/s	80
4-percent AEP flood	100	ft^3/s	80
2-percent AEP flood	143	ft^3/s	83
1-percent AEP flood	199	ft^3/s	88
0.5-percent AEP flood	263	ft^3/s	94
0.2-percent AEP flood	368	ft^3/s	104

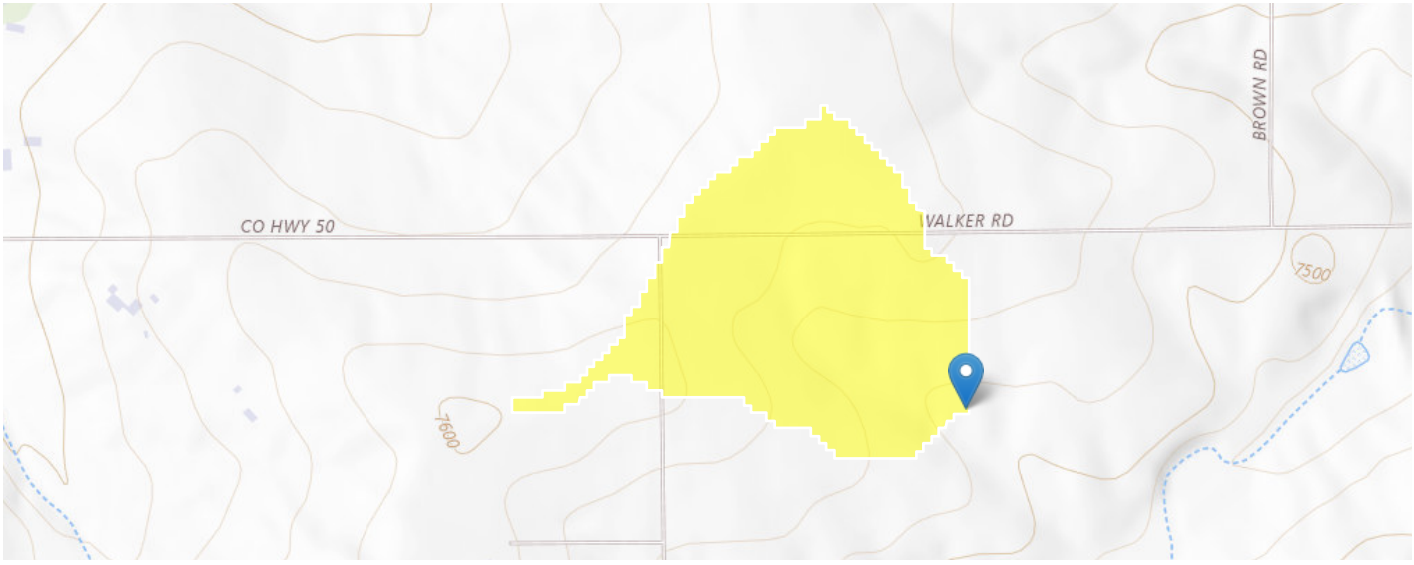
Peak-Flow Statistics Citations

Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A.,2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (http://dx.doi.org/10.3133/sir20165099)

Application Version: 4.29.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Iron Ridge Subdivision - DPOS2 - Offsite Drainage Basin West

Region ID: CO
Workspace ID: CO20250911180928394000
Clicked Point (Latitude, Longitude): 39.09053, -104.72889
Time: 2025-09-11 12:09:51 -0600



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	5	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	146.3	feet per mi
DRNAREA	Area that drains to a point on a stream	0.0576	square miles
EL7500	Percent of area above 7500 ft	100	percent
ELEV	Mean Basin Elevation	7556	feet
ELEVMAX	Maximum basin elevation	7600	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.93	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.91	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.090594	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	10.2	percent
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	0	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	78.1	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	10.3	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	11.7	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent

Parameter Code	Parameter Description	Value	Unit
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0	percent
LFPLENGTH	Length of longest flow path	0.61	miles
LONG_OUT	Longitude of Basin Outlet	-104.728901	degrees
MINBELEV	Minimum basin elevation	7500	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7504	feet
PRECIP	Mean Annual Precipitation	21.86	inches
RCN	Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	60.17	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.25	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	100	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	0	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0	percent
TOC	Time of concentration in hours	1.04	hours

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0576	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3	inches	2.38	4.89
OUTLETELEV	Elevation of Gage	7504	feet	4290	8270
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5

Peak-Flow Statistics Disclaimers [Foothills Region Peak Flow 2016 5099]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

Statistic	Value	Unit
50-percent AEP flood	1.28	ft^3/s
20-percent AEP flood	3.46	ft^3/s
10-percent AEP flood	5.6	ft^3/s
4-percent AEP flood	9.1	ft^3/s
2-percent AEP flood	12.3	ft^3/s
1-percent AEP flood	16.4	ft^3/s
0.5-percent AEP flood	20.8	ft^3/s
0.2-percent AEP flood	27.8	ft^3/s

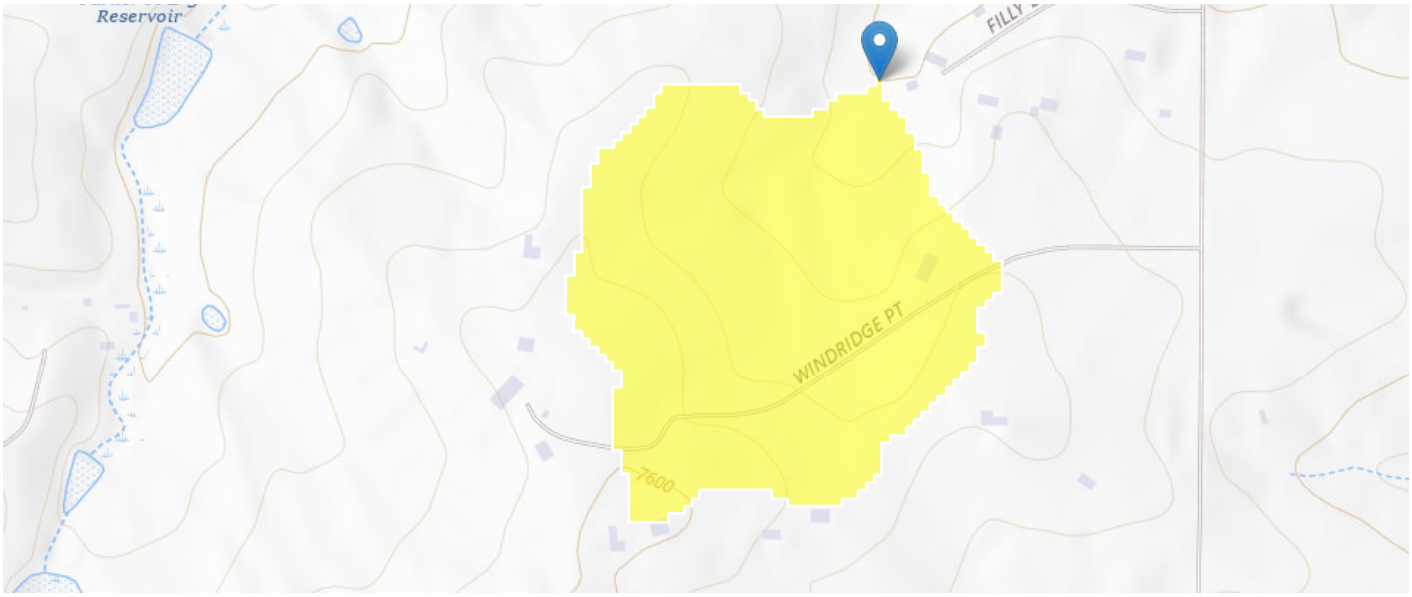
Peak-Flow Statistics Citations

Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A.,2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (http://dx.doi.org/10.3133/sir20165099)

Application Version: 4.29.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Iron Ridge Subdivision - DPOS3 - Offsite Drainage Basin South

Region ID: CO
Workspace ID: CO20250916210122474000
Clicked Point (Latitude, Longitude): 39.08654, -104.71870
Time: 2025-09-16 15:01:34 -0600



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM10M	Mean basin slope computed from 10 m DEM	6	percent
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	268.2	feet per mi
DRNAREA	Area that drains to a point on a stream	0.0843	square miles
EL7500	Percent of area above 7500 ft	100	percent
ELEV	Mean Basin Elevation	7557	feet
ELEVMAX	Maximum basin elevation	7610	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	4.93	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	1.9	inches
I6H100Y	6-hour precipitation that is expected to occur on average once in 100 years	3	inches
I6H2Y	Maximum 6-hour precipitation that occurs on average once in 2 years	1.38	inches
LAT_OUT	Latitude of Basin Outlet	39.086515	degrees
LC11BARE	Percentage of barren from NLCD 2011 class 31	0	percent
LC11CRPHAY	Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	0	percent
LC11FOREST	Percentage of forest from NLCD 2011 classes 41-43	0	percent
LC11GRASS	Percent of area covered by grassland/herbaceous using 2011 NLCD	70	percent

Parameter Code	Parameter Description	Value	Unit
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0	percent
LC11SHRUB	Percent of area covered by shrubland using 2011 NLCD	30	percent
LC11SNOIC	Percent snow and ice from NLCD 2011 class 12	0	percent
LC11WATER	Percent of open water, class 11, from NLCD 2011	0	percent
LC11WETLND	Percentage of wetlands, classes 90 and 95, from NLCD 2011	0	percent
LFPLENGTH	Length of longest flow path	0.43	miles
LONG_OUT	Longitude of Basin Outlet	-104.718741	degrees
MINBELEV	Minimum basin elevation	7500	feet
OUTLETELEV	Elevation of the stream outlet in feet above NAVD88	7501	feet
PRECIP	Mean Annual Precipitation	21.46	inches
RCN	Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	61.66	dimensionless
RUNCO_CO	Soil runoff coefficient as defined by Verdin and Gross (2017)	0.24	dimensionless
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
SSURGOB	Percentage of area of Hydrologic Soil Type B from SSURGO	100	percent
SSURGOC	Percentage of area of Hydrologic Soil Type C from SSURGO	0	percent
SSURGOD	Percentage of area of Hydrologic Soil Type D from SSURGO	0	percent
STATSCLAY	Percentage of clay soils from STATSGO	16.3	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0	percent
TOC	Time of concentration in hours	0.69	hours

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Foothills Region Peak Flow 2016 5099]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0843	square miles	0.6	2850
I6H100Y	6 Hour 100 Year Precipitation	3	inches	2.38	4.89
OUTLETELEV	Elevation of Gage	7501	feet	4290	8270
STATSCLAY	STATSGO Percentage of Clay Soils	16.3	percent	9.87	37.5

Peak-Flow Statistics Disclaimers [Foothills Region Peak Flow 2016 5099]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Foothills Region Peak Flow 2016 5099]

Statistic	Value	Unit
50-percent AEP flood	1.63	ft^3/s
20-percent AEP flood	4.34	ft^3/s
10-percent AEP flood	7	ft^3/s
4-percent AEP flood	11.4	ft^3/s

Statistic	Value	Unit
2-percent AEP flood	15.4	ft^3/s
1-percent AEP flood	20.4	ft^3/s
0.5-percent AEP flood	25.9	ft^3/s
0.2-percent AEP flood	34.5	ft^3/s

Peak-Flow Statistics Citations

Kohn, M.S., Stevens, M.R., Harden, T.M., Godaire, J.E., Klinger, R.E., and Mommandi, A.,2016, Paleoflood investigations to improve peak-streamflow regional-regression equations for natural streamflow in eastern Colorado, 2015: U.S. Geological Survey Scientific Investigations Report 2016–5099, 58 p. (http://dx.doi.org/10.3133/sir20165099)

Application Version: 4.29.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

APPENDIX C – HYDRAULIC CALCULATIONS

PER THE EL PASO COUNTY PREIMINARY DRAINAGE REPORT CHECKLIST AND THE FINAL DRAINAGE REPORT CHECKLIST, HYDRAULIC CALCULATIONS OF SWALES, CHANNELS AND CULVERTS WILL BE PROVIDED WITH THE FINAL DRAINAGE REPORT.

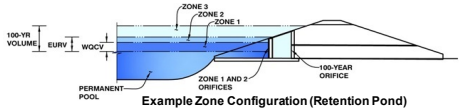
APPENDIX D – WATER QUALITY & DETENTION

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: Iron Ridge Subdivision

Basin ID: Pond 1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	15.95	acres
Watershed Length =	1,000	ft
Watershed Length to Centroid =	320	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	13.10%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	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) =	0.111 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.201 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.92 in.) =	0.103 acre-feet	0.92	inches
5-yr Runoff Volume (P1 = 1.2 in.) =	0.227 acre-feet	1.20	inches
10-yr Runoff Volume (P1 = 1.44 in.) =	0.424 acre-feet	1.44	inches
25-yr Runoff Volume (P1 = 1.82 in.) =	0.991 acre-feet	1.82	inches
50-yr Runoff Volume (P1 = 2.13 in.) =	1.364 acre-feet	2.13	inches
100-yr Runoff Volume (P1 = 2.47 in.) =	1.887 acre-feet	2.47	inches
500-yr Runoff Volume (P1 = 3.36 in.) =	3.043 acre-feet	3.36	inches
Approximate 2-yr Detention Volume =	0.102 acre-feet		
Approximate 5-yr Detention Volume =	0.162 acre-feet		
Approximate 10-yr Detention Volume =	0.309 acre-feet		
Approximate 25-yr Detention Volume =	0.456 acre-feet		
Approximate 50-yr Detention Volume =	0.500 acre-feet		
Approximate 100-yr Detention Volume =	0.657 acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.111	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.089	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.456	acre-feet
Total Detention Basin Volume =	0.657	acre-feet
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 ($R_{L/W}$) =	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

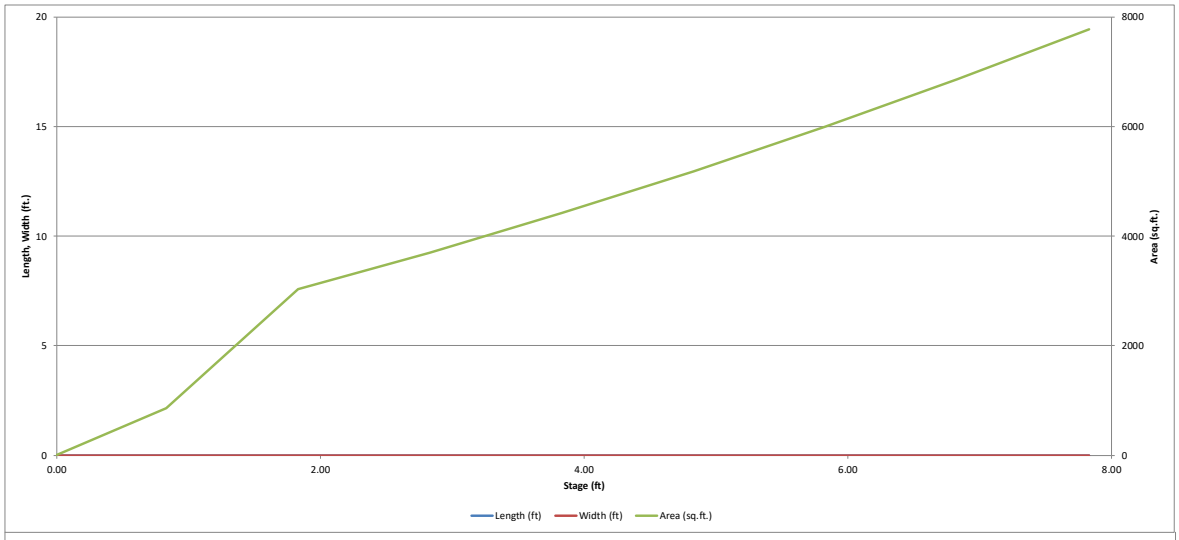
Depth Increment = ft

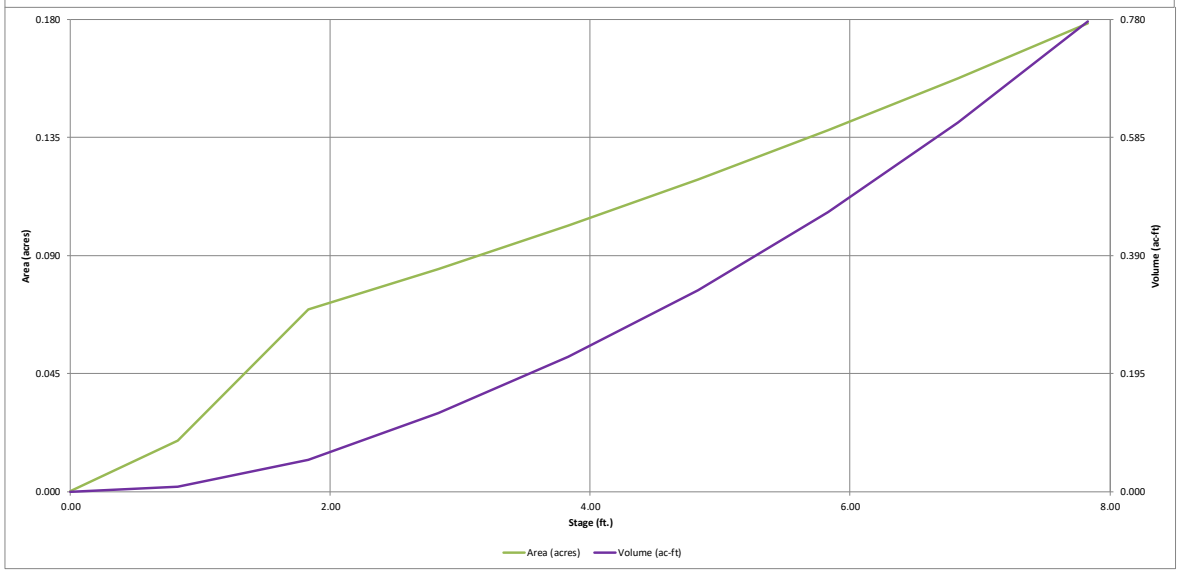
7454.17

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	--	--	--	10	0.000		
7455	--	0.83	--	--	--	853	0.020	358	0.008
7456	--	1.83	--	--	--	3,025	0.069	2,297	0.053
7457	--	2.83	--	--	--	3,697	0.085	5,658	0.130
7458	--	3.83	--	--	--	4,416	0.101	9,715	0.223
7459	--	4.83	--	--	--	5,185	0.119	14,515	0.333
7460	--	5.83	--	--	--	6,001	0.138	20,108	0.462
7461	--	6.83	--	--	--	6,866	0.158	26,542	0.609
7462	--	7.83	--	--	--	7,779	0.179	33,864	0.777

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



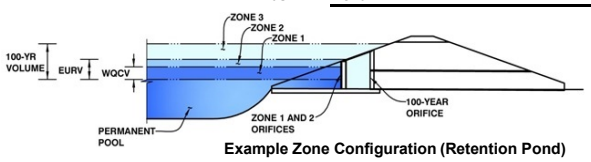


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Iron Ridge Subdivision**

Basin ID: **Pond 1**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.61	0.111	Orifice Plate
Zone 2 (EURV)	3.61	0.089	Circular Orifice
Zone 3 (100-year)	7.13	0.456	Weir&Pipe (Restrict)
Total (all zones)		0.657	

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

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
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 BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	3.194E-03	ft^2
Depth at top of Zone using Orifice Plate =	2.60	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	10.40	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	0.46	sq. inches (diameter = 3/4 inch)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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)	0.00	0.87	1.73					
Orifice Area (sq. inches)	0.46	0.46	0.46					

	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)

	Zone 2 Circular	Not Selected			Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	3.00	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.00	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	3.58	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.02	N/A	feet
Vertical Orifice Diameter =	0.38	N/A	inches				

Calculated Parameters for Vertical Orifice

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

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.83	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.83	N/A	feet
Overflow Weir Front Edge Length =	5.00	N/A	feet	Overflow Weir Slope Length =	5.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	7.82	N/A	
Horiz. Length of Weir Sides =	5.00	N/A	feet	Overflow Grate Open Area w/o Debris =	17.40	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	8.70	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.22	N/A	ft^2
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.75	N/A	feet
Restrictor Plate Height Above Pipe Invert =	16.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.91	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	5.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.85	feet
Spillway Crest Length =	11.00	feet	Stage at Top of Freeboard =	7.35	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.17	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	0.69	acre-ft

Calculated Parameters for Spillway

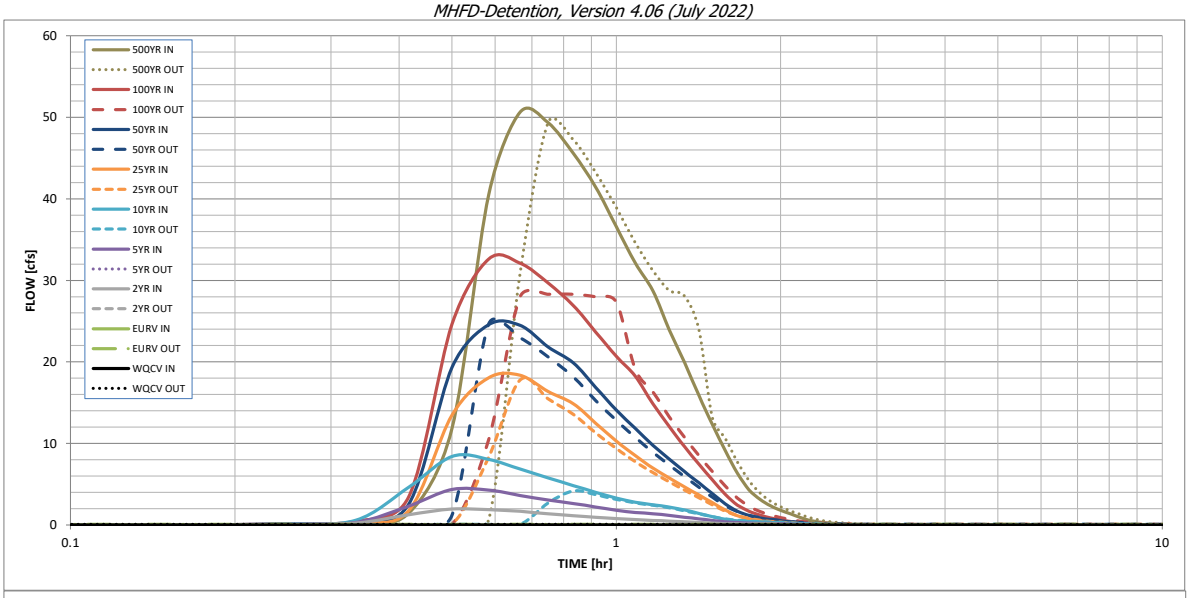
Routed Hydrograph Results

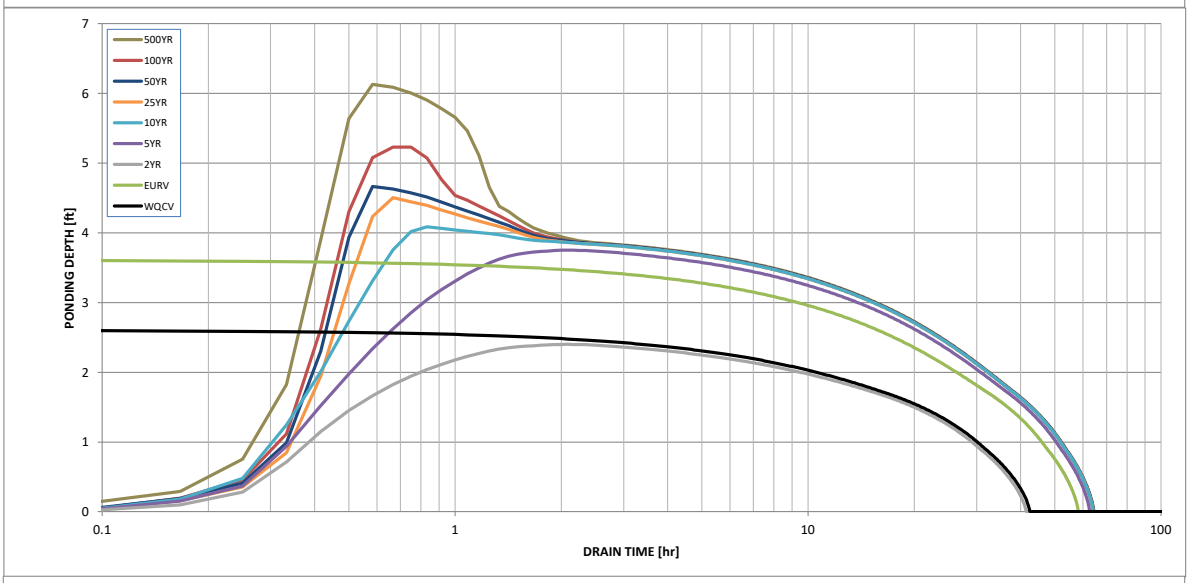
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

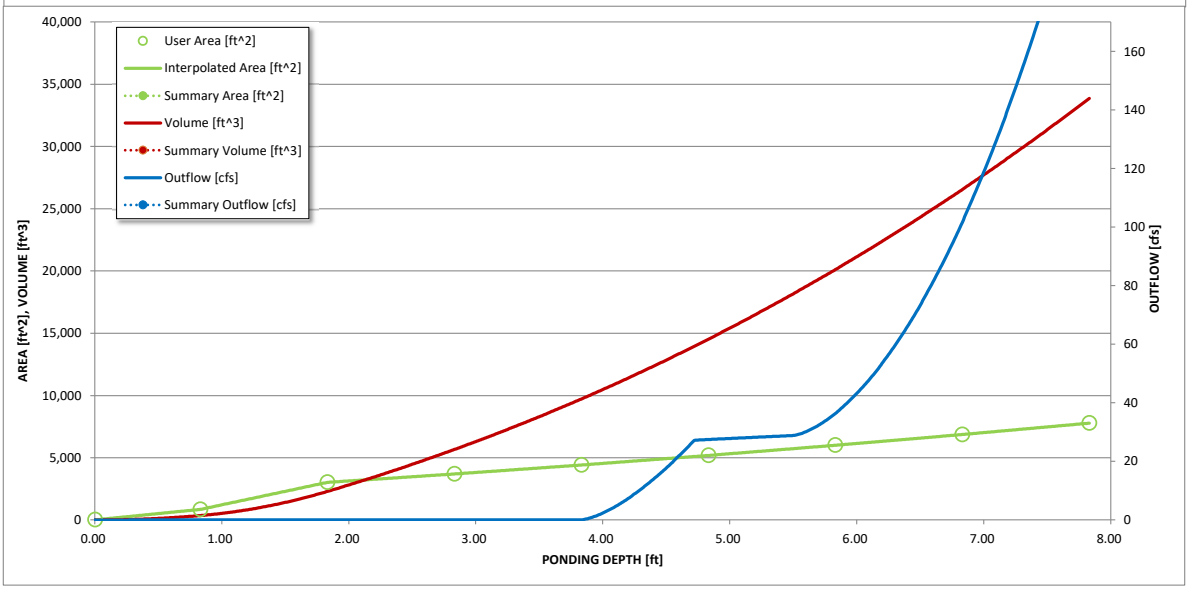
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.92	1.20	1.44	1.82	2.13	2.47	3.36
CUHP Runoff Volume (acre-ft) =	0.111	0.201	0.103	0.227	0.424	0.991	1.364	1.887	3.043
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.103	0.227	0.424	0.991	1.364	1.887	3.043
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.3	2.2	5.9	16.3	22.4	30.1	47.9
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.14	0.37	1.02	1.40	1.89	3.01
Peak Inflow Q (cfs) =	N/A	N/A	1.9	4.3	8.4	18.3	24.6	32.6	50.6
Peak Outflow Q (cfs) =	0.1	0.1	0.1	0.1	4.2	17.8	24.6	28.3	49.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.0	0.7	1.1	1.1	0.9	1.0
Structure Controlling Flow =	Plate	Vertical Orifice 1	Plate	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.2	1.0	1.4	1.6	1.7
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	51	37	55	52	44	40	35	26
Time to Drain 99% of Inflow Volume (hours) =	**40**	55	39	59	58	53	51	49	44
Maximum Ponding Depth (ft) =	2.61	3.61	2.40	3.75	4.08	4.50	4.66	5.23	6.13
Area at Maximum Ponding Depth (acres) =	0.08	0.10	0.08	0.10	0.11	0.11	0.12	0.13	0.14
Maximum Volume Stored (acre-ft) =	0.112	0.201	0.094	0.214	0.249	0.295	0.313	0.381	0.502

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	0:15:00	0.00	0.00	0.04	0.09	0.13	0.10	0.14	0.14	0.24
	0:20:00	0.00	0.00	0.22	0.31	0.57	0.27	0.34	0.46	1.45
	0:25:00	0.00	0.00	1.27	2.33	4.63	1.76	2.55	3.44	11.80
	0:30:00	0.00	0.00	1.94	4.35	8.41	13.45	19.29	24.59	40.51
	0:35:00	0.00	0.00	1.87	4.27	8.04	18.06	24.56	32.62	50.64
	0:40:00	0.00	0.00	1.67	3.62	6.86	18.35	24.47	32.11	49.32
	0:45:00	0.00	0.00	1.38	3.06	5.78	16.37	21.83	29.67	45.59
	0:50:00	0.00	0.00	1.15	2.63	4.84	14.89	19.90	26.93	41.44
	0:55:00	0.00	0.00	0.95	2.20	4.01	12.49	16.88	23.68	36.57
	1:00:00	0.00	0.00	0.78	1.81	3.28	10.28	14.09	20.67	32.13
	1:05:00	0.00	0.00	0.67	1.55	2.80	8.51	11.86	18.25	28.71
	1:10:00	0.00	0.00	0.56	1.38	2.48	6.98	9.77	14.86	23.93
	1:15:00	0.00	0.00	0.47	1.18	2.20	5.77	8.09	12.07	19.94
	1:20:00	0.00	0.00	0.39	0.96	1.84	4.67	6.55	9.60	15.88
	1:25:00	0.00	0.00	0.31	0.75	1.42	3.68	5.17	7.47	12.32
	1:30:00	0.00	0.00	0.24	0.56	1.02	2.73	3.84	5.53	9.13
	1:35:00	0.00	0.00	0.17	0.40	0.70	1.82	2.60	3.76	6.34
	1:40:00	0.00	0.00	0.14	0.29	0.51	1.13	1.68	2.44	4.33
	1:45:00	0.00	0.00	0.13	0.24	0.43	0.74	1.17	1.70	3.14
	1:50:00	0.00	0.00	0.12	0.20	0.37	0.51	0.86	1.21	2.34
	1:55:00	0.00	0.00	0.11	0.18	0.32	0.37	0.66	0.88	1.78
	2:00:00	0.00	0.00	0.10	0.15	0.27	0.29	0.53	0.64	1.38
	2:05:00	0.00	0.00	0.07	0.12	0.20	0.20	0.38	0.41	0.94
	2:10:00	0.00	0.00	0.06	0.09	0.15	0.14	0.26	0.25	0.61
	2:15:00	0.00	0.00	0.04	0.06	0.11	0.10	0.18	0.17	0.41
	2:20:00	0.00	0.00	0.03	0.05	0.08	0.07	0.13	0.12	0.29
	2:25:00	0.00	0.00	0.02	0.03	0.05	0.05	0.10	0.09	0.21
	2:30:00	0.00	0.00	0.02	0.02	0.04	0.03	0.07	0.07	0.15
	2:35:00	0.00	0.00	0.01	0.02	0.03	0.02	0.05	0.05	0.11
	2:40:00	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.04	0.08
	2:45:00	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.03	0.06
	2:50:00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.04
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft ^{2}]	Area [acres]	Volume [ft ^{3}]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

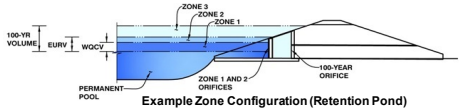
Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: IRON RIDGE SUBDIVISION

Basin ID: POND 2



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	9.47	acres
Watershed Length =	1,093	ft
Watershed Length to Centroid =	250	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	17.10%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	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) =	0.081	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.159	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.92 in.) =	0.085	acre-feet	0.92 inches
5-yr Runoff Volume (P1 = 1.2 in.) =	0.169	acre-feet	1.20 inches
10-yr Runoff Volume (P1 = 1.44 in.) =	0.290	acre-feet	1.44 inches
25-yr Runoff Volume (P1 = 1.82 in.) =	0.626	acre-feet	1.82 inches
50-yr Runoff Volume (P1 = 2.13 in.) =	0.850	acre-feet	2.13 inches
100-yr Runoff Volume (P1 = 2.47 in.) =	1.159	acre-feet	2.47 inches
500-yr Runoff Volume (P1 = 3.36 in.) =	1.848	acre-feet	3.36 inches
Approximate 2-yr Detention Volume =	0.083	acre-feet	
Approximate 5-yr Detention Volume =	0.129	acre-feet	
Approximate 10-yr Detention Volume =	0.224	acre-feet	
Approximate 25-yr Detention Volume =	0.316	acre-feet	
Approximate 50-yr Detention Volume =	0.347	acre-feet	
Approximate 100-yr Detention Volume =	0.447	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.081	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.077	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.288	acre-feet
Total Detention Basin Volume =	0.447	acre-feet
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 ($R_{L/W}$) =	user	

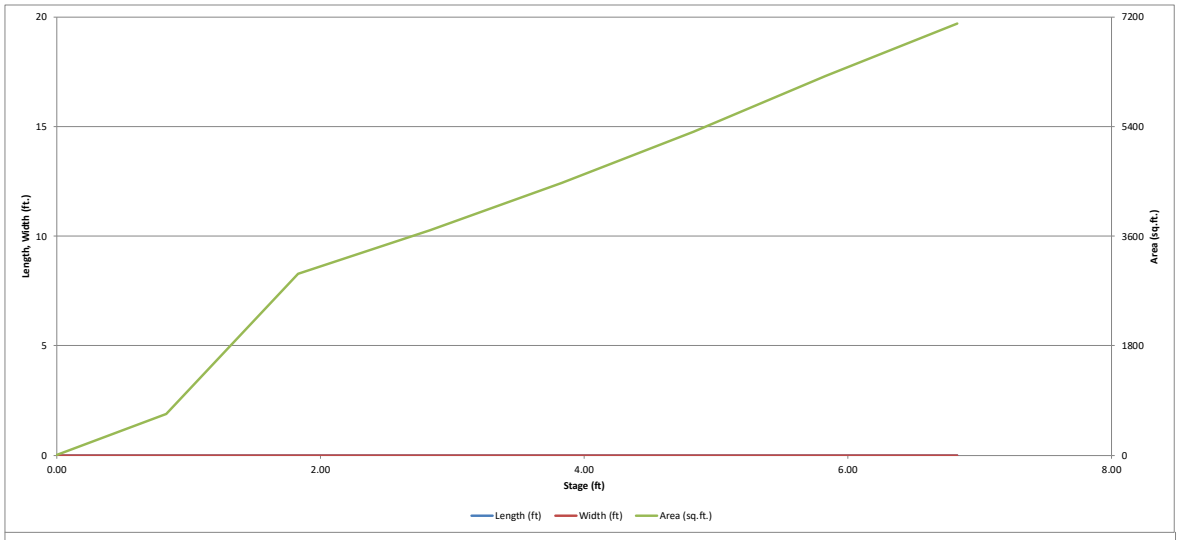
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	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

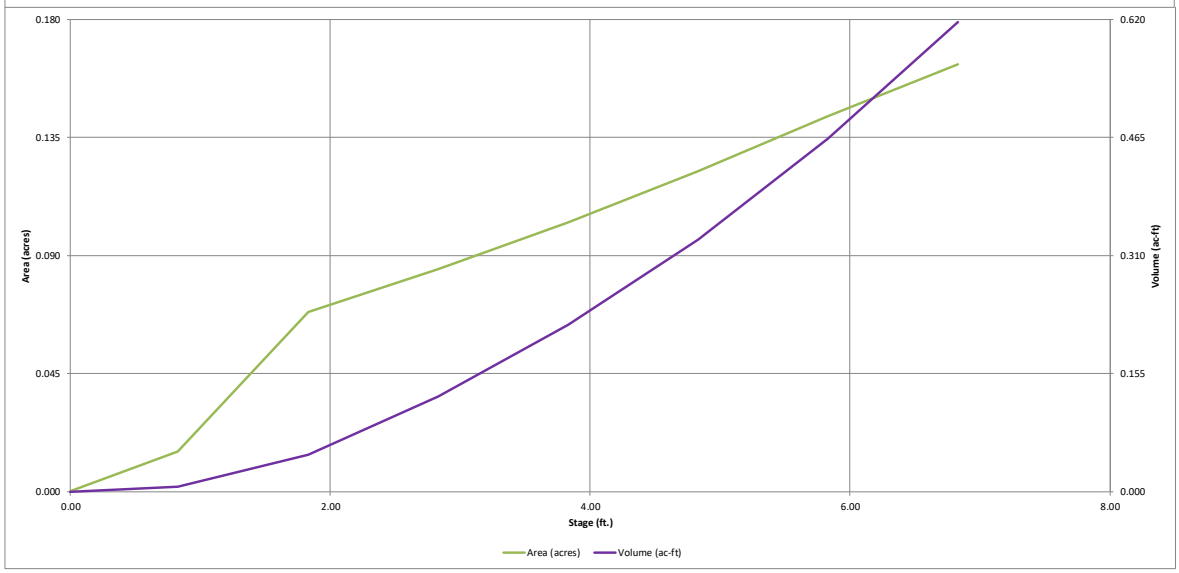
Depth Increment = ft

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)
7486.17 **Top of Micropool**	--	0.00	--	--	--	10	0.000		
7487	--	0.83	--	--	--	672	0.015	283	0.006
7488	--	1.83	--	--	--	2,981	0.068	2,110	0.048
7489	--	2.83	--	--	--	3,692	0.085	5,446	0.125
7490	--	3.83	--	--	--	4,472	0.103	9,528	0.219
7491	--	4.83	--	--	--	5,319	0.122	14,423	0.331
7492	--	5.83	--	--	--	6,233	0.143	20,199	0.464
7493	--	6.83	--	--	--	7,100	0.163	26,866	0.617

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



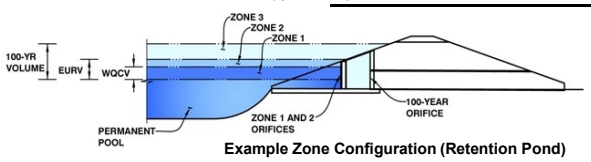


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: IRON RIDGE SUBDIVISION

Basin ID: POND 2



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.29	0.081	Orifice Plate
Zone 2 (EURV)	3.22	0.077	Circular Orifice
Zone 3 (100-year)	5.72	0.288	Weir&Pipe (Restrict)
Total (all zones)		0.447	

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

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
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 BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.361E-03	ft^2
Depth at top of Zone using Orifice Plate =	2.29	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	9.20	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	0.34	sq. inches (diameter = 5/8 inch)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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)	0.00	0.76	1.53					
Orifice Area (sq. inches)	0.34	0.34	0.34					

	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)

	Zone 2 Circular	Not Selected			Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.29	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.00	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	3.22	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.02	N/A	feet
Vertical Orifice Diameter =	0.38	N/A	inches				

Calculated Parameters for Vertical Orifice

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

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.50	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.50	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	4.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	9.53	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	11.14	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	5.57	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.17	N/A	ft^2
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.53	N/A	feet
Restrictor Plate Height Above Pipe Invert =	11.30		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.83	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	4.60	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.78	feet
Spillway Crest Length =	6.00	feet	Stage at Top of Freeboard =	6.38	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.15	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	0.55	acre-ft

Calculated Parameters for Spillway

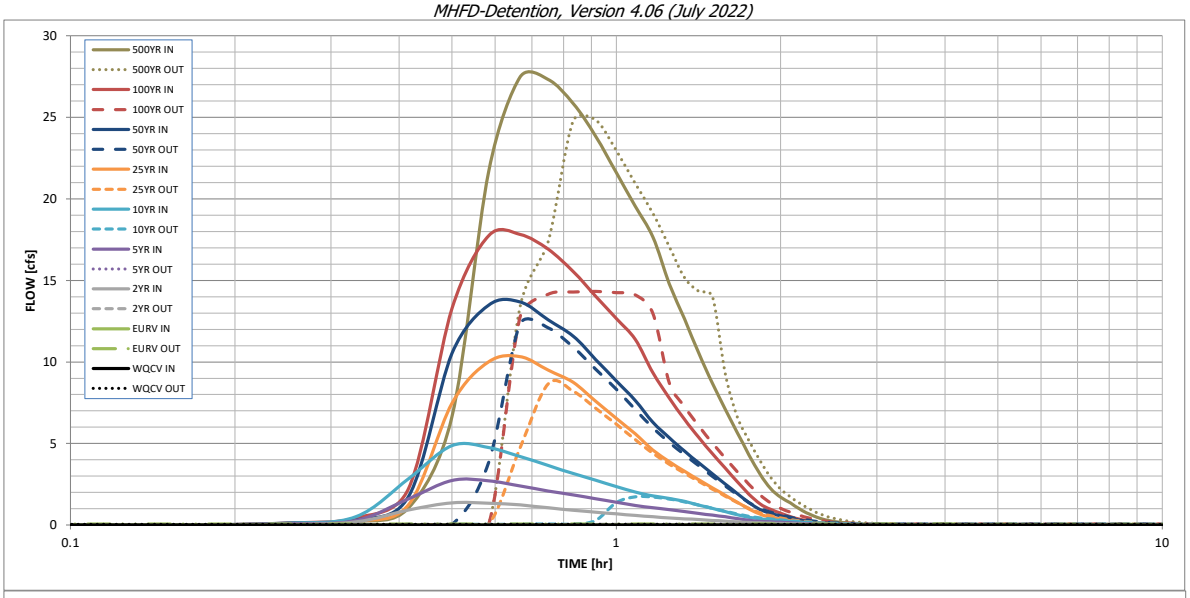
Routed Hydrograph Results

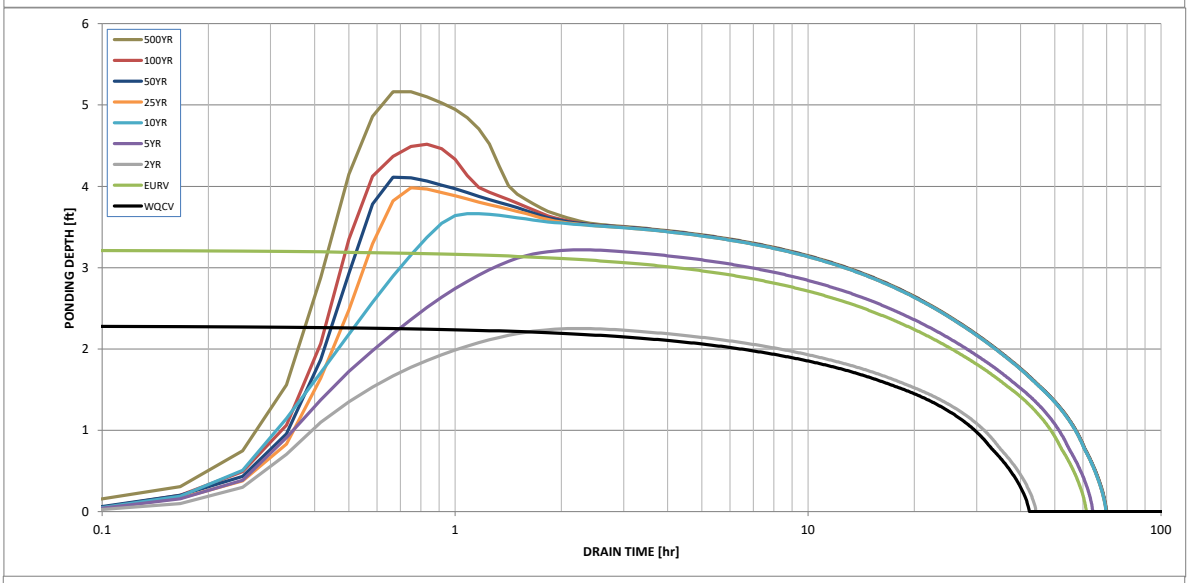
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

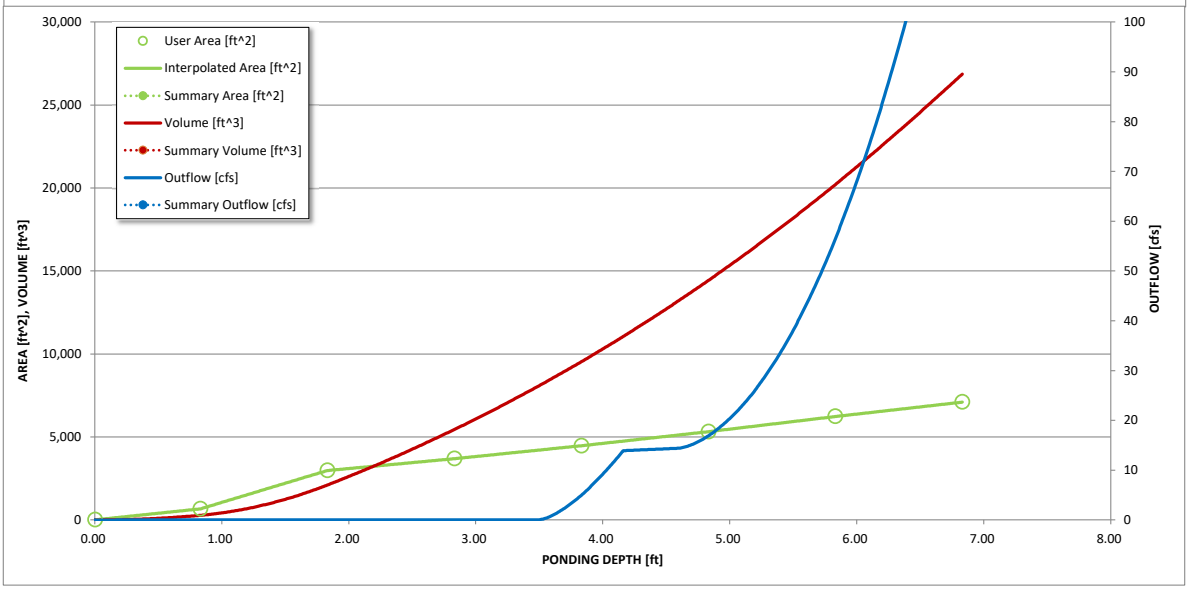
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.92	1.20	1.44	1.82	2.13	2.47	3.36
CUHP Runoff Volume (acre-ft) =	0.081	0.159	0.085	0.169	0.290	0.626	0.850	1.159	1.848
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.085	0.169	0.290	0.626	0.850	1.159	1.848
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.1	1.1	3.1	8.6	11.9	15.9	25.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.12	0.33	0.91	1.25	1.68	2.66
Peak Inflow Q (cfs) =	N/A	N/A	1.4	2.7	4.9	10.3	13.7	17.8	27.5
Peak Outflow Q (cfs) =	0.0	0.1	0.0	0.1	1.7	8.7	12.3	14.3	24.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.6	1.0	1.0	0.9	1.0
Structure Controlling Flow =	Plate	Vertical Orifice 1	Plate	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.8	1.1	1.3	1.3
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	53	39	56	58	52	48	44	36
Time to Drain 99% of Inflow Volume (hours) =	**40**	58	42	60	64	60	58	56	52
Maximum Ponding Depth (ft) =	2.29	3.22	2.25	3.22	3.66	3.98	4.11	4.52	5.16
Area at Maximum Ponding Depth (acres) =	0.08	0.09	0.08	0.09	0.10	0.11	0.11	0.12	0.13
Maximum Volume Stored (acre-ft) =	0.082	0.159	0.079	0.159	0.202	0.234	0.247	0.293	0.373

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
	0:15:00	0.00	0.00	0.04	0.08	0.11	0.09	0.12	0.13	0.21
	0:20:00	0.00	0.00	0.20	0.28	0.51	0.24	0.30	0.44	1.07
	0:25:00	0.00	0.00	0.93	1.61	2.86	1.27	1.76	2.26	6.64
	0:30:00	0.00	0.00	1.37	2.73	4.87	7.46	10.51	13.27	21.69
	0:35:00	0.00	0.00	1.34	2.71	4.75	10.01	13.49	17.75	27.46
	0:40:00	0.00	0.00	1.23	2.40	4.20	10.33	13.68	17.82	27.32
	0:45:00	0.00	0.00	1.05	2.09	3.65	9.50	12.58	16.91	25.85
	0:50:00	0.00	0.00	0.91	1.85	3.16	8.75	11.59	15.54	23.84
	0:55:00	0.00	0.00	0.79	1.62	2.75	7.59	10.16	14.03	21.60
	1:00:00	0.00	0.00	0.69	1.40	2.36	6.54	8.84	12.67	19.55
	1:05:00	0.00	0.00	0.59	1.20	2.02	5.59	7.64	11.39	17.66
	1:10:00	0.00	0.00	0.50	1.07	1.79	4.60	6.30	9.33	14.81
	1:15:00	0.00	0.00	0.44	0.95	1.64	3.90	5.35	7.79	12.63
	1:20:00	0.00	0.00	0.39	0.83	1.45	3.29	4.53	6.48	10.53
	1:25:00	0.00	0.00	0.34	0.71	1.23	2.78	3.82	5.36	8.70
	1:30:00	0.00	0.00	0.29	0.61	1.02	2.28	3.14	4.39	7.11
	1:35:00	0.00	0.00	0.24	0.50	0.82	1.83	2.52	3.49	5.65
	1:40:00	0.00	0.00	0.20	0.39	0.63	1.39	1.93	2.65	4.30
	1:45:00	0.00	0.00	0.16	0.29	0.48	0.99	1.38	1.89	3.11
	1:50:00	0.00	0.00	0.14	0.23	0.38	0.66	0.95	1.31	2.24
	1:55:00	0.00	0.00	0.12	0.20	0.33	0.48	0.72	0.96	1.71
	2:00:00	0.00	0.00	0.10	0.17	0.28	0.37	0.57	0.73	1.35
	2:05:00	0.00	0.00	0.08	0.14	0.22	0.26	0.42	0.52	0.98
	2:10:00	0.00	0.00	0.06	0.11	0.17	0.19	0.30	0.36	0.69
	2:15:00	0.00	0.00	0.05	0.08	0.13	0.14	0.22	0.24	0.48
	2:20:00	0.00	0.00	0.04	0.06	0.10	0.10	0.16	0.16	0.32
	2:25:00	0.00	0.00	0.03	0.05	0.08	0.07	0.12	0.11	0.22
	2:30:00	0.00	0.00	0.02	0.03	0.05	0.05	0.09	0.08	0.16
	2:35:00	0.00	0.00	0.02	0.03	0.04	0.04	0.06	0.06	0.12
	2:40:00	0.00	0.00	0.01	0.02	0.03	0.03	0.05	0.05	0.09
	2:45:00	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.04	0.07
	2:50:00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.05
	2:55:00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.04
	3:00:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft ^{2}]	Area [acres]	Volume [ft ^{3}]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

2880 International Circle, Suite 110
Colorado Springs, CO 80910
Phone: 719-520-6300
Email: Stormwater@elpasoco.com
publicworks.elpasoco.com/stormwater/

EL PASO COUNTY
PCM APPLICABILITY FORM

EPC Project Number: SP253

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

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

Part I. Project Summary			
Project Name:	Iron Ridge Subdivision		
Is Stormwater Detention Required?	☒ Yes ☐ No	**Is Water Quality Treatment Required? (i.e.: non-excluded disturbance >1ac)**	☒ Yes ☐ No
Is an ESQCP Required? If "No," Check Applicable Reason	☒ Yes ☐ No	☐ Not an Applicable Construction Activity ☐ Oil & Gas ☐ R-Factor	
Engineer of Record Email Address:	njokerst@allterraineng.com		

Part II. PCM Exclusions

Note: Questions A through K directly correlate to Part I.E.4.a.i (A) to (K) on page 27 of the 2016 CDPS Statewide Standard MS4 General Permit COR090000 (i.e.: the MS4 Permit), as amended. Document exclusions that apply to the whole project or parts of it.

Questions	Excluded Acreage	Yes	No	Notes
A. Is this project a "Pavement Management Site?"			X	This exclusion applies to the maintenance, rehabilitation, and reconstruction of pavement on existing roads, bridges, bike lanes, and parking along roads. Areas used primarily for parking (i.e.: separate lots not along roadway) or access to parking are not included. No increase in impervious area is allowable.
B. Review two options below to see if project is an "Excluded Roadway Development."				Does not include sidewalks. Does include curb & gutter.
• Does the project include improvements to an existing roadway that adds < 1 acre of paved or gravel area per mile of roadway?			X	If selected, list the proposed additional acreage per mile in Part IV Notes below.
• Does the project include improvements to an existing roadway that adds ≤ 8.25 ft of paved width at any location?			X	If selected, list the proposed additional width in Part IV Notes below.

2880 International Circle, Suite 110
Colorado Springs, CO 80910
Phone: 719-520-6300
Email: Stormwater@elpasoco.com
publicworks.elpasoco.com/stormwater/

EL PASO COUNTY
PCM APPLICABILITY FORM

EPC Project Number: SP253

Part II. PCM Exclusions (continued)				
Questions	**Excluded Acreage**	**Yes**	**No**	**Notes**
C. Does the project include "Excluded Existing Roadway Areas?"			X	For redevelopment of existing roadways. This exclusion only excludes the original roadway area, it does NOT apply to the entire project. This exclusion applies only when the proposed project will expand the existing roadway width by <2x on average. If selected, list the proposed expanded width in Part IV Notes below.
D. Is the project considered an Aboveground or Underground Utilities activity?			X	Activity can not permanently alter the terrain, ground cover, or drainage patterns from existing conditions.
E. Is the project considered a "Large Lot Single-Family Site"? *This exclusion only pertains to the lots and does not include roadways.*		X		Must be a single-family residential lot or agricultural zoned land with ≥ 2.5 acres per dwelling and total lot impervious area < 10%. If "Yes," notate the percent impervious below in Part IV: Notes.
F. Do Non-Residential or Non-Commercial Infiltration Conditions exist? *Post-development surface conditions do not result in concentrated stormwater flow or surface water discharge during an 80th percentile stormwater runoff event, and the 80th percentile event must be infiltrated.*			X	Exclusion does not apply to residential or commercial sites for buildings. A site-specific study is required and must show rainfall and soil conditions, allowable slopes, surface conditions, and ratios of imperviousness area to pervious area.
G. Is the project land disturbance to Undeveloped Land where undeveloped land remains undeveloped following the activity?			X	Project must be on land with no human made structures such as buildings or pavement. The proposed development must return the disturbed area to its historical condition. See CDPHE's "Standard MS4 Permit FAQ" for more detail on how this exclusion applies.
H. Is the project a Stream Stabilization Site?			X	
I. Is the project a Bike or Pedestrian Trail?			X	Bike lanes for roadways are not included in this exclusion but may qualify if attached to a larger roadway activity that is excluded in A, B or C above. Pedestrian trails (e.g. sidewalks) that are attached to a roadway do not apply.
J. Is the project Oil and Gas Exploration?			X	Activities and facilities associated with oil and gas exploration are excluded.
K. Is the project in a County Growth Area?				El Paso County does not apply this exclusion.

If any exclusions above apply (via a "Yes" for any row), runoff from those areas is excluded from stormwater quality treatment requirements. All runoff from remaining non-excluded disturbed areas will need to be treated by a stormwater quality PCM, unless remaining area is <1ac. If remaining area is >1ac, select at least one Design Standard on the next page.

2880 International Circle, Suite 110
Colorado Springs, CO 80910
Phone: 719-520-6300
Email: Stormwater@elpasoco.com
publicworks.elpasoco.com/stormwater/

EL PASO COUNTY
PCM APPLICABILITY FORM

EPC Project Number: SP253

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

Part IV: Notes

Provide info regarding all applicable PCM(s) and PCM Exclusion(s) including location, PCM name(s)/number(s), and additional relevant filings or reports or maintenance agreements, etc. Attach an additional sheet if you need more space. Attaching a detailed summary table would replace the need for any notes here.

Iron Ranch Court will be captured and detained within Pond 1.

The onsite portion of Colt Court will be captured and detained with Pond 2.

The offsite portion of Colt Court is not practical to capture and is excluded from permanent WQ treatment per EPC ECM Section I.7.1.C.1.A.

The large lot average percent impervious for the site is 7% and therefore lot area is excluded from permanent WQ. However, lot areas that are captured by roadside swales will be treated in either Pond 1 or 2.

2880 International Circle, Suite 110
Colorado Springs, CO 80910
Phone: 719-520-6300
Email: Stormwater@elpasoco.com
publicworks.elpasoco.com/stormwater/

EL PASO COUNTY
PCM APPLICABILITY FORM

EPC Project Number: SP253

Part V: Signatures

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

_____ _____

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

Date

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

_____ _____

Signature of El Paso County Project Engineer

Date

Reference Information:

If a PCM is required, then these additional documents will also need to be submitted:

- PCM Maintenance Agreement
- PCM O&M Manual
- MHFD Detention Basin Design Workbook*
- Proof of Submittal of: Notice of Intent to Construct a Non-Jurisdictional Water Impoundment Structure*

*Not required for all PCMs, check ECM Appendix I for requirements

The following are screenshots of example Water Quality Treatment Summary Tables. The Excel versions can be found at the EPC DPW Stormwater website linked below. These are optional tables that can be used to summarize water quality treatment and applicable exclusions. Select the table that best suits the project based on the number of basins, PCMs, and/or exclusions. A PDF of the selected table(s) can be attached to this form and/or to the Drainage Report. It is helpful to also include a basic overview map with color shading or hatch patterns that shows areas tributary to each type of PCM (pond, runoff reduction, etc.) and those areas that are not captured by a PCM, with the applicable exclusion(s) labeled.

https://publicworks.elpasoco.com/stormwater/

Water Quality Treatment Summary Table		
Basin ID(s)	**PCM Tributary Area (ac)**	**PCM ID**
A1 - A5	4	Pond 1
B1 - B3	3.25	Pond 2
C, D	5.5	Runoff Reduction
E	10	Excluded*
* Excluded based on ECM App I.7.1.B.5		

Water Quality Treatment Summary Table							
Basin ID	**Total Area (ac)**	**Total Proposed Disturbed Area (ac)**	**Area Trib to Pond A (ac)**	**Disturbed Area Treated via Runoff Reduction (ac)**	**Disturbed Area Excluded from WQ per ECM App I.7.1.C.1 (ac)**	**Disturbed Area Excluded from WQ per ECM App I.7.1.B.# (ac)**	**Applicable WQ Exclusions (App I.7.1.B.#)**
A	4.50	4.50	4.50				
B	1.25	1.25		1.25			
C	6.00	4.00				4.00	ECM App I.7.1.B.5
D	2.50	2.50	1.00		0.50	1.00	ECM App I.7.1.B.7
E	3.00		3.00				
F	8.25						
Total	25.50	12.25	8.50	1.25	0.50	5.00	

Min Required Area to Receive WQ Treatment	**Total Proposed Disturbed Area (ac)**	**Total Proposed Treated Area (ac)**	**Total Proposed Disturbed Area Excluded from WQ (ac)**	**Net Treatment (ac)**
6.75	12.25	9.75	5.50	3.00

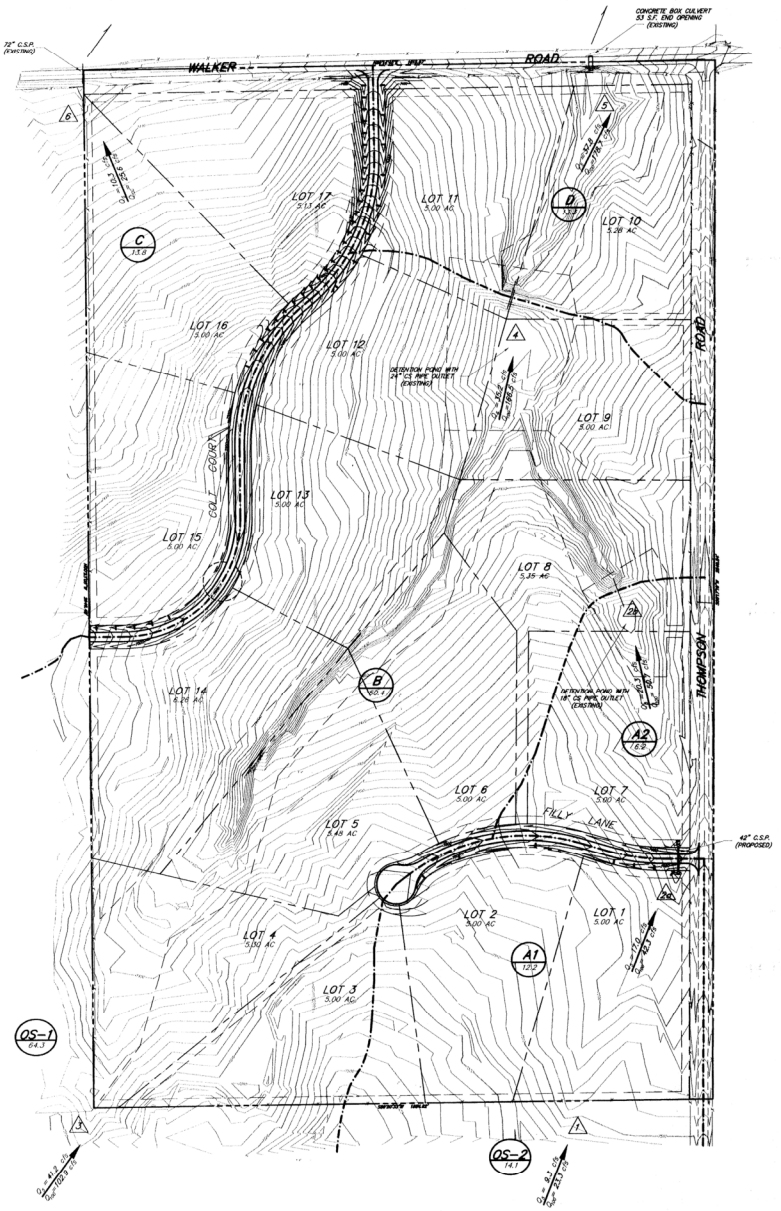
Design Standard D, definition of "Waters of the State of Colorado" per MS4 Permit:

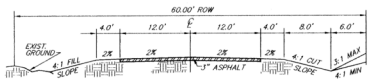
> *"Any and all surface waters and subsurface waters which are contained in or flow in or through this state, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed. This definition can include water courses that are usually dry."*
>
> The following website shows Waters of the State of Colorado:
>
> https://cdphe.maps.arcgis.com/apps/Viewer/index.html?appid=f1541d2f21834642ba1551c674fd4a79

Design Standard E, additional info from the MS4 Permit:

> *Before discharging to a water of the state, at least 20 percent of the upstream imperviousness of the applicable development site must be disconnected from the storm drainage system and drain through a receiving pervious area control measure comprising a footprint of at least 10 percent of the upstream disconnected impervious area of the applicable development site. The control measure must be designed in accordance with a design manual identified by the permittee. In addition, the stream channel between the discharge point of the applicable development site and the regional WQCV facility must be stabilized.*
>
> Below are the 8 conditions that must be met:
>
> *1) The regional WQCV facility must be implemented, functional, and maintained following good engineering, hydrologic and pollution control practices.*
>
> *2) The regional WQCV facility must be designed and maintained for 100% WQCV for its entire drainage area.*
>
> *3) The regional WQCV facility must have capacity to accommodate the drainage from the applicable development site.*
>
> *4) The regional WQCV facility be designed and built to comply with all assumptions for the development activities planned by the permittee within its drainage area, including the imperviousness of its drainage area and the applicable development site.*
>
> *5) Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the facility. Consideration of drain time shall include maintaining vegetation necessary for operation of the facility (e.g., wetland vegetation).*
>
> *6) The permittee shall meet the requirements in Parts I.E.4.a.v. and vii. and Part I.E.4.b. for the regional WQCV facility consistent with requirements and actions for control measures.*
>
> *7) The regional WQCV facility must be subject to the permittee's authority consistent with requirements and actions for a Control Measure in accordance with Part I.E.4.a.iv.*
>
> *8) Regional Facilities must be designed and implemented with flood control or water quality as the primary use. Recreational ponds and reservoirs may not be considered Regional Facilities. Water bodies listed by name in surface water quality classifications and standards regulations (5 CCR 1002-32 through 5 CCR 1002-38) may not be considered regional facilities.*

APPENDIX E – REFERENCE MATERIAL





TYPICAL ROAD SECTION

VICINITY MAP
NTS

LEGEND

- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- DRAINAGE BASIN BOUNDARY LINE
- E / 0.40 — DRAINAGE BASIN DESIGNATION / DRAINAGE BASIN AREA
- 18" CSP — PROPOSED CULVERT PIPE
- DESIGN POINT DESIGNATION
- FLOW DIRECTION ARROW
- $Q_5 = 10.8$ cfs, $Q_{100} = 21.9$ cfs — FLOW DIRECTION AND QUANTITIES

NORTH

NOTES

1. INDIVIDUAL LOT OWNERS WILL BE RESPONSIBLE FOR CONSTRUCTING POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES.
2. INDIVIDUAL LOT OWNERS WILL BE RESPONSIBLE FOR PLACING DRIVEWAY CULVERTS. EL PASO COUNTY D.O.T. SHOULD BE CONTACTED FOR CULVERT SIZING AND LOCATION. MINIMUM DRIVEWAY CULVERTS SIZE SHALL BE 18" DIAMETER.
3. PUBLIC UTILITY AND DRAINAGE EASEMENTS AS SHOWN ON THE SUBDIVISION PLAT FOR EQUINE MEADOWS ARE 20' WIDE ON ALL FRONT AND REAR LOT LINES, 10' WIDE ON ALL SIDE LOT LINES UNLESS OTHERWISE SHOWN.
4. SEE OFFSITE DRAINAGE BASIN MAP FOR OFFSITE BASINS (OS___).

SCALE

150' 100' 50' 0 75' 150' 300'

1" = 150' 1:1800

DEVELOPED HYDROLOGIC DATA TABLE

DESIGN POINT	INCL. BASINS	AREA (Ac)	Q_5 (cfs)	Q_{100} (cfs)	STRUCTURE TYPE AND SIZE
1	OS-2	14.1	9.3	23.3	----
2A	OS-2, A1	26.5	17.0	42.3	42"
2B	OS-2, A1, A2	32.7	20.3	50.7	----
3	OS-1	64.3	41.2	102.9	----
4	OS-1 & 2, A1 & 2, B	114.7	35.2	166.5	----
5	OS-1 & 2, A1 & 2, B, D	160.7	37.8	178.7	CBC 53SF EXIST
6	C	15.8	10.3	25.6	72" --EXIST

PROJECT: EQUINE MEADOWS

TITLE: DEVELOPED DRAINAGE MAP

MONUMENT VALLEY ENGINEERS INC.
ENGINEERS • SURVEYORS
1911 ELARAY STREET
COLORADO SPRINGS, COLORADO 80909
PHONE (719) 635-5736

PROJ. NO. 60635
DRAWN: BDK
ENGINEER: SGC
CHECKED: ---C.
SCALE: 1" = 150'
DATE: 11-11-00
REVISIONS:

NO.:	DATE:	ITEM

SHEET 1 OF 1

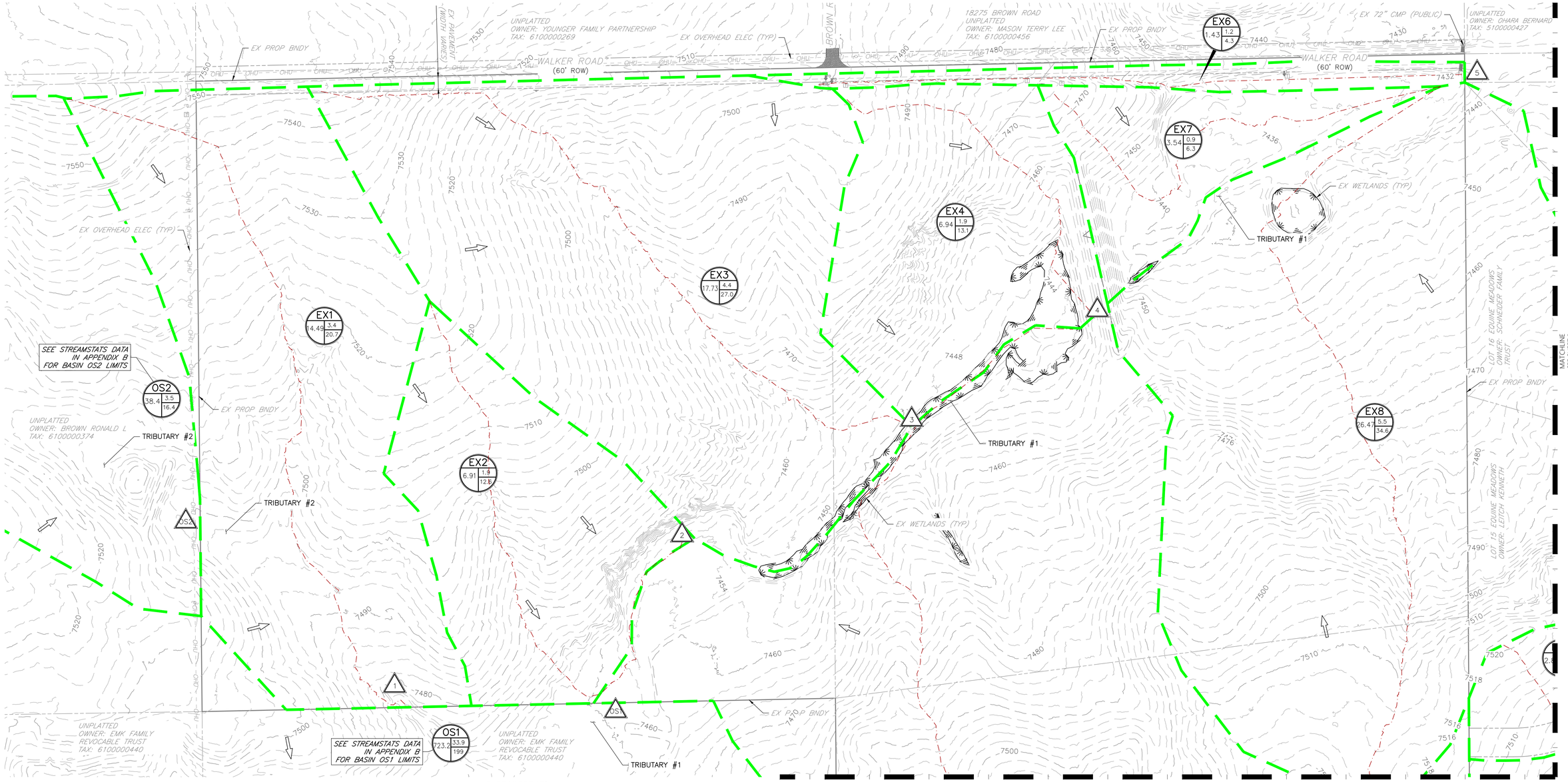
DRAWING NO. 60635002

DISK NO. 1836

APPENDIX F – DRAINAGE MAPS

IRON RIDGE SUBDIVISION

EXISTING DRAINAGE MAP



EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	13.4
OS3	53.90	-	-	-	41.4	4.3	20.4
EX1	14.49	3.5%	0.10	0.37	33.7	3.4	20.7
EX2	6.91	2.0%	0.09	0.36	21.1	1.9	12.6
EX3	17.73	3.4%	0.10	0.37	30.3	4.4	27.0
EX4	6.91	2.0%	0.09	0.36	19.5	1.9	13.1
EX5	39.65	2.0%	0.09	0.36	28.5	9.1	61.2
EX6	1.43	22.2%	0.22	0.45	11.1	1.2	4.3
EX7	3.54	2.0%	0.09	0.36	21.7	0.9	6.3
EX8	26.47	3.3%	0.10	0.37	38.3	5.5	34.6
EX9	12.23	2.0%	0.09	0.36	28.5	2.8	18.9
EX10	2.15	2.0%	0.09	0.36	15.9	0.7	4.5
EX11	2.84	6.6%	0.12	0.38	16.2	1.2	6.2

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	33.9	199.0
OS2	3.5	13.4
OS3	4.3	20.4
1	3.4	20.7
2	3.8	24.0
3	11.5	73.8
4	12.4	80.2
5 (ONSITE)	14.0	88.4
5 (TOTAL)	51.4	300.8
6	2.8	18.9
7 (ONSITE)	3.4	21.6
7 (TOTAL)	7.7	42.0

LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		
BASIN ID	ID / AC	DESIGN POINT DESIGNATION .1
DRAINAGE BASIN		
TC PATH		

N

100 50 0 100 200

ORIGINAL SCALE: 1" = 100'

EXISTING DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 1

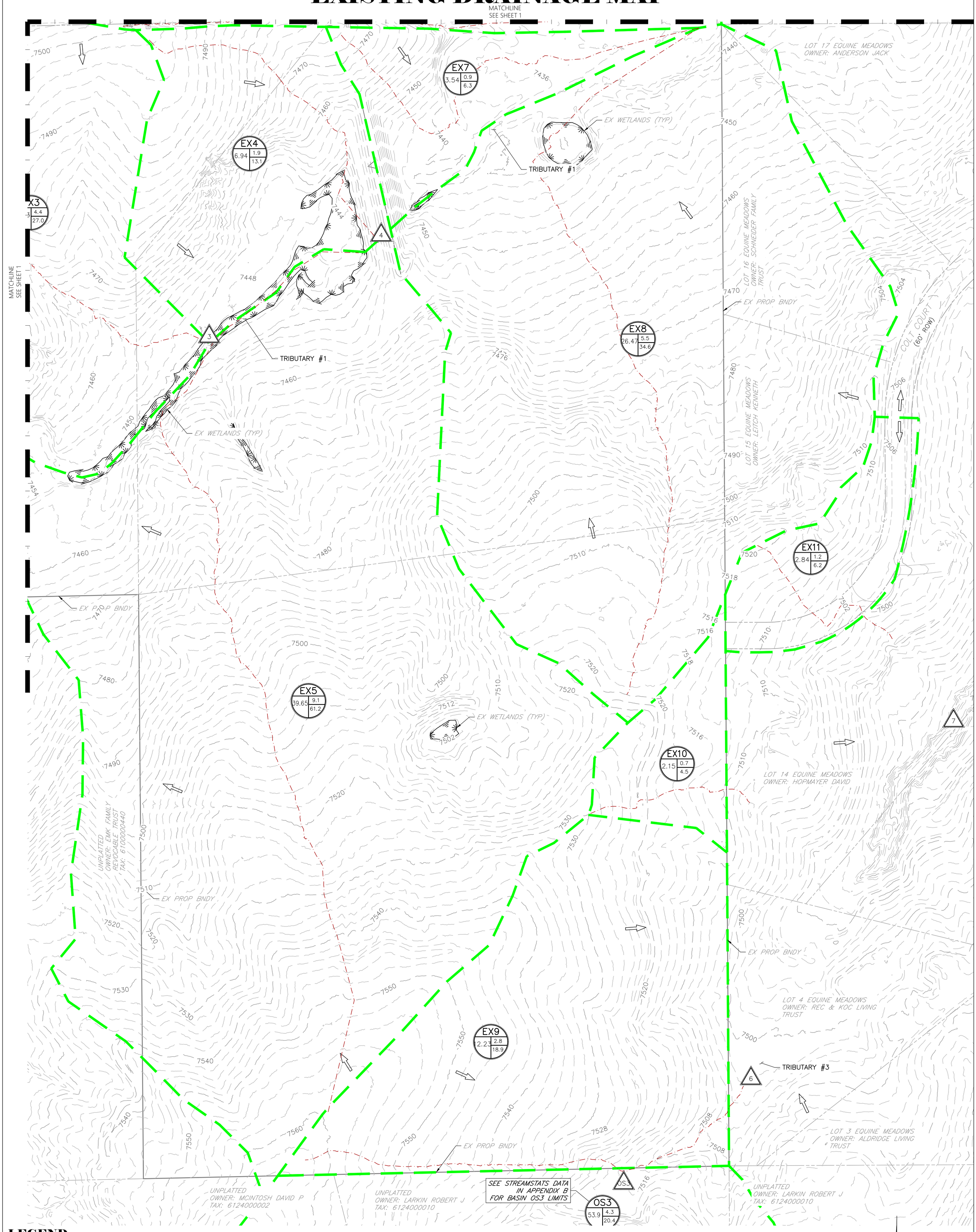
LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING

IRON RIDGE SUBDIVISION

EXISTING DRAINAGE MAP



LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		
BASIN ID	ID / AC	DESIGN POINT DESIGNATION: 1
DRAINAGE BASIN		
TC PATH		

EXISTING CONDITIONS - BASIN SUMMARY TABLE

Sub-basin	Area (ac)	Impervious	C_5	C_{100}	t_c (min)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	13.4
OS3	53.90	-	-	-	41.4	4.3	20.4
EX1	14.49	3.5%	0.10	0.37	33.7	3.4	20.7
EX2	6.91	2.0%	0.09	0.36	21.1	1.9	12.6
EX3	17.73	3.4%	0.10	0.37	30.3	4.4	27.0
EX4	6.91	2.0%	0.09	0.36	19.5	1.9	13.1
EX5	39.65	2.0%	0.09	0.36	28.5	9.1	61.2
EX6	1.43	22.2%	0.22	0.45	11.1	1.2	4.3
EX7	3.54	2.0%	0.09	0.36	21.7	0.9	6.3
EX8	26.47	3.3%	0.10	0.37	38.3	5.5	34.6
EX9	12.23	2.0%	0.09	0.36	28.5	2.8	18.9
EX10	2.15	2.0%	0.09	0.36	15.9	0.7	4.5
EX11	2.84	6.6%	0.12	0.38	16.2	1.2	6.2

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	33.9	199.0
OS2	3.5	13.4
OS3	4.3	20.4
1	3.4	20.7
2	3.8	24.0
3	11.5	73.8
4	12.4	80.2
5 (ONSITE)	14.0	88.4
5 (TOTAL)	51.4	300.8
6	2.8	18.9
7 (ONSITE)	3.4	21.6
7 (TOTAL)	7.7	42.0

N

100 50 0 100 200

ORIGINAL SCALE: 1" = 100'

EXISTING DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 2

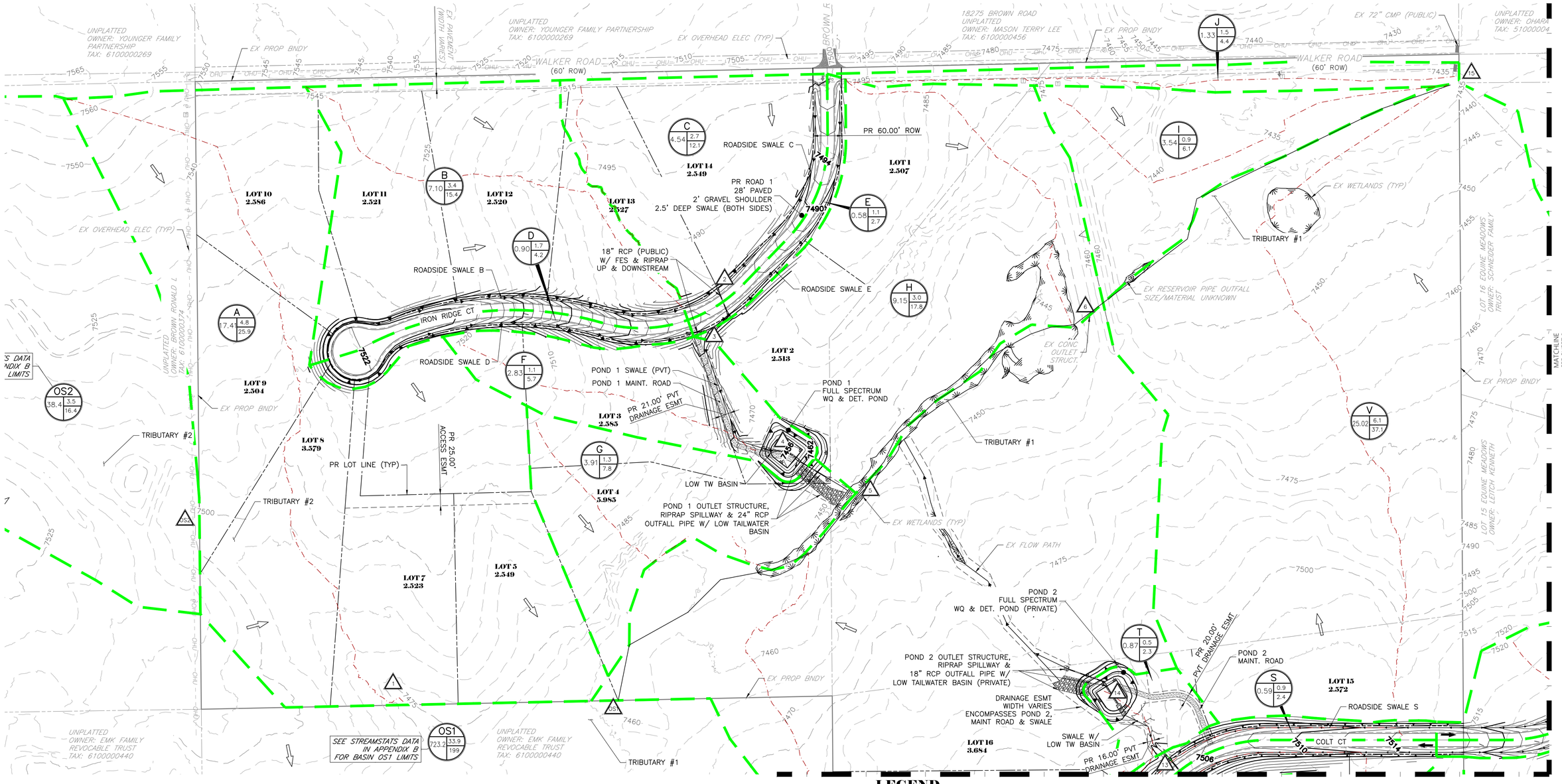
LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING

IRON RIDGE SUBDIVISION

PROPOSED DRAINAGE MAP



PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	17.41	6.2%	0.12	0.38	33.4	4.8	25.9
B	7.10	10.9%	0.15	0.41	19.5	3.4	15.4
C	4.54	11.0%	0.15	0.41	12.2	2.7	12.1
D	0.90	40.3%	0.40	0.58	6.7	1.7	4.2
E	0.58	38.1%	0.38	0.57	5.9	1.1	2.7
F	2.83	8.3%	0.13	0.40	20.7	1.1	5.7
G	3.91	4.8%	0.11	0.37	18.8	1.3	7.8
H	9.15	4.2%	0.10	0.37	19.1	3.0	17.8
I	3.54	2.0%	0.09	0.35	22.2	0.9	6.1
J	1.33	27.4%	0.30	0.51	12.2	1.5	4.4
K	0.89	7.0%	0.12	0.39	9.6	0.4	2.4
L	11.99	5.5%	0.11	0.38	27.2	3.5	20.0
M	2.04	5.5%	0.11	0.38	13.4	0.8	4.8
N	2.18	12.7%	0.16	0.42	9.2	1.5	6.5
O	0.73	23.9%	0.25	0.48	6.2	0.9	2.8
P	5.02	13.3%	0.17	0.43	17.4	2.9	11.9
Q	1.18	20.3%	0.23	0.46	11.5	1.1	3.6
R	1.81	24.3%	0.27	0.49	11.5	1.9	5.8
S	0.59	34.2%	0.35	0.54	8.1	0.9	2.4
T	0.87	7.6%	0.13	0.38	9.5	0.5	2.3
U	31.90	4.4%	0.10	0.37	32.5	7.9	46.6
V	25.02	3.9%	0.10	0.37	31.2	6.1	37.1
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.0	199.0
OS2	3.5	16.4
OS3	4.3	20.4
1	4.8	25.9
2	5.6	25.2
3	7.4	29.7
4	8.0	33.4
5	3.9	49.6
6	10.3	89.4
7	3.5	20
8	0.8	4.8
9	1.5	6.5
10	2.3	9
11 (ONSITE)	4.2	22.3
11 (TOTAL)	8.5	42.7
12	2.9	11.5
13	4.6	16.6
14	4.8	17.5
15 (ONSITE)	12.7	92.5
15 (TOTAL)	50.2	294.9

LEGEND

	EXISTING	PROPOSED
BOUNDARY LINE		
PROPERTY LINE		
EASEMENT LINE		
RIGHT OF WAY		
STORM SEWER		
SWALE/WATERWAY FLOWLINE		
INDEX CONTOUR	6100	6100
INTERMEDIATE CONTOUR		
FLOW DIRECTION		
BASIN ID	ID / AC / Q5 / Q100	
DESIGN POINT DESIGNATION	1	
DRAINAGE BASIN		
TC PATH		

MATCHLINE SEE SHEET 2

100 50 0 100 200

ORIGINAL SCALE: 1" = 100'

PROPOSED DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 1

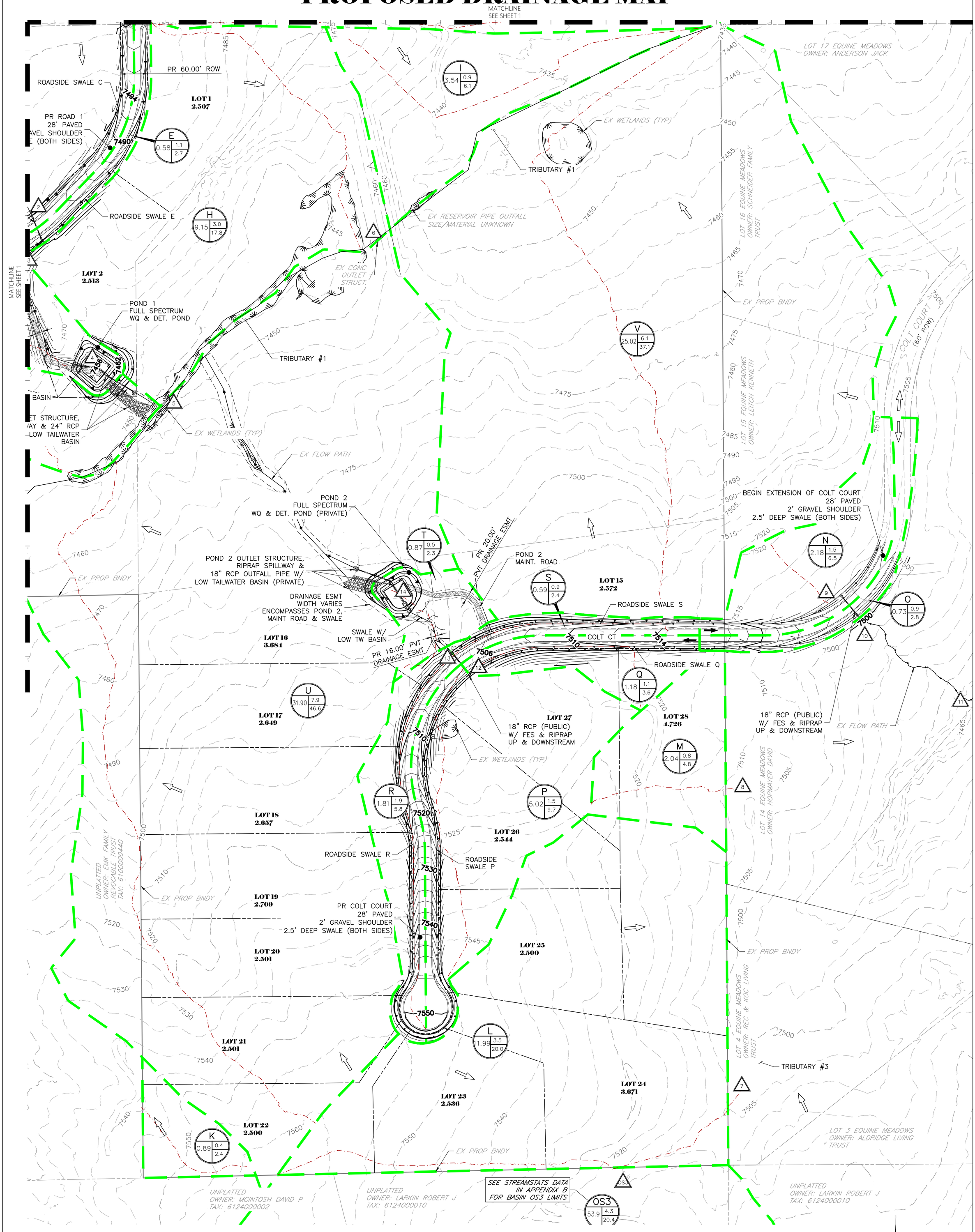
LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING

IRON RIDGE SUBDIVISION

PROPOSED DRAINAGE MAP



PROPOSED CALCS - BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	17.41	6.2%	0.12	0.38	33.4	4.8	25.9
B	7.10	10.9%	0.15	0.41	19.5	3.4	15.4
C	4.54	11.0%	0.15	0.41	12.2	2.7	12.1
D	0.90	40.3%	0.40	0.58	6.7	1.7	4.2
E	0.58	38.1%	0.38	0.57	5.9	1.1	2.7
F	2.83	8.3%	0.13	0.40	20.7	1.1	5.7
G	3.91	4.8%	0.11	0.37	18.8	1.3	7.8
H	9.15	4.2%	0.10	0.37	19.1	3.0	17.8
I	3.54	2.0%	0.09	0.35	22.2	0.9	6.1
J	1.33	27.4%	0.30	0.51	12.2	1.5	4.4
K	0.89	7.0%	0.12	0.39	9.6	0.4	2.4
L	11.99	5.5%	0.11	0.38	27.2	3.5	20.0
M	2.04	5.5%	0.11	0.38	13.4	0.8	4.8
N	2.18	12.7%	0.16	0.42	9.2	1.5	6.5
O	0.73	23.9%	0.25	0.48	6.2	0.9	2.8
P	5.02	13.3%	0.17	0.43	17.4	2.9	11.9
Q	1.18	20.3%	0.23	0.46	11.5	1.1	3.6
R	1.81	24.3%	0.27	0.49	11.5	1.9	5.8
S	0.59	34.2%	0.35	0.54	8.1	0.9	2.4
T	0.87	7.6%	0.13	0.38	9.5	0.5	2.3
U	31.90	4.4%	0.10	0.37	32.5	7.9	46.6
V	25.02	3.9%	0.10	0.37	31.2	6.1	37.1
OS1	723.20	-	-	-	129.0	33.9	199.0
OS2	38.40	-	-	-	62.4	3.5	16.4
OS3	53.90	-	-	-	41.4	4.3	20.4

DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
OS1	34.0	199.0
OS2	3.5	16.4
OS3	4.3	20.4
1	4.8	25.9
2	5.6	25.2
3	7.4	29.7
4	8.0	33.4
5	3.9	49.6
6	10.3	89.4
7	3.5	20
8	0.8	4.8
9	1.5	6.5
10	2.3	9
11 (ONSITE)	4.2	22.3
11 (TOTAL)	8.5	42.7
12	2.9	11.5
13	4.6	16.6
14	4.8	17.5
15 (ONSITE)	12.7	92.5
15 (TOTAL)	50.2	294.9

PROPOSED DRAINAGE MAP

IRON RIDGE SUBDIVISION

JOB NO. 25009 | SHEET 2

LOCATION: EPC

09/17/2025

ALL TERRAIN ENGINEERING