Ascent Church

Final Drainage Report

PCD File No: PPR265

All Terrain Engineering Project No: 25023

April 2026

Prepared for:

Ascent Church

Attn: Jason Schott

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Prepared by:

All Terrain Engineering LLC

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ENGINEER'S STATEMENT

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

Stamp and signatures

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.

Jason Schott Date

EL PASO COUNTY ONLY

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

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

Conditions:

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I. General Purpose, Location & Description

a. Purpose & Project Description

The purpose of the Final Drainage Report (FDR) for the Ascent Church 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.

The Ascent Church project proposes a 21,750 sq. ft. addition to the existing church. To support the addition, a fire access road, drainage infrastructure and a full spectrum water quality and detention pond are proposed. Due to the volume of excavation required for the addition's construction, off-site grading will occur on the adjacent northern property to distribute the excess fill. Coordination is ongoing with the property owner to facilitate this offsite earthwork.

b. Location

Ascent Church, referred to as 'the site' herein, is Lot 1 of the Tri-Lakes subdivision. The site is bound by Palmer Ridge Highschool to the north, Microscope Way to the west, Woodmoor Road to the east and Deer Creek Road to the south. Surrounding platted developments include Woodmoor Business/Technological Park to the west, Woodmoor Oaks to the east and Patriot Place Subdivision to the south. A vicinity map is presented in Appendix A.

c. Description of Property

The site is approximately 7.27 acres. The current property includes a large parking lot, an existing church & open space. The total disturbed area associated with the project activities is 2.81 acres.

In general, the site slopes south and west. Onsite elevations range from 7140' - 7190' with slopes ranging 1 – 5%. Per an NRCS soil survey, the site is made up of Type Kettle gravelly loamy sand and Pring coarse sandy loam. There are no major drainageways that traverse the site. On-site, existing utilities include water, sewer, irrigation, storm sewer, gas, electric and communications. An existing drainage map is presented in Appendix F.

The ultimate receiving waters for the site are Crystal Creek and Dirty Woman Creek.

d. Floodplain Statement

Based on FEMA Firm map 08041C0276G dated 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 Crystal Creek Drainage Basin and the Dirty Woman Creek Drainage Basin. The DBPS determined that due to the extent of existing development, the increase in runoff for future conditions of the basin was minimal. The reach in the upper end of the basin shows no difference between the existing and future flow conditions. The difference in flow rates further south is generated by the potential future

development along the Interstate 25 corridor and within the general area of the Town of Monument. The DBPS recommends providing stormwater management facilities which will at least maintain and/or enhance water quality characteristics of the basin. Excerpts from the DBPS are presented in Appendix E.

b. Existing Subbasin Description

The existing site's drainage patterns are south and west. The existing site is divided into 8 existing drainage basins.

Basin EX1 is 1.99 acres of onsite and offsite undeveloped area. The offsite portion of this basin is part of Palmer Ridge Highschool. Basin EX1 stormwater (Q_5 = 1.1 cfs Q_{100} = 5.4 cfs) sheet flows north & offsite towards DP1. DP1 flow is conveyed west to Crystal Creek in an existing, grass lined swale.

Basin EX2 is 2.37 acres of the existing church, parking lot and surrounding undeveloped area. Basin EX2 stormwater (Q_5 = 2.4 cfs Q_{100} = 7.5 cfs) flows west across the basin towards Microscope Way. Existing roadside ditches on the east side of Microscope Way capture Basin EX2 stormwater and convey it to DP2 (Q_5 = 3.0 cfs Q_{100} = 8.7 cfs). At DP2, an existing 20" CMP culvert conveys the stormwater under Microscope Way and to Lot 12 Woodmoor Business/Technological Park. Stormwater continues overland to Crystal Creek which runs along the west side of Woodmoor Business/Technological Park. Pictures of the downstream outfall for DP2 are provided in Appendix E.

Basin EX3 is 0.28 acres of Microscope Way and adjacent undeveloped area. Basin EX3 stormwater (Q_5 = 0.6 cfs Q_{100} = 1.3 cfs) is captured by roadside swales and conveyed to DP2 (Q_5 = 3.0 cfs Q_{100} = 8.7 cfs).

Basin EX4 is 2.22 acres of Woodmoor Drive, church building, parking lot and surrounding undeveloped area. Basin EX4 stormwater (Q_5 = 4.6 cfs Q_{100} = 9.7 cfs) is conveyed south by sheet flow in the existing parking lot & swale flow along Woodmoor Drive to DP3. DP3 (Q_5 = 4.6 cfs Q_{100} = 9.7 cfs) is captured by an existing, 18" CMP culvert & piped to DP4.

Basin EX5 is 1.59 acres of the existing church building, parking lot and surrounding undeveloped area. Basin EX5 stormwater (Q_5 = 6.7 cfs Q_{100} = 12.4 cfs) is conveyed south by sheet flow in the existing parking lot to DP4. DP4 (Q_5 = 9.3 cfs Q_{100} = 18.3 cfs) is conveyed south under Deer Creek Road in an existing, 18" CMP culvert.

Basin EX6 is 0.63 acres of existing parking lot and surrounding undeveloped area. Basin EX6 stormwater (Q_5 = 1.1 cfs Q_{100} = 2.6 cfs) sheet flows southwest to an existing open channel that conveys the flow to DP5 (Q_5 = 1.1 cfs Q_{100} = 2.6 cfs). DP5 is conveyed south along Microscope Way in an existing swale to DP7. Refer to the Basin 8 *Proposed Basin Description* for proposed improvements to the open channel.

Basin EX7 is 0.15 acres of Microscope Way and adjacent undeveloped area. Basin EX7 stormwater (Q_5 = 0.2 cfs Q_{100} = 0.6 cfs) is captured by a roadside swale and conveyed to DP6 (Q_5 = 1.3 cfs Q_{100} = 3.1 cfs). DP6 continues in the roadside swale to DP7.

Basin EX8 is 1.14 acres of existing parking lot, Lot 1 LLS Subdivision and adjacent undeveloped area. Basin EX8 stormwater (Q_5 = 2.3 cfs Q_{100} = 5.1 cfs) is captured by a swale along Deer Creek Road and conveyed to

DP7 (Q_5 = 3.4 cfs Q_{100} = 7.8 cfs) where an existing, 20" CMP culvert conveys the flow west under Microscope Way.

c. Proposed Subbasin Description

Proposed basins are delineated based upon the proposed site improvements and grading. The site has been divided into 11 proposed basins.

Basin 1A is 0.05 acres of offsite area along Woodmoor Drive. Basin 1A stormwater (Q_5 = 0.1 cfs Q_{100} = 0.3 cfs) will sheet flow across the fire access road and continue to DP2 (Q_5 = 0.7 cfs Q_{100} = 2.8 cfs). Due to the flat grades along Woodmoor Drive within Basin 1A and the lack of a defined roadside swale, a culvert is not feasible to convey the flow across the fire access road. Ther are no improvements or increased impervious within Basin 1A.

Basin 1B is 1.03 acres of offsite undeveloped area. The proposed disturbance within Basin 1 is to place excess fill from the site's excavation. Existing drainage patterns will be maintained after the completion of grading of the offsite area. Basin 1B stormwater (Q_5 = 0.6 cfs Q_{100} = 2.6 cfs) will follow historic drainage patterns to DP2 (Q_5 = 0.7 cfs Q_{100} = 2.8 cfs). At DP2, an existing, unnamed drainage conveys DP2 flow to Crystal Creek. Basin 1B is excluded from water quality and detention per EPC ECM Appendix I, Section I.7.1.B.7.

Basin 2 is 0.48 acres of rooftop, paved area and undeveloped area. Basin 2 stormwater (Q_5 = 0.8 cfs Q_{100} = 2.2 cfs) is conveyed to DP3 in a grass-lined swale. At DP3, a 12" RCP culvert (private) conveys stormwater under the loading dock to a grass-lined swale along the fire access road before discharging into Pond 1. Hydraulic calculations for the culvert and swales are presented in Appendix C.

Basin 3 is 1.23 acres of rooftop, paved area and undeveloped area. Basin 3 stormwater (Q_5 = 1.6 cfs Q_{100} = 3.8 cfs) is conveyed to DP4 (Q_5 = 2.1 cfs Q_{100} = 5.1 cfs) via sheet flow and a grass-lined swale. DP4 represents the total flow entering Pond 1 from the site. Hydraulic calculations for the Basin 3 swale is presented in Appendix C.

Basin 4 is 0.07 acres of the fire access road, pond maintenance road and undeveloped area. Basin 4 stormwater (Q_5 = 0.1 cfs Q_{100} = 0.3 cfs) is captured by a roadside ditch at DP5 along the east side of Microscope Way and conveyed to DP6 (Q_5 = 3.0 cfs Q_{100} = 9.5 cfs). At DP6, the existing 20" CMP culvert will be replaced with a 30" x 19" HERCP per the Deer Creek Roadway Improvement Plans. Per the Deer Creek Roadway Improvement Plan, the anticipated flow at the proposed 30" x 19" culvert is Q_5 = 4.36 cfs Q_{100} = 12.83 cfs. Therefore, the site discharge is in compliance with the culvert design. The culvert receives stormwater flow from the site & the east side of Microscope Way north of the high point. Basin 4 is not detained in the onsite water quality and detention pond. Basin 4 is excluded per EPC ECM Appendix I, Section I.7.1.C.1a.

Basin 5A is 0.22 acres of Microscope Way & undeveloped area. Basin 5A stormwater (Q_5 = 0.4 cfs Q_{100} = 0.8 cfs) is captured by the roadside ditch on the east side of Microscope Way and is conveyed to DP6 (Q_5 = 3.0 cfs Q_{100} = 9.5 cfs). See Basin 5A for DP6 details. Basin 5A is delineated to provide an accurate flow for comparison

to the DP6 culvert design from the Deer Creek Roadway Improvement Plans. Basin 5A will remain undeveloped and will not be detained in the onsite water quality and detention pond. Basin 5A is excluded per EPC ECM Appendix I, Section I.7.1.B.7.

Basin 6 is 1.4 acres of the existing church, parking lot and undeveloped area. Basin 6 represents the proposed condition of Basin EX2. Basin 6 area is reduced compared to Baxin EX2 as a portion of the basin is redirected to Pond 1. Basin 6 stormwater (Q_5 = 2.3 cfs Q_{100} = 5.9 cfs) follows historic drainage patterns to the roadside ditch along Microscope Way and is conveyed to DP6 (Q_5 = 3.0 cfs Q_{100} = 9.5 cfs). Within Basin 6, the developer is expanding the parking lot by 0.14 acres. However, historic drainage patterns will be maintained. Therefore, the parking area will drain away from Pond 1. This portion of Basin 6 is excluded from water quality per EPC ECM Appendix I, Section I.7.1.C.1a. and contributes to the site's allowable 1 acre undetained area total.

Basin 7 is 0.12 acres of Microscope Way and undeveloped area. Basin 7 stormwater (Q_5 = 0.2 cfs Q_{100} = 0.5 cfs) is captured in a roadside ditch along Microscope Way and conveyed to DP8 (Q_5 = 1.4 cfs Q_{100} = 5.1 cfs) Basin 7 represents the proposed condition of Basin EX7. Basin 7 area is reduced compared to Baxin EX7 due to the Microscope Way improvements as part of the Deer Creek Road project by AECOM and El Paso County. There is no disturbance or development within Basin 7 associated with this project.

Basin 8 is 0.63 acres of the existing parking lot and undeveloped area. Basin 8 represents the proposed condition of Basin EX6. Basin 8 stormwater (Q_5 = 1.2 cfs Q_{100} = 2.8 cfs) follows historic drainage patterns and is conveyed in an onsite swale to DP7. The onsite swale is eroded and unstable in its existing condition. In the proposed condition, the swale will be improved to a 1' bottom width, 3:1 side slopes and 1.5' total depth. The hydraulics of the swale indicate a stable condition with a maximum velocity of 4.68 ft/s. However, due to the existing hillside slope and low flow quantity, the flow is supercritical (Froude # = 1.3). The slight increase in Basin 8 flow compared to Basin EX6 is due to the slight time of concentration decrease from the proposed swale design. DP7 discharges to the Microscope Way roadside ditch at DP8 (Q_5 = 1.4 cfs Q_{100} = 5.1 cfs) and continues to DP9 (Q_5 = 3.3 cfs Q_{100} = 9.5 cfs). The disturbance within Basin 8 5A is excluded from water quality per EPC ECM Appendix I, Section I.7.1.B.7. Hydraulic calculations for the Basin 8 swale are presented in Appendix C.

Basin 9 is 1.08 acres of Microscope Way, existing parking lot, Lot 1 LLS subdivision and undeveloped area. Basin 9 stormwater (Q_5 = 2.0 cfs Q_{100} = 4.7 cfs) is captured in a roadside ditch along Deer Creek Road and conveyed to DP9 (Q_5 = 3.3 cfs Q_{100} = 9.5 cfs) Basin 9 represents the proposed condition of Basin EX8. Basin 9 area is reduced compared to Baxin EX8 due to the Deer Creek Road improvements as part of the Deer Creek Road project by AECOM and El Paso County. There is no disturbance or development within Basin 9 associated with this project.

Basin 10 is 1.58 acres of Deer Creek Road, existing parking lot and undeveloped area. Basin 10 stormwater (Q_5 = 6.7 cfs Q_{100} = 12.3 cfs) sheet flows south through the existing parking lot to DP11 (Q_5 = 9.3 cfs Q_{100} = 20.3 cfs) Basin 10 represents the proposed condition of Basin EX5. Basin 10 area is reduced compared to Baxin EX5 due to the Deer Creek Road improvements as part of the Deer Creek Road project by AECOM and El Paso County. There is no disturbance or development within Basin 10 associated with this project.

Basin 11 is 2.23 acres of Deer Creek Road, Woodmoor Drive existing parking lot and undeveloped area. Basin 11 stormwater (Q_5 = 4.7 cfs Q_{100} = 9.8 cfs) is conveyed south to DP10 (Q_5 = 4.7 cfs Q_{100} = 9.8 cfs) where a 30"x19" HERCP culvert (by others) conveys the flow to DP11(Q_5 = 9.3 cfs Q_{100} = 20.3 cfs). Basin 11 represents the proposed condition of Basin EX4. Basin 11 area is increased compared to Baxin EX4 due to the Deer Creek Road improvements as part of the Deer Creek Road project by AECOM and El Paso County. There is no disturbance or development within Basin 11 associated with this project.

update

The site's existing composite impervious is 44.1%. In the proposed condition, the impervious increases to 50.9%. A total of 0.55 acres of impervious will be added to the site, xx acres of the new impervious area are detained in Pond 1. A total of 0.20 acres of impervious area is not feasible to receive water quality treatment in Pond 1. Those areas are excluded from water quality per EPC ECM Appendix I, Section I.7.1.C.1a. and constitute ~2.0% of the total site area.

EXISTING V. PROPOSED FLOW COMPARISON

LOCATION	Ex $Q_{5\text{-YR}}$	Ex $Q_{100\text{-YR}}$	Pr $Q_{5\text{-YR}}$	Pr $Q_{100\text{-YR}}$
Ex DP1/Pr DP2	1.1	5.4	0.7	2.8
Ex DP2/Pr DP6	3.0	8.7	3.0	9.5
Ex DP3/Pr DP10	4.6	9.7	4.7	9.8
Ex DP4/ Pr DP11	9.3	18.3	9.3	20.3
Ex DP6/Pr DP8	1.3	3.1	1.4	5.1
Ex DP7/ Pr DP9	3.4	7.8	3.3	9.5

Proposed DP6 increase in flow is due to the widening of Microscope Way (by others) and the additional impervious parking area within Basin 6. However, the culvert at DP6, constructed with the Deer Creek project, is designed for a 100-year flow of 12.83 cfs per the Deer Creek FDR. The Deer Creek FDR was approved prior to this FDR and did not account for the reduced site release from the construction of Pond 1. Therefore, the increase in flow at DP6 compared to the existing condition is within the intended design flow for the culvert.

Proposed DP8 – DP11 increase in flow is due to the widening of Microscope Way, Deer Creek Road and Woodmoor Drive (by others) as no on-site, proposed impervious area discharges to these design points.

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

Onsite drainage analysis included the 5-year storm (minor event) and 100-year storm (major event). Runoff is calculated per EPCDCM Chapter 5 – Storm Runoff Method of Analysis.

c.

d. Hydraulic Criteria

Hydraulic criteria for channel analysis are obtained from EPCDCM Chapter 10 - Open Channels and Structures.

III. Drainage Facility Design

a. General Concept

The proposed site will construct a 21,750 square foot building addition. Water quality & detention will be provided for the building addition and disturbed areas not meeting any EPC Water Quality exclusions. The existing site area, outside the limits of disturbance, will remain as is and will not be detained in the onsite water quality and detention pond.

b. Water Quality & Detention

c. Water quality and detention for Basins 2 -3 is provided in Pond 1. Pond 1 is an onsite, private, full spectrum detention pond located along Microscope Way. A total of 1.71 acres at 43.3% composite imperviousness will be detained. The WQCV is 0.027 ac-ft, the EURV is 0.051 ac-ft, and the 100-year volume is 0.066 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 72 and 87 hours, respectively. A private, Type VL riprap low tailwater basin is located at the outfall into the pond and a 2.0' concrete trickle channel conveys flow towards the private outlet structure. A 10' access and maintenance road is provided to the bottom of the pond to facilitate future maintenance. A 10' emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Microscope Way. The spillway and downstream outfall will be lined with Type L riprap. The pond outlet structure discharges into private 12" RCP storm sewer that discharges to the roadside ditch/30" x 19" HERCP culvert along Microscope Way. Pond design calculations are presented in Appendix D.

d. Inspections & Maintenance

An Inspection and Maintenance Manual for Pond 1 has been submitted concurrently with this FDR.

e. Grading & Erosion Control Plan

Since the grading activities will exceed 1 acre, a Grading and Erosion Control plan is required. The GEC Plan, SWMP and associated documents have been submitted concurrently with this FDR.

f. Four Step Method

Step 1 – Employ Runoff Reduction Practices: Roof drains will discharge to landscaped areas. Implementation of landscaping and open space throughout the site will help slow runoff and increase infiltration. Additionally, grass-lined swales are used as the primary stormwater conveyance method. Grass-lined swales allow for infiltration and reduce runoff velocities compared to storm sewer.

Step 2 – Stabilize Drainageways: All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization with the drainage basin. However, the site was previously platted in 1994 and will not pay drainage basin fees because of this project. El Paso County & AECOM are completing the Deer Creek Road project which will widen Microscope Way, portions of Deer Creek Road & portions of Woodmoor Drive. Along Microscope Way, roadside ditches are being constructed to meet El Paso County typical road section criteria and will be stabilized with this construction. Onsite swales will be grass lined and have been designed to maintain non-erosive velocities. The existing drainageway in Basin 8 will be reconstructed as it has become eroded and unstable. The proposed design will line the channel with erosion control blanket and a native seed mix to provide future stability.

Step 3 – Provide WQCV: Water quality treatment is provided for Basin 2 and Basin 3 in Pond 1. The water quality volume will be captured and released over a period of 40 hours.

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

g. Drainage Basin & Bridge Fees

The site is within the Crystal Creek and Dirty Woman Creek Drainage Basin. Drainage basin and bridge fees are due at time of platting. As the site was platted in 1994, drainage basin and bridge fees were previously paid for the site.

h. Engineer's Opinion of Probable Cost

An OPC is provided in Appendix E.

IV. Summary

Ascent Church remains consistent with pre-development drainage conditions. The proposed development will not adversely affect downstream stormwater infrastructure or surrounding developments. This report is in accordance with the latest El Paso County Drainage criteria.

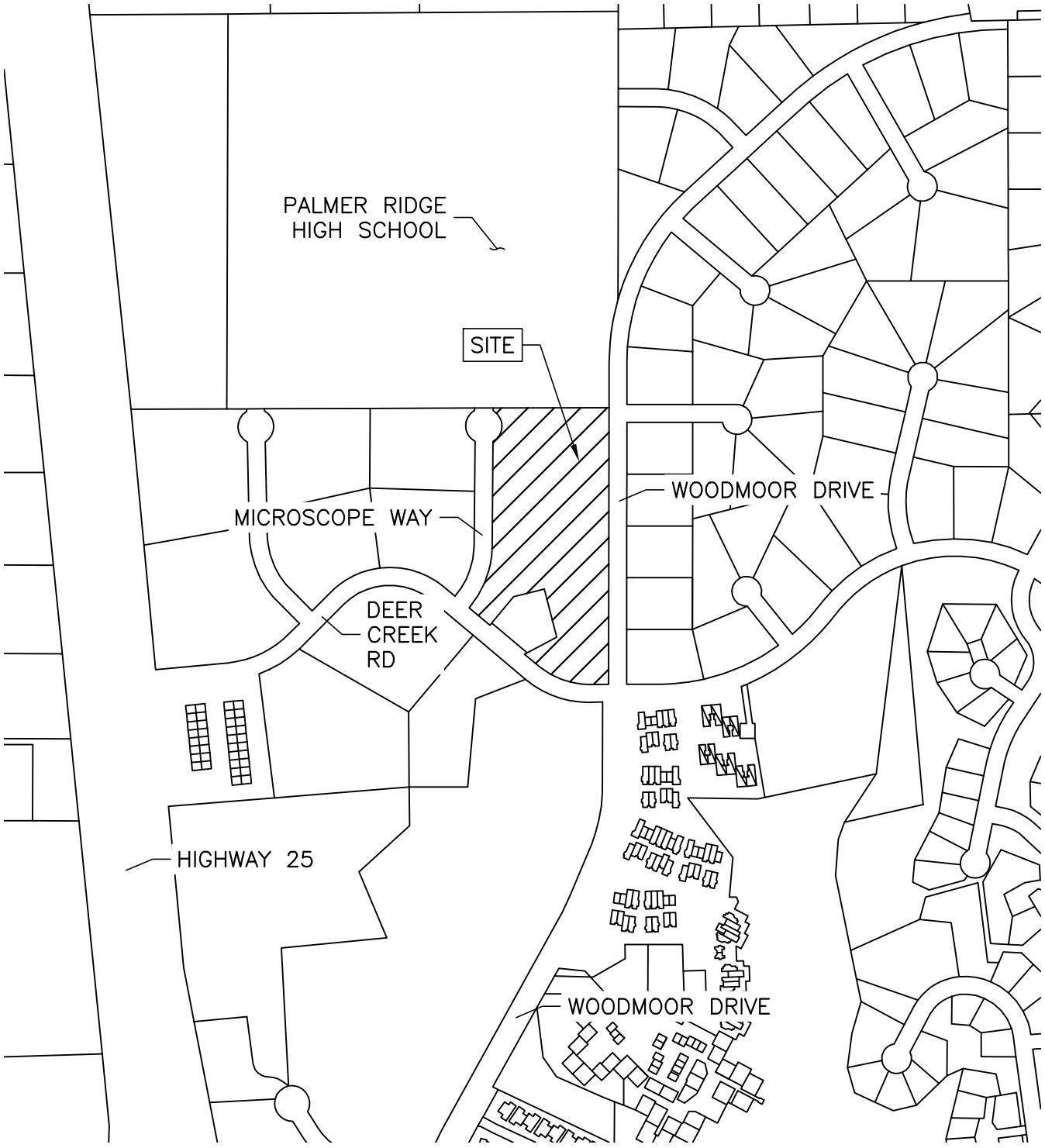
V. References

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

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

ASCENT CHURCH EXPANSION

VICINITY MAP



N

500 250 0 500 1000

ORIGINAL SCALE: 1" = 500'

VICINITY MAP	
ASCENT CHURCH	
JOB NO. 25023	
LOCATION: EPC	SHEET
02/09/2026	

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

National Flood Hazard Layer FIRMette

FEMA

104°51'51"W 39°6'39"N

104°51'14"W 39°6'11"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

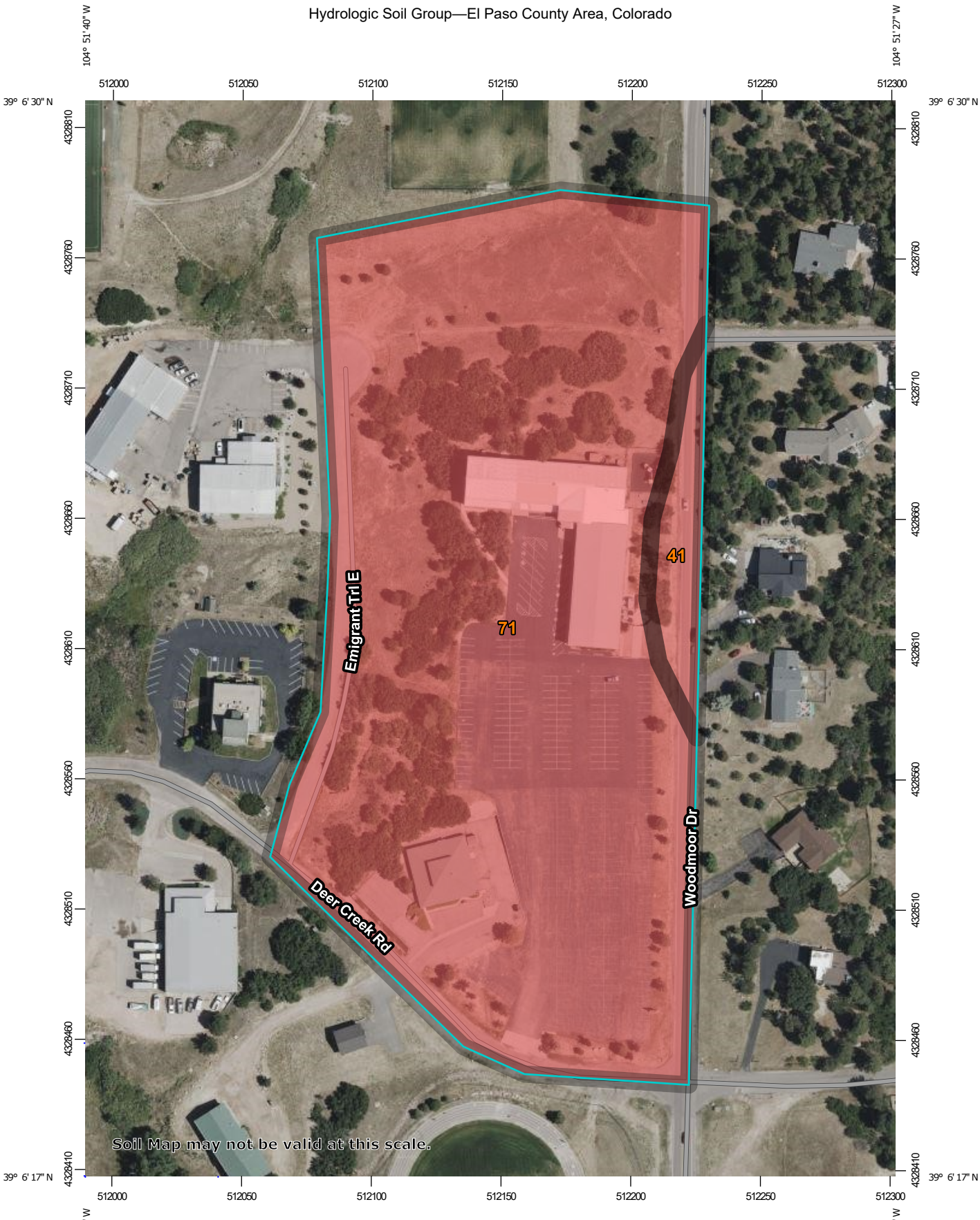
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/10/2026 at 11:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Map Scale: 1:2,010 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: 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
41	Kettle gravelly loamy sand, 8 to 40 percent slopes	B	0.5	4.4%
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	11.1	95.6%
Totals for Area of Interest			**11.7**	**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.

APPENDIX B – HYDROLOGIC CALCULATIONS

Subdivision:	Ascent Church
Location:	El Paso County
Project Name:	Ascent Church
Project Number:	25023
Calculated By:	NQJ
Checked By:	REB
Date:	3/19/2026

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)
EX1	1.99	7%	0.13	0.39	9.9	1.1	5.4
EX2	2.37	25%	0.27	0.49	11.9	2.4	7.5
EX3	0.28	51%	0.50	0.66	9.4	0.6	1.3
EX4	2.22	61%	0.57	0.72	14.0	4.6	9.7
EX5	1.59	91%	0.82	0.90	5.0	6.7	12.4
EX6	0.63	49%	0.48	0.65	12.3	1.1	2.6
EX7	0.15	22%	0.25	0.48	5.1	0.2	0.6
EX8	1.14	50%	0.47	0.64	9.7	2.3	5.1

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	1.1	5.4
2	3.0	8.7
3	4.6	9.7
4	9.3	18.3
5	1.1	2.6
6	1.3	3.1
7	3.4	7.8

COMPOSITE % IMPERVIOUS CALCULATIONS - EXISTING CONDITIONS

Subdivision: Ascent Church
Location: El Paso County

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

		Gravel Drives				Paved				Roofs				Undeveloped				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}	
EX1	1.99	0.59	0.70	0.00	80.0%	0.90	0.96	0.10	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	1.89	2.0%	0.13	0.39	6.9%
EX2	2.37	0.59	0.70	0.00	80.0%	0.90	0.96	0.27	100.0%	0.73	0.81	0.31	90.0%	0.09	0.36	1.79	2.0%	0.27	0.49	24.7%
EX3	0.28	0.59	0.70	0.00	80.0%	0.90	0.96	0.14	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.14	2.0%	0.50	0.66	51.0%
EX4	2.22	0.59	0.70	0.00	80.0%	0.90	0.96	1.24	100.0%	0.73	0.81	0.11	90.0%	0.09	0.36	0.87	2.0%	0.57	0.72	61.1%
EX5	1.59	0.59	0.70	0.00	80.0%	0.90	0.96	1.34	100.0%	0.73	0.81	0.11	90.0%	0.09	0.36	0.14	2.0%	0.82	0.90	90.7%
EX6	0.63	0.59	0.70	0.00	80.0%	0.90	0.96	0.30	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.33	2.0%	0.48	0.65	48.7%
EX7	0.15	0.59	0.70	0.00	80.0%	0.90	0.96	0.03	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.12	2.0%	0.25	0.48	21.6%
EX8	1.14	0.59	0.70	0.00	80.0%	0.90	0.96	0.43	100.0%	0.73	0.81	0.14	90.0%	0.09	0.36	0.57	2.0%	0.47	0.64	49.8%
Total	**10.37**																			**44.1%**

STANDARD FORM SF-2 - EXISTING CONDITIONS
TIME OF CONCENTRATION

Subdivision: Ascent Church
Location: El Paso County

Project Name: Ascent Church
Project No.: 24031.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

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	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)
EX1	1.99	B	0.13	0.39	6.9%	33	2.0%	8.0	265	11.3%	7.0	2.4	1.9	9.9	298.0	26.1	9.9
EX2	2.37	B	0.27	0.49	24.7%	95	5.0%	8.6	430	10.0%	7.0	2.2	3.2	11.9	525.0	23.6	11.9
EX3	0.28	B	0.50	0.66	51.0%	49	2.0%	6.1	200	1.0%	10.0	1.0	3.3	9.4	249.0	19.4	9.4
EX4	2.22	B	0.57	0.72	61.1%	82	2.0%	6.8	882	4.2%	10.0	2.0	7.2	14.0	964.0	19.7	14.0
EX5	1.59	B	0.82	0.90	90.7%	30	1.0%	2.8	525	4.9%	20.0	4.4	2.0	4.8	555.0	12.4	5.0
EX6	0.63	B	0.48	0.65	48.7%	180	3.9%	9.7	257	2.7%	10.0	1.6	2.6	12.3	437.0	19.4	12.3
EX7	0.15	B	0.25	0.48	21.6%	60	23.0%	4.2	125	2.4%	15.0	2.3	0.9	5.1	185.0	23.4	5.1
EX8	1.14	B	0.47	0.64	49.8%	130	3.8%	8.3	265	10.5%	10.0	3.2	1.4	9.7	395.0	18.4	9.7

NOTES:

$$t_c = t_i + t_t$$

Where:

t_c = computed time of concentration (minutes)

t_i = overland (initial) flow time (minutes)

t_t = channelized flow time (minutes).

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

s:

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: Ascent Church
Location: El Paso County
Design Storm: 5-Year

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

DESCRIPTION	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	tc (min)	C*A (ac)	I (in/hr)	Q (cfs)	$Q_{overland}$ (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	
	1	EX1	1.99	0.13	9.9	0.26	4.15	1.1															BASIN EX1 FLOW @ DP1, CONTINUES WEST IN OFFSITE SWALE
		EX2	2.37	0.27	11.9	0.63	3.87	2.4															BASIN EX2 FLOW @ DP2
		EX3	0.28	0.50	9.4	0.14	4.22	0.6															BASIN EX3 FLOW @ DP2
	2								11.9	0.77	3.87	3.0											BASIN EX2 & EX3 FLOW @ DP2, CONVEYED UNDER MICROSCOPE WAY IN EX 20" CMP
	3	EX4	2.22	0.57	14.0	1.27	3.62	4.6								4.6	1.27	1.0	18	63	5.7	0.2	BASIN EX4 FLOW @ DP3, CONVEYED IN 18" CMP CULVERT TO DP4
		EX5	1.59	0.82	5.0	1.30	5.17	6.7															BASIN EX5 FLOW @ DP4
	4								14.2	2.57	3.60	9.3											COMBINED BASIN EX4 & EX5 @ DP4, CONVEYED UNDER DEER CREEK ROAD IN EX 18" CMP
	5	EX6	0.63	0.48	12.3	0.30	3.82	1.1															BASIN EX6 @ DP5, CONTINUES TO DP6
		EX7	0.15	0.25	5.1	0.04	5.14	0.2															BASIN EX7 @ DP6
	6								12.3	0.34	3.82	1.3											COMBINED BASIN EX6 & EX7 @ DP6, CONTINUES SOUTH IN SWALE ALONG MICROSCOPE WAY
		EX8	1.14	0.47	9.7	0.54	4.18	2.3															BASIN EX8 FLOW @ DP7
	7								12.3	0.88	3.82	3.4											COMBINED DP6 & BASIN EX8 FLOW @ DP7, CONVEYED UNDER MICROSCOPE WAY IN EX 20" CMP

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: Ascent Church
Location: El Paso County
Design Storm: 100-Year

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

		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)	$Q_{OVERLAND}$ (cfs)	C*A (ac)	Slope (%)	Q_{pipe} (cfs)	C*A (ac)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	t_t (min)	REMARKS
	1	EX1	1.99	0.39	9.9	0.78	6.96	5.4															BASIN EX1 FLOW @ DP1, CONTINUES WEST IN OFFSITE SWALE
		EX2	2.37	0.49	11.9	1.15	6.50	7.5															BASIN EX2 FLOW @ DP2
		EX3	0.28	0.66	9.4	0.18	7.08	1.3															BASIN EX3 FLOW @ DP2
	2								11.9	1.34	6.50	8.7											BASIN EX2 & EX3 FLOW @ DP2, CONVEYED UNDER MICROSCOPE WAY IN EX 20" CMP
	3	EX4	2.22	0.72	14.0	1.59	6.08	9.7								9.7	1.59	1.0	18	63	6.7	0.2	BASIN EX4 FLOW @ DP3, CONVEYED IN 18" CMP CULVERT TO DP4
		EX5	1.59	0.90	5.0	1.43	8.68	12.4															BASIN EX5 FLOW @ DP4
	4								14.2	3.02	6.05	18.3											COMBINED BASIN EX4 & EX5 @ DP4, CONVEYED UNDER DEER CREEK ROAD IN EX 18" CMP
	5	EX6	0.63	0.65	12.3	0.41	6.42	2.6															BASIN EX6 @ DP5, CONTINUES TO DP6
		EX7	0.15	0.48	5.1	0.07	8.62	0.6															BASIN EX7 @ DP6
	6								12.3	0.48	6.42	3.1											COMBINED BASIN EX6 & EX7 @ DP6, CONTINUES SOUTH IN SWALE ALONG MICROSCOPE WAY
		EX8	1.14	0.64	9.7	0.73	7.02	5.1															BASIN EX8 FLOW @ DP7
	7								12.3	1.21	6.42	7.8											COMBINED DP6 & BASIN EX8 FLOW @ DP7, CONVEYED UNDER MICROSCOPE WAY IN EX 20" CMP

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

Subdivision:	Ascent Church
Location:	El Paso County
Project Name:	Ascent Church
Project Number:	25023
Calculated By:	NQJ
Checked By:	REB
Date:	4/17/2026

PROPOSED 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)
1A	0.05	41%	0.41	0.60	5.3	0.1	0.3
1B	1.03	10%	0.15	0.41	12.9	0.6	2.6
2	0.48	35%	0.32	0.53	5.0	0.8	2.2
3	1.23	47%	0.41	0.59	19.6	1.6	3.8
4	0.07	47%	0.38	0.55	6.2	0.1	0.3
5A	0.14	58%	0.55	0.70	6.1	0.4	0.8
5B	0.14	51%	0.50	0.66	7.4	0.3	0.7
6	1.41	35%	0.35	0.55	7.8	2.3	5.9
7	0.12	27%	0.29	0.51	5.0	0.2	0.5
8	0.63	49%	0.48	0.65	10.5	1.2	2.8
9	1.08	47%	0.45	0.62	10.0	2.0	4.7
10	1.58	91%	0.82	0.90	5.0	6.7	12.3
11	2.23	61%	0.58	0.72	14.0	4.7	9.8

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	0.1	0.3
2	0.7	2.8
3	0.8	2.2
4	2.1	5.1
5	0.1	0.3
6	3.0	9.5
7	1.2	2.8
8	1.4	5.1
9	3.3	9.5
10	4.7	9.8
11	9.3	20.3

COMPOSITE % IMPERVIOUS CALCULATIONS - PROPOSED CONDITIONS

Subdivision: Ascent Church
Location: El Paso County

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

		Gravel Drives				Paved				Roofs				Undeveloped				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}	
1A	0.05	0.59	0.70	0.00	80.0%	0.90	0.96	0.02	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.03	2.0%	0.41	0.60	41.2%
1B	1.03	0.59	0.70	0.00	80.0%	0.90	0.96	0.08	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.95	2.0%	0.15	0.41	9.6%
2	0.48	0.59	0.70	0.03	80.0%	0.90	0.96	0.01	100.0%	0.73	0.81	0.14	90.0%	0.09	0.36	0.30	2.0%	0.32	0.53	34.6%
3	1.23	0.59	0.70	0.10	80.0%	0.90	0.96	0.05	100.0%	0.73	0.81	0.48	90.0%	0.09	0.36	0.60	2.0%	0.41	0.59	46.7%
4	0.07	0.59	0.70	0.04	80.0%	0.90	0.96	0.00	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.03	2.0%	0.38	0.55	46.6%
5A	0.14	0.59	0.70	0.00	80.0%	0.90	0.96	0.08	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.06	2.0%	0.55	0.70	58.0%
5B	0.14	0.59	0.70	0.00	80.0%	0.90	0.96	0.07	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.07	2.0%	0.50	0.66	51.0%
6	1.41	0.59	0.70	0.00	80.0%	0.90	0.96	0.31	100.0%	0.73	0.81	0.19	90.0%	0.09	0.36	0.91	2.0%	0.35	0.55	35.4%
7	0.12	0.59	0.70	0.00	80.0%	0.90	0.96	0.03	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.09	2.0%	0.29	0.51	26.5%
8	0.63	0.59	0.70	0.00	80.0%	0.90	0.96	0.30	100.0%	0.73	0.81	0.00	90.0%	0.09	0.36	0.33	2.0%	0.48	0.65	48.7%
9	1.08	0.59	0.70	0.00	80.0%	0.90	0.96	0.37	100.0%	0.73	0.81	0.14	90.0%	0.09	0.36	0.57	2.0%	0.45	0.62	47.0%
10	1.58	0.59	0.70	0.00	80.0%	0.90	0.96	1.33	100.0%	0.73	0.81	0.11	90.0%	0.09	0.36	0.14	2.0%	0.82	0.90	90.6%
11	2.23	0.59	0.70	0.00	80.0%	0.90	0.96	1.25	100.0%	0.73	0.81	0.11	90.0%	0.09	0.36	0.87	2.0%	0.58	0.72	61.3%
Pond (2 &3)	**1.71**																			**43.3%**
Total	**10.19**																			**50.9%**

STANDARD FORM SF-2 - PROPOSED CONDITIONS
TIME OF CONCENTRATION

Subdivision: Ascent Church
Location: El Paso County

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

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	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)
1A	0.05	B	0.41	0.60	41.2%	17	2.0%	4.1	75	1.0%	10.0	1.0	1.3	5.3	92.0	19.8	5.3
1B	1.03	B	0.15	0.41	9.6%	164	10.4%	10.1	288	5.9%	7.0	1.7	2.8	12.9	452.0	26.3	12.9
2	0.48	B	0.32	0.53	34.6%	55	25.0%	3.6	172	2.0%	15.0	2.1	1.4	4.9	227.0	21.6	5.0
3	1.23	B	0.41	0.59	46.7%	170	0.5%	20.3	400	7.5%	15.0	4.1	1.6	21.9	570.0	19.6	19.6
4	0.07	B	0.38	0.55	46.6%	100	10.0%	6.1	5	2.0%	10.0	1.4	0.1	6.2	105.0	18.1	6.2
5A	0.14	B	0.55	0.70	58.0%	25	2.0%	3.9	160	1.5%	10.0	1.2	2.2	6.1	185.0	17.4	6.1
5B	0.14	B	0.50	0.66	51.0%	12	2.0%	3.0	251	0.9%	10.0	0.9	4.4	7.4	263.0	20.1	7.4
6	1.41	B	0.35	0.55	35.4%	40	2.0%	6.8	320	7.2%	20.0	5.4	1.0	7.8	360.0	21.4	7.8
7	0.12	B	0.29	0.51	26.5%	60	23.0%	4.0	125	2.4%	15.0	2.3	0.9	4.9	185.0	22.6	5.0
8	0.63	B	0.48	0.65	48.7%	180	3.9%	9.7	234	10.0%	15.0	4.7	0.8	10.5	414.0	18.5	10.5
9	1.08	B	0.45	0.62	47.0%	130	3.8%	8.6	265	10.5%	10.0	3.2	1.4	10.0	395.0	18.9	10.0
10	1.58	B	0.82	0.90	90.6%	30	1.0%	2.8	525	4.9%	20.0	4.4	2.0	4.8	555.0	12.4	5.0
11	2.23	B	0.58	0.72	61.3%	82	2.0%	6.8	882	4.2%	10.0	2.0	7.2	14.0	964.0	19.7	14.0

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

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 - PROPOSED CONDITIONS

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Ascent Church
Location: El Paso County
Design Storm: 5-Year

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

DESCRIPTION	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	t_c (min)	C*A (Ac)	I (in/hr)	Q (cfs)	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)	
	1	1A	0.05	0.41	5.3	0.02	5.08	0.1					0.1	0.02	6.7					472	1.8	4.3	BASIN 1 FLOW @ DP1, SHEET FLOW ACROSS FIRE ACCESS ROAD, CONTINUES TO DP2
		1B	1.03	0.15	12.9	0.16	3.74	0.6															BASIN 1B FLOW @ DP2
	2								12.9	0.18	3.74	0.7											COMBINED DP1 & BASIN 1B FLOW @ DP2, CONVEYED WEST IN OFFSITE SWALE
	3	2	0.48	0.32	5.0	0.16	5.17	0.8					0.8	0.16	12					316	5.3	1.0	BASIN 2 FLOW CAPTURED IN DRAINAGE SWALE TO DP2, CONVEYED UNDER LOADING DOCK IN 12" RCP CULVERT, CONINTUES IN SWALE TO DP4
		3	1.23	0.41	19.6	0.51	3.12	1.6															BASIN 3 CAPTURED IN POND A (DP4)
	4								19.6	0.66	3.12	2.1											COMBINED BASIN 3 & DP3 @ DP4
	5	4	0.07	0.38	6.2	0.03	4.85	0.1					0.1	0.03	2.5					160	1.7	1.6	BASIN 4 FLOW @ DP5, CONTINUES SOUTH ALONG MICROSCOPE WAY IN ROADSIDE SWALE TO DP6
		5A	0.14	0.55	6.1	0.08	4.87	0.4															BASIN 5A FLOW CONVEYED IN DEER CREEK FDR SWALE: 206M-N TO DP6
		5B	0.14	0.50	7.4	0.07	4.58	0.3															BASIN 5B FLOW CONVEYED IN DEER CREEK FDR SWALE: 206M-S TO DP6
		6	1.41	0.35	7.8	0.50	4.51	2.3															BASIN 6 SHEET FLOWS TO DEER CREEK FDR SWALE: 206M-S, CONVEYED TO DP6
	6								7.8	0.67	4.51	3.0											COMBINED POND A DISCHARGE, DP5, BASIN 5A, 5B & 6 FLOW @ DP6, COINVEYED WEST UNDER MICROSCOPE WAY IN 30" x 19" HERCP, FOLLOWS HISTORIC DRAINAGE PATTERN
		7	0.12	0.29	5.0	0.04	5.17	0.2															BASIN 7 FLOW, CONVEYED IN DEER CREEK ROAD SWALE: 200-M TO DP8
	7	8	0.63	0.48	10.5	0.30	4.06	1.2															BASIN 8 FLOW CONVEYED IN DP7 SWALE TO DP7, CONTINUES TO DP8
	8								10.5	0.33	4.06	1.4	1.4	0.33	2.3					170	5.3	0.5	COMBINED BASIN 7 & DP7 FLOW @ DP8, CONTINUES IN DEER CREEK ROAD SWALE: 200-M TO DP9
		9	1.08	0.45	10.0	0.49	4.13	2.0															BASIN 9 FLOW CONVEYED IN DEER CREEK ROADSIDE SWALE TO DP9
	9								11.0	0.82	3.99	3.3											COMBINED DP8 & BASIN 9 FLOW @ DP9, CONVEYED WEST IN 23" X 14" HERCP CULVERT (DEER CREED CULVERT: CV-412
		10	1.58	0.82	5.0	1.29	5.17	6.7															BASIN 10 FLOW @ DP11
	10	11	2.23	0.58	14.0	1.28	3.63	4.7															BASIN 11 FLOW @ DP10, CONVEYED IN 30" X 19" HERCP CULVERT (DEER CREEK CULVERT: CV-416) TO DP11
	11								14.0	2.57	3.63	9.3											COMBINED DP10 & BASIN 10 FLOW @ DP11, CONVEYED SOUTH IN 30"X19" HERCP CULVERT (DEER CREEK CULVERT: CV-415)

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

Subdivision: Ascent Church
Location: El Paso County
Design Storm: 100-Year

Project Name: Ascent Church
Project No.: 25023.00
Calculated By: NQJ
Checked By: REB
Date: 4/17/26

		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
	1	1A	0.05	0.60	5.3	0.03	8.53	0.3					0.3	0.03	6.7					472	1.8	4.3	BASIN 1 FLOW @ DP1, SHEET FLOW ACROSS FIRE ACCESS ROAD, CONTINUES TO DP2
		1B	1.03	0.41	12.9	0.42	6.28	2.6															BASIN 1B FLOW @ DP2
	2								12.9	0.45	6.28	2.8											COMBINED DP1 & BASIN 1B FLOW @ DP2, CONVEYED WEST IN OFFSITE SWALE
	3	2	0.48	0.53	5.0	0.25	8.68	2.2					2.2	0.25	12					316	5.3	1.0	BASIN 2 FLOW CAPTURED IN DRAINAGE SWALE TO DP2, CONVEYED UNDER LOADING DOCK IN 12" RCP CULVERT, CONINTUES IN SWALE TO DP4
		3	1.23	0.59	19.6	0.72	5.23	3.8															BASIN 3 CAPTURED IN POND A (DP4)
	4								19.6	0.97	5.23	5.1											COMBINED BASIN 3 & DP3 @ DP4
	5	4	0.07	0.55	6.2	0.04	8.15	0.3					0.3	0.04	2.5					160	1.7	1.6	BASIN 4 FLOW @ DP5, CONTINUES SOUTH ALONG MICROSCOPE WAY IN ROADSIDE SWALE TO DP6
		5A	0.14	0.70	6.1	0.10	8.18	0.8															BASIN 5A FLOW CONVEYED IN DEER CREEK FDR SWALE: 206M-N TO DP6
		5B	0.14	0.66	7.4	0.09	7.68	0.7															BASIN 5B FLOW CONVEYED IN DEER CREEK FDR SWALE: 206M-S TO DP6
		6	1.41	0.55	7.8	0.78	7.57	5.9															BASIN 6 SHEET FLOWS TO DEER CREEK FDR SWALE: 206M-S, CONVEYED TO DP6
	6								7.8	1.01	7.57	9.5											COMBINED POND A DISCHARGE, DP5, BASIN 5A, 5B & 6 FLOW @ DP6, COINVEYED WEST UNDER MICROSCOPE WAY IN 30" x 19" HERCP, FOLLOWS HISTORIC DRAINAGE PATTERN
		7	0.12	0.51	5.0	0.06	8.68	0.5															BASIN 7 FLOW, CONVEYED IN DEER CREEK ROAD SWALE: 200-M TO DP8
	7	8	0.63	0.65	10.5	0.41	6.82	2.8															BASIN 8 FLOW CONVEYED IN DP7 SWALE TO DP7, CONTINUES TO DP8
	8								10.5	0.47	6.82	5.1	5.1	0.47	2.3					170	5.3	0.5	COMBINED BASIN 7 & DP7 FLOW @ DP8, CONTINUES IN DEER CREEK ROAD SWALE: 200-M TO DP9
		9	1.08	0.62	10.0	0.67	6.94	4.7															BASIN 9 FLOW CONVEYED IN DEER CREEK ROADSIDE SWALE TO DP9
	9								11.0	1.14	6.69	9.5											COMBINED DP8 & BASIN 9 FLOW @ DP9, CONVEYED WEST IN 23" X 14" HERCP CULVERT (DEER CREED CULVERT: CV-412
		10	1.58	0.90	5.0	1.42	8.68	12.3															BASIN 10 FLOW @ DP11
	10	11	2.23	0.72	14.0	1.60	6.09	9.8															BASIN 11 FLOW @ DP10, CONVEYED IN 30" X 19" HERCP CULVERT (DEER CREEK CULVERT: CV-416) TO DP11
	11								14.0	3.02	6.09	20.3											COMBINED DP10 & BASIN 10 FLOW @ DP11, CONVEYED SOUTH IN 30"X19" HERCP CULVERT (DEER CREEK CULVERT: CV-415)

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

APPENDIX C – HYDRAULIC CALCULATIONS

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Basin 2 Swale (Q100 = 2.2 cfs)

Triangular

Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 7171.84
Slope (%)	= 2.00
N-Value	= 0.030

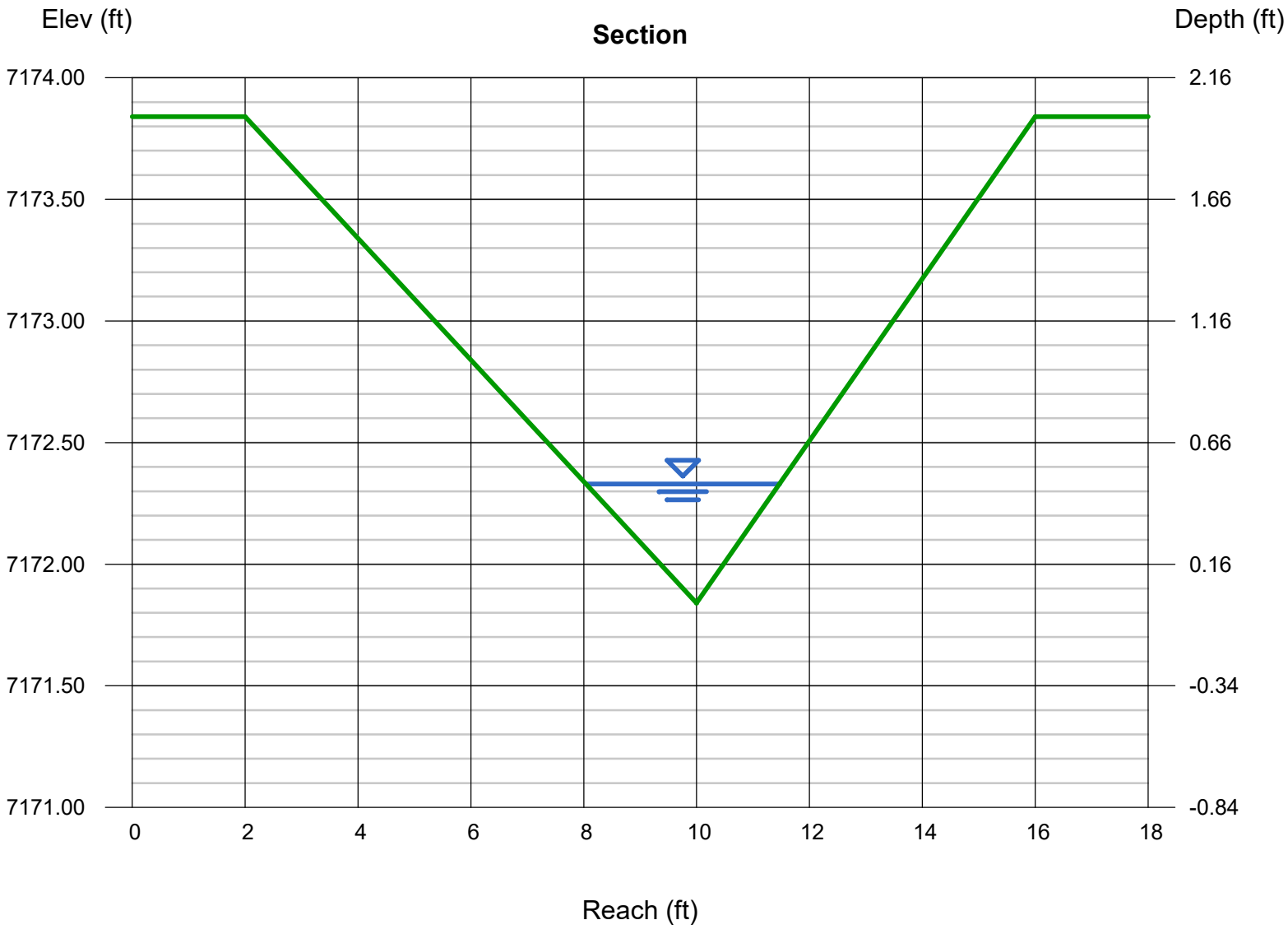
Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.20

Highlighted

Depth (ft)	= 0.49
Q (cfs)	= 2.200
Area (sqft)	= 0.84
Velocity (ft/s)	= 2.62
Wetted Perim (ft)	= 3.57
Crit Depth, Yc (ft)	= 0.48
Top Width (ft)	= 3.43
EGL (ft)	= 0.60

Froude = 0.66



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Basin 3 Swale (Q100 = 5.1 cfs)

Triangular

Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 7149.60
Slope (%)	= 2.00
N-Value	= 0.030

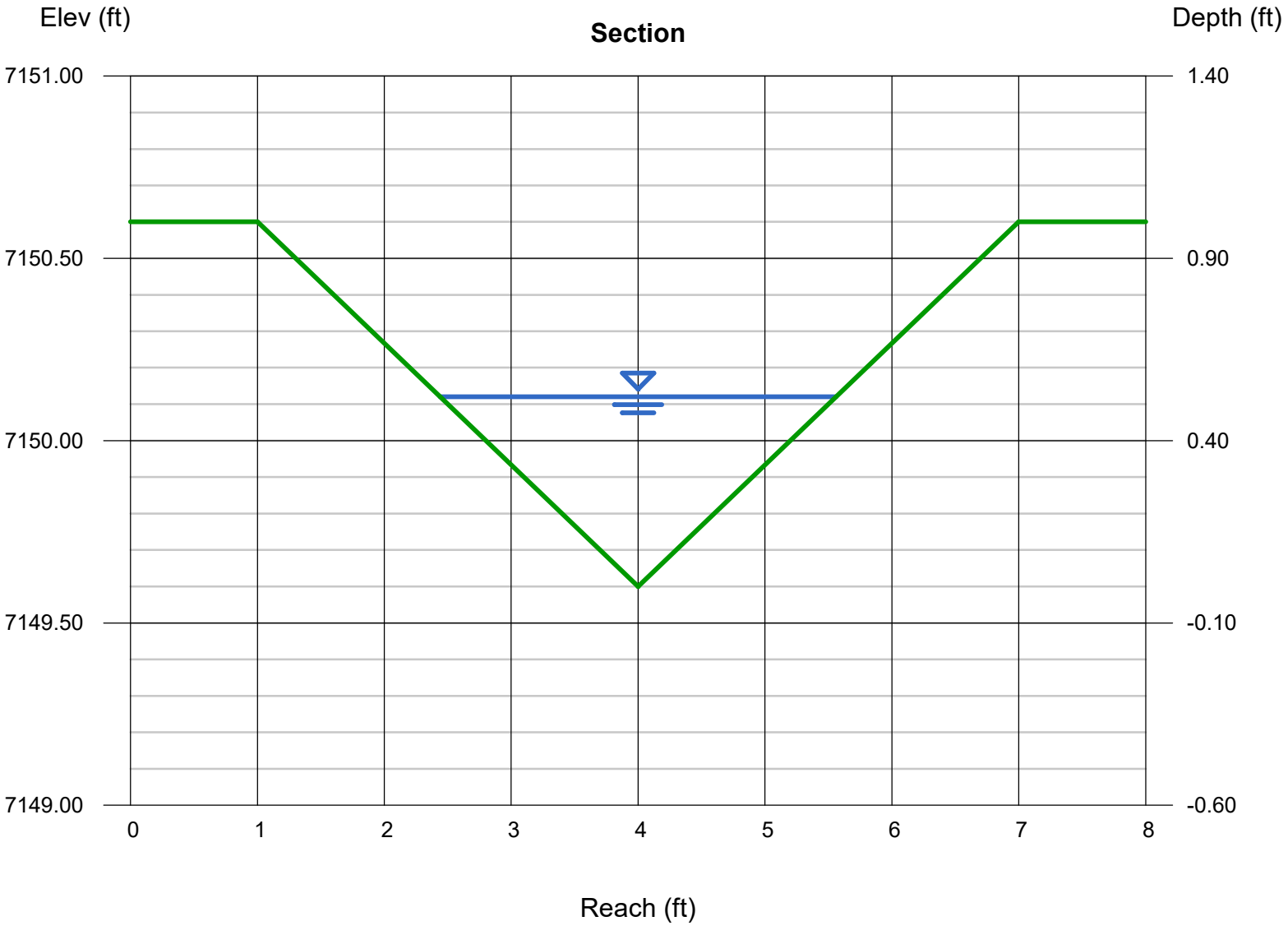
Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.20

Highlighted

Depth (ft)	= 0.52
Q (cfs)	= 2.200
Area (sqft)	= 0.81
Velocity (ft/s)	= 2.71
Wetted Perim (ft)	= 3.29
Crit Depth, Yc (ft)	= 0.51
Top Width (ft)	= 3.12
EGL (ft)	= 0.63

Froude = 0.67



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Basin 5A Swale (Q100 = 1.1 cfs)

Triangular

Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 7138.50
Slope (%)	= 2.00
N-Value	= 0.030

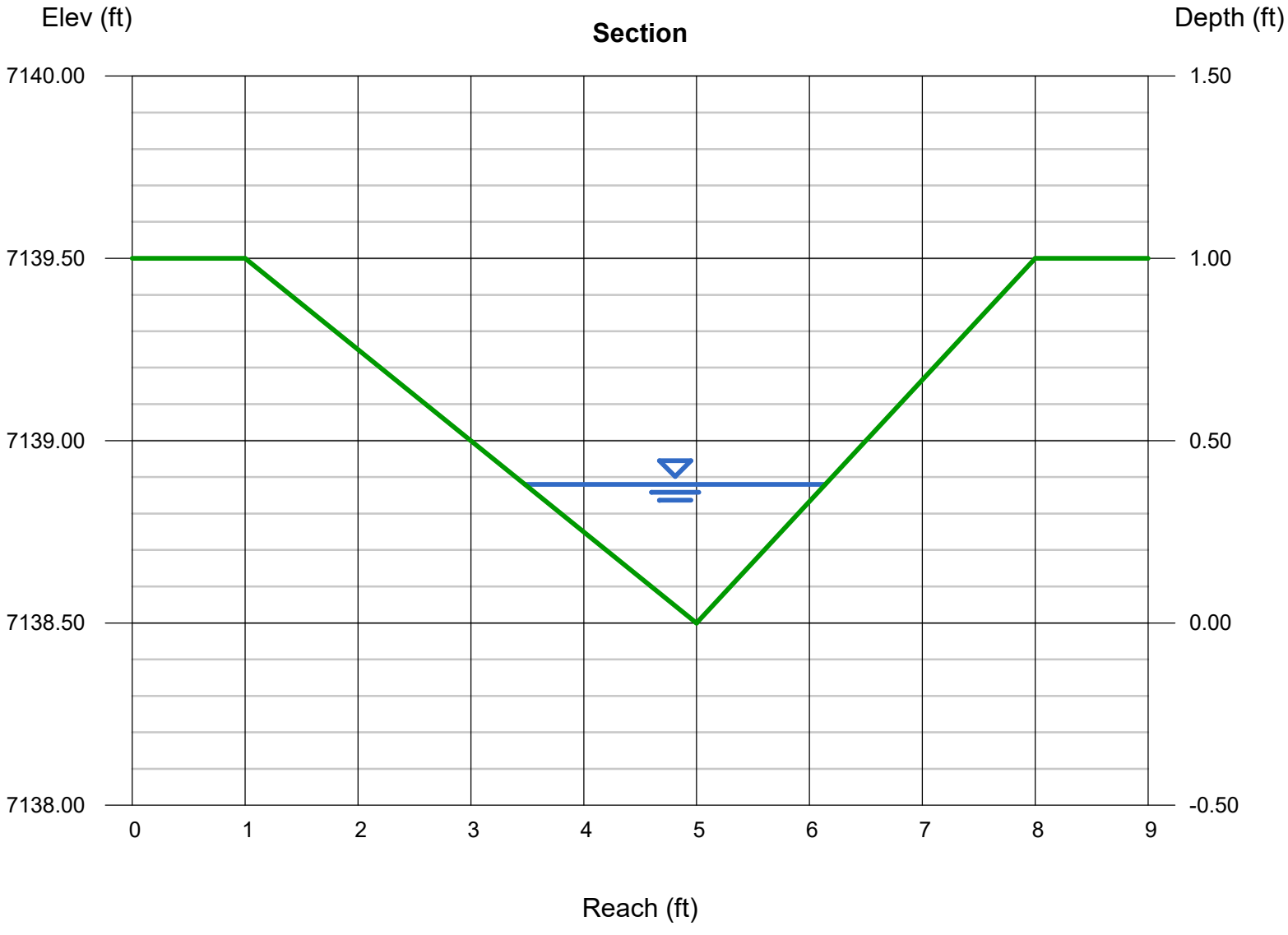
Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.10

Highlighted

Depth (ft)	= 0.38
Q (cfs)	= 1.100
Area (sqft)	= 0.51
Velocity (ft/s)	= 2.18
Wetted Perim (ft)	= 2.77
Crit Depth, Yc (ft)	= 0.37
Top Width (ft)	= 2.66
EGL (ft)	= 0.45

Froude = 0.62



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Basin 5B Swale (Q100 = 6.6 cfs)

Triangular

Side Slopes (z:1)	= 4.00, 3.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 7138.50
Slope (%)	= 1.66
N-Value	= 0.030

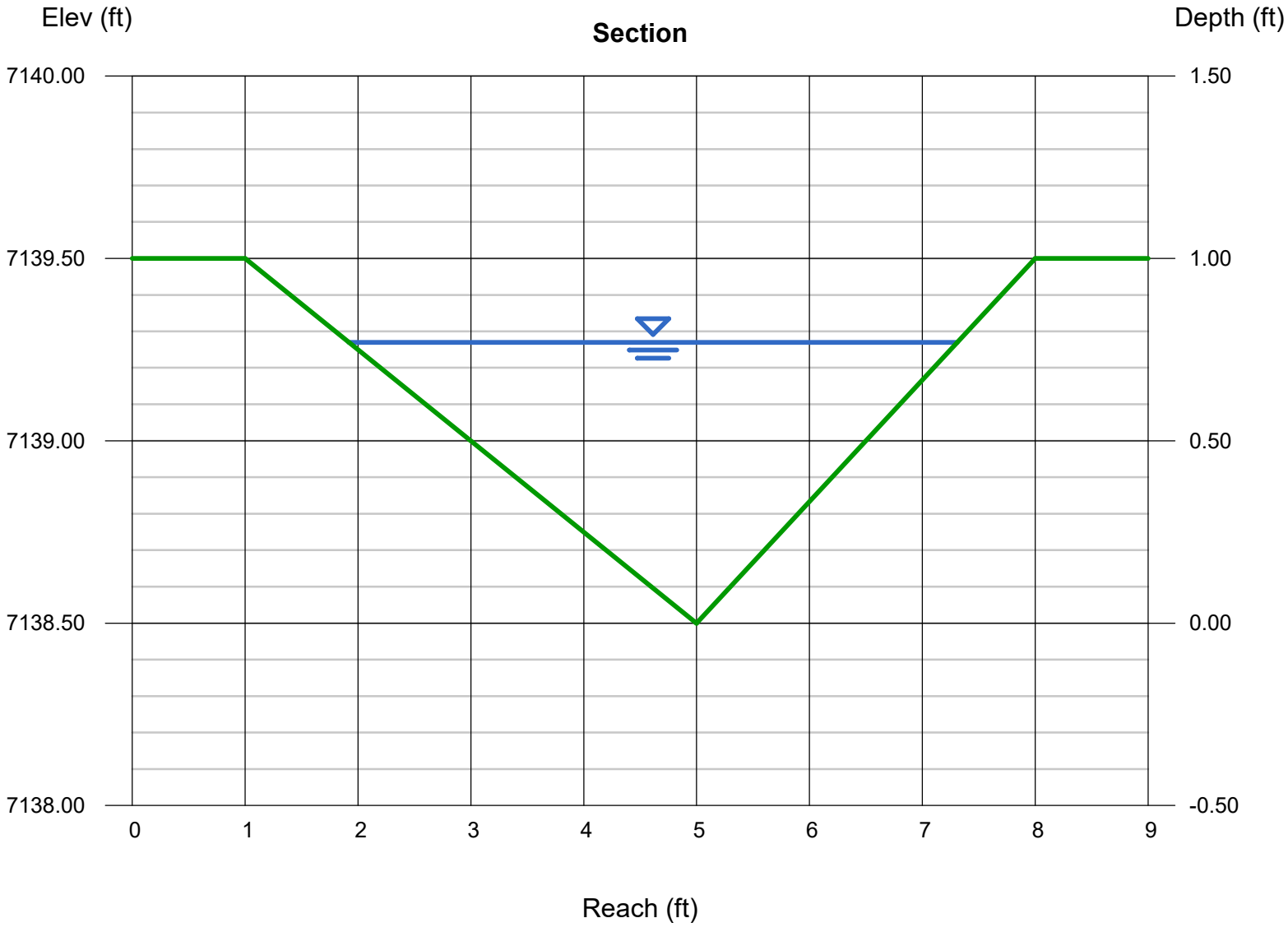
Calculations

Compute by:	Known Q
Known Q (cfs)	= 6.60

Highlighted

Depth (ft)	= 0.77
Q (cfs)	= 6.600
Area (sqft)	= 2.08
Velocity (ft/s)	= 3.18
Wetted Perim (ft)	= 5.61
Crit Depth, Yc (ft)	= 0.74
Top Width (ft)	= 5.39
EGL (ft)	= 0.93

Froude = 0.65



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Basin 8 Swale (Q100 = 2.8 cfs)

Trapezoidal

Bottom Width (ft)	= 1.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 1.50
Invert Elev (ft)	= 7139.98
Slope (%)	= 10.70
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.80

Highlighted

Depth (ft)	= 0.31
Q (cfs)	= 2.800
Area (sqft)	= 0.60
Velocity (ft/s)	= 4.68
Wetted Perim (ft)	= 2.96
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 2.86
EGL (ft)	= 0.65

Froude = 1.3

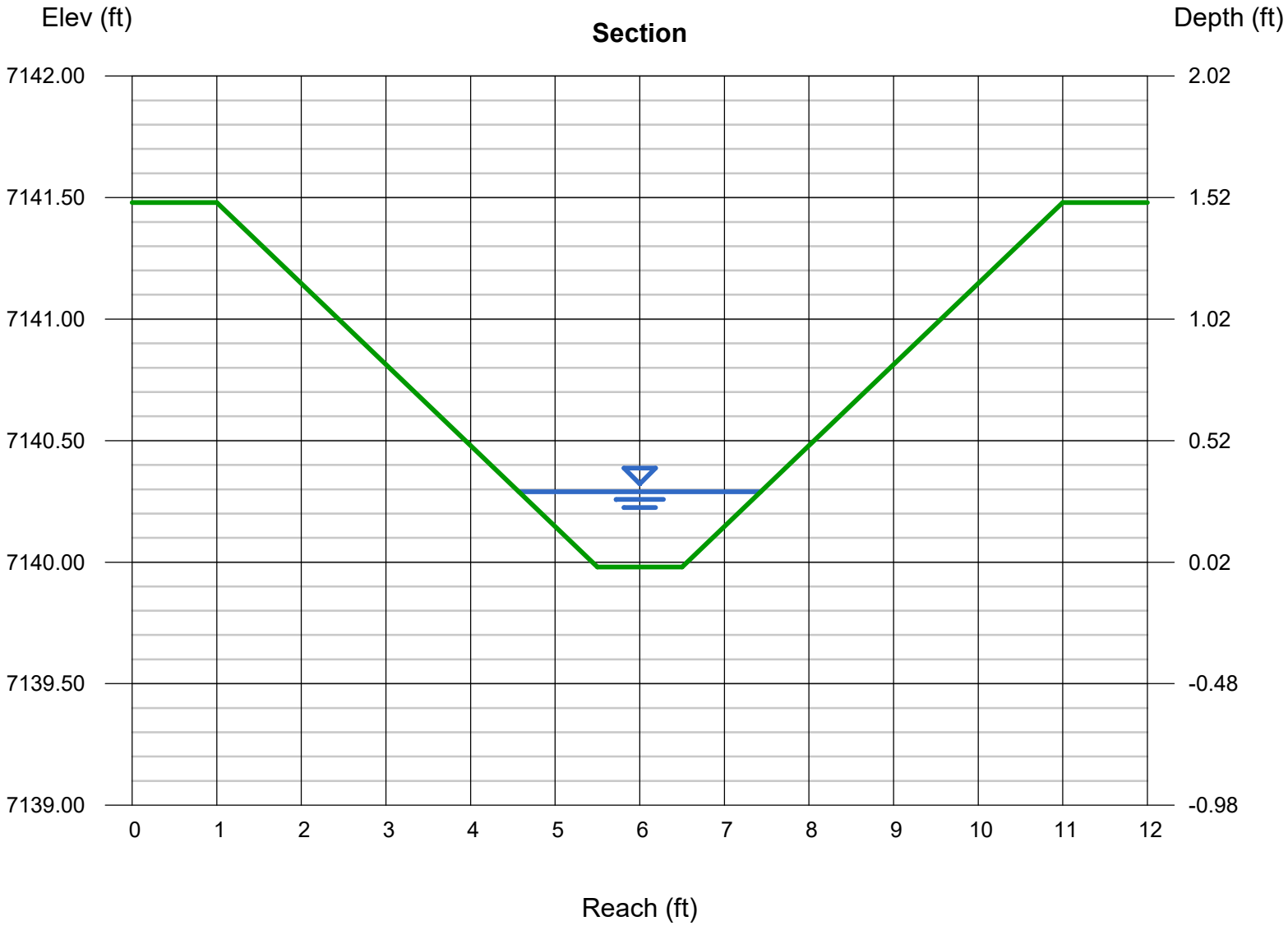


Figure 13-12c. Emergency Spillway Protection

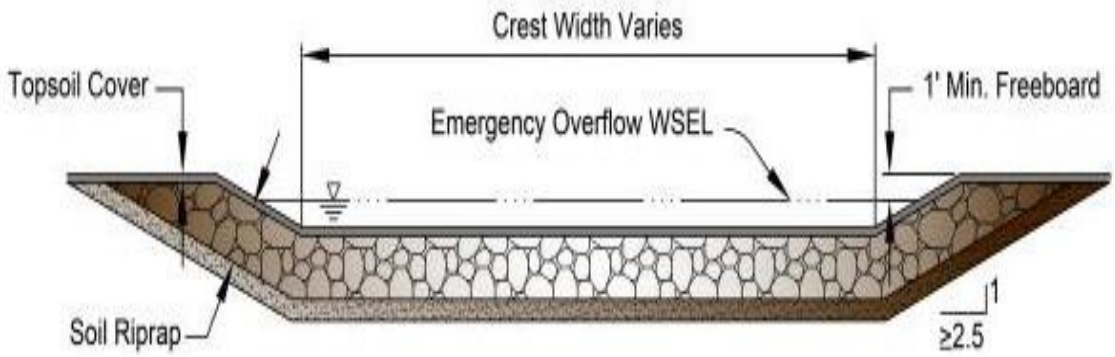
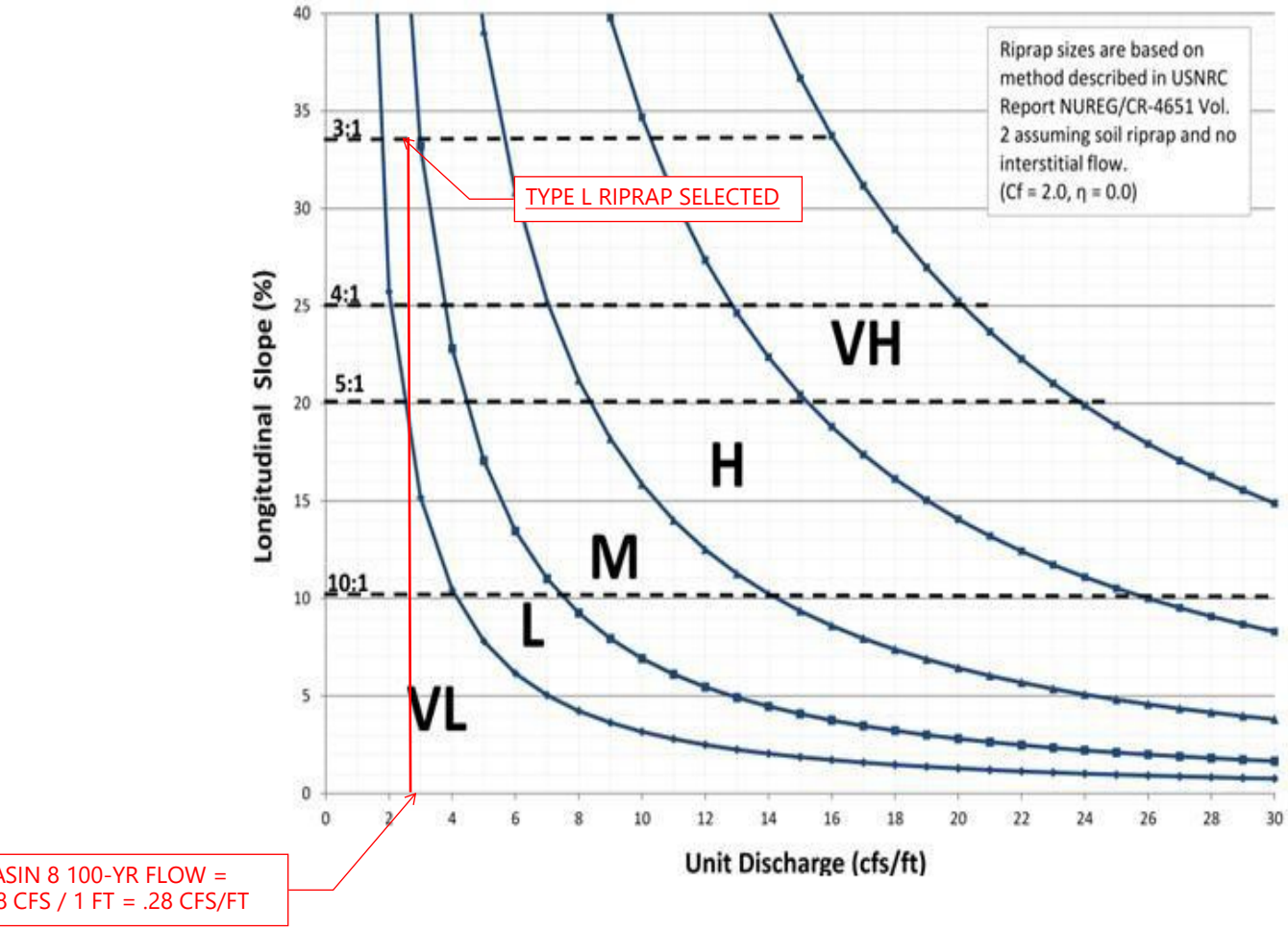


Figure 13-12d. Riprap Types for Emergency Spillway Protection



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Loading Dock Culvert DP2 (Q100 = 2.8 cfs)

Invert Elev Dn (ft)	=	7171.31
Pipe Length (ft)	=	41.36
Slope (%)	=	1.28
Invert Elev Up (ft)	=	7171.84
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

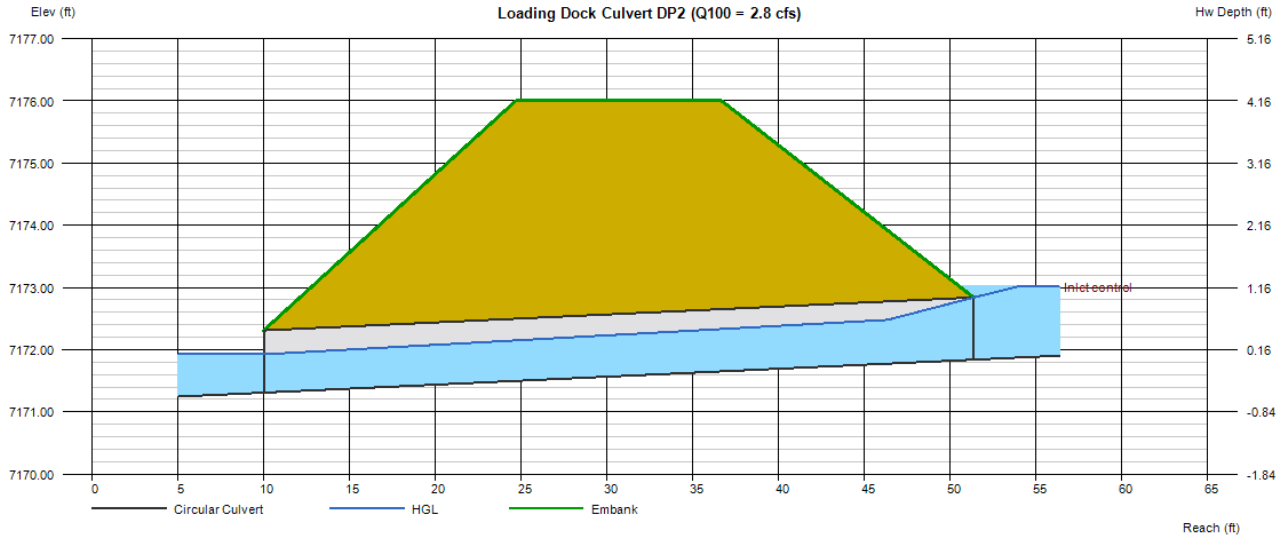
Top Elevation (ft)	=	7176.00
Top Width (ft)	=	12.00
Crest Width (ft)	=	13.00

Calculations

Qmin (cfs)	=	0.30
Qmax (cfs)	=	2.80
Tailwater Elev (ft)	=	0.00

Highlighted

Qtotal (cfs)	=	2.80
Qpipe (cfs)	=	2.80
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.52
Veloc Up (ft/s)	=	4.65
HGL Dn (ft)	=	7171.93
HGL Up (ft)	=	7172.56
Hw Elev (ft)	=	7173.01
Hw/D (ft)	=	1.17
Flow Regime	=	Inlet Control



Project: Ascent Church
Project No: 25023
Date: 4/9/2026

Forebay Sizing (Per USDCM Volume 3, Table 4-12)				
WQCV (ac-ft)	1% WQCV (ft^3)	Forebay Area (ft^2)	Forebay Depth (ft)	Forebay Volume (ft^3)
0.028	12	12	1.5	18

GEC Plan missing forebay

Forebay Notch Sizing (Per USDCM Volume 3 Equation 4-1)			
$w=9.23(A_{FB}/t)(1/sqrt(h_{max}))$			
A_{FB} (ft^2)	t (s)	h_{max} (ft)	w_{min} (in)
12	240	1.5	0.38

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Apr 13 2026

Pond 1 Trickle Channel (Q100 = 1% of 100-year Peak Inflow = 0.44 cfs)

Rectangular

Bottom Width (ft)	= 2.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 7145.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.44

Highlighted

Depth (ft)	= 0.10
Q (cfs)	= 0.440
Area (sqft)	= 0.20
Velocity (ft/s)	= 2.20
Wetted Perim (ft)	= 2.20
Crit Depth, Yc (ft)	= 0.12
Top Width (ft)	= 2.00
EGL (ft)	= 0.18

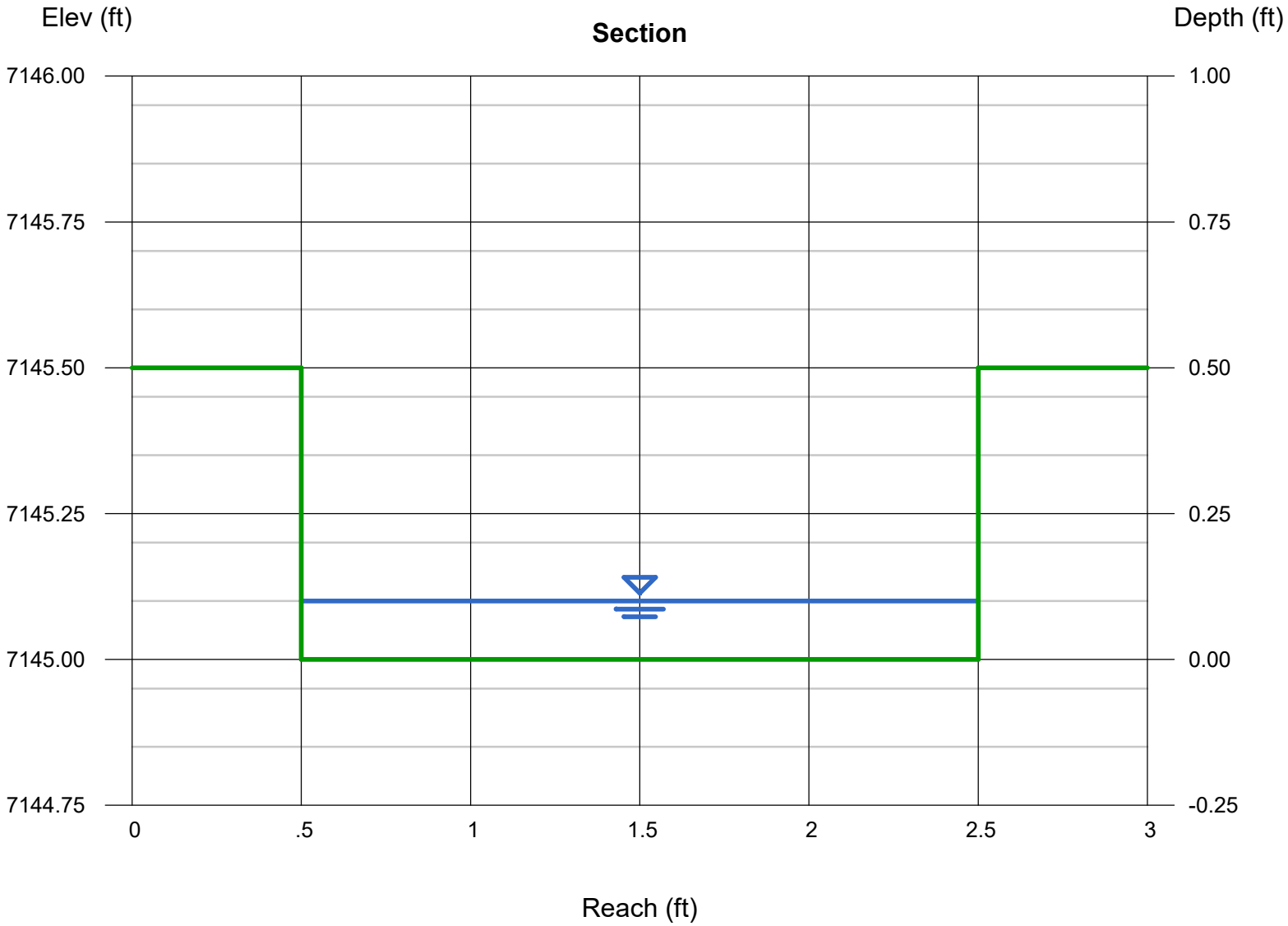


Figure 13-12c. Emergency Spillway Protection

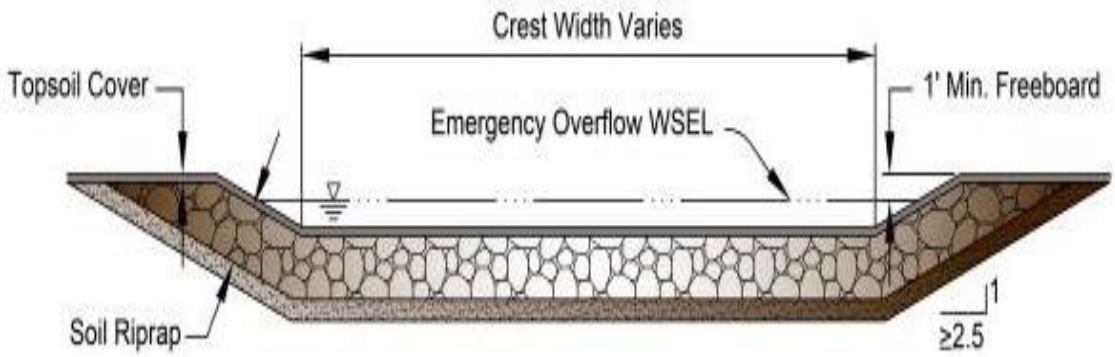
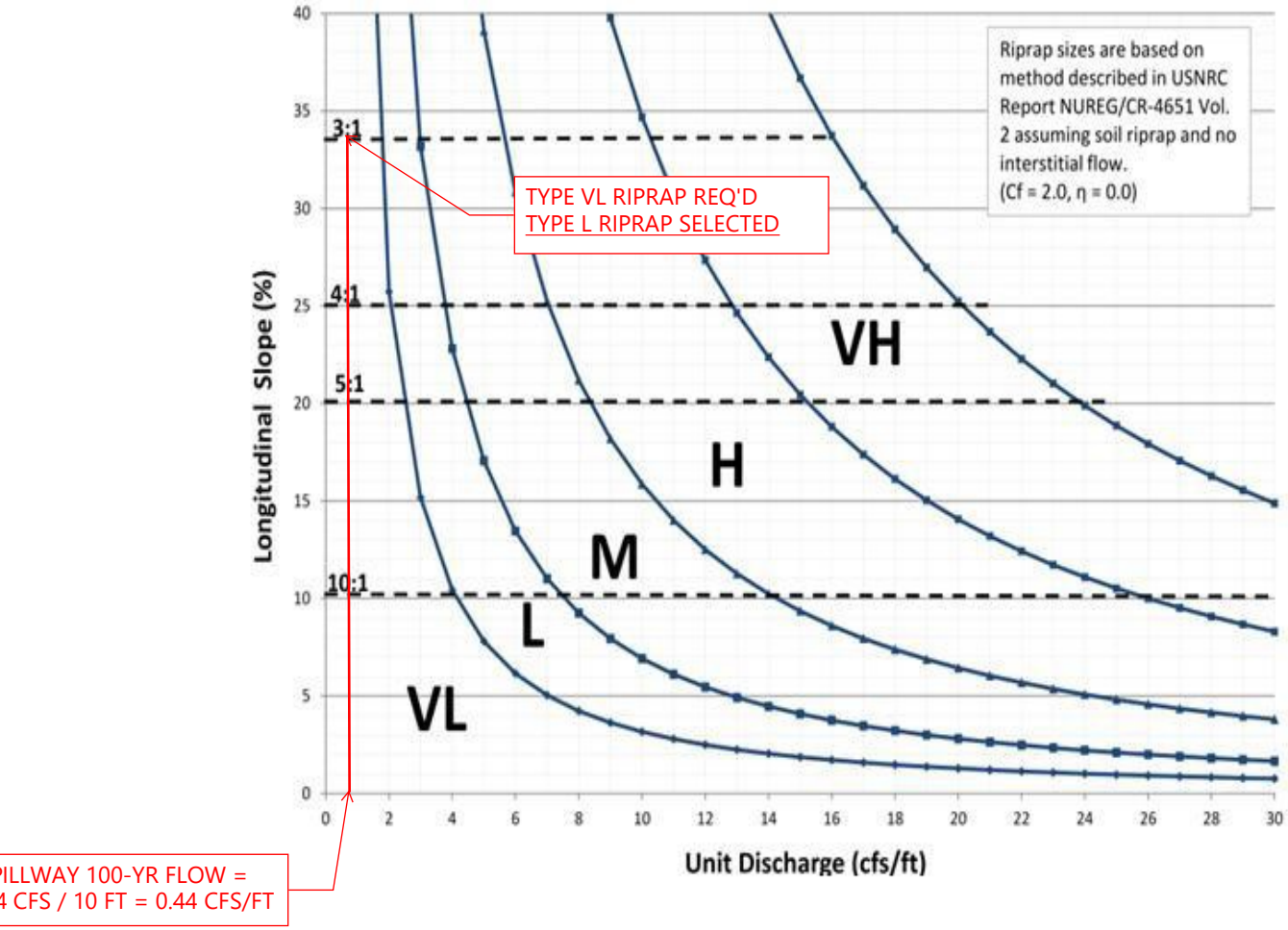


Figure 13-12d. Riprap Types for Emergency Spillway Protection



ALL TERRAIN ENGINEERING

Ascent Church - Riprap Sizing

Location	Ss	Velocity (ft/s)	Slope (ft/ft)	d_{50} (calc) (in)	d_{50} (selected) (in)	Designation	Depth
Loading Dock Culvert Outfall	2.5	5.52	0.12	2.9	6"	TYPE VL	12"
Pond Rundown	2.5	8.43	0.33	5.3	6"	TYPE VL	12"

$$\frac{VS^{0.17}}{(S_s-1)^{0.66}} = 1.0$$

Where:

V = mean channel flow velocity, in fps;

S = longitudinal channel slope, in feet per foot (ft/ft); and

S_s = specific gravity of stone (minimum S_s = 2.50)

RIPRAP DESIGNATION	% SMALLER THAN GIVEN SIZE BY WEIGHT	INTERMEDIATE ROCK DIMENSION (INCHES)	D_{50}* (INCHES)
TYPE VL	70 – 100 50 – 70 35 – 50 2 – 10	12 9 6 2	6
TYPE L	70 – 100 50 – 70 35 – 50 2 – 10	15 12 9 3	9
TYPE M	70 – 100 50 – 70 35 – 50 2 – 10	21 18 12 4	12
TYPE H	70 – 100 50 – 70 35 – 50 2 – 10	30 24 18 6	18
*D_{50} = MEAN ROCK SIZE			

Figure 8-34. Riprap and soil riprap placement and gradation (part 1 of 3)

MHFD USDCM Figure 8-34

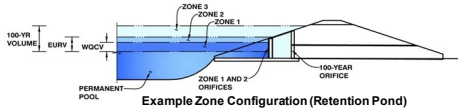
APPENDIX D – WATER QUALITY & DETENTION

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **Ascent Church Expansion**

Basin ID: **Basin 2 & 3**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	1.71	acres
Watershed Length =	480	ft
Watershed Length to Centroid =	220	ft
Watershed Slope =	0.060	ft/ft
Watershed Imperviousness =	43.0%	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) =	0.027	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.078	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 0.9 in.) =	0.047	acre-feet	0.90 inches
5-yr Runoff Volume (P1 = 1.2 in.) =	0.071	acre-feet	1.20 inches
10-yr Runoff Volume (P1 = 1.46 in.) =	0.100	acre-feet	1.46 inches
25-yr Runoff Volume (P1 = 1.86 in.) =	0.161	acre-feet	1.86 inches
50-yr Runoff Volume (P1 = 2.18 in.) =	0.204	acre-feet	2.18 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	0.257	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.4 in.) =	0.381	acre-feet	3.40 inches
Approximate 2-yr Detention Volume =	0.044	acre-feet	
Approximate 5-yr Detention Volume =	0.065	acre-feet	
Approximate 10-yr Detention Volume =	0.091	acre-feet	
Approximate 25-yr Detention Volume =	0.113	acre-feet	
Approximate 50-yr Detention Volume =	0.123	acre-feet	
Approximate 100-yr Detention Volume =	0.144	acre-feet	

Provide source for rainfall values. If from NOAA Atlas 14 please provide summary sheets.

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.027	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.051	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.066	acre-feet
Total Detention Basin Volume =	0.144	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	

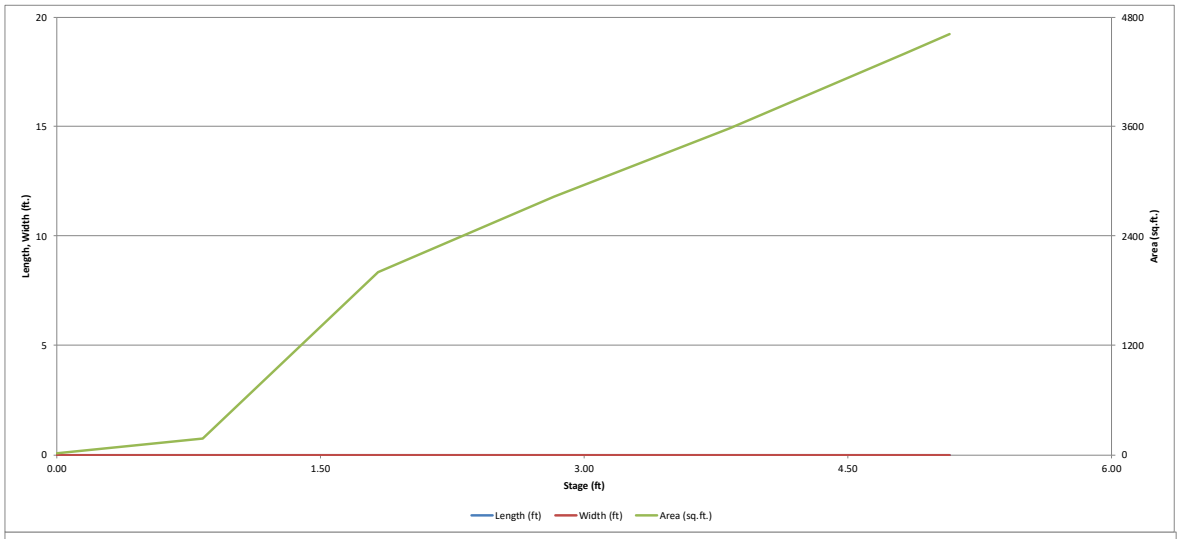
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user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

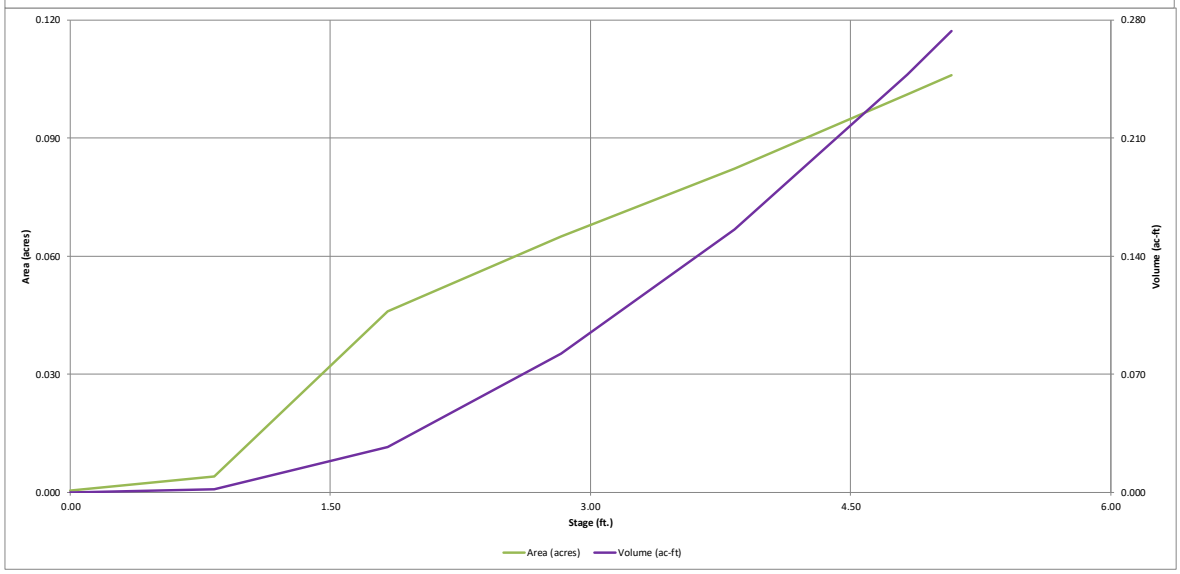
Depth Increment = ft

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)
7144.17 **Top of Micropool**	--	0.00	--	--	--	20	0.000		
7145	--	0.83	--	--	--	175	0.004	81	0.002
7146	--	1.83	--	--	--	2,001	0.046	1,169	0.027
7147	--	2.83	--	--	--	2,830	0.065	3,584	0.082
7148	--	3.83	--	--	--	3,581	0.082	6,790	0.156
7149	--	4.83	--	--	--	4,403	0.101	10,782	0.248
7149.25	--	5.08	--	--	--	4,615	0.106	11,909	0.273

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



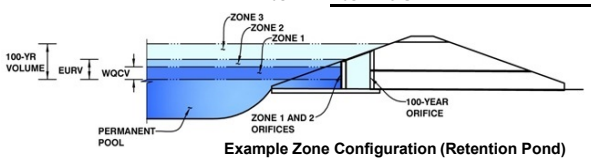


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **Ascent Church Expansion**

Basin ID: **Basin 2 & 3**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.84	0.027	Orifice Plate
Zone 2 (EURV)	2.77	0.051	Circular Orifice
Zone 3 (100-year)	3.69	0.066	Weir&Pipe (Restrict)
Total (all zones)		0.144	

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 =	9.028E-04	ft^2
Depth at top of Zone using Orifice Plate =	1.84	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	0.13	sq. inches (diameter = 3/8 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 ✓	1.00 ✓	1.33 ✓					
Orifice Area (sq. inches)	0.13 ✓	0.13 ✓	0.13 ✓					

	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
Invert of Vertical Orifice =	1.75	N/A
Depth at top of Zone using Vertical Orifice =	2.77	N/A
Vertical Orifice Diameter =	0.50	N/A

Since this orifice is on the orifice plate please input the centroid/area in the section above. This section is for orifices cut into the concrete structure above the plate.

Calculated Parameters for Vertical Orifice

	Zone 2 Circular	Not Selected	
Area =	0.00	N/A	ft^2
troid =	0.02	N/A	feet

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	
Overflow Weir Front Edge Height, Ho =	3.25 ✓	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	2.00	N/A	feet
Overflow Weir Grate Slope =	0.00 ✓	N/A	H:V
Horiz. Length of Weir Sides =	2.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50% ✓	N/A	%

CDs show 3x3' grate

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	3.25	N/A	feet
Overflow Weir Slope Length =	2.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	15.66	N/A	
Overflow Grate Open Area w/o Debris =	2.78	N/A	ft^2
Overflow Grate Open Area w/ Debris =	1.39	N/A	ft^2

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

	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 Pipe Diameter =	12.00 ✓	N/A	inches
Restrictor Plate Height Above Pipe Invert =	3.33 ✗		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.18	N/A	ft^2
Outlet Orifice Centroid =	0.16	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.11	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.75 ✓	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.27	feet
Spillway Crest Length =	10.00 ✓	feet	Stage at Top of Freeboard =	5.02	feet
Spillway End Slopes =	4.00 ✓	H:V	Basin Area at Top of Freeboard =	0.10	acres
Freeboard above Max Water Surface =	1.00 ✓	feet	Basin Volume at Top of Freeboard =	0.27	acre-ft

Calculated Parameters for Spillway

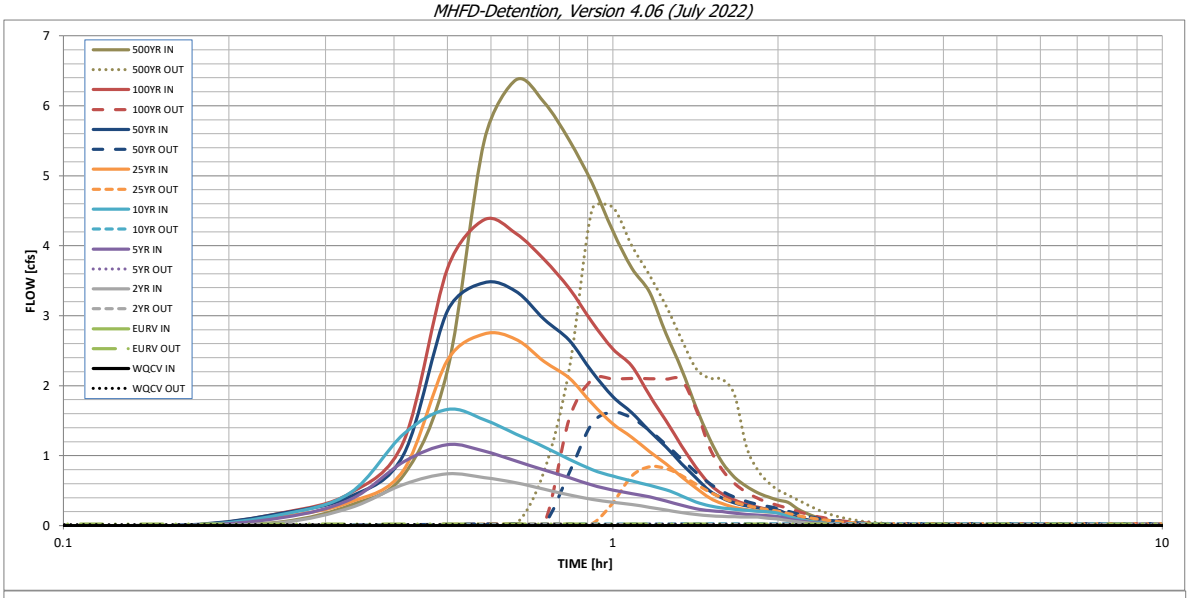
Routed Hydrograph Results

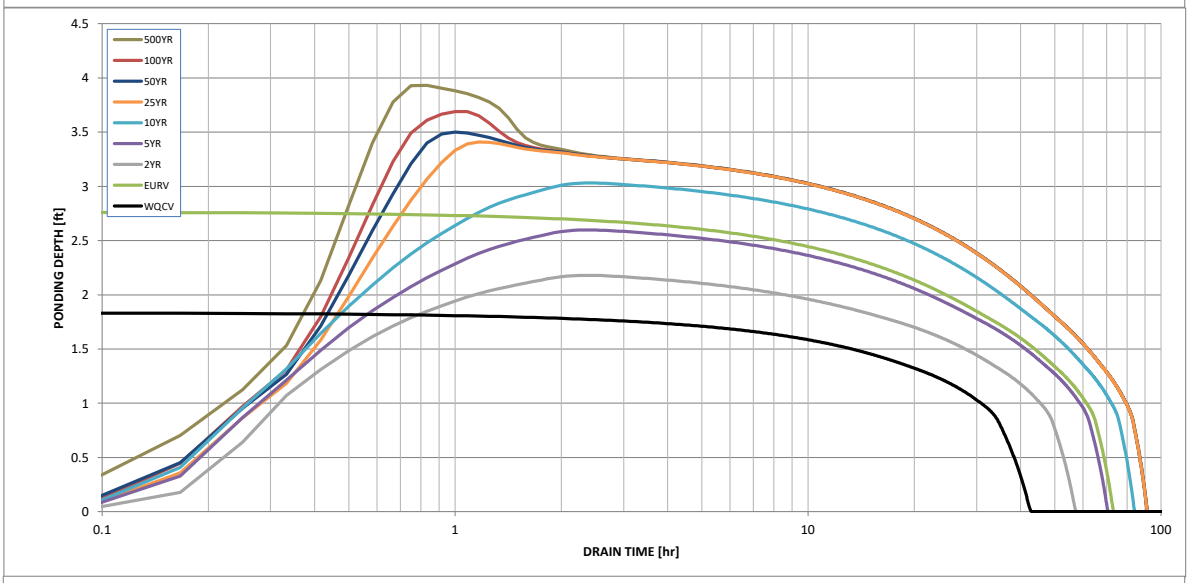
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

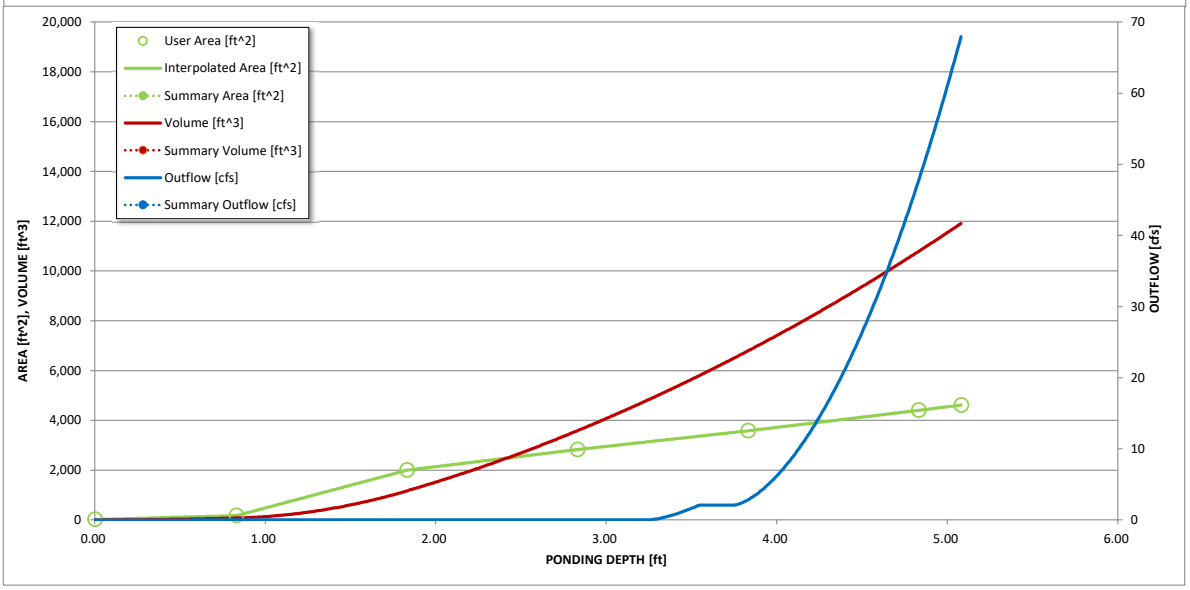
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.90	1.20	1.46	1.86	2.18	2.52	3.40
CUHP Runoff Volume (acre-ft) =	0.027	0.078	0.047	0.071	0.100	0.161	0.204	0.257	0.381
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.047	0.071	0.100	0.161	0.204	0.257	0.381
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.2	0.5	1.3	1.8	2.4	3.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.09	0.28	0.78	1.08	1.43	2.23
Peak Inflow Q (cfs) =	N/A	N/A	0.7	1.2	1.7	2.7	3.5	4.4	6.4
Peak Outflow Q (cfs) =	0.0	0.0	0.0	0.0	0.0	0.8	1.6	2.1	4.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.1	0.1	0.6	0.9	0.9	1.2
Structure Controlling Flow =	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 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	N/A	0.3	0.6	0.7	0.8
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	64	51	62	73	76	74	71	65
Time to Drain 99% of Inflow Volume (hours) =	**41**	69	54	67	79	84	83	81	78
Maximum Ponding Depth (ft) =	1.84	2.77	2.18	2.60	3.03	3.41	3.50	3.69	3.93
Area at Maximum Ponding Depth (acres) =	0.05	0.06	0.05	0.06	0.07	0.07	0.08	0.08	0.08
Maximum Volume Stored (acre-ft) =	0.027	0.078	0.044	0.067	0.095	0.122	0.129	0.144	0.163

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	0.01	0.00	0.06
	0:15:00	0.00	0.00	0.05	0.11	0.16	0.13	0.18	0.18	0.29
	0:20:00	0.00	0.00	0.26	0.37	0.47	0.34	0.42	0.46	0.73
	0:25:00	0.00	0.00	0.59	0.91	1.31	0.80	1.03	1.21	2.22
	0:30:00	0.00	0.00	0.74	1.16	1.66	2.36	3.07	3.67	5.50
	0:35:00	0.00	0.00	0.69	1.06	1.51	2.74	3.47	4.37	6.37
	0:40:00	0.00	0.00	0.61	0.92	1.31	2.66	3.35	4.18	6.05
	0:45:00	0.00	0.00	0.52	0.79	1.13	2.34	2.95	3.80	5.50
	0:50:00	0.00	0.00	0.44	0.69	0.95	2.11	2.65	3.39	4.90
	0:55:00	0.00	0.00	0.38	0.58	0.80	1.75	2.20	2.91	4.21
	1:00:00	0.00	0.00	0.33	0.51	0.71	1.45	1.84	2.53	3.68
	1:05:00	0.00	0.00	0.30	0.46	0.64	1.26	1.61	2.28	3.33
	1:10:00	0.00	0.00	0.26	0.41	0.58	1.06	1.35	1.86	2.74
	1:15:00	0.00	0.00	0.22	0.35	0.51	0.88	1.12	1.50	2.24
	1:20:00	0.00	0.00	0.19	0.29	0.43	0.70	0.89	1.14	1.70
	1:25:00	0.00	0.00	0.16	0.24	0.34	0.54	0.68	0.84	1.25
	1:30:00	0.00	0.00	0.14	0.21	0.28	0.40	0.50	0.59	0.90
	1:35:00	0.00	0.00	0.13	0.20	0.25	0.31	0.39	0.45	0.69
	1:40:00	0.00	0.00	0.13	0.18	0.23	0.26	0.33	0.37	0.56
	1:45:00	0.00	0.00	0.12	0.16	0.22	0.23	0.28	0.31	0.47
	1:50:00	0.00	0.00	0.12	0.15	0.21	0.21	0.25	0.26	0.41
	1:55:00	0.00	0.00	0.11	0.14	0.20	0.19	0.23	0.23	0.36
	2:00:00	0.00	0.00	0.09	0.13	0.18	0.19	0.22	0.21	0.33
	2:05:00	0.00	0.00	0.07	0.10	0.13	0.14	0.16	0.16	0.24
	2:10:00	0.00	0.00	0.05	0.07	0.10	0.10	0.12	0.11	0.18
	2:15:00	0.00	0.00	0.04	0.05	0.07	0.07	0.09	0.08	0.13
	2:20:00	0.00	0.00	0.03	0.04	0.05	0.05	0.06	0.06	0.09
	2:25:00	0.00	0.00	0.02	0.03	0.04	0.04	0.04	0.04	0.07
	2:30:00	0.00	0.00	0.01	0.02	0.03	0.03	0.03	0.03	0.05
	2:35:00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.03
	2:40:00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	2:45:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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).

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: PPR265

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:	ASCENT CHURCH		
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: PPR265

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?	see notes			Project must be on land with no human made structures such as buildings or pavement. The proposed development must return the disturbed area to its historical condition. See CDPHE's "Standard MS4 Permit FAQ" for more detail on how this exclusion applies.
H. Is the project a Stream Stabilization Site?			X	
I. Is the project a Bike or Pedestrian Trail?			X	Bike lanes for roadways are not included in this exclusion but may qualify if attached to a larger roadway activity that is excluded in A, B or C above. Pedestrian trails (e.g. sidewalks) that are attached to a roadway do not apply.
J. Is the project Oil and Gas Exploration?			X	Activities and facilities associated with oil and gas exploration are excluded.
K. Is the project in a County Growth Area?				El Paso County does not apply this exclusion.

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

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EL PASO COUNTY
PCM APPLICABILITY FORM

EPC Project Number: PPR265

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?		X

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.

A full spectrum water quality & detention pond (Pond 1) will be constructed on-site to capture & treat stormwater from proposed drainage basins 2 & 3.

Basin 1B: 0.97 disturbed, undeveloped acres are excluded from WQ & detention per EPC ECM Appendix I, Section I.7.1.B.7.
Basin 4: 0.07 acres of disturbed, impervious area are excluded from WQ & detention per EPC ECM Appendix I, Section I.7.1.C.1a.
Basin 6: 0.14 acres of disturbed, impervious area are excluded from WQ & detention per EPC ECM Appendix I, Section I.7.1.C.1a.
Basin 6: 0.03 acres of disturbed, undeveloped acres are excluded from WQ & detention per EPC ECM Appendix I, Section I.7.1.B.7.
Basin 8: 0.11 acres of disturbed, undeveloped acres are excluded from WQ & detention per EPC ECM Appendix I, Section I.7.1.B.7.

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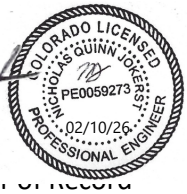
EL PASO COUNTY
PCM APPLICABILITY FORM

EPC Project Number: PPR265

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

02/10/2026
Date

(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)

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

Signature of El Paso County Project Engineer

Date

APPENDIX E – REFENCE MATERIAL

Approved
El Paso County
Planning Commission
This 21 day of July 19 93
Barbara E. Smith
Chairman
Elaine Nelson, Secretary

DIRTY WOMAN CREEK
and
CRYSTAL CREEK
DRAINAGE BASIN PLANNING STUDY

PRELIMINARY DESIGN REPORT

Prepared for:

El Paso County Department of Public Works
Stormwater Management Division
3105 North Stone
Colorado Springs, CO 80907

Prepared by:

Kiowa Engineering Corporation
419 West Bijou Street
Colorado Springs, CO 80905-1308

KIOWA Project No. 91.07.17
D22/R191

February 1993
Revised April 1993
Revised May 1993
Revised June 1993

storms is also included in the *Criteria Manual.* Rainfall depths shown in the criteria manual are based on *National Oceanographic and Atmospheric Administration (NOAA) Atlas 2.* Rainfall depths used in the model are 4.40 inches and 2.88 inches for the 24-hour and 2-hour, 100-year storms respectively. It was determined through analysis that the 2-hour storm was the critical storm. The rainfall depth for the 2-hour, 10-year storm used in the analysis is 1.94 inches. The use of the 2-hour storm is consistent with the ongoing FEMA Restudy of Dirty Woman and Crystal Creeks.

The *City/County Criteria* was subsequently changed during the course of this study to exclude the use of the 2-hour storm and AMC-III. Because the hydrology was completed under then current criteria, the decision was made to utilize the 2-hour storm hydrology. The use of this storm type is comparable to the previous studies by CWCB and FEMA. The soil and basin conditions of Dirty Woman and Crystal Creeks lends itself to the use of the AMC-III condition. The relatively small size of the drainage basins, under 6 square miles, lends itself to the use of AMC-III. The AMC-III provides a method to better depict the infiltration rates during intense rain events. These were all factors in utilizing the 2-hour storm hydrology.

Hydrologic Modeling

The hydrologic model consists of 95 sub-basins linked by drainageways or "reaches". Presented on Exhibit 1 (in map pocket) is the Hydrologic Basin Map which shows the sub-basins analyzed.. Hydrographs are accumulated at design points along the major drainages. A hydrologic flow chart was developed and is presented in Figure 4. Both the existing and future development condition hydrologic models are based on the current configuration of both Dirty Woman and Crystal Creeks and their tributary drainages.

The hydrologic model for the basin is based upon the 1-inch to 200-foot topographic mapping prepared by Landmark Mapping, Ltd. for this project. Basin areas, lengths, slopes, and flow patterns were determined using these maps.

Results

The results of the hydrologic analysis have been presented in several formats. A basin hydrologic map which contains the basin boundary, regional basins, channel routing scheme, sub-basin locations, and design points is shown on Exhibit 1 which is contained in a map pocket attached to this report. Flood discharge profiles for the various storm types analyzed are shown on Figures 5 through 7. Summarized on Table 1 is the sub-basin peak discharge information. Presented on Table 2 are the peak discharges for the key design points in the basin.

The flows generated by the 2-hour storm were greater than those generated by the 24-hour storm for both drainage basins. The decision was made in the technical review meetings to use the 2-hour storm for this drainage basin planning study.

The differences in the existing and future flow conditions were minimal. The reaches in the upper end of the basin show no difference between the existing and future flow conditions. The difference between flow rates is generated by the potential future development along the Interstate 25 corridor and within the general area of the Town of Monument. The hydraulic analysis and drainageway planning utilized the future condition flow rates due to the small difference between future and existing flow rates. The use of the future flow rates will prevent proposed structures from becoming hydraulically inadequate as development in the basin proceeds.

V. EVALUATION OF CONCEPTUAL ALTERNATIVES

Introduction

Alternative drainageway improvement concepts have been examined that address the existing and future stormwater management needs of the basin. Alternatives have been identified for each reach of the Dirty Woman and Crystal Creek drainageways. Quantitative and qualitative comparisons were presented, and a recommendation made as to which concepts were most feasible to advance to preliminary design and eventually to implementation. The majority of the alternative analysis is presented in the *Development of Alternatives* report.

The general planning goals to be achieved during the alternative evaluation phase were:

1. Identify stormwater facilities which will reduce existing floodplains and flooding problems within urbanized areas;

2. Provide stormwater management within developing areas of the basin in order to reduce the detrimental effects of runoff and sedimentation from disturbed areas;

3. Provide stormwater facilities which preserve and/or enhance the existing drainageway and areas adjacent to the drainageway which provide an environmental resource in the area;

4. Identify facilities which will minimize future operations and maintenance costs; and

5. Provide stormwater management facilities which will at least maintain and/or enhance the water quality characteristics of the basin.

The *City/County Drainage Criteria Manual* was used as a guide in the conceptual sizing of facilities. Planning goals were developed through the agency/individual coordination process. Common and/or mutual goals of the interested agencies were identified prior to the initiation of the alternative evaluation phase.

Evaluation Parameters

Coordination meetings were held throughout the planning process in order to discuss the overall goals of the study and to solicit specific concerns from governmental agencies, individuals, and private community groups. One result of this coordination effort was the

disturbance), moderate (30 to 60 percent disturbance), and major (greater than 60 percent disturbance).

Conclusions

Based upon the concept evaluation discussed and summarized in the Development of Alternatives report, the following findings were established:

1. Regional detention, except that currently being provided by Lake Woodmoor, is not feasible from the flood control and peak flow reduction standpoints. The storage behind man-made embankments (roadways and ponds), in combination with the floodplain overbank storage is providing a sufficient amount of long-term stormwater storage in the basin(s). On site detention for new commercial or residential areas within the Town of Monument is desirable from the localized erosion and water quality control viewpoints. On site detention and its effect upon peak discharges in Dirty Woman or Crystal creeks is not significant.

2. Feasible channel section alternatives for the mainstem of Dirty Woman and Crystal creeks range from the floodplain preservation, or "do nothing" alternate to selective riprap bank linings. The feasibility of channelization concepts decreases within the upper reaches of the basin(s).

3. Habitat disturbances due to channelization of the Dirty Woman and Crystal creeks would be significant and would have to be replaced elsewhere along the drainageways. In some locations the channelization of runoff could have the effect of "drying up" the natural base flow and thereby having a negative impact upon the vegetative and wildlife habitat.

4. Long-term maintenance concerns make the implementation of a 100-year or 10-year contiguous channelization concept difficult. The acquisition of property along the drainages would have to occur if a channelized concept was advanced to implementation.

Detention

This plan does not recommend detention as a basin-wide flood control measure. The difference between the future and existing flow rates is minimal and the downstream structures don't warrant reducing the peak flow. However, on site detention may be used, as approved by the County or Town, to reduce the local storm sewer costs along with providing water quality benefits to the site and the basin. The Town of Monument currently has an on site detention policy in effect. All developed flows within the Town of Monument must be reduced to the existing flow rate. The overall impacts of on-site detention on the major drainages should be evaluated throughout the Town.

Water Quality

Improvement of stormwater quality has become an important issue in drainage basin planning. Many pollutants are naturally associated with sediments that enter sensitive receiving waters. The pollutants are naturally occurring compounds that are carried to the drainageways in storm runoff. Other pollutants are the result of urbanization such as lawn chemicals, oil and grease, pet feces, lawn clippings and other items. Many pollutants can be limited by programs such as erosion control at construction sites, educational programs to inform the public as to the proper use of lawn chemicals, oil recycling programs and street sweeping programs. Even with these programs in place, erosion along the drainageways can generate large quantities of sediment that can settle out along the downstream channel bottoms.

Various methods of water quality enhancement have been identified for use in this preliminary design. Channels are lined to prevent erosion, selective improvements are placed to prevent erosion, and drop/check structures are used to control channel grade. On site detention facilities should be designed not only to reduce flows to historic rates but probably more importantly to improve the stormwater quality. General criteria for designing and sizing a water quality pond can be found in the Urban Drainage and Flood Control District's December 1989 *Flood Hazard News*. The article outlining criteria is called "Sizing a Capture Volume for Stormwater Quality Enhancement," by Urbonas, Guo and Tucker.

Trails

In areas where routine maintenance of the drainageways is necessary, a trail for that purpose should be provided. These maintenance trails, while few in number in this basin, should be evaluated for potential multi-purpose use. The multi-use trails could include hiking, biking

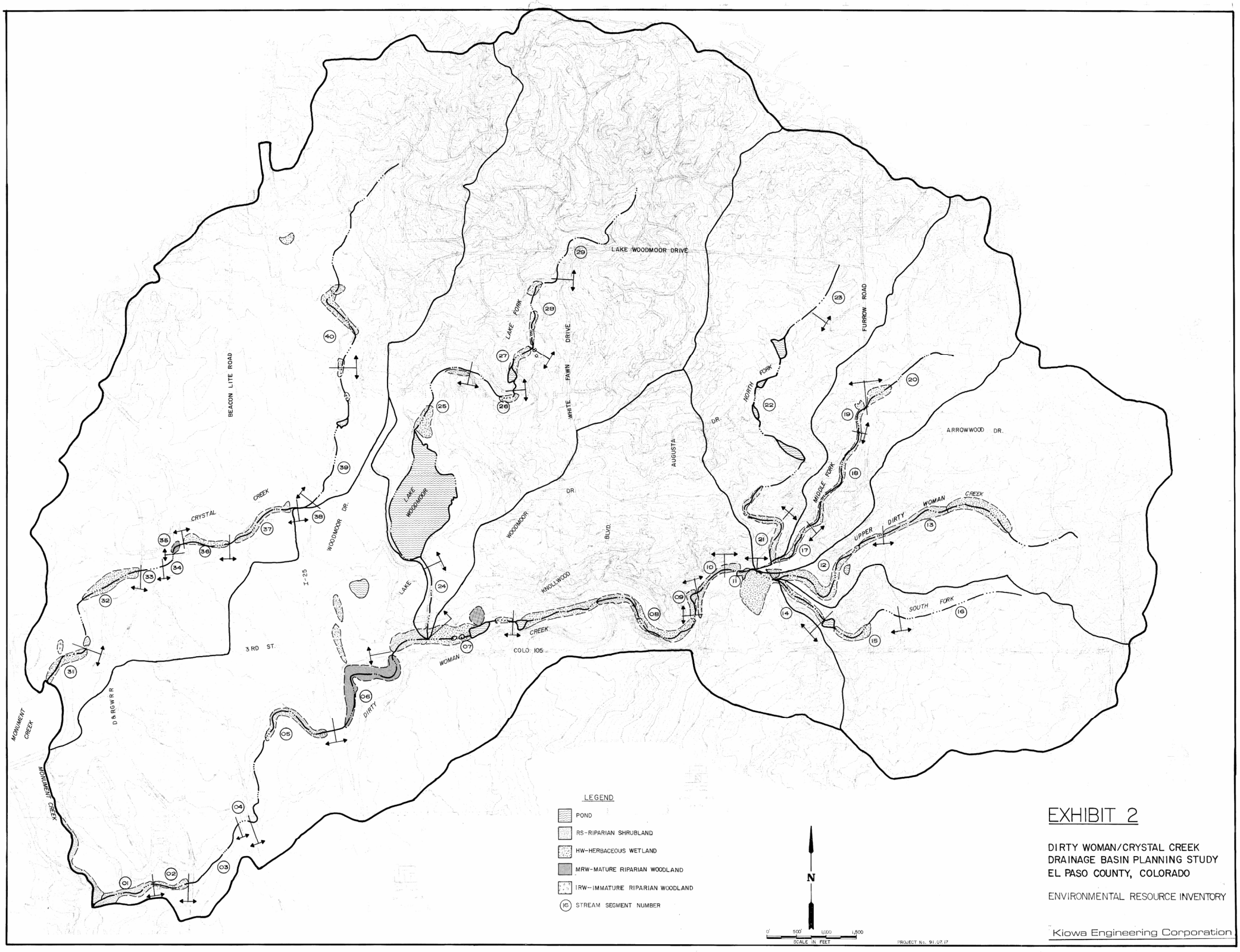


EXHIBIT 2

DIRTY WOMAN/CRYSTAL CREEK
DRAINAGE BASIN PLANNING STUDY
EL PASO COUNTY, COLORADO

ENVIRONMENTAL RESOURCE INVENTORY

Kiowa Engineering Corporation

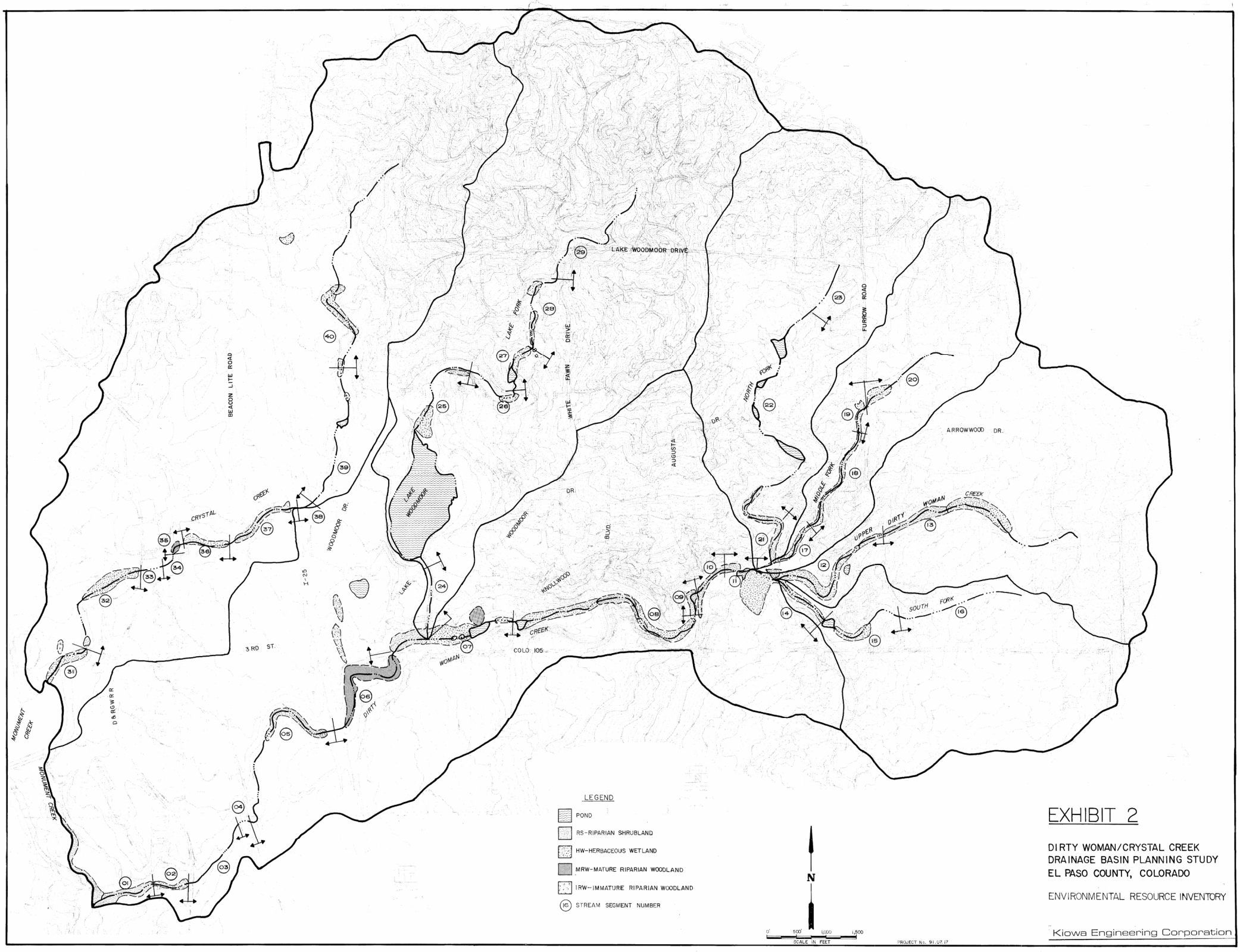


EXHIBIT 2

DIRTY WOMAN/CRYSTAL CREEK
DRAINAGE BASIN PLANNING STUDY
EL PASO COUNTY, COLORADO

ENVIRONMENTAL RESOURCE INVENTORY

Kiowa Engineering Corporation

Deer Creek Road

Final Drainage Report

Prepared for:

El Paso County
Department of Public Works
Transportation Division

Prepared by:

2315 Briargate Pkwy
Colorado Springs, CO 80920

June 2024

Street Classification	Use of Streets for Initial and Major Storms		Cross Flow In Streets For Initial and Major Storms	
	Initial Storm	Major Storm	Initial Storm	Major Storm
Type A (Local with Roadside Ditch)	Flow must not encroach upon street shoulder area.	Residential dwellings, public, commercial and industrial buildings shall not be inundated at the ground line. The depth of flow shall not exceed 6 inches at the shoulder.	Requires culvert. Flow shall not encroach upon street shoulder.	Requires culvert, depth of flow shall not exceed 6 inches at the street shoulder.
Type B (Collector or Minor Arterial)	No curb overtopping. Flow spread must be limited to a maximum 20 foot spread from each curb face.	Same as Type A (Local/Residential) above.	Where cross pans are allowed, depth of flow shall not exceed 6 inches at flow line	12 inches of depth at gutter flow line
Type B (Collector or Minor Arterial with Roadside Ditch)	Flow must not encroach upon street shoulder area.	Same as Type A (Local with Roadside Ditch) above.	Requires culvert. Flow shall not encroach upon street shoulder.	Requires culvert. Depth of flow shall not exceed 6 inches at the street shoulder.

3.1.3 Roadside Ditches

Roadside ditches will be utilized to convey flow from the roadway to storm systems and culverts. Deer Creek Road is classified as a rural collector and Base Camp Road and Microscope Way are rural locals. The DCM Section 6.4.1, Table 6-1 criteria will be applied to the design of proposed roadside ditches.

Deer Creek Road and Woodmoor Drive: Type A & B (Local/Residential and Collector with Roadside ditch). Flow must not encroach upon street shoulder during the minor storm event. For the major storm event residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line. The depth of flow shall not exceed 6 inches at the shoulder.

Base Camp and Microscope Way: Type A & B (Local/Residential and Collector with Roadside ditch). Flow must not encroach upon street shoulder during the minor storm event. For the major storm event residential dwellings, public, commercial, and industrial buildings shall not be inundated at the ground line. The depth of flow shall not exceed 6 inches at the shoulder.

3.1.4 Culverts

Design of culverts follows the DCM Chapter 2, 6 and 9 and ECM Chapter 3 guidance. The minimum culvert size will be 18-inches, are designed for H-20 loading, and minimum velocity is 2.5 feet per second with a maximum velocity of 12 feet per second. Culverts will include end treatments and outlet protection. Standard end sections will be utilized for most of the pipe culverts and headwall used only where required due to topography or conflicts. End sections provide sufficient outlet protection in conjunction with riprap outlet paving to prevent erosion at the outlet. Table 3.1 lists the existing culverts within the project limits.

Deer Creek Road and Woodmoor Drive are classified as rural collectors while Base Camp Road and Microscope Way are classified rural local roads. The DCM Section 6.4.1, Table 6-4 criteria will be applied to the design of proposed culverts.

Deer Creek Road and Woodmoor Drive: Type A & B (Local/Residential and Collector with Roadside ditch). The HW/D ratio shall be less than the pipe height for the design storm and maximum depth at the street shall be six inches or less during the major event.

Base Camp Road and Microscope Way: Type A & B (Local/Residential and Collector with Roadside ditch). The HW/D ratio shall be less than the pipe height for the design storm and maximum depth at the street shall be six inches or less during the major event.

3.1.5 Hydraulic Analysis

Bentley StormCAD Connect was used to analyze the proposed storm drain systems throughout the project. The StormCAD calculations were used to size drainage pipes, determine hydraulic grade lines, and calculate flow velocities.

The StormCAD calculations differ slightly from the Rational Method spreadsheet calculations used in the Excel spreadsheets and StormCAD produces the higher value, due to rounding and interpolation of the flow calculations. The basin areas and average C values from the Rational Method spreadsheet were used as StormCAD inputs.

3.2 EXISTING STRUCTURE DESCRIPTIONS

Within the Project site, there are ten existing culverts. Culverts are conveyance beneath driveways and under Deer Creek Road or Microscope Way. Existing culverts within the project area were analyzed for conveyance capacity and compliance with current criteria and are summarized in Table 3-1.

Table 3-1 Summary of Existing Culverts

Culvert ID	Approx. Location	Basin ID	Pipe Size	Pipe Material	Minor Storm				Major Storm			
					Q_5	Design HW/D	Design HW Elev	Outlet Velocity	Q_{100}	Design HW/D	Design HW Elev	Outlet Velocity
			in		cfs		feet	fps	cfs		feet	fps
EX-CV-101	Base Camp Sta 101+50 RT	103*	15	CSP	9.63	1.36	7136.89	5.01	19.86	1.54	7137.12	5.22
EX-CV-104A	Base Camp Sta 104+20 RT	104*	18	CSP	8.52	1.01	7142.21	5.29	17.20	1.12	7142.39	5.71
EX-CV-104B	Base Camp Sta 104+80 RT	107	18	RCP	0.76	0.31	7142.41	4.21	1.62	0.46	7142.64	5.26
EX-CV-204	Microscope Way Sta 204+80	206	24	CSP	4.36	0.66	7140.19	4.18	12.83	1.17	7141.22	5.99
EX-CV-404	Deer Creek Sta 404+30 RT	405	18	RCP	0.44	0.23	7128.11	3.32	0.97	0.35	7128.28	4.20
EX-CV-409[1]	Deer Creek Sta 409+00	-	60	CMP	-	-	-	-	530	1.58	7127.70	13.49

Culvert ID	Approx. Location	Basin ID	Pipe Size	Pipe Material	Minor Storm				Major Storm			
					Q_5	Design HW/D	Design HW Elev	Outlet Velocity	Q_{100}	Design HW/D	Design HW Elev	Outlet Velocity
			in		cfs		feet	fps	cfs		feet	fps
EX-CV-410	Deer Creek Sta 410+50	201*	18	CSP	3.76	0.86	7129.05	5.74	8.54	1.46	7129.94	7.02
EX-CV-412	Deer Creek Sta 412+00 LT	202*	18	CSP	3.49	0.83	7136.32	6.89	7.90	1.38	7137.14	8.56
EX-CV-414	Deer Creek Sta 414+40 LT	415	18	CMP	2.57	0.69	7148.57	6.53	4.66	0.98	7149.0	7.72
EX-CV-415	Deer Creek Sta 415+70	414*	18	CMP	10.46	1.93	7147.89	6.54	20.33	2.04	7148.05	6.66
EX-CV-416	Deer Creek Sta 416+20 LT	417	12	CMP	7.34	1.74	7147.97	1.58	14.56	1.89	7148.12	0.73

[1]Crystal Creek crossing, 100-year storm event used as design storm.
* Indicates a routed flow from specified basin and contributing upstream basins. See existing hydrology calculations.

3.2.1 Utilities

Utilities that will be encountered include, but not limited to, fiber optic, gas, underground and overhead electrical lines, sanitary, and water. A preliminary Subsurface Utility Investigation (SUE) has been conducted to locate utilities horizontally in compliance with ASCE Standard 38. The utility information contains utilities mapped from Quality Level D up to Quality Level B.

3.3 PROPOSED IMPROVEMENTS

As part of the proposed roadway improvements, the roadway corridors will remain as rural. Roadway runoff will be conveyed via roadside ditches, culverts, and a few closed storm systems.

Line 101 replaces a 15-inch corrugated steel pip (CSP) with a 30-inch by 19-inch horizontal elliptical reinforced concrete pipe (HERCP). The upstream culverts are both 18-inches in diameter. Flow direction for the culvert will not change.

Line 204 replaces an undersized culvert which flows west under Microscope Way. The existing pipe is a 24-inch CSP and will be replaced with a 30-inch by 19-inch HERCP to meet cover criteria. Flow direction for the culvert will not change.

Line 408 is added to prevent concentrated roadway runoff from flowing off-site. The system will capture roadway runoff and convey the flow under a driveway and discharge directly into Crystal Creek.

Line 409 is a 12-foot by 6-foot box culvert that will replace an undersized 60-inch corrugated metal pipe (CMP). The culvert will convey Crystal Creek under Deer Creek Road.

Line 410 replaces an existing 18-inch CSP culvert under a driveway. There is not enough distance between the roadway and the wall to get a ditch deep enough to get a culvert to fit so an inlet was placed at the upstream end with an 18-inch reinforced concrete pipe (RCP).

Line 412 replaces an existing undersized culvert under Microscope Way. It will carry flow west under Microscope Way towards Line 410 on the north side of Deer Creek Road. The existing culvert is an 18-inch CSP and will be replaced with a 23-inch by 14-inch HERCP.

Line 415 will replace an undersized culvert. This culvert will convey flow under Deer Creek Road and tie into an existing storm system. The existing 18-inch CSP will be replaced with a 30-inch by 19-inch HERCP. The downstream existing pipe to remain is an 18-inch plastic pipe. The existing pipe was analyzed in StormCAD which shows that it has capacity for the flow contributing to it.

Line 416 replaces an existing undersized culvert under driveway 416. The existing 12-inch CMP will be replaced with a 30-inch by 19-inch HERCP. It will carry flow west to Line 415 on the north side of Deer Creek Road. The downstream side will have a headwall due to the grading and prevent a conflict with the end section of Line 415.

Line 419 is located to convey the roadside ditch at the northeast corner of Deer Creek Road and Woodmoor Drive south under Deer Creek Road. Currently there is a sump in the existing ditch with no storm drain to convey the flow, so it overtops Deer Creek Road. The new storm system will maintain existing flow patterns by discharging south into the roadside ditch that runs parallel to Woodmoor Drive.

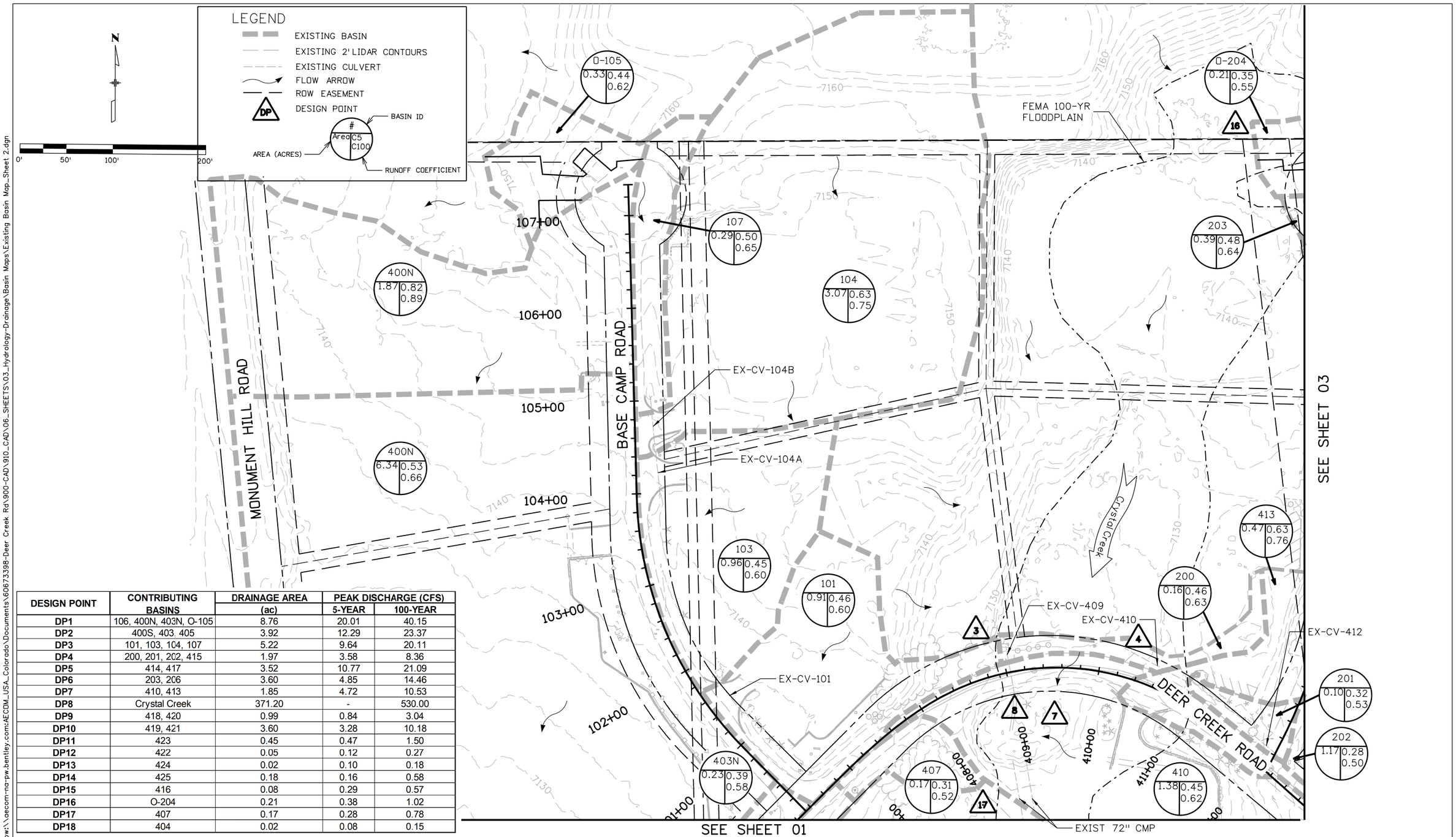
Table 3-2 Summary of Proposed Culverts

Culvert ID	Approx. Location	Basin ID	Pipe Size	Pipe Material	Minor Storm				Major Storm				
					Q_5	Design HW/D	HW Elev / HGL	HW/D <Pipe Height[3]	Q_{100}	Design HW/D	HW Elev / HGL	EOP[4] Elev	HW Elev < EOP Elev + 6" [3]
			in		cfs		feet		cfs		feet	feet	
CV-101	Base Camp Sta 101+50 RT	103*	30x19	HERCP	9.63	0.84	7136.28	Yes	19.86	1.13	7136.74	7136.40	Yes
CV-204	Microscope Way Sta 204+80	206	30x19	HERCP	4.36	0.56	7139.40	Yes	12.83	1.01	7140.12	7141.47	Yes
CV-408[2]	Deer Creek Sta 407+84	407	18	RCP	0.37	-	7122.30	-	0.77	-	7122.40	7129.00	-
CV-409	Deer Creek Sta 409+00	-	12'x6'	RCBC	530[1]	1.15	7126.67	Yes	530[1]	1.15	7126.67	7128.12	Yes
CV-410[2]	Deer Creek Sta 410+99	201*	18	RCP	3.79	-	7126.53	-	8.54	-	7127.20	7129.90	-
CV-412	Deer Creek Sta 412+00LT	202*	23x14	HERCP	3.49	0.74	7136.32	Yes	7.90	1.21	7136.88	7138.40	Yes
CV-415	Deer Creek Sta 415+70	414*	30x19	HERCP	10.46	0.89	7146.35	Yes	20.33	1.52	7147.37	7147.80	Yes
CV-416	Deer Creek Sta 416+20 LT	417	30x19	HERCP	7.34	0.75	7146.75	Yes	14.56	1.47	7147.91	7148.01	Yes
CV-419[2]	Deer Creek Sta 410+99	419	24	RCP	1.94	-	7149.97	-	8.05	-	7150.00	7152.50	-

[1]Crystal Creek crossing,100-year storm event used as design storm.
[2]Storm line has an inlet at upstream end so HW/D was not calculated.
[3]DCM Table 6-4 Criteria Requirement.
[4]Edge of Pavement
* Indicates a routed flow from specified basin and contributing upstream basins. See proposed hydrology calculations.

Hydraulic calculations can be found in Appendix D.

A majority of the off-site runoff in the Project area will continue to be conveyed via roadside ditches and culverts. Project improvements will not change culvert crossing locations. Lines 408 and 410 will have area inlets added to meet both pipe cover and roadside ditch grading requirements. Existing undersized culverts, mentioned at the beginning of this section, will be replaced to meet current design standards and/or replaced due to the proposed roadway improvements and grading.



DESIGN POINT	CONTRIBUTING BASINS	DRAINAGE AREA (ac)	PEAK DISCHARGE (CFS) 5-YEAR	PEAK DISCHARGE (CFS) 100-YEAR
DP1	106, 400N, 403N, O-105	8.76	20.01	40.15
DP2	400S, 403, 405	3.92	12.29	23.37
DP3	101, 103, 104, 107	5.22	9.64	20.11
DP4	200, 201, 202, 415	1.97	3.58	8.36
DP5	414, 417	3.52	10.77	21.09
DP6	203, 206	3.60	4.85	14.46
DP7	410, 413	1.85	4.72	10.53
DP8	Crystal Creek	371.20	-	530.00
DP9	418, 420	0.99	0.84	3.04
DP10	419, 421	3.60	3.28	10.18
DP11	423	0.45	0.47	1.50
DP12	422	0.05	0.12	0.27
DP13	424	0.02	0.10	0.18
DP14	425	0.18	0.16	0.58
DP15	416	0.08	0.29	0.57
DP16	O-204	0.21	0.38	1.02
DP17	407	0.17	0.28	0.78
DP18	404	0.02	0.08	0.15

Computer File Information	
Print Date: 6/3/2024	
File Name: Existing Basin Map_Sheet 2.dgn	
Last Modification Date: 6/3/2024	
Designer: JB Detailer: IC Checker: WC	
11x17 Scale: 1"= 100 Units: Survey Feet	

Index of Revisions		
Date:	Comments	Init.

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DEER CREEK ROAD INTERSECTION IMPROVEMENTS

EXISTING BASIN MAP

2 of 3

Sheet Number

DESIGN POINT	CONTRIBUTING BASINS	DRAINAGE AREA (ac)	PEAK DISCHARGE (CFS) 5-YEAR	100-YEAR
DP1	106, 400N, 403N, O-105	8.76	20.01	40.15
DP2	400S, 403, 405	3.92	12.29	23.37
DP3	101, 103, 104, 107	5.22	9.64	20.11
DP4	200, 201, 202, 415	1.97	3.58	8.36
DP5	414, 417	3.52	10.77	21.09
DP6	203, 206	3.60	4.85	14.46
DP7	410, 413	1.85	4.72	10.53
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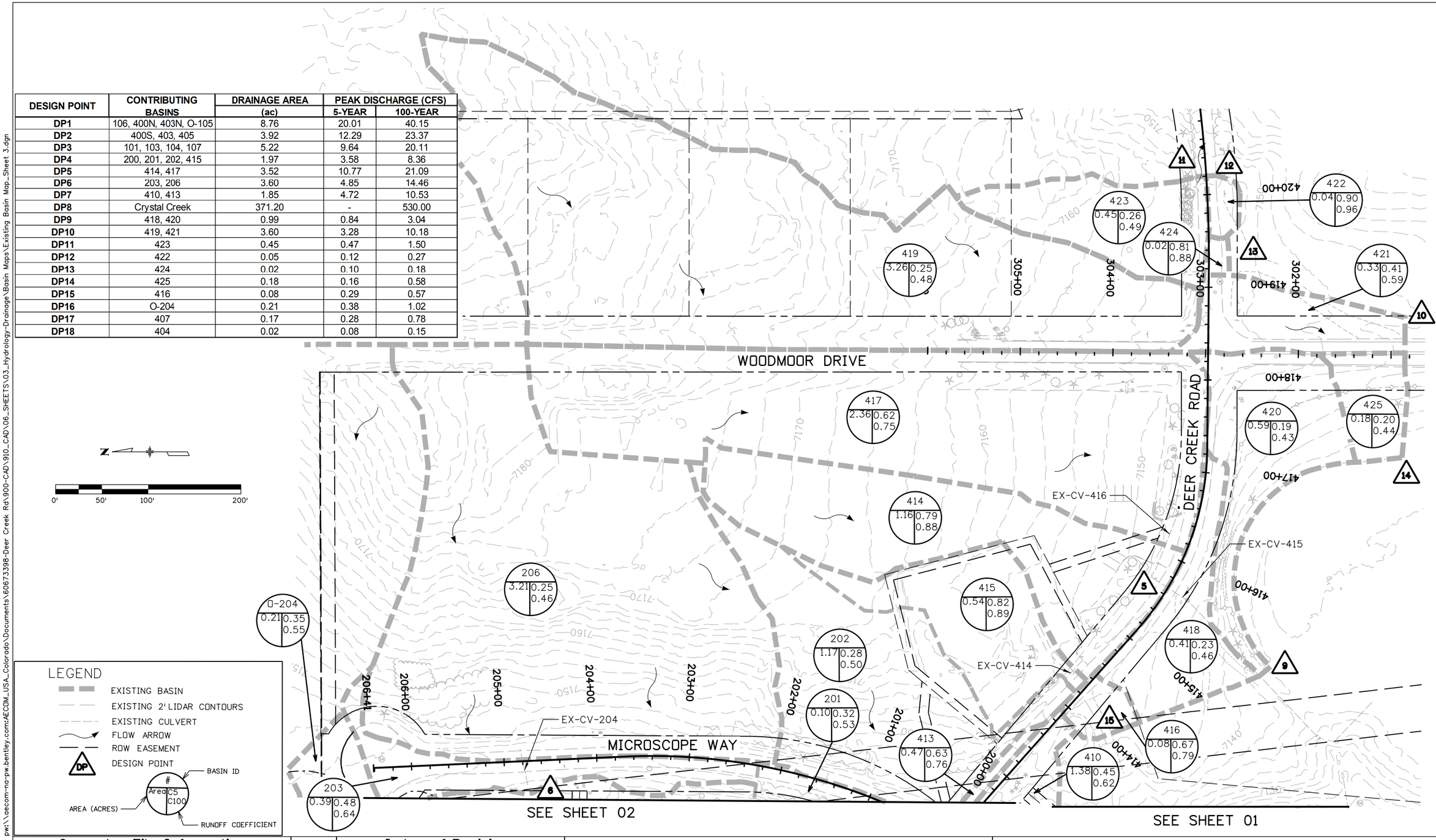
DP16	O-204	0.21	0.38	1.02
DP17	407	0.17	0.28	0.78
DP18	404	0.02	0.08	0.15



LEGEND

- EXISTING BASIN
- EXISTING 2' LIDAR CONTOURS
- EXISTING CULVERT
- FLOW ARROW
- ROW EASEMENT
- DESIGN POINT (DP)
- # / Area / C5 / C100 — BASIN ID; AREA (ACRES); RUNOFF COEFFICIENT

Computer File Information		Index of Revisions		
Print Date: 6/3/2024		Date:	Comments	Init.
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DEER CREEK ROAD INTERSECTION IMPROVEMENTS

EXISTING BASIN MAP

3 of 3

Sheet Number

Deer Creek Existing Hydrology

		User Entered Data
		Calculated Cells

BASIN NAMES	Area: Total Area	Area: Total Area	Pred. Soil Type	Landuse & C-Values: Surface Type 1 (Streets - Paved)					Surface Type 2 (Streets - Gravel)					Surface Type 3 (Undeveloped - Pasture/Meadow or Lawns)					Surface Type 4 (Residential 1\2 Acre)				
	[sf]	[ac]		C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area
101	39506	0.91	B	0.89	0.90	0.92	0.96	4133	0.57	0.59	0.63	0.70	2465	0.02	0.08	0.15	0.35	9065	0.15	0.22	0.30	0.46	0
103	41772	0.96	B	0.89	0.90	0.92	0.96	3856	0.57	0.59	0.63	0.70	4373	0.02	0.08	0.15	0.35	9140	0.15	0.22	0.30	0.46	0
103*	188046	4.32	B	0.89	0.90	0.92	0.96	10229	0.57	0.59	0.63	0.70	6813	0.02	0.08	0.15	0.35	48465	0.15	0.22	0.30	0.46	0
104	133657	3.07	B	0.89	0.90	0.92	0.96	1482	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	34037	0.15	0.22	0.30	0.46	0
104*	146275	3.36	B	0.89	0.90	0.92	0.96	6372	0.57	0.59	0.63	0.70	2440	0.02	0.08	0.15	0.35	39325	0.15	0.22	0.30	0.46	0
106	81540	1.87	B	0.89	0.90	0.92	0.96	11976	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	0
107	12617	0.29	B	0.89	0.90	0.92	0.96	4890	0.57	0.59	0.63	0.70	2440	0.02	0.08	0.15	0.35	5288	0.15	0.22	0.30	0.46	0
200	6973	0.16	B	0.89	0.90	0.92	0.96	1069	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	3483	0.15	0.22	0.30	0.46	0
201	4485	0.10	B	0.89	0.90	0.92	0.96	1312	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	3173	0.15	0.22	0.30	0.46	0
201*	78749	1.81	B	0.89	0.90	0.92	0.96	12868	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	41310	0.15	0.22	0.30	0.46	0
202	50925	1.17	B	0.89	0.90	0.92	0.96	9331	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	38137	0.15	0.22	0.30	0.46	0
202*	74264	1.70	B	0.89	0.90	0.92	0.96	11556	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	38137	0.15	0.22	0.30	0.46	0
203	16903	0.39	B	0.89	0.90	0.92	0.96	8168	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	8734	0.15	0.22	0.30	0.46	0
206	139777	3.21	B	0.89	0.90	0.92	0.96	2663	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	85909	0.15	0.22	0.30	0.46	0
400N	276209	6.34	B	0.89	0.90	0.92	0.96	28946	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	0
400S	156933	3.60	B	0.89	0.90	0.92	0.96	11924	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	14231	0.15	0.22	0.30	0.46	0
403	5833	0.13	B	0.89	0.90	0.92	0.96	2061	0.57	0.59	0.63	0.70	1061	0.02	0.08	0.15	0.35	2712	0.15	0.22	0.30	0.46	0
403*	13645	0.31	B	0.89	0.90	0.92	0.96	4528	0.57	0.59	0.63	0.70	1061	0.02	0.08	0.15	0.35	8057	0.15	0.22	0.30	0.46	0
403N	9828	0.23	B	0.89	0.90	0.92	0.96	3752	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	6076	0.15	0.22	0.30	0.46	0
404	779	0.02	B	0.89	0.90	0.92	0.96	779	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	0
405	7812	0.18	B	0.89	0.90	0.92	0.96	2467	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	5345	0.15	0.22	0.30	0.46	0
407	7481	0.17	B	0.89	0.90	0.92	0.96	2104	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	5377	0.15	0.22	0.30	0.46	0
410	60310	1.38	B	0.89	0.90	0.92	0.96	14089	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	31727	0.45	0.49	0.53	0.62	0
413	20315	0.47	B	0.89	0.90	0.92	0.96	13701	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	6614	0.45	0.49	0.53	0.62	0
414	50742	1.16	B	0.89	0.90	0.92	0.96	44040	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	6702	0.45	0.49	0.53	0.62	0
415	23340	0.54	B	0.89	0.90	0.92	0.96	2225	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	0
416	3658	0.08	B	0.89	0.90	0.92	0.96	2624	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	1034	0.15	0.22	0.30	0.46	0
417	102625	2.36	B	0.89	0.90	0.92	0.96	60893	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	27346	0.15	0.22	0.30	0.46	0
418	17660	0.41	B	0.89	0.90	0.92	0.96	2836	0.57	0.59	0.63	0.70	565	0.02	0.08	0.15	0.35	14259	0.15	0.22	0.30	0.46	0
419	142191	3.26	B	0.89	0.90	0.92	0.96	6973	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	135218
420	25527	0.59	B	0.89	0.90	0.92	0.96	3459	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	22069	0.45	0.49	0.53	0.62	0
421	14554	0.33	B	0.89	0.90	0.92	0.96	5564	0.57	0.59	0.63	0.70	396	0.02	0.08	0.15	0.35	8594	0.15	0.22	0.30	0.46	0
422	2043	0.05	B	0.89	0.90	0.92	0.96	725	0.57	0.59	0.63	0.70	562	0.02	0.08	0.15	0.35	757	0.15	0.22	0.30	0.46	0
423	19787	0.45	B	0.89	0.90	0.92	0.96	1096	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	18692
424	998	0.02	B	0.89	0.90	0.92	0.96	696	0.57	0.59	0.63	0.70	301	0.02	0.08	0.15	0.35	0	0.15	0.22	0.30	0.46	0
425	7982	0.18	B	0.89	0.90	0.92	0.96	1211	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	6771	0.15	0.22	0.30	0.46	0
O-105	14163	0.33	B	0.89	0.90	0.92	0.96	6229	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	7934	0.15	0.22	0.30	0.46	0
O-204	9344	0.21	B	0.89	0.90	0.92	0.96	3022	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	6322	0.15	0.22	0.30	0.46	0
DP1	381740	8.76	B	0.89	0.90	0.92	0.96	50903	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	14010	0.15	0.22	0.30	0.46	0
DP2	170578	3.92	B	0.89	0.90	0.92	0.96	16452	0.57	0.59	0.63	0.70	1061	0.02	0.08	0.15	0.35	22288	0.15	0.22	0.30	0.46	0
DP3	227552	5.22	B	0.89	0.90	0.92	0.96	14361	0.57	0.59	0.63	0.70	9278	0.02	0.08	0.15	0.35	57530	0.15	0.22	0.30	0.46	0
DP4	85723	1.97	B	0.89	0.90	0.92	0.96	13937	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	44793	0.15	0.22	0.30	0.46	0
DP5	153367	3.52	B	0.89	0.90	0.92	0.96	104934	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	34048	0.45	0.49	0.53	0.62	0
DP6	156679	3.60	B	0.89	0.90	0.92	0.96	10831	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	94644	0.15	0.22	0.30	0.46	0
DP7	80625	1.85	B	0.89	0.90	0.92	0.96	27791	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	38341	0.15	0.22	0.30	0.46	0
DP9	43187	0.99	B	0.89	0.90	0.92	0.96	6294	0.57	0.59	0.63	0.70	565	0.02	0.08	0.15	0.35	36328	0.15	0.22	0.30	0.46	0
DP10	156745	3.60	B	0.89	0.90	0.92	0.96	12537	0.57	0.59	0.63	0.70	396	0.02	0.08	0.15	0.35	8594	0.15	0.22	0.30	0.46	135218

BASIN NAMES	Surface Type 5 (Business-Neighborhood)					Surface Type 6 (Business-Commercial)					Average	Average	Average	Average	% Impervious
	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	
101	0.45	0.49	0.53	0.62	23843	0.79	0.81	0.83	0.88	0	0.40	0.45	0.49	0.60	57.70
103	0.45	0.49	0.53	0.62	24402	0.79	0.81	0.83	0.88	0	0.41	0.45	0.49	0.60	58.50
103*	0.45	0.49	0.53	0.62	24402	0.79	0.81	0.83	0.88	98137	0.54	0.58	0.61	0.71	67.00
104	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	98137	0.60	0.63	0.66	0.75	70.86
104*	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	98137	0.58	0.61	0.65	0.74	69.43
106	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	69563	0.80	0.82	0.84	0.89	95.73
107	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.46	0.50	0.54	0.65	54.22
200	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	2421	0.42	0.46	0.50	0.63	48.31
201	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.27	0.32	0.38	0.53	29.26
201*	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	24572	0.40	0.44	0.49	0.62	45.98
202	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	3456	0.23	0.28	0.34	0.50	24.77
202*	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	24572	0.41	0.45	0.49	0.62	46.99
203	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.44	0.48	0.52	0.64	48.32
206	0.45	0.49	0.53	0.62	51205	0.79	0.81	0.83	0.88	0	0.19	0.25	0.30	0.46	27.55
400N	0.45	0.49	0.53	0.62	247263	0.79	0.81	0.83	0.88	0	0.50	0.53	0.57	0.66	73.14
400S	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	130778	0.73	0.75	0.78	0.84	86.77
403	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.43	0.46	0.51	0.63	49.88
403*	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.35	0.39	0.44	0.58	39.40
403N	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.35	0.39	0.44	0.58	38.18
404	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.89	0.90	0.92	0.96	100.00
405	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.29	0.34	0.39	0.54	31.57
407	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.26	0.31	0.37	0.52	28.12
410	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	14494	0.41	0.45	0.49	0.62	46.19
413	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.61	0.63	0.67	0.76	67.44
414	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.78	0.79	0.82	0.88	86.79
415	0.45	0.49	0.53	0.62		0.79	0.81	0.83	0.88	21115	0.80	0.82	0.84	0.89	95.48
416	0.45	0.49	0.53	0.62		0.79	0.81	0.83	0.88	0	0.64	0.67	0.70	0.79	71.73
417	0.45	0.49	0.53	0.62	14385	0.79	0.81	0.83	0.88	0	0.60	0.62	0.66	0.75	69.15
418	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.18	0.23	0.29	0.46	18.62
419	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.19	0.25	0.33	0.48	28.68
420	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.14	0.19	0.25	0.43	13.55
421	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.37	0.41	0.46	0.59	40.41
422	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.48	0.51	0.56	0.66	57.47
423	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.19	0.26	0.33	0.49	29.15
424	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.79	0.81	0.83	0.88	93.96
425	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.15	0.20	0.27	0.44	15.17
O-105	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.40	0.44	0.49	0.62	43.98
O-204	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.30	0.35	0.40	0.55	32.34
DP1	0.45	0.49	0.53	0.62	247263	0.79	0.81	0.83	0.88	69563	0.55	0.59	0.62	0.70	75.99
DP2	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	130778	0.70	0.72	0.75	0.82	82.98
DP3	0.45	0.49	0.53	0.62	48245	0.79	0.81	0.83	0.88	98137	0.52	0.55	0.59	0.69	65.39
DP4	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	26993	0.40	0.44	0.49	0.62	46.17
DP5	0.45	0.49	0.53	0.62	14385	0.79	0.81	0.83	0.88	0	0.66	0.68	0.71	0.79	74.99
DP6	0.45	0.49	0.53	0.62	51205	0.79	0.81	0.83	0.88	0	0.27	0.27	0.33	0.48	29.79
DP7	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	14494	0.46	0.49	0.54	0.66	51.55
DP9	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.15	0.21	0.27	0.44	15.62
DP10	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.20	0.27	0.34	0.49	29.77

BASIN NAMES	Overland Flow: total flow length	Overland Flow Length	High Point	Low Point	Slope	Channel Flow/ Guter Flow: Channel flow Length	High Point	Low Point	Slope	Initial	Channel	Total	i_2	Q_2	i_5	Q_5	i_{10}	Q_{10}	i_{100}	Q_{100}
	[ft]	[ft]	Elevation	Elevation	[ft/ft]	[ft]	Elevation	Elevation	[ft/ft]	[min]	[min]	[min]	[in/hr]	[cfs]	[in/hr]	[cfs]	[in/hr]	[cfs]	[in/hr]	[cfs]
101	556	100	7145.0	7141.0	0.04	456	7141.0	7124.0	0.037	7.48	3.58	11.06	3.17	**1.17**	3.98	**1.61**	4.64	**2.06**	6.68	**3.63**
103	424	73	7148.0	7144.0	0.05	351	7144.0	7136.0	0.023	5.73	1.94	7.67	3.61	**1.42**	4.53	**1.95**	5.28	**2.50**	7.60	**4.38**
103*	986	100	7167.0	7165.0	0.02	886	7165.0	7136.0	0.033	7.51	5.11	12.62	3.02	**7.10**	3.78	**9.42**	4.41	**11.68**	6.35	**19.39**
104	728	100	7167.0	7165.0	0.02	628	7165.0	7142.0	0.037	6.82	2.73	9.55	3.35	**6.11**	4.20	**8.05**	4.90	**9.88**	7.05	**16.13**
104*	728	100	7167.0	7165.0	0.02	628	7165.0	7142.0	0.037	6.98	2.73	9.71	3.33	**6.53**	4.17	**8.60**	4.87	**10.59**	7.01	**17.36**
106	640	100	7158.0	7153.0	0.05	540	7153.0	7142.0	0.020	2.94	3.80	6.74	3.76	**5.67**	4.72	**7.28**	5.51	**8.69**	7.93	**13.23**
107	325	100	7160.5	7157.3	0.03	225	7157.3	7142.6	0.065	7.40	0.91	8.31	3.51	**0.47**	4.41	**0.63**	5.14	**0.81**	7.40	**1.40**
200	207	100	7134.0	7133.0	0.01	107	7133.0	7127.5	0.051	11.57	0.39	11.15	3.17	**0.21**	3.97	**0.29**	4.63	**0.37**	6.66	**0.67**
201	149	67	7139.8	7133.0	0.10	81	7133.0	7128.0	0.062	5.40	0.36	5.77	3.95	**0.11**	4.95	**0.16**	5.78	**0.22**	8.32	**0.45**
201*	727	100	7170.0	7166.5	0.04	627	7166.5	7128.0	0.061	7.86	2.43	10.29	3.26	**2.37**	4.09	**3.26**	4.77	**4.21**	6.86	**7.63**
202	555	100	7175.0	7171.6	0.03	455	7171.6	7136.0	0.078	9.89	2.00	11.89	3.09	**0.84**	3.87	**1.27**	4.52	**1.78**	6.50	**3.78**
202*	591	100	7170.0	7166.5	0.04	491	7166.5	7136.0	0.062	7.77	1.82	9.59	3.34	**2.34**	4.19	**3.21**	4.89	**4.13**	7.04	**7.44**
203						Assumed minimum Tc						5.00	4.12	**0.70**	5.17	**0.96**	6.03	**1.22**	8.68	**2.17**
206	571	14	7190.0	7186.0	0.28	557	7186.0	7140.9	0.081	1.92	3.80	5.72	3.96	**2.47**	4.97	**3.92**	5.80	**5.65**	8.34	**12.33**
400N	758	100	7146.5	7142.2	0.04	658	7142.2	7116.0	0.040	6.33	3.09	9.41	3.37	**10.59**	4.22	**14.26**	4.92	**17.82**	7.08	**29.45**
400S	683	100	7129.1	7126.0	0.03	583	7126.0	7114.0	0.021	4.34	3.38	7.72	3.60	**9.44**	4.52	**12.21**	5.27	**14.72**	7.58	**22.89**
403	183	36	7130.9	7129.3	0.04	148	7129.3	7123.2	0.041	4.19	0.81	5.00	4.12	**0.24**	5.17	**0.32**	6.03	**0.41**	8.68	**0.73**
403*	437	17	7136.8	7135.1	0.10	420	7135.1	7123.2	0.028	2.47	2.78	5.25	4.06	**0.45**	5.10	**0.63**	5.95	**0.82**	8.56	**1.55**
403N	302	23	7136.8	7136.2	0.03	279	7136.2	7128.0	0.029	4.46	1.81	6.27	3.85	**0.31**	4.83	**0.43**	5.63	**0.56**	8.11	**1.07**
404						Assumed minimum Tc						5.00	4.12	**0.07**	5.17	**0.08**	6.03	**0.10**	8.68	**0.15**
405	242	17	7136.8	7135.1	0.10	225	7135.1	7128.2	0.031	2.66	1.42	5.00	4.12	**0.22**	5.17	**0.31**	6.03	**0.43**	8.68	**0.84**
407	213	17	7136.8	7135.1	0.10	196	7135.1	7125.5	0.049	2.79	0.98	5.00	4.12	**0.19**	5.17	**0.28**	6.03	**0.38**	8.68	**0.78**
410	468	15	7149.0	7147.8	0.08	452	7147.8	7116.0	0.070	2.33	1.73	5.00	4.12	**2.33**	5.17	**3.20**	6.03	**4.12**	8.68	**7.45**
413	369	49	7143.5	7133.5	0.20	320	7133.5	7125.8	0.024	2.18	1.72	5.00	4.12	**1.17**	5.17	**1.53**	6.03	**1.88**	8.68	**3.08**
414	524	100	7175.0	7170.0	0.05	424	7170.0	7146.0	0.057	3.27	1.53	5.00	4.12	**3.72**	5.17	**4.77**	6.03	**5.75**	8.68	**8.89**
415	397	100	7170.0	7166.5	0.04	297	7166.5	7149.8	0.056	3.36	1.04	5.00	4.12	**1.76**	5.17	**2.27**	6.03	**2.71**	8.68	**4.13**
416						Assumed minimum Tc						5.00	4.12	**0.22**	5.17	**0.29**	6.03	**0.36**	8.68	**0.57**
417	874	30	7185.0	7184.0	0.03	844	7184.0	7147.0	0.044	3.12	4.48	7.60	3.62	**5.09**	4.54	**6.68**	5.30	**8.24**	7.62	**13.47**
418	279	33	7148.4	7146.0	0.07	247	7146.0	7137.5	0.034	4.64	1.47	6.11	3.88	**0.28**	4.87	**0.45**	5.68	**0.67**	8.17	**1.52**
419	960	100	7208.0	7200.0	0.08	860	7200.0	7152.0	0.056	7.70	6.58	14.28	2.87	**1.75**	3.60	**2.97**	4.19	**4.52**	6.04	**9.55**
420	425	180	7153.0	7137.0	0.09	245	7137.0	7135.5	0.006	10.71	3.47	5.00	4.12	**0.33**	5.17	**0.58**	6.03	**0.90**	8.68	**2.20**
421	266	83	7153.5	7150.0	0.04	183	7150.0	7145.4	0.025	7.06	1.63	8.69	3.46	**0.43**	4.34	**0.59**	5.06	**0.77**	7.29	**1.44**
422	121	19	7152.3	7151.5	0.04	102	7151.5	7149.6	0.019	2.87	0.61	5.00	4.12	**0.09**	5.17	**0.12**	6.03	**0.16**	8.68	**0.27**
423	372	100	7167.0	7161.0	0.06	272	7161.0	7149.5	0.042	8.42	2.20	10.62	3.22	**0.28**	4.04	**0.47**	4.71	**0.72**	6.78	**1.50**
424						Assumed minimum Tc						5.00	4.12	**0.07**	5.17	**0.10**	6.03	**0.11**	8.68	**0.18**
425	167	125	7148.2	7137.8	0.08	42	7137.8	7136.8	0.024	8.99	0.30	9.29	3.38	**0.09**	4.24	**0.16**	4.95	**0.24**	7.12	**0.58**
O-105						Assumed minimum Tc						5.00	4.12	**0.54**	5.17	**0.74**	6.03	**0.96**	8.68	**1.74**
O-204						Assumed minimum Tc						5.00	4.12	**0.27**	5.17	**0.38**	6.03	**0.52**	8.68	**1.02**
DP1	1235	100	7158	7153	0.05	1135	7153.0	7116.0	0.033	5.44	6.35	11.79	3.10	**15.07**	3.88	**20.01**	4.53	**24.72**	6.52	**40.15**
DP2	988	17	7136.8	7135.1	0.10	971	7135.1	7114.0	0.022	1.32	7.32	8.64	3.47	**9.48**	4.35	**12.29**	5.07	**14.87**	7.30	**23.37**
DP3	1385	100	7167.0	7165.0	0.02	1285	7165.0	7124.0	0.032	7.84	9.20	17.04	2.66	**7.24**	3.33	**9.64**	3.88	**12.01**	5.59	**20.11**
DP4	727	100	7170.0	7166.5	0.04	627	7166.5	7128.0	0.061	7.84	2.32	10.16	3.28	**2.60**	4.11	**3.58**	4.79	**4.61**	6.89	**8.36**
DP5	952	30	7185.0	7184.0	0.03	923	7184.0	7146.0	0.041	2.76	5.05	7.81	3.59	**8.28**	4.50	**10.77**	5.25	**13.17**	7.56	**21.09**
DP6	571	14	7190.0	7186.0	0.28	557	7186.0	7140.9	0.081	1.86	3.80	5.66	3.97	**3.85**	4.98	**4.85**	5.81	**6.85**	8.37	**14.46**
DP7	468	15	7149.0	7147.8	0.08	452	7147.8	7116.0	0.070	2.16	1.72	5.00	4.12	**3.49**	5.17	**4.72**	6.03	**6.00**	8.68	**10.53**
DP9	425	100	7153.0	7146.0	0.07	245	7146.0	7135.5	0.043	8.49	1.59	10.08	3.29	**0.50**	4.12	**0.84**	4.80	**1.28**	6.91	**3.04**
DP10	1182	100	7208.0	7200.0	0.08	1082	7200.0	7145.4	0.050	7.57	8.60	16.17	2.72	**1.99**	3.41	**3.28**	3.98	**4.90**	5.72	**10.18**

* Indicates a routed flow from specified basin and contributing upstream basins.
DP Indications the routed flow at a specific design point for all upstream contributing basins.
Use Rational Method if basin is less than 130 acres, otherwise use SCS Method.
Design Storms determined from El Paso County Drainage Criteria Manual
C values taken from El Paso Drainage Criteria Maual Table 6.6, based on predominant soil type for each basin

LEGEND

- PROPOSED BASIN
- EXISTING 2' LIDAR CONTOURS
- EXISTING CULVERT
- FLOW ARROW
- ROW EASEMENT
- DESIGN POINT (DP)
- BASIN ID (#)
- AREA (ACRES) (Area)
- C5
- C100
- RUNOFF COEFFICIENT

N

0' 50' 100' 200'

O-105 0.30 | 0.44 | 0.62

105 0.22 | 0.86 | 0.93

107 0.31 | 0.54 | 0.69

104 3.02 | 0.62 | 0.74

106 1.73 | 0.53 | 0.65

400N 6.02 | 0.52 | 0.65

403N 0.47 | 0.49 | 0.65

103 1.01 | 0.45 | 0.60

101 0.84 | 0.44 | 0.59

O-204 0.20 | 0.47 | 0.64

204 0.25 | 0.61 | 0.74

200 0.07 | 0.29 | 0.50

413 0.28 | 0.68 | 0.80

201 0.18 | 0.44 | 0.62

202 1.15 | 0.29 | 0.50

411 0.43 | 0.84 | 0.91

410 1.29 | 0.49 | 0.65

408 0.12 | 0.62 | 0.75

407 0.10 | 0.35 | 0.55

MONUMENT HILL ROAD

BASE CAMP ROAD

DEER CREEK ROAD

Crystal Creek

FEMA 100-YR FLOODPLAIN

107+00

106+00

105+00

104+00

103+00

102+00

101+00

410+00

411+00

EX-CV-104B

EX-CV-104A

CV-101

CV-409

CV-412

IN-410

LINE-410

LINE-408

PROP RIPRAP RUNDOWN

EXIST 72" CMP

SEE SHEET 03

SEE SHEET 01

DESIGN POINT	CONTRIBUTING BASINS	DRAINAGE AREA (ac)	PEAK DISCHARGE (CFS) 5-YEAR	PEAK DISCHARGE (CFS) 100-YEAR
DP1	105, 106, 400N, 403N, O-105	8.96	17.95	37.16
DP2	400S, 403, 405	3.91	12.26	23.20
DP3	101, 103, 104, 107	5.18	9.88	20.64
DP4	200, 201, 202, 413, 415	2.28	4.52	10.09
DP5	414, 417	3.45	10.46	20.33
DP6	203, 204, 206	3.62	5.35	14.94
DP7	408, 410, 411	1.83	5.00	10.42
DP8	Crystal Creek	371.20	-	530.00
DP9	418, 420	0.97	1.47	3.91
DP10	419, 421	3.61	3.50	10.54
DP11	423	0.44	0.46	1.46
DP12	422	0.05	0.12	0.28
DP13	424	0.03	0.14	0.25
DP14	425	0.18	0.22	0.64
DP15	416	0.05	0.15	0.31
DP16	O-204	0.20	0.47	1.08
DP17	407	0.10	0.17	0.45
DP18	404	0.01	0.06	0.11

Computer File Information

Print Date: 6/3/2024
File Name: Proposed Basin Map_Sheet 2.dgn
Last Modification Date: 6/3/2024
Designer: JB Detailer: IC Checker: WC
11x17 Scale: 1"= 100 Units: Survey Feet

Index of Revisions

Date:	Comments	Init.

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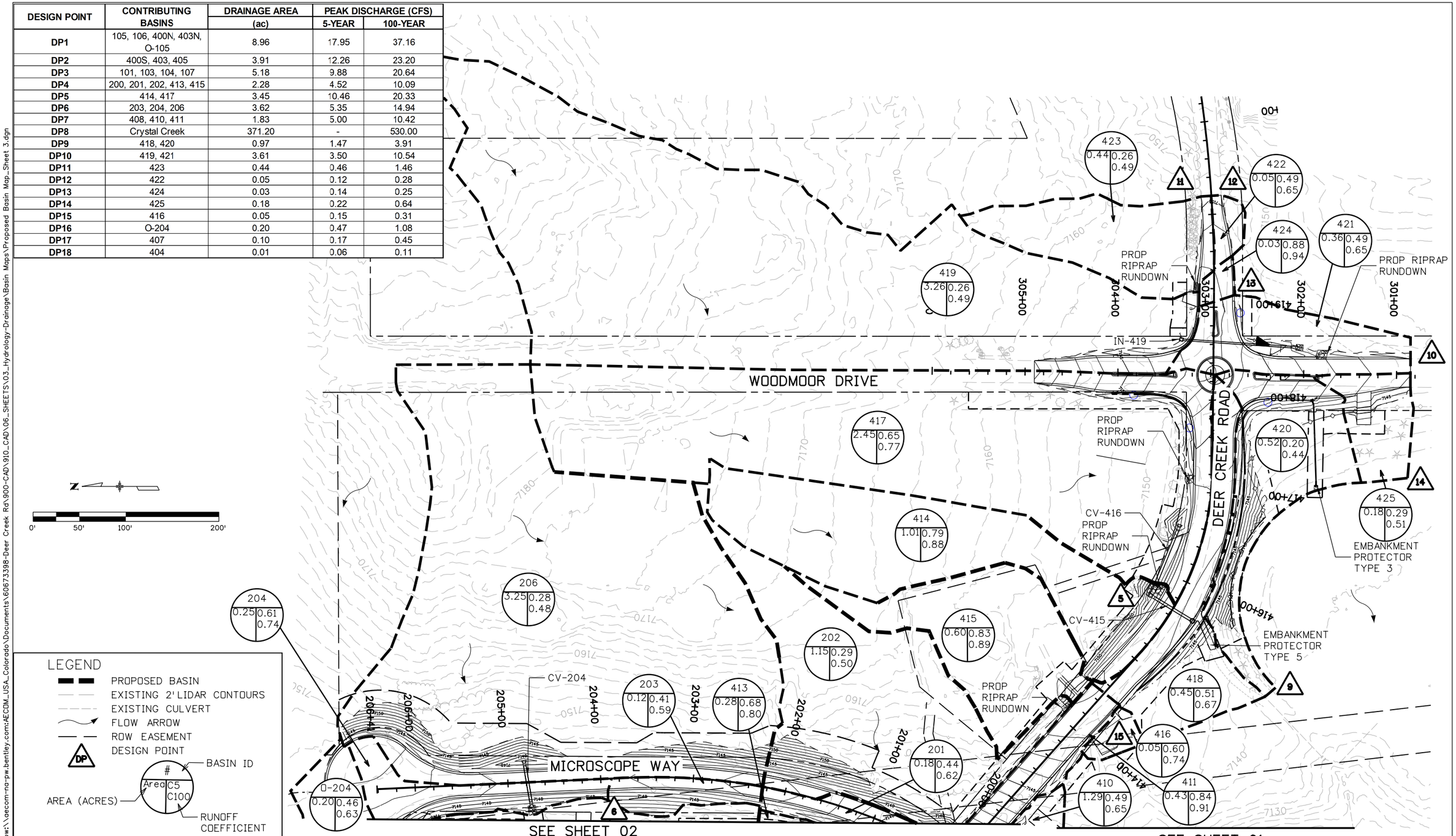
AECOM #60673398

DEER CREEK ROAD INTERSECTION IMPROVEMENTS

PROPOSED BASIN MAP

2 of 3
Sheet Number

DESIGN POINT	CONTRIBUTING BASINS	DRAINAGE AREA (ac)	PEAK DISCHARGE (CFS) 5-YEAR	100-YEAR
DP1	105, 106, 400N, 403N, O-105	8.96	17.95	37.16
DP2	400S, 403, 405	3.91	12.26	23.20
DP3	101, 103, 104, 107	5.18	9.88	20.64
DP4	200, 201, 202, 413, 415	2.28	4.52	10.09
DP5	414, 417	3.45	10.46	20.33
DP6	203, 204, 206	3.62	5.35	14.94
DP7	408, 410, 411	1.83	5.00	10.42
DP8	Crystal Creek	371.20	-	530.00
DP9	418, 420	0.97	1.47	3.91
DP10	419, 421	3.61	3.50	10.54
DP11	423	0.44	0.46	1.46
DP12	422	0.05	0.12	0.28
DP13	424	0.03	0.14	0.25
DP14	425	0.18	0.22	0.64
DP15	416	0.05	0.15	0.31
DP16	O-204	0.20	0.47	1.08
DP17	407	0.10	0.17	0.45
DP18	404	0.01	0.06	0.11



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DEER CREEK ROAD INTERSECTION IMPROVEMENTS

PROPOSED BASIN MAP

3 of 3

Sheet Number

**Deer Creek
Proposed
Hydrology**

		User Entered Data
		Calculated Cells

BASIN NAMES	Area			Pred. Soil Type	Landuse & C-Values: Surface Type 1 (Streets - Paved)					Surface Type 2 (Streets - Gravel)					Surface Type 3 (Undeveloped - Pasture/Meadow or Lawns)				
	Total Area [sf]	Total Area [ac]	A/B Soil [sf]		C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area
101	36558	0.84	36558	B	0.89	0.90	0.92	0.96	3833	0.57	0.59	0.63	0.70	442	0.02	0.08	0.15	0.35	8719
103	43887	1.01	43887	B	0.89	0.90	0.92	0.96	5829	0.57	0.59	0.63	0.70	2333	0.02	0.08	0.15	0.35	11045
103*	188879	4.34	188879	B	0.89	0.90	0.92	0.96	12098	0.57	0.59	0.63	0.70	4460	0.02	0.08	0.15	0.35	50190
104	131488	3.02	131488	B	0.89	0.90	0.92	0.96	0	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	34037
104*	144992	3.33	144992	B	0.89	0.90	0.92	0.96	6269	0.57	0.59	0.63	0.70	2127	0.02	0.08	0.15	0.35	39145
105	9503	0.22	9503	B	0.89	0.90	0.92	0.96	8949	0.57	0.59	0.63	0.70	56	0.02	0.08	0.15	0.35	497
106	75542	1.73	75542	B	0.89	0.90	0.92	0.96	7590	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	45
107	13504	0.31	13504	B	0.89	0.90	0.92	0.96	6269	0.57	0.59	0.63	0.70	2127	0.02	0.08	0.15	0.35	5108
200	3006	0.07	3006	B	0.89	0.90	0.92	0.96	669	0.57	0.59	0.63	0.70	156	0.02	0.08	0.15	0.35	2181
201	8043	0.18	8043	B	0.89	0.90	0.92	0.96	3152	0.57	0.59	0.63	0.70	597	0.02	0.08	0.15	0.35	4294
201*	84297	1.94	84297	B	0.89	0.90	0.92	0.96	17641	0.57	0.59	0.63	0.70	822	0.02	0.08	0.15	0.35	41317
202	50099	1.15	50099	B	0.89	0.90	0.92	0.96	9421	0.57	0.59	0.63	0.70	224	0.02	0.08	0.15	0.35	36998
202*	76254	1.75	76254	B	0.89	0.90	0.92	0.96	14489	0.57	0.59	0.63	0.70	225	0.02	0.08	0.15	0.35	37023
203	5065	0.12	5065	B	0.89	0.90	0.92	0.96	1810	0.57	0.59	0.63	0.70	331	0.02	0.08	0.15	0.35	2924
204	10765	0.25	10765	B	0.89	0.90	0.92	0.96	6620	0.57	0.59	0.63	0.70	588	0.02	0.08	0.15	0.35	3557
206	141647	3.25	141647	B	0.89	0.90	0.92	0.96	7601	0.57	0.59	0.63	0.70	934	0.02	0.08	0.15	0.35	81907
400N	262300	6.02	262300	B	0.89	0.90	0.92	0.96	21572	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0
400S	156933	3.60	156933	B	0.89	0.90	0.92	0.96	11924	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	14231
403	6046	0.14	6046	B	0.89	0.90	0.92	0.96	2325	0.57	0.59	0.63	0.70	1194	0.02	0.08	0.15	0.35	2527
403*	13255	0.30	13255	B	0.89	0.90	0.92	0.96	5909	0.57	0.59	0.63	0.70	1623	0.02	0.08	0.15	0.35	5722
403N	20650	0.47	20650	B	0.89	0.90	0.92	0.96	9506	0.57	0.59	0.63	0.70	1298	0.02	0.08	0.15	0.35	9846
403N*	30153	0.69	30153	B	0.89	0.90	0.92	0.96	18456	0.57	0.59	0.63	0.70	1354	0.02	0.08	0.15	0.35	10343
404	570	0.01	570	B	0.89	0.90	0.92	0.96	570	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	0
405	7209	0.17	7209	B	0.89	0.90	0.92	0.96	3585	0.57	0.59	0.63	0.70	429	0.02	0.08	0.15	0.35	3195
407	4456	0.10	4456	B	0.89	0.90	0.92	0.96	1397	0.57	0.59	0.63	0.70	120	0.02	0.08	0.15	0.35	2939
408	5046	0.12	5046	B	0.89	0.90	0.92	0.96	3119	0.57	0.59	0.63	0.70	353	0.02	0.08	0.15	0.35	1575
410	56006	1.29	56006	B	0.89	0.90	0.92	0.96	14024	0.57	0.59	0.63	0.70	1592	0.02	0.08	0.15	0.35	25896
411	18609	0.43	18609	B	0.89	0.90	0.92	0.96	16841	0.57	0.59	0.63	0.70	622	0.02	0.08	0.15	0.35	1146
413	12164	0.28	12164	B	0.89	0.90	0.92	0.96	6095	0.57	0.59	0.63	0.70	31	0.02	0.08	0.15	0.35	2834
414	43871	1.01	43871	B	0.89	0.90	0.92	0.96	37758	0.57	0.59	0.63	0.70	437	0.02	0.08	0.15	0.35	5676
415	26155	0.60	26155	B	0.89	0.90	0.92	0.96	5068	0.57	0.59	0.63	0.70	1	0.02	0.08	0.15	0.35	25
416	2073	0.05	2073	B	0.89	0.90	0.92	0.96	1327	0.57	0.59	0.63	0.70	0	0.02	0.08	0.15	0.35	746
417	106552	2.45	106552	B	0.89	0.90	0.92	0.96	67054	0.57	0.59	0.63	0.70	335	0.02	0.08	0.15	0.35	24777
418	19622	0.45	19622	B	0.89	0.90	0.92	0.96	9945	0.57	0.59	0.63	0.70	568	0.02	0.08	0.15	0.35	9108
419	141801	3.26	141801	B	0.89	0.90	0.92	0.96	8049	0.57	0.59	0.63	0.70	151	0.02	0.08	0.15	0.35	0
420	22707	0.52	22707	B	0.89	0.90	0.92	0.96	3167	0.57	0.59	0.63	0.70	359	0.02	0.08	0.15	0.35	19181
421	15579	0.36	15579	B	0.89	0.90	0.92	0.96	7527	0.57	0.59	0.63	0.70	324	0.02	0.08	0.15	0.35	7728
422	2135	0.05	2135	B	0.89	0.90	0.92	0.96	996	0.57	0.59	0.63	0.70	113	0.02	0.08	0.15	0.35	1026
423	19167	0.44	19167	B	0.89	0.90	0.92	0.96	1028	0.57	0.59	0.63	0.70	165	0.02	0.08	0.15	0.35	0
424	1321	0.03	1321	B	0.89	0.90	0.92	0.96	1237	0.57	0.59	0.63	0.70	84	0.02	0.08	0.15	0.35	0
425	8035	0.18	8035	B	0.89	0.90	0.92	0.96	1703	0.57	0.59	0.63	0.70	610	0.02	0.08	0.15	0.35	5721
O-105	12851	0.30	12851	B	0.89	0.90	0.92	0.96	5586	0.57	0.59	0.63	0.70	60	0.02	0.08	0.15	0.35	7205
O-204	8579	0.20	8579	B	0.89	0.90	0.92	0.96	3865	0.57	0.59	0.63	0.70	232	0.02	0.08	0.15	0.35	4482
DP1	390349	8.96	390349	B	0.89	0.90	0.92	0.96	62154	0.57	0.59	0.63	0.70	1470	0.02	0.08	0.15	0.35	18090
DP2	170188	3.91	170188	B	0.89	0.90	0.92	0.96	17833	0.57	0.59	0.63	0.70	1623	0.02	0.08	0.15	0.35	19953
DP3	225437	5.18	225437	B	0.89	0.90	0.92	0.96	15931	0.57	0.59	0.63	0.70	4902	0.02	0.08	0.15	0.35	58910
DP4	99467	2.28	99467	B	0.89	0.90	0.92	0.96	24405	0.57	0.59	0.63	0.70	1008	0.02	0.08	0.15	0.35	46333
DP5	150423	3.45	150423	B	0.89	0.90	0.92	0.96	104812	0.57	0.59	0.63	0.70	773	0.02	0.08	0.15	0.35	30453
DP6	157477	3.62	157477	B	0.89	0.90	0.92	0.96	16031	0.57	0.59	0.63	0.70	1853	0.02	0.08	0.15	0.35	88388
DP7	79661	1.83	79661	B	0.89	0.90	0.92	0.96	33984	0.57	0.59	0.63	0.70	2566	0.02	0.08	0.15	0.35	28617
DP9	42328	0.97	42328	B	0.89	0.90	0.92	0.96	13112	0.57	0.59	0.63	0.70	928	0.02	0.08	0.15	0.35	28289
DP10	157381	3.61	157381	B	0.89	0.90	0.92	0.96	15577	0.57	0.59	0.63	0.70	474	0.02	0.08	0.15	0.35	7728
D-202N	42339	0.97	42339	B	0.89	0.90	0.92	0.96	9421	0.57	0.59	0.63	0.70	157	0.02	0.08	0.15	0.35	30801
D-202S*	33915	0.78	33915	B	0.89	0.90	0.92	0.96	5068	0.57	0.59	0.63	0.70	28	0.02	0.08	0.15	0.35	6263
D-206N	63412	1.46	63412	B	0.89	0.90	0.92	0.96	4752	0.57	0.59	0.63	0.70	413	0.02	0.08	0.15	0.35	44135
D-206S	78234	1.80	78234	B	0.89	0.90	0.92	0.96	2849	0.57	0.59	0.63	0.70	521	0.02	0.08	0.15	0.35	37771

BASIN NAMES	Surface Type 4 (Residential 1/2 Acre)					Surface Type 5 (Business-Neighborhood)					Surface Type 6 (Business-Commercial)					Average	Average	Average	Average	% Impervious
	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	Area	C_2	C_5	C_{10}	C_{100}	
101	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	23563	0.79	0.81	0.83	0.88	0	0.40	0.44	0.48	0.59	56.57
103	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	24680	0.79	0.81	0.83	0.88	0	0.41	0.45	0.49	0.60	56.90
103*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	24680	0.79	0.81	0.83	0.88	97451	0.54	0.57	0.61	0.71	66.46
104	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	97451	0.59	0.62	0.65	0.74	70.41
104*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	97451	0.58	0.61	0.65	0.74	69.35
105	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.84	0.86	0.88	0.93	94.65
106	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	67906	0.79	0.81	0.83	0.88	0	0.49	0.53	0.57	0.65	72.97
107	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.51	0.54	0.58	0.69	59.02
200	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.24	0.29	0.35	0.50	26.41
201	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.40	0.44	0.49	0.62	45.13
201*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	24517	0.43	0.47	0.51	0.64	49.34
202	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	3456	0.24	0.29	0.34	0.50	25.72
202*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	24517	0.43	0.47	0.52	0.64	49.78
203	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.37	0.41	0.46	0.59	40.96
204	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.59	0.61	0.65	0.74	65.87
206	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	51205	0.79	0.81	0.83	0.88	0	0.23	0.28	0.33	0.48	31.20
400N	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	240728	0.79	0.81	0.83	0.88	0	0.49	0.52	0.56	0.65	72.47
400S	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	130778	0.73	0.75	0.78	0.84	86.77
403	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.46	0.50	0.54	0.65	54.25
403*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.48	0.51	0.55	0.66	54.38
403N	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.46	0.49	0.53	0.65	51.06
403N*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.58	0.60	0.64	0.74	64.80
404	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.89	0.90	0.92	0.96	100.00
405	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.49	0.52	0.56	0.67	54.49
407	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.31	0.35	0.40	0.55	33.49
408	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.60	0.62	0.66	0.75	67.40
410	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	14494	0.45	0.49	0.53	0.65	51.90
411	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.83	0.84	0.86	0.91	93.17
413	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	3204	0.66	0.68	0.72	0.80	75.33
414	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.77	0.79	0.82	0.88	86.86
415	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	21061	0.81	0.83	0.85	0.89	95.88
416	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.58	0.60	0.64	0.74	64.00
417	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	14385	0.79	0.81	0.83	0.88	0	0.63	0.65	0.69	0.77	72.63
418	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.48	0.51	0.55	0.67	53.00
419	0.15	0.22	0.30	0.46	133601	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.19	0.26	0.34	0.49	29.32
420	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.15	0.20	0.26	0.44	15.21
421	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.45	0.49	0.53	0.65	49.98
422	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.45	0.49	0.53	0.65	50.88
423	0.15	0.22	0.30	0.46	17975	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.19	0.26	0.34	0.49	29.50
424	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.87	0.88	0.90	0.94	98.73
425	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.25	0.29	0.35	0.51	27.27
O-105	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.40	0.44	0.49	0.62	43.84
O-204	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.43	0.46	0.51	0.63	47.22
DP1	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	308635	0.79	0.81	0.83	0.88	0	0.50	0.54	0.57	0.66	71.57
DP2	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	130778	0.71	0.73	0.76	0.82	84.24
DP3	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	48243	0.79	0.81	0.83	0.88	97451	0.52	0.55	0.59	0.69	64.85
DP4	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	27721	0.45	0.49	0.53	0.65	51.82
DP5	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	14385	0.79	0.81	0.83	0.88	0	0.67	0.69	0.73	0.80	76.78
DP6	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	51205	0.79	0.81	0.83	0.88	0	0.25	0.30	0.36	0.50	33.88
DP7	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	14494	0.55	0.58	0.62	0.72	62.52
DP9	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.30	0.35	0.40	0.55	32.73
DP10	0.15	0.22	0.30	0.46	133601	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	0	0.22	0.28	0.35	0.50	31.36
D-202N	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	1960	0.25	0.30	0.35	0.51	26.95
D-202S*	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	0	0.79	0.81	0.83	0.88	22557	0.66	0.69	0.72	0.79	78.19
D-206N	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	14112	0.79	0.81	0.83	0.88	0	0.18	0.24	0.30	0.46	23.59
D-206S	0.15	0.22	0.30	0.46	0	0.45	0.49	0.53	0.62	37093	0.79	0.81	0.83	0.88	0	0.26	0.31	0.36	0.50	37.36

BASIN NAMES	Overland Flow: total flow length	Overland Flow Length	High Point	Low Point	Slope	Channel Flow/ Guter Flow: Channel flow Length	High Point	Low Point	Slope	Initial	Channel	Total	i_2	Q_2	i_5	Q_5	i_{10}	Q_{10}	i_{100}	Q_{100}
	[ft]	[ft]	Elevation	Elevation	[ft/ft]	[ft]	Elevation	Elevation	[ft/ft]	[min]	[min]	[min]	[in/hr]	[cfs]	[in/hr]	[cfs]	[in/hr]	[cfs]	[in/hr]	[cfs]
101	627	100	7145.00	7141.00	0.04	527	7141.00	7126.50	0.028	7.58	3.40	10.98	3.18	1.06	3.99	1.46	4.65	1.88	6.70	3.33
103	424	73	7148.00	7144.00	0.05	351	7144.00	7136.00	0.023	5.75	1.94	7.69	3.61	1.48	4.52	2.04	5.28	2.61	7.60	4.60
103*	985	100	7167.00	7165.00	0.02	885	7165.00	7136.00	0.033	7.54	4.39	11.94	3.08	7.25	3.86	9.63	4.51	11.95	6.49	19.86
104	728	100	7167.00	7165.00	0.02	628	7165.00	7142.00	0.037	6.88	2.73	9.61	3.34	5.96	4.19	7.85	4.89	9.65	7.03	15.77
104*	728	100	7167.00	7165.00	0.02	628	7165.00	7142.00	0.037	6.99	2.73	9.72	3.33	6.46	4.17	8.52	4.87	10.49	7.00	17.20
105	477	100	7160.10	7155.50	0.05	377	7155.50	7139.30	0.043	2.67	1.52	5.00	4.12	0.76	5.17	0.96	6.03	1.16	8.68	1.75
106	549	100	7155.90	7147.80	0.08	449	7147.80	7132.00	0.035	5.15	2.56	7.72	3.60	3.09	4.52	4.16	5.27	5.20	7.59	8.60
107	329	100	7160.50	7157.20	0.03	229	7157.20	7142.60	0.064	6.81	0.95	7.76	3.60	0.57	4.51	0.76	5.26	0.95	7.57	1.62
200	142	52	7129.00	7126.00	0.06	90	7126.00	7123.00	0.034	5.92	0.54	6.46	3.81	0.06	4.78	0.10	5.58	0.13	8.03	0.28
201	293	20	7143.30	7141.40	0.09	272	7141.40	7128.20	0.048	2.54	1.38	5.00	4.12	0.31	5.17	0.42	6.03	0.54	8.68	0.99
201*	721	100	7170.00	7166.50	0.04	621	7166.50	7128.20	0.062	7.54	2.40	9.93	3.30	2.76	4.14	3.76	4.83	4.80	6.95	8.54
202	542	100	7175.00	7171.60	0.03	442	7171.60	7138.50	0.075	9.80	1.66	11.46	3.13	0.86	3.92	1.29	4.58	1.81	6.59	3.81
202*	594	100	7170.00	7166.50	0.04	494	7166.50	7138.50	0.057	7.50	1.92	9.42	3.37	2.56	4.22	3.49	4.92	4.45	7.08	7.90
203	Assumed minimum Tc											5.00	4.12	0.18	5.17	0.24	6.03	0.32	8.68	0.60
204	269	100	7145.00	7141.80	0.03	169	7141.80	7139.50	0.014	6.00	1.61	7.61	3.62	0.52	4.54	0.69	5.30	0.85	7.62	1.40
206	568	14	7190.00	7186.00	0.28	553	7186.00	7140.00	0.083	1.87	4.24	6.11	3.88	2.85	4.87	4.36	5.68	6.13	8.17	12.83
400N	731	100	7146.00	7141.00	0.05	631	7141.00	7116.00	0.040	6.12	2.89	9.00	3.42	10.01	4.29	13.52	5.00	16.93	7.20	28.08
400S	683	100	7129.10	7126.00	0.03	583	7126.00	7114.00	0.021	4.34	3.38	7.72	3.60	9.44	4.52	12.21	5.27	14.72	7.58	22.89
403	193	49	7131.23	7129.00	0.05	144	7129.00	7123.20	0.040	4.64	0.80	5.44	4.02	0.26	5.04	0.35	5.88	0.44	8.47	0.77
403*	426	22	7136.83	7136.00	0.04	405	7136.00	7123.20	0.032	3.20	2.53	5.72	3.96	0.57	4.97	0.77	5.79	0.97	8.34	1.69
403N	595	41	7140.00	7136.00	0.10	554	7136.00	7127.60	0.015	3.33	5.00	8.33	3.51	0.76	4.40	1.02	5.14	1.30	7.39	2.29
403N*	1050	100	7160.10	7155.50	0.05	950	7155.50	7127.60	0.029	5.40	5.44	10.84	3.20	1.28	4.01	1.68	4.68	2.08	6.73	3.44
404	Assumed minimum Tc											5.00	4.12	0.05	5.17	0.06	6.03	0.07	8.68	0.11
405	233	22	7136.83	7136.00	0.04	212	7136.00	7128.20	0.037	3.14	1.23	5.00	4.12	0.33	5.17	0.44	6.03	0.56	8.68	0.97
407	150	90	7136.00	7129.00	0.08	60	7129.00	7125.50	0.058	6.52	0.28	6.80	3.75	0.12	4.71	0.17	5.49	0.23	7.91	0.45
408	145	22	7136.85	7135.90	0.04	123	7135.90	7130.00	0.048	2.50	0.62	5.00	4.12	0.28	5.17	0.37	6.03	0.46	8.68	0.76
410	445	100	7147.00	7133.50	0.14	345	7133.50	7116.00	0.051	4.68	1.72	6.39	3.83	2.23	4.80	3.02	5.60	3.83	8.06	6.73
411	467	35	7149.11	7148.50	0.02	432	7148.50	7126.20	0.052	2.30	1.58	5.00	4.12	1.45	5.17	1.85	6.03	2.22	8.68	3.39
413	322	21	7141.50	7133.50	0.38	302	7133.50	7127.80	0.019	1.03	1.83	5.00	4.12	0.76	5.17	0.99	6.03	1.21	8.68	1.93
414	526	100	7175.00	7170.00	0.05	426	7170.00	7146.00	0.056	3.28	1.54	5.00	4.12	3.21	5.17	4.12	6.03	4.97	8.68	7.68
415	397	100	7170.00	7166.50	0.04	297	7166.50	7150.00	0.056	3.26	1.05	5.00	4.12	2.00	5.17	2.57	6.03	3.07	8.68	4.66
416	Assumed minimum Tc											5.00	4.12	0.11	5.17	0.15	6.03	0.18	8.68	0.31
417	864	30	7185.00	7184.00	0.03	835	7184.00	7147.00	0.044	2.93	4.40	7.33	3.66	5.62	4.59	7.34	5.36	9.01	7.71	14.56
418	383	56	7152.21	7149.82	0.04	327	7149.82	7137.50	0.038	4.93	1.65	6.58	3.79	0.81	4.76	1.09	5.55	1.39	7.99	2.41
419	919	100	7207.00	7200.30	0.07	819	7200.30	7152.00	0.059	8.11	7.07	15.11	2.80	1.76	3.51	2.96	4.10	4.47	5.89	9.37
420	522	48	7152.21	7150.13	0.04	474	7150.13	7135.50	0.031	6.96	2.61	9.57	3.35	0.26	4.19	0.44	4.89	0.68	7.04	1.62
421	286	60	7153.75	7152.00	0.03	226	7152.00	7145.96	0.027	6.01	1.31	7.32	3.67	0.59	4.60	0.80	5.36	1.02	7.72	1.80
422	Assumed minimum Tc											5.00	4.12	0.09	5.17	0.12	6.03	0.16	8.68	0.28
423	371	100	7167.00	7161.00	0.06	271	7161.00	7149.50	0.042	8.40	2.21	10.61	3.22	0.27	4.04	0.46	4.71	0.70	6.78	1.46
424	127	56	7149.76	7147.28	0.04	71	7147.28	7145.74	0.022	1.83	0.00	5.00	4.12	0.11	5.17	0.14	6.03	0.16	8.68	0.25
425	180	150	7149.00	7137.50	0.08	30	7137.50	7136.50	0.033	9.12	1.02	10.14	3.28	0.15	4.11	0.22	4.79	0.31	6.90	0.64
O-105	Assumed minimum Tc											5.00	4.12	0.49	5.17	0.67	6.03	0.87	8.68	1.58
O-204	Assumed minimum Tc											5.00	4.12	0.35	5.17	0.47	6.03	0.61	8.68	1.08
DP1	1326	100	7160	7156	0.05	1226	7155.50	7116.00	0.032	6.15	6.88	13.03	2.98	13.37	3.73	17.95	4.35	22.43	6.27	37.16
DP2	978	22	7136.83	7136.00	0.04	956	7136.00	7114.00	0.023	1.99	7.00	8.99	3.42	9.47	4.29	12.26	5.00	14.81	7.20	23.20
DP3	1385	100	7167.00	7165.00	0.02	1285	7165.00	7126.50	0.030	7.87	7.80	15.67	2.76	7.41	3.46	9.88	4.03	12.31	5.80	20.64
DP4	905	100	7170.00	7166.50	0.04	805	7166.50	7123.00	0.054	7.29	3.29	10.58	3.23	3.34	4.04	4.52	4.72	5.75	6.79	10.09
DP5	941	30	7170.00	7166.50	0.12	912	7166.50	7146.00	0.022	1.76	6.76	8.52	3.49	8.07	4.37	10.46	5.10	12.77	7.34	20.33
DP6	568	14	7190.00	7186.00	0.28	553	7186.00	7140.00	0.083	1.81	4.24	6.05	3.89	3.59	4.88	5.35	5.70	7.37	8.20	14.94
DP7	467	35	7149.11	7148.50	0.02	432	7148.50	7126.20	0.052	4.60	2.12	6.72	3.77	3.78	4.72	5.00	5.51	6.23	7.93	10.42
DP9	522	48	7152	7150	0.04	474	7150.13	7135.50	0.031	5.85	2.61	8.46	3.49	1.02	4.38	1.47	5.11	1.98	7.35	3.91
DP10	1167	100	7207.00	7200.30	0.07	1067	7200.30	7145.96	0.051	7.89	7.92	15.81	2.75	2.17	3.44	3.50	4.02	5.15	5.78	10.54
D-202N	542	100	7175.00	7171.60	0.03	442	7171.60	7138.50	0.075	9.67	1.66	11.32	3.15	0.77	3.94	1.14	4.60	1.59	6.62	3.29
D-202S*	594	100	7170.00	7166.50	0.04	494	7166.50	7138.50	0.057	4.91	1.92	6.83	3.75	1.93	4.70	2.52	5.48	3.06	7.89	4.88
D-206N	568	14	7190.00	7184.00	0.42	553	7184.00	7140.00	0.080	1.72	4.33	6.05	3.89	1.05	4.88	1.68	5.70	2.45	8.20	5.47
D-206S	567	100	7175.00	7172.00	0.03	467	7172.00	7140.00	0.069	9.96	2.15	12.10	3.07	1.43	3.84	2.12	4.48	2.91	6.45	5.82

* Indicates a routed flow from specified basin and contributing upstream basins.
DP Indications the routed flow at a specific design point for all upstream contributing basins.
Use Rational Method if basin is less than 130 acres, otherwise use SCS Method.
Design Storms determined from El Paso County Drainage Criteria Manual
C values taken from El Paso Drainage Criteria Maual Table 6.6, based on predominant soil type for each basin

Culvert Analysis Report
CV-204
5-year

Comments: Flow taken from basin 206

Analysis Component			
Storm Event	Design	Discharge	4.36 cfs

Peak Discharge Method: User-Specified			
Design Discharge	4.36 cfs	Check Discharge	12.83 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	N/A ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-19x30 inch Horiz Ellipse	4.36 cfs	7,139.40 ft	6.13 ft/s
Weir	Roadway	0.00 cfs	7,139.40 ft	N/A
Total	----------	4.36 cfs	7,139.40 ft	N/A

Culvert Analysis Report
CV-204
5-year

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	7,139.40	ft	Discharge	4.36	cfs
Inlet Control HW Elev.	7,139.34	ft	Tailwater Elevation	N/A	ft
Outlet Control HW Elev.	7,139.40	ft	Control Type	Entrance Control	
Headwater Depth/Height	0.56				

Grades					
Upstream Invert	7,138.50	ft	Downstream Invert	7,137.85	ft
Length	39.19	ft	Constructed Slope	0.016586	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.44	ft
Slope Type	Steep		Normal Depth	0.44	ft
Flow Regime	Supercritical		Critical Depth	0.62	ft
Velocity Downstream	6.13	ft/s	Critical Slope	0.004084	ft/ft

Section					
Section Shape	Horizontal Ellipse		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.52	ft
Section Size	19x30 inch		Rise	1.60	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	7,139.40	ft	Upstream Velocity Head	0.23	ft
Ke	0.20		Entrance Loss	0.05	ft

Inlet Control Properties					
Inlet Control HW Elev.	7,139.34	ft	Flow Control	N/A	
Inlet Type	Groove end projecting (horizontal ellipse)		Area Full	3.3	ft²
K	0.00450		HDS 5 Chart	29	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Culvert Analysis Report
CV-204
5-year

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	7,139.40	ft
Roadway Width	26.00	ft	Overtopping Coefficient	2.90	US
Low Point	7,141.47	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	2.90		Submergence Factor (Kt)	1.00	
Tailwater Elevation	-9,999.00	ft			

Sta (ft)	Elev. (ft)
0.00	7,141.47
13.00	7,141.73
26.00	7,141.47

Culvert Analysis Report
CV-204
100-year

Comments: Basin 206

Analysis Component			
Storm Event	Design	Discharge	12.83 cfs

Peak Discharge Method: User-Specified			
Design Discharge	12.83 cfs	Check Discharge	12.83 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	N/A ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-19x30 inch Horiz Ellipse	12.84 cfs	7,140.12 ft	8.09 ft/s
Weir	Roadway	0.00 cfs	7,140.12 ft	N/A
Total	----------	12.84 cfs	7,140.12 ft	N/A

Culvert Analysis Report
CV-204
100-year

Component:Culvert-1

Culvert Summary					
Computed Headwater Elevation	7,140.12	ft	Discharge	12.84	cfs
Inlet Control HW Elev.	7,140.08	ft	Tailwater Elevation	N/A	ft
Outlet Control HW Elev.	7,140.12	ft	Control Type	Entrance Control	
Headwater Depth/Height	1.01				

Grades					
Upstream Invert	7,138.50	ft	Downstream Invert	7,137.85	ft
Length	39.18	ft	Constructed Slope	0.016590	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.80	ft
Slope Type	Steep		Normal Depth	0.75	ft
Flow Regime	Supercritical		Critical Depth	1.04	ft
Velocity Downstream	8.09	ft/s	Critical Slope	0.004472	ft/ft

Section					
Section Shape	Horizontal Ellipse		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.52	ft
Section Size	19x30 inch		Rise	1.60	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	7,140.12	ft	Upstream Velocity Head	0.48	ft
Ke	0.20		Entrance Loss	0.10	ft

Inlet Control Properties					
Inlet Control HW Elev.	7,140.08	ft	Flow Control	N/A	
Inlet Type	Groove end projecting (horizontal ellipse)		Area Full	3.3	ft²
K	0.00450		HDS 5 Chart	29	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Culvert Analysis Report
CV-204
100-year

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	7,140.12	ft
Roadway Width	26.00	ft	Overtopping Coefficient	2.90	US
Low Point	7,141.47	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	2.90		Submergence Factor (Kt)	1.00	
Tailwater Elevation	-9,999.00	ft			

Sta (ft)	Elev. (ft)
0.00	7,141.47
13.00	7,141.73
26.00	7,141.47

DEER CREEK DITCHES - 5 YEAR CAPACITY

Label	Start Station	End Station	Alignment	Location	Roughness Coefficient	Min Channel Slope (ft/ft)	Min Normal Depth (ft)	Left Side Slope (ft/ft (H:V))	Right Side Slope (ft/ft (H:V))	Bottom Width (ft)	Discharge (ft^3/s)	Max Capacity (ft^3/s)	Max Ditch Depth (ft)	Actual Freeboard (ft)	Flow Area (ft^2)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Top Width (ft)	Critical Depth (ft)	Critical Slope (ft/ft)	Velocity (ft/s)	Froude Number	Flow Type	Basin
102B	101+80	104+00	Base Camp Rd.	Right	0.03	0.015	0.90	4	3	0	9.63	23.68	1.25	0.35	2.80	6.50	0.40	6.25	0.90	0.02	3.45	0.91	Subcritical	Basin 103*
105B	105+00	106+80	Base Camp Rd.	Right	0.03	0.042	0.30	4	3	0	0.76	17.50	0.92	0.62	0.30	2.10	0.10	1.99	0.30	0.03	2.69	1.26	Supercritical	Basin 107
200M	200+30	202+30	Microscope Way	Right	0.03	0.012	0.40	4	3	0	1.14	15.06	1.10	0.70	0.60	3.00	0.20	2.93	0.40	0.02	1.86	0.72	Subcritical	Basin D-202N
204M	204+80	206+40	Microscope Way	Left	0.03	0.010	0.40	3	4	0	0.69	1.68	0.50	0.10	0.40	2.60	0.20	2.51	0.30	0.03	1.53	0.64	Subcritical	Basin 204
206M-N	204+80	206+40	Microscope Way	Right	0.03	0.015	0.50	4	3	0	1.68	16.84	1.10	0.60	0.80	3.40	0.20	3.25	0.40	0.02	2.23	0.82	Subcritical	Basin D-206N
206M-S	202+30	204+80	Microscope Way	Right	0.03	0.009	0.60	4	3	0	2.12	13.04	1.10	0.50	1.10	4.10	0.30	3.90	0.50	0.02	1.95	0.65	Subcritical	Basin D-206S
402D	403+40	404+00	Deer Creek Rd.	Right	0.03	0.012	0.40	4	3	0	0.77	16.96	1.15	0.75	0.50	2.60	0.20	2.54	0.30	0.03	1.67	0.69	Subcritical	Basin 403*
403D	403+40	103+20	Deer Creek Rd. / Base Camp Rd.	Left	0.03	0.005	0.60	3	3	0	1.68	3.90	0.83	0.23	1.10	3.80	0.30	3.64	0.50	0.02	1.52	0.49	Subcritical	Basin 403N*
404D	404+50	406+60	Deer Creek Rd.	Right	0.03	0.018	0.30	4	3	0	0.44	2.25	0.50	0.20	0.30	2.00	0.10	1.90	0.30	0.03	1.71	0.82	Subcritical	Basin 405
407D	406+60	408+00	Deer Creek Rd.	Right	0.03	0.014	0.30	4	3	0	0.37	1.99	0.50	0.20	0.20	1.90	0.10	1.87	0.20	0.03	1.49	0.72	Subcritical	Basin 408
409D	101+30	409+00	Base Camp Rd. / Deer Creek Rd.	Right / Left	0.03	0.005	1.10	3	4	0	9.88	29.60	1.67	0.57	4.30	8.10	0.50	7.75	0.90	0.02	2.30	0.55	Subcritical	Basin DP3
411D	411+00	202+30	Deer Creek Rd. / Microscope Way	Left	0.03	0.035	0.50	3	4	0	3.76	11.00	0.80	0.30	1.00	3.90	0.30	3.75	0.60	0.02	3.75	1.28	Supercritical	Basin 201*
412D	412+30	414+20	Deer Creek Rd.	Left	0.03	0.028	0.50	3	4	0	2.52	6.89	0.70	0.20	0.80	3.50	0.20	3.36	0.50	0.02	3.12	1.12	Supercritical	Basin D-202S*
415D	414+60	415+80	Deer Creek Rd.	Left	0.03	0.017	0.60	3	4	0	4.12	25.21	1.25	0.65	1.40	4.60	0.30	4.46	0.60	0.02	2.91	0.91	Subcritical	Basin 414
416D	416+60	418+20	Deer Creek Rd. / Woodmoor Dr	Left	0.03	0.045	0.70	3	4	0	7.34	10.50	0.75	0.05	1.50	4.80	0.30	4.60	0.80	0.02	4.87	1.50	Supercritical	Basin 417
419N	304+90	419+00	Woodmoor Dr / Deer Creek Rd.	Right / Left	0.03	0.042	0.40	4	4	0	2.96	5.88	0.58	0.18	0.80	3.70	0.20	3.59	0.50	0.02	3.68	1.37	Supercritical	Basin 419
421D	301+20	302+00	Woodmoor Dr	Right	0.03	0.018	0.60	4	3	0	3.50	84.04	2.00	1.40	1.20	4.10	0.30	3.95	0.60	0.02	2.91	0.93	Subcritical	Basin DP10
423D	419+20	420+20	Deer Creek Rd.	Left	0.03	0.020	0.30	4	4	0	0.46	9.57	0.80	0.50	0.30	2.10	0.10	2.05	0.20	0.03	1.75	0.86	Subcritical	Basin 423

DEER CREEK DITCHES - 100 YEAR CAPACITY

Label	Start Station	End Station	Alignment	Location	Roughness Coefficient	Min Channel Slope (ft/ft)	Min Normal Depth (ft)	Left Side Slope (ft/ft (H:V))	Right Side Slope (ft/ft (H:V))	Bottom Width (ft)	Discharge (ft^3/s)	Max Capacity (ft^3/s)	Max Ditch Depth (ft)	Actual Freeboard (ft)	Flow Area (ft^2)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Top Width (ft)	Critical Depth (ft)	Critical Slope (ft/ft)	Velocity (ft/s)	Froude Number	Flow Type	Basin
102B	101+80	104+00	Base Camp Rd.	Right	0.03	0.015	1.20	4	3	0	19.86	23.68	1.25	0.05	4.80	8.50	0.60	8.20	1.10	0.02	4.13	0.95	Subcritical	Basin 103*
105B	105+00	106+80	Base Camp Rd.	Right	0.03	0.042	0.40	4	3	0	1.62	17.50	0.92	0.52	0.50	2.70	0.20	2.64	0.40	0.02	3.25	1.32	Supercritical	Basin 107
200M	200+20	202+30	Microscope Way	Right	0.03	0.012	0.60	4	3	0	3.29	15.06	1.10	0.50	1.40	4.50	0.30	4.36	0.60	0.02	2.43	0.77	Subcritical	Basin D-202N
204M	204+80	206+40	Microscope Way	Left	0.03	0.010	0.50	3	4	0	1.40	1.68	0.50	0.00	0.80	3.40	0.20	3.27	0.40	0.02	1.83	0.67	Subcritical	Basin 204
206M-N	204+80	206+40	Microscope Way	Right	0.03	0.015	0.70	4	3	0	5.47	16.84	1.10	0.40	1.80	5.30	0.30	5.06	0.70	0.02	3.00	0.88	Subcritical	Basin D-206N
206M-S	202+30	204+80	Microscope Way	Right	0.03	0.009	0.80	4	3	0	5.82	13.04	1.10	0.30	2.30	5.90	0.40	5.70	0.70	0.02	2.51	0.69	Subcritical	Basin D-206S
402D	403+40	404+00	Deer Creek Rd.	Right	0.03	0.012	0.50	4	3	0	1.69	16.96	1.15	0.65	0.80	3.60	0.20	3.42	0.40	0.02	2.03	0.72	Subcritical	Basin 403*
403D	403+40	103+20	Deer Creek Rd. / Base Camp Rd.	Left	0.03	0.005	0.80	3	3	0	3.44	3.90	0.83	0.03	1.90	5.00	0.40	4.76	0.60	0.02	1.82	0.51	Subcritical	Basin 403N*
404D	404+50	406+60	Deer Creek Rd.	Right	0.03	0.018	0.40	4	3	0	0.97	2.25	0.50	0.10	0.50	2.70	0.20	2.55	0.30	0.03	2.08	0.86	Subcritical	Basin 405
407D	406+60	408+00	Deer Creek Rd.	Right	0.03	0.014	0.30	4	3	0	0.76	1.99	0.50	0.20	0.40	2.50	0.20	2.44	0.30	0.03	1.78	0.75	Subcritical	Basin 408
409D	101+30	409+00	Base Camp Rd. / Deer Creek Rd.	Right / Left	0.03	0.005	1.50	3	4	0	20.64	29.60	1.67	0.17	7.50	10.60	0.70	10.22	1.20	0.02	2.77	0.57	Subcritical	Basin DP3
411D	411+00	202+30	Deer Creek Rd. / Microscope Way	Left	0.03	0.035	0.70	3	4	0	8.54	11.00	0.80	0.10	1.90	5.30	0.30	5.10	0.80	0.02	4.60	1.34	Supercritical	Basin 201*
412D	412+30	414+20	Deer Creek Rd.	Left	0.03	0.028	0.60	3	4	0	4.88	6.89	0.70	0.10	1.30	4.50	0.30	4.31	0.70	0.02	3.68	1.17	Supercritical	Basin D-202S*
415D	414+60	415+80	Deer Creek Rd.	Left	0.03	0.017	0.80	3	4	0	7.68	13.90	1.00	0.20	2.20	5.80	0.40	5.61	0.80	0.02	3.42	0.95	Subcritical	Basin 414
416D	416+60	418+20	Deer Creek Rd.	Left	0.03	0.045	0.80	3	4	0	14.56	22.62	1.00	0.20	2.50	6.20	0.40	5.94	1.00	0.02	5.78	1.56	Supercritical	Basin 417
419N	304+90	419+00	Woodmoor Dr / Deer Creek Rd.	Right / Left	0.03	0.042	0.70	4	4	0	9.37	5.88	0.58	-0.12	1.90	5.70	0.30	5.53	0.80	0.02	4.90	1.47	Supercritical	Basin 419
421D	301+20	302+00	Woodmoor Dr	Right	0.03	0.018	0.90	4	3	0	10.54	84.04	2.00	1.10	2.70	6.30	0.40	5.97	0.90	0.02	3.84	1.00	Subcritical	Basin DP10
423D	419+20	420+20	Deer Creek Rd.	Left	0.03	0.020	0.40	4	4	0	1.46	9.57	0.80	0.40	0.60	3.30	0.20	3.17	0.40	0.02	2.33	0.92	Subcritical	Basin 423

EL PASO COUNTY

DEPARTMENT OF PUBLIC WORKS
TRANSPORTATION DIVISION

FINAL PLANS OF PROPOSED DEER CREEK ROAD INTERSECTION IMPROVEMENTS

GRADING AND EROSION CONTROL PLAN

June 4, 2024

EPC •17-067-90

Engineer's Statement:

These detailed plans and specifications were prepared under my direction and supervision. Said plans and specifications have been prepared according to the criteria established by the County for detailed roadway, drainage, grading and erosion control plans and specificatons, and said plans and specifications are in conformity with applicable master drainage plans and master transportation plans. Said plans and specifications meet the purposes for which the particular roadway and drainage facilities are designed and are correct to the best of my knowledge and belief. I accept responsiblity for any liability caused by any negligent acts, errors or omissions on my part in preparation of these detailed plans and specifications.

Engineer of Record Signature Date

Owner's Statement:

I, the owner/developer have read and will comply with the requirements of the grading and erosion control plan and all of the requirements specified in these detailed plans and specifications.

Owner Signature Date

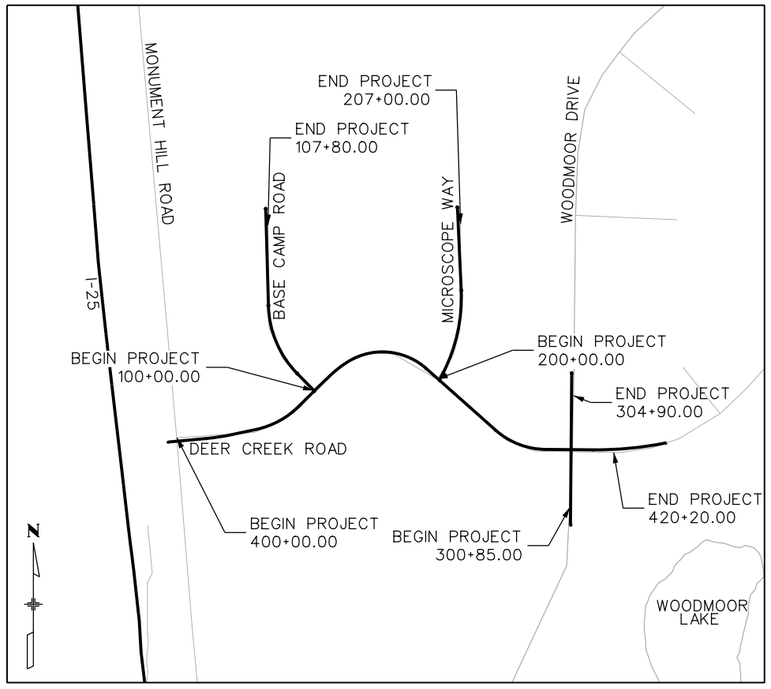
El Paso County:

County plan review is provided only for general conformance with County Design Criteria. The County is not responsible for the accuracy and adequacy of the design, dimensions, and/ or elevations which shall be confirmed at the job site. The County throught the approval of this document assumes no responsibility for completeness and/ or accuracy of this document.

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

In accordance with ECM Section 1.12, these construction documents will be vaild for construction for a period of 2 years from the date signed by the El Paso County Engineer. If construction has not started within those 2 years, the plans will need to be resubmitted for approval, including payment of review fees at the Planning and Community Development Director's discretion.

JOSHUA A PALMER, PE Date
COUNTY ENGINEER/ECM ADMINISTRATOR



PROJECT LOCATION MAP

0 300' 600' 1200'

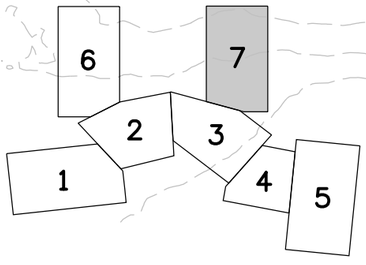
AECOM
2315 BRIARGATE PARKWAY, SUITE 150
COLORADO SPRINGS, CO 80920
719-531-0001
AECOM •60673398

Sheet Number 072

FINAL- NOT FOR CONSTRUCTION

FEMA 100-YR FLOODPLAIN
EXIST UTIL EASEMENT (TYP)
TOP OF CUT (TYP)
EXIST ROW (TYP)
TOE OF FILL (TYP)
EXISTING CULVERT EX-CV-204 SEE REMOVAL PLANS
RIPRAP OUTLET PAVING PER CDOT M-601-12 D50=12",T=24"
OF-204
TOE OF FILL (TYP)
DITCH 204M
PROP TCE (TYP)
DWY 206
MATCHLINE 201+70
DITCH 200M
HCL MICROSCOPE RD
39 LF 30"X19" HERCP
LINE 204
MICROSCOPE WAY
CONCRETE PIPE CRADLE SEE DRAINAGE DETAIL SHEET 7
EXIST ROW (TYP)
CV-204
TOP OF CUT (TYP)
PROP PE (TYP)
DITCH 206M-S
DITCH 206M-N
202+00
203+00
204+00
205+00
206+00
207+00
7140
7145
7150

CV-204 TO OF-204
STA 204+80.94,17.74'RT TO
STA 204+76.18,21.16'LT
REQ'D 39'X30"X19" HERCP
2- 30"X19" HERCES
SEE PROFILE SHEET 1



NOTES:

1. SEE REMOVAL PLANS FOR DRAINAGE REMOVALS.
2. SEE ROW PLANS FOR UTILITY EASEMENT LABLES.
3. ALL PROPOSED DRAINAGE IS PUBLIC INFRASTRUCTURE.
4. ALL STORM PIPES SHALL BE CLASS III UNLESS OTHERWISE SPECIFIED IN THE PLANS.
5. EMBANKMENT PROTECTOR TYPE 5 SHALL BE CONCRETE SLOPE AND DITCH PAVING.

N

0' 20' 40' 80'

FINAL - NOT FOR CONSTRUCTION

Computer File Information		Index of Revisions		
Print Date: 6/3/2024		Date:	Comments	Init.
File Name: dr_layout_07				
Last Modification Date: 6/3/2024				
Designer: CS Detailer: IC Checker: WC				
11x17 Scale: 1"= 40' Units: Survey Feet				

El Paso County
Department of Public Works
3275 Akers Dr
Phone: 719-520-6460
Fax: 719-520-6879

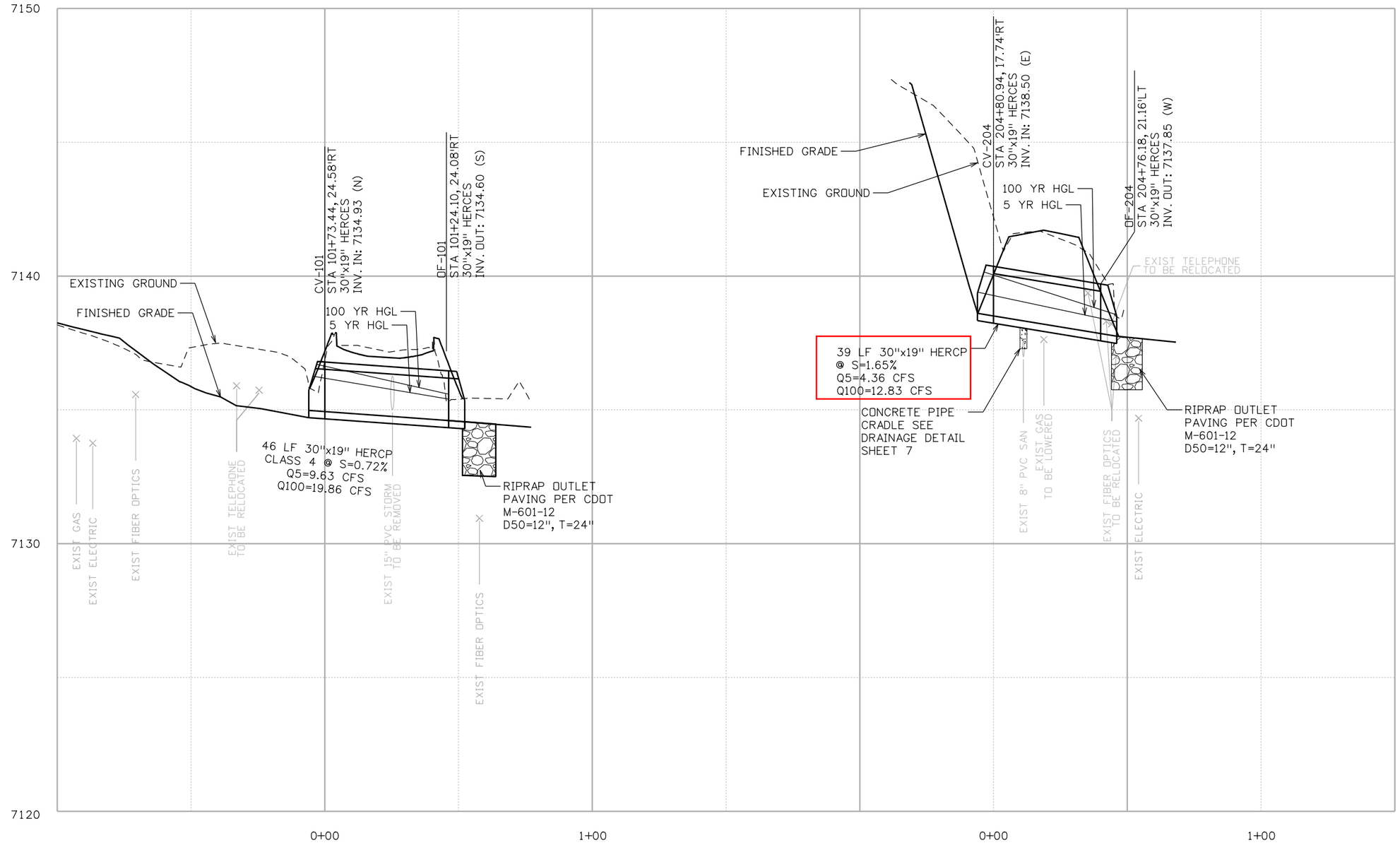
AECOM
2315 Briargate Pkwy #150
Colorado Springs, CO 80920
Phone: 719-531-0001
Fax: 719-531-0007
AECOM #60673398

DEER CREEK ROAD INTERSECTION IMPROVEMENTS

DRAINAGE AND GRADING PLAN
STA 201+70 TO STA 206+34.67

DRAINAGE 7 of 7

Sheet Number 107



LINE 101

LINE 204

FINAL - NOT FOR CONSTRUCTION

Computer File Information		Index of Revisions		
Print Date: 6/3/2024		Date:	Comments	Init.
File Name: dr_profile_01				
Last Modification Date: 5/29/2024				
Designer: CS Detailer: IC Checker: WC				
11x17 Scale: 1"= 40' Units: Survey Feet				

El Paso County
Department of Public Works
3275 Akers Dr
Phone: 719-520-6460
Fax: 719-520-6879

AECOM
2315 Briargate Pkwy #150
Colorado Springs, CO 80920
Phone: 719-531-0001
Fax: 719-531-0007
AECOM #60611261

DEER CREEK ROAD INTERSECTION IMPROVEMENTS

DRAINAGE PROFILE
LINE 101 & LINE 204

DRAINAGE 1 of 5

Sheet Number 108


Crystal Creek
EX 20" CMP culvert outfall
Microscope Way

Project: Ascent Church
Project No: 25023
4/13/2026

Engineer's Opinion of Probable Cost				
Item	Quantity	Unit	Unit Cost	Cost
Pond Earthwork	2600	CY	$7.50	$19,500.00
Type VL Low TW Basin	1	LS	$5,000.00	$5,000.00
Type VL Rundown	9	TON	$102.00	$867.00
Outlet Structure	1	LS	$15,000.00	$15,000.00
Concrete Trickle Channel	50	LF	$25.00	$1,250.00
Type L Spillway Riprap	84	TON	$102.00	$8,568.00
Maintenance Access Road	168	SY	$24.00	$4,032.00
			Subtotal	$54,217.00
			10% Contingency	$5,421.70
			Total:	$59,638.70

2026 Financial Assurance Estimate Form
(with pre-plat construction)

Updated: 2/2026

PROJECT INFORMATION

Project Name: Ascent Church Expansion	Date: 04/17/2026	PCD File No.PPR265

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining	
SECTION 1 - GRADING AND EROSION CONTROL (Construction and Permanent BMPs)								
Earthwork								*
less than 5,000; $8,000 min		CY	$ 7.50	=	$ -		$ -	*
5,001-20,000; $30,000 min		CY	$ 6.50	=	$ -		$ -	*
20,001-50,000; $100,000 min	28700.	CY	$ 4.50	=	$ 129,150.00		$ 129,150.00	*
50,001-200,000; $175,000 min		CY	$ 3.00	=	$ -		$ -	*
greater than 200,000; $500,000 min		CY	$ 2.50	=	$ -		$ -	*
Erosion Control Blanket	800.	SY	$ 6.00	=	$ 4,800.00		$ 4,800.00	*
Seeding (inc. noxious weed mgmnt.) & Mulching	3.	AC	$ 2,037.00	=	$ 6,111.00		$ 6,111.00	*
Permanent Pond/PCM (provide engineer's estimate)	1.	EA	$ 59,639.00	=	$ 59,639.00		$ 59,639.00	*
					$ -		$ -	*
					$ -		$ -	*
[insert items not listed but part of construction plans]					$ -		$ -	*
Safety Fence		LF	$ 5.00	=	$ -		$ -	
Inlet Protection	1.	EA	$ 322.00	=	$ 322.00		$ 322.00	
Rock Check Dam		EA	$ 908.00	=	$ -		$ -	
Concrete Washout Basin	1.	EA	$ 1,790.00	=	$ 1,790.00		$ 1,790.00	
Sediment Basin		EA	$ 3,483.00	=	$ -		$ -	
Sediment Trap		EA	$ 877.00	=	$ -		$ -	
Silt Fence	811.	LF	$ 3.00	=	$ 2,433.00		$ 2,433.00	
Slope Drain		LF	$ 30.00	=	$ -		$ -	
Straw Bale		EA	$ 56.00	=	$ -		$ -	
Straw Wattle/Rock Sock		LF	$ 11.00	=	$ -		$ -	
Surface Roughening		AC	$ 507.00	=	$ -		$ -	
Vehicle Tracking Control	1.	EA	$ 3,840.00	=	$ 3,840.00		$ 3,840.00	
				=	$ -		$ -	
				=	$ -		$ -	
				=	$ -		$ -	
[insert items not listed but part of construction plans]				=	$ -		$ -	
MAINTENANCE (35% of Construction BMPs)				=	$ 2,934.75		$ 2,934.75	
* - Subject to defect warranty financial assurance. A minimum of 20% shall be retained until final acceptance (MAXIMUM OF 80% COMPLETE ALLOWED)		**Section 1 Subtotal**		**=**	**$ 211,019.75**		**$ 211,019.75**	
SECTION 2 - PUBLIC IMPROVEMENTS *								
ROADWAY IMPROVEMENTS								*
Construction Traffic Control		LS		=	$ -		$ -	*
Aggregate Base Course (135 lbs/cf)		Tons	$ 42.00	=	$ -		$ -	*
Aggregate Base Course (135 lbs/cf)		CY	$ 81.00	=	$ -		$ -	*
Asphalt Pavement (3" thick)		SY	$ 22.00	=	$ -		$ -	*
Asphalt Pavement (4" thick)		SY	$ 31.00	=	$ -		$ -	*
Asphalt Pavement (6" thick)		SY	$ 47.00	=	$ -		$ -	*
Asphalt Pavement (147 lbs/cf) __" thick		Tons	$ 140.00	=	$ -		$ -	*
Raised Median, Paved		SF	$ 15.00	=	$ -		$ -	*
Signs (regulatory/advisory/guide/street)		EA	$ 293.00	=	$ -		$ -	*
Epoxy Pavement Marking		SF	$ 19.00	=	$ -		$ -	*
Thermoplastic Pavement Marking		SF	$ 29.00	=	$ -		$ -	*
Barricade - Type 3		EA	$ 380.00	=	$ -		$ -	*
Delineator - Type I		EA	$ 38.00	=	$ -		$ -	*
Curb and Gutter, Type A (6" Vertical)		LF	$ 49.00	=	$ -		$ -	*
Curb and Gutter, Type B (Median)		LF	$ 50.00	=	$ -		$ -	*
Curb and Gutter, Type C (Ramp)		LF	$ 51.00	=	$ -		$ -	*
4" Sidewalk (common areas only)		SY	$ 69.00	=	$ -		$ -	*
5" Sidewalk		SY	$ 85.00	=	$ -		$ -	*
6" Sidewalk		SY	$ 113.00	=	$ -		$ -	*
8" Sidewalk		SY	$ 141.00	=	$ -		$ -	*
Pedestrian Ramp		EA	$ 1,961.00	=	$ -		$ -	*
Cross Pan, local (8" thick, 6' wide to include return)		LF	$ 87.00	=	$ -		$ -	*
Cross Pan, collector (9" thick, 8' wide to include return)		LF	$ 131.00	=	$ -		$ -	*
Curb Opening with Drainage Chase		EA	$ 2,341.00	=	$ -		$ -	*
Guardrail Type 3 (W-Beam)		LF	$ 87.00	=	$ -		$ -	*
Guardrail Type 7 (Concrete)		LF	$ 104.00	=	$ -		$ -	*
Guardrail End Anchorage		EA	$ 2,485.00	=	$ -		$ -	*
Guardrail Impact Attenuator		EA	$ 22,568.00	=	$ -		$ -	*
Sound Barrier Fence (CMU block, 6' high)		LF	$ 113.00	=	$ -		$ -	*
Sound Barrier Fence (panels, 6' high)		LF	$ 115.00	=	$ -		$ -	*
Electrical Conduit, Size =		LF	$ 33.00	=	$ -		$ -	*
Traffic Signal, (provide engineer's estimate)		EA		=	$ -		$ -	*
Survey Monumentation		EA	$ 638.00	=	$ -		$ -	*
				=	$ -		$ -	*

PROJECT INFORMATION		
Project Name: Ascent Church Expansion	**Date: 04/17/2026**	**PCD File No.PPR265**

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining	
				=	$ -		$ -	*
				=	$ -		$ -	*
[insert items not listed but part of construction plans]				=	$ -		$ -	*
STORM DRAIN IMPROVEMENTS								*
Concrete Box Culvert (M Standard), Size (W x H)		LF		=	$ -		$ -	*
18" Reinforced Concrete Pipe		LF	$ 111.00	=	$ -		$ -	*
24" Reinforced Concrete Pipe		LF	$ 161.00	=	$ -		$ -	*
30" Reinforced Concrete Pipe		LF	$ 167.00	=	$ -		$ -	*
36" Reinforced Concrete Pipe		LF	$ 191.00	=	$ -		$ -	*
42" Reinforced Concrete Pipe		LF	$ 275.00	=	$ -		$ -	*
48" Reinforced Concrete Pipe		LF	$ 349.00	=	$ -		$ -	*
54" Reinforced Concrete Pipe		LF	$ 465.00	=	$ -		$ -	*
60" Reinforced Concrete Pipe		LF	$ 476.00	=	$ -		$ -	*
66" Reinforced Concrete Pipe		LF	$ 550.00	=	$ -		$ -	*
72" Reinforced Concrete Pipe		LF	$ 616.00	=	$ -		$ -	*
18" Corrugated Steel Pipe		LF	$ 136.00	=	$ -		$ -	*
24" Corrugated Steel Pipe		LF	$ 229.00	=	$ -		$ -	*
30" Corrugated Steel Pipe		LF	$ 244.00	=	$ -		$ -	*
36" Corrugated Steel Pipe		LF	$ 244.00	=	$ -		$ -	*
42" Corrugated Steel Pipe		LF	$ 226.00	=	$ -		$ -	*
48" Corrugated Steel Pipe		LF	$ 465.00	=	$ -		$ -	*
54" Corrugated Steel Pipe		LF	$ 459.00	=	$ -		$ -	*
60" Corrugated Steel Pipe		LF	$ 501.00	=	$ -		$ -	*
66" Corrugated Steel Pipe		LF	$ 580.00	=	$ -		$ -	*
72" Corrugated Steel Pipe		LF	$ 654.00	=	$ -		$ -	*
78" Corrugated Steel Pipe		LF	$ 728.00	=	$ -		$ -	*
84" Corrugated Steel Pipe		LF	$ 901.00	=	$ -		$ -	*
Flared End Section (FES) RCP Size = (unit cost = 6x pipe unit cost)		EA		=	$ -		$ -	*
Flared End Section (FES) CSP Size = (unit cost = 6x pipe unit cost)		EA		=	$ -		$ -	*
				=	$ -		$ -	*
[insert items not listed but part of construction plans]				=	$ -		$ -	*
End Treatment- Headwall		EA		=	$ -		$ -	*
End Treatment- Wingwall		EA		=	$ -		$ -	*
End Treatment - Cutoff Wall		EA		=	$ -		$ -	*
Curb Inlet (Type R) L=5', Depth < 5'		EA	$ 8,814.00	=	$ -		$ -	*
Curb Inlet (Type R) L=5', 5' ≤ Depth < 10'		EA	$ 10,835.00	=	$ -		$ -	*
Curb Inlet (Type R) L =5', 10' ≤ Depth < 15'		EA	$ 12,206.00	=	$ -		$ -	*
Curb Inlet (Type R) L =10', Depth < 5'		EA	$ 11,438.00	=	$ -		$ -	*
Curb Inlet (Type R) L =10', 5' ≤ Depth < 10'		EA	$ 12,689.00	=	$ -		$ -	*
Curb Inlet (Type R) L =10', 10' ≤ Depth < 15'		EA	$ 16,174.00	=	$ -		$ -	*
Curb Inlet (Type R) L =15', Depth < 5'		EA	$ 14,452.00	=	$ -		$ -	*
Curb Inlet (Type R) L =15', 5' ≤ Depth < 10'		EA	$ 17,237.00	=	$ -		$ -	*
Curb Inlet (Type R) L =15', 10' ≤ Depth < 15'		EA	$ 21,610.00	=	$ -		$ -	*
Curb Inlet (Type R) L =20', Depth < 5'		EA	$ 16,499.00	=	$ -		$ -	*
Curb Inlet (Type R) L =20', 5' ≤ Depth < 10'		EA	$ 20,012.00	=	$ -		$ -	*
Grated Inlet (Type C), Depth < 5'		EA	$ 8,156.00	=	$ -		$ -	*
Grated Inlet (Type D), Depth < 5'		EA	$ 11,435.00	=	$ -		$ -	*
Storm Sewer Manhole, Box Base		EA	$ 18,950.00	=	$ -		$ -	*
Storm Sewer Manhole, Slab Base		EA	$ 9,314.00	=	$ -		$ -	*
Geotextile (Erosion Control)		SY	$ 6.00	=	$ -		$ -	*
Rip Rap, d50 size from 6" to 24"		Tons	$ 102.00	=	$ -		$ -	*
Rip Rap, Grouted		Tons	$ 136.00	=	$ -		$ -	*
Drainage Channel Construction, Size (W x H)		LF		=	$ -		$ -	*
Drainage Channel Lining, Concrete		CY	$ 815.00	=	$ -		$ -	*
Drainage Channel Lining, Rip Rap		CY	$ 234.00	=	$ -		$ -	*
Drainage Channel Lining, Grass		AC	$ 2,100.00	=	$ -		$ -	*
Permanent Drainage Channel Lining or Roadside Ditch TRM		SY	$ 13.00	=	$ -		$ -	*
				=	$ -		$ -	*
				=	$ -		$ -	*
				=	$ -		$ -	*
[insert items not listed but part of construction plans]				=	$ -		$ -	*
* - Subject to defect warranty financial assurance. A minimum of 20% shall be retained until final acceptance (MAXIMUM OF 80% COMPLETE ALLOWED)		**Section 2 Subtotal**		**=**	**$ -**		**$ -**	*

PROJECT INFORMATION		
Project Name: Ascent Church Expansion	**Date: 04/17/2026**	**PCD File No.PPR265**

Description	Quantity	Units	Unit Cost		Total	(with Pre-Plat Construction) % Complete	Remaining
SECTION 3 - COMMON DEVELOPMENT IMPROVEMENTS (Private or District and NOT Maintained by EPC)**							
ROADWAY IMPROVEMENTS							
Fire Access Road	715.	CY	$ 81.00	=	$ 57,915.00		$ 57,915.00
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
STORM DRAIN IMPROVEMENTS	(Exception: Permanent Pond/BMP shall be itemized under Section 1)						
12" RCP	35.	LF	$ 95.00	=	$ 3,325.00		$ 3,325.00
12" FES	2.	EA	$ 1,000.00	=	$ 2,000.00		$ 2,000.00
Type L Riprap	14.	TONS	$ 102.00	=	$ 1,428.00		$ 1,428.00
				=	$ -		$ -
				=	$ -		$ -
				=	$ -		$ -
WATER SYSTEM IMPROVEMENTS							
Water Main Pipe (PVC), Size 8"		LF	$ 90.00	=	$ -		$ -
Water Main Pipe (Ductile Iron), Size 8"		LF	$ 105.00	=	$ -		$ -
Gate Valves, 8"		EA	$ 2,599.00	=	$ -		$ -
Fire Hydrant Assembly, w/ all valves		EA	$ 9,228.00	=	$ -		$ -
Water Service Line Installation, inc. tap and valves	1.	EA	$ 1,852.00	=	$ 1,852.00		$ 1,852.00
Fire Cistern Installation, complete		EA		=	$ -		$ -
				=	$ -		$ -
[insert items not listed but part of construction plans]				=	$ -		$ -
SANITARY SEWER IMPROVEMENTS							
Sewer Main Pipe (PVC), Size 8"		LF	$ 90.00	=	$ -		$ -
Sanitary Sewer Manhole, Depth < 15 feet		EA	$ 6,136.00	=	$ -		$ -
Sanitary Service Line Installation, complete	1.	EA	$ 1,962.00	=	$ 1,962.00		$ 1,962.00
Sanitary Sewer Lift Station, complete		EA		=	$ -		$ -
				=	$ -		$ -
[insert items not listed but part of construction plans]				=	$ -		$ -
LANDSCAPING IMPROVEMENTS	(For subdivision specific condition of approval, or PUD)						
		EA		=	$ -		$ -
		EA		=	$ -		$ -
		EA		=	$ -		$ -
		EA		=	$ -		$ -
		EA		=	$ -		$ -
** - Section 3 is not subject to defect warranty requirements		**Section 3 Subtotal**		**=**	**$ 68,482.00**		**$ 68,482.00**
AS-BUILT PLANS (Public Improvements inc. Permanent WQCV BMPs)		LS	$ 500.00	=	$ 500.00		$ 500.00
POND/BMP CERTIFICATION (inc. elevations and volume calculations)		LS	$ 500.00	=	$ 500.00		$ 500.00

Total Construction Financial Assurance **$ 280,501.75**
(Sum of all section subtotals plus as-builts and pond/BMP certification)

Total Remaining Construction Financial Assurance (with Pre-Plat Construction) **$ 280,501.75**
(Sum of all section totals less credit for items complete plus as-builts and pond/BMP certification)

Total Defect Warranty Financial Assurance **$ 39,940.00**
(20% of all items identified as (*). To be collateralized at time of preliminary acceptance)

Approvals

I hereby certify that this is an accurate and complete estimate of costs for the work as shown on the Grading and Erosion Control Plan and Construction Drawings associated with the Project.

Engineer (P.E. Seal Required)

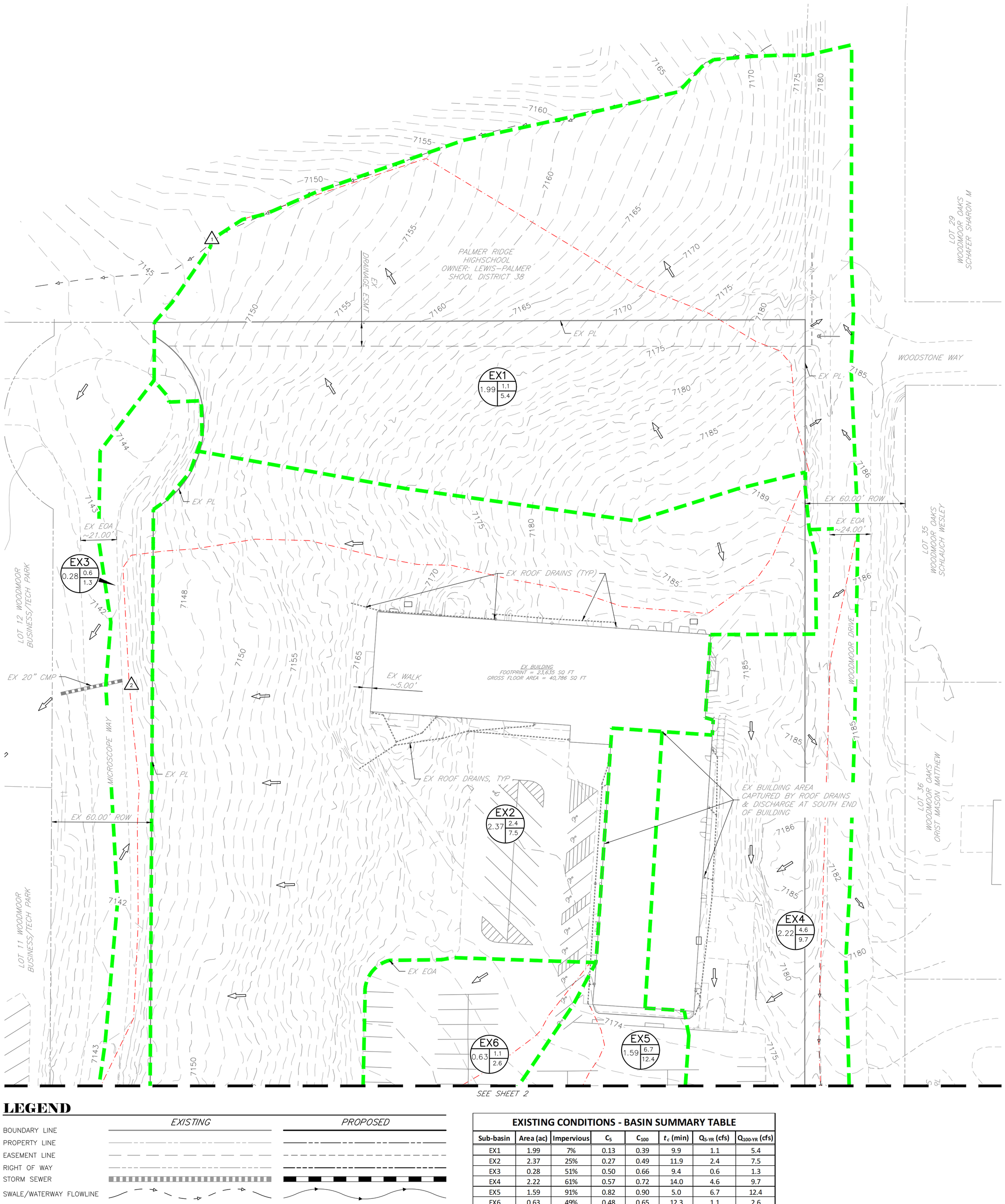
Approved by Owner / Applicant — Date

Approved by El Paso County Engineer / ECM Administrator — Date

APPENDIX F – DRAINAGE MAPS

ASCENT CHURCH

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 / Q5 / Q100

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)
EX1	1.99	7%	0.13	0.39	9.9	1.1	5.4
EX2	2.37	25%	0.27	0.49	11.9	2.4	7.5
EX3	0.28	51%	0.50	0.66	9.4	0.6	1.3
EX4	2.22	61%	0.57	0.72	14.0	4.6	9.7
EX5	1.59	91%	0.82	0.90	5.0	6.7	12.4
EX6	0.63	49%	0.48	0.65	12.3	1.1	2.6
EX7	0.15	22%	0.25	0.48	5.1	0.2	0.6
EX8	1.14	50%	0.47	0.64	9.7	2.3	5.1

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	1.1	5.4
2	3.0	8.7
3	4.6	9.7
4	9.3	18.3
5	1.1	2.6
6	1.3	3.1
7	3.4	7.8

30 15 0 30 60

ORIGINAL SCALE: 1" = 30'

EXISTING DRAINAGE MAP

ASCENT CHURCH

JOB NO. 25023 | SHEET 1

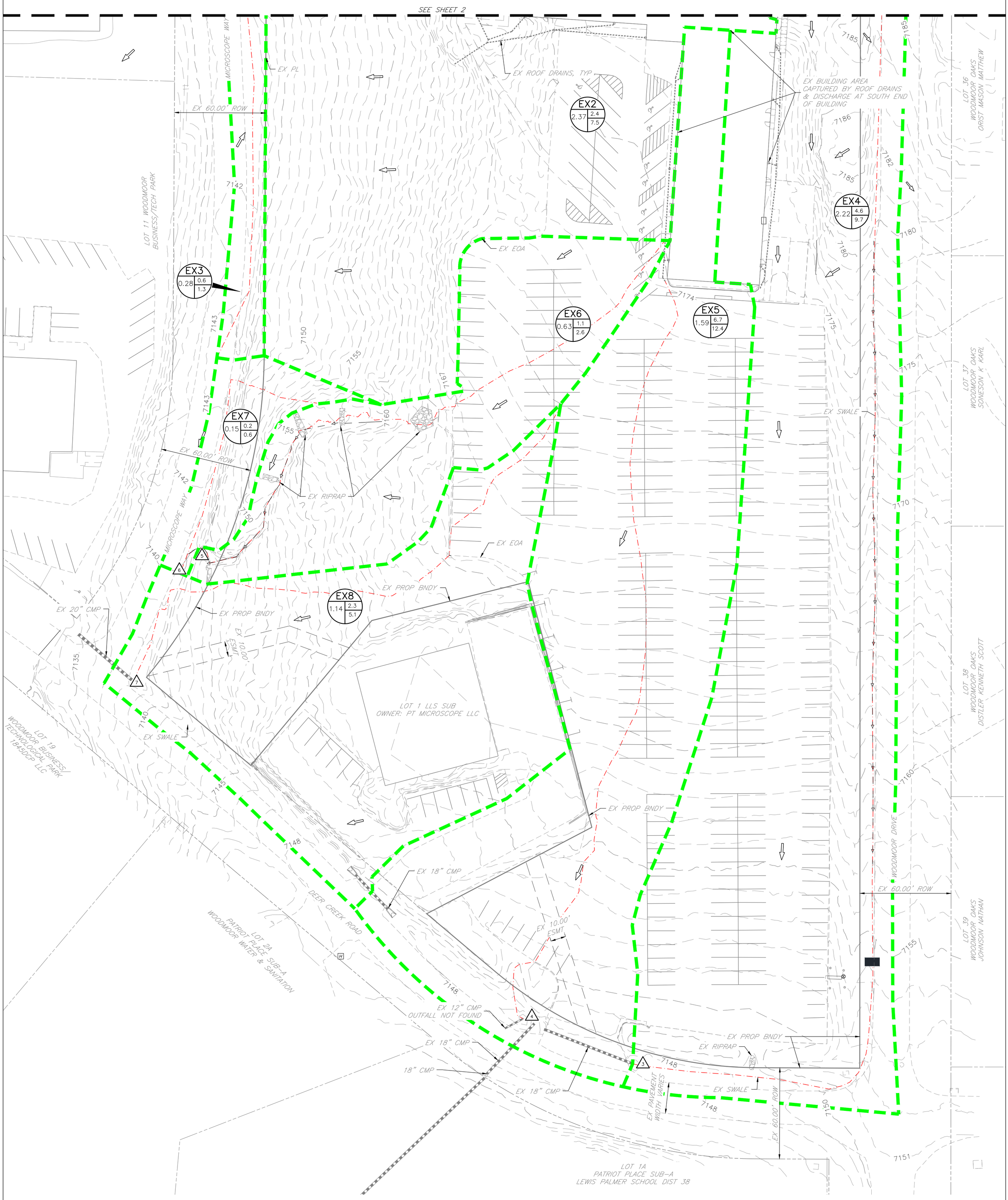
LOCATION: EPC

04/17/2026

ALL TERRAIN ENGINEERING

ASCENT CHURCH

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 / Q5 / Q100	
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)
EX1	1.99	7%	0.13	0.39	9.9	1.1	5.4
EX2	2.37	25%	0.27	0.49	11.9	2.4	7.5
EX3	0.28	51%	0.50	0.66	9.4	0.6	1.3
EX4	2.22	61%	0.57	0.72	14.0	4.6	9.7
EX5	1.59	91%	0.82	0.90	5.0	6.7	12.4
EX6	0.63	49%	0.48	0.65	12.3	1.1	2.6
EX7	0.15	22%	0.25	0.48	5.1	0.2	0.6
EX8	1.14	50%	0.47	0.64	9.7	2.3	5.1

EXISTING CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	1.1	5.4
2	3.0	8.7
3	4.6	9.7
4	9.3	18.3
5	1.1	2.6
6	1.3	3.1
7	3.4	7.8

30 15 0 30 60

ORIGINAL SCALE: 1" = 30'

EXISTING DRAINAGE MAP

ASCENT CHURCH

JOB NO. 25023 | SHEET 2

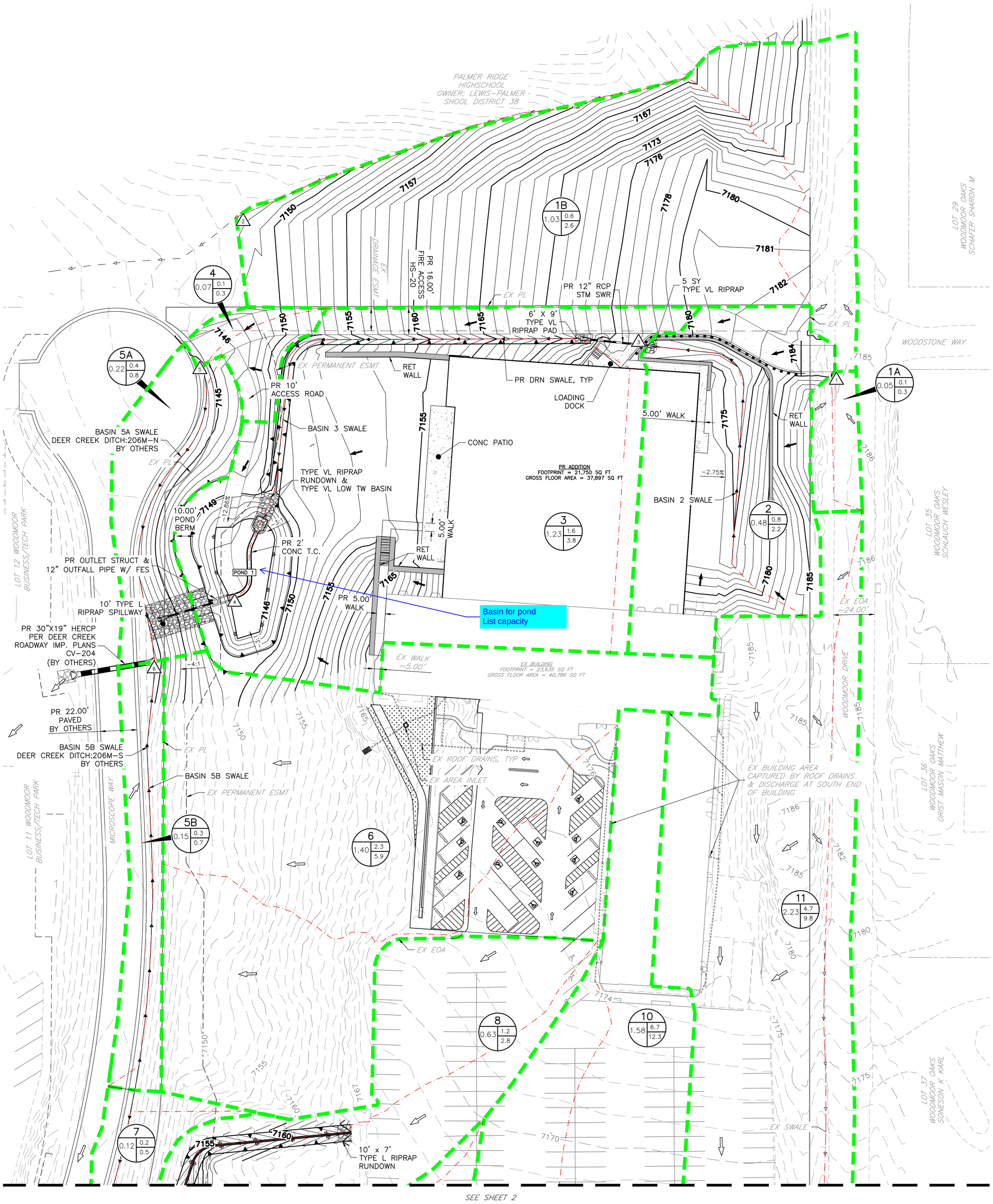
LOCATION: EPC

04/17/2026

ALL TERRAIN ENGINEERING

ASCENT CHURCH

PROPOSED 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 / Q5 / Q100

DESIGN POINT DESIGNATION: 1

DRAINAGE BASIN

TC PATH

NOTES

1. PROPOSED IMPROVEMENTS WITHIN DEER CREEK ROW, MICROSCOPE WAY ROW AND WOODMOOR DRIVE ROW ARE DESIGNED & COMPLETED BY OTHERS. REFER TO EPC PROJECT NUMBER 17-067-90. THOSE IMPROVEMENTS ARE SHOWN AS EXISTING & ARE SHOWN FOR REFERENCE ONLY.
2. PROPOSED SITE GRADING ALONG MICROSCOPE WAY DAYLIGHTS TO PROPOSED IMPROVEMENTS LINEWORK PROVIDED BY AECOM FOR PROJECT 17-067-90.

PROPOSED 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)
1A	0.05	41%	0.41	0.60	5.3	0.1	0.3
1B	1.03	10%	0.15	0.41	12.9	0.6	2.6
2	0.48	35%	0.32	0.53	5.0	0.8	2.2
3	1.23	47%	0.41	0.59	19.6	1.6	3.8
4	0.07	47%	0.38	0.55	6.2	0.1	0.3
5A	0.14	58%	0.55	0.70	6.1	0.4	0.8
5B	0.14	51%	0.50	0.66	7.4	0.3	0.7
6	1.41	35%	0.35	0.55	7.8	2.3	5.9
7	0.12	27%	0.29	0.51	5.0	0.2	0.5
8	0.63	49%	0.48	0.65	10.5	1.2	2.8
9	1.08	47%	0.45	0.62	10.0	2.0	4.7
10	1.58	91%	0.82	0.90	5.0	6.7	12.3
11	2.23	61%	0.58	0.72	14.0	4.7	9.8

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	0.1	0.3
2	0.7	2.8
3	0.8	2.2
4	2.1	5.1
5	0.1	0.3
6	3.0	9.5
7	1.2	2.8
8	1.4	5.1
9	3.3	9.5
10	4.7	9.8
11	9.3	20.3

N

30 15 0 30 60

ORIGINAL SCALE: 1" = 30'

PROPOSED DRAINAGE MAP

ASCENT CHURCH

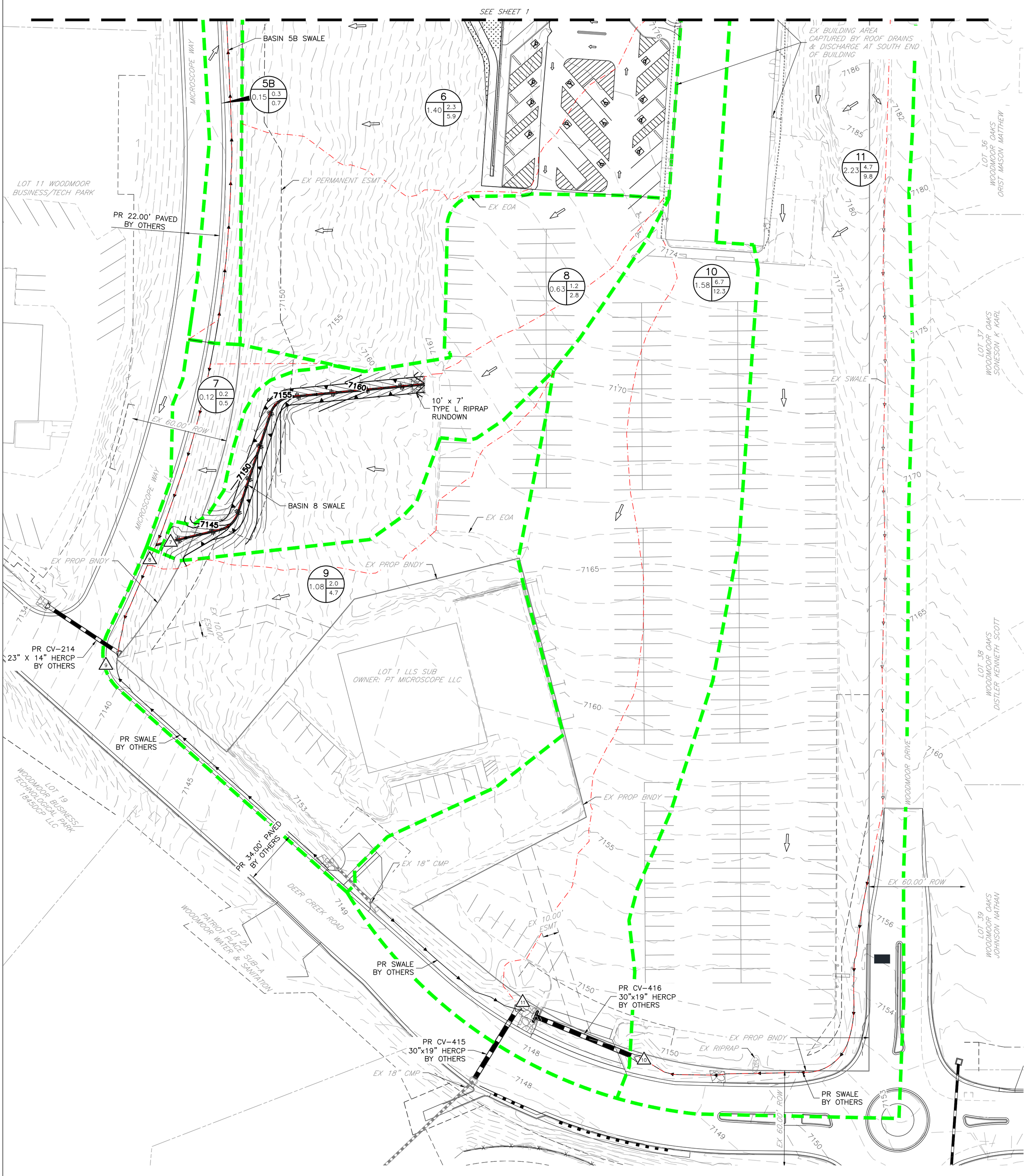
JOB NO. 25023
LOCATION: EPC
02/10/2025

SHEET 1

ALL TERRAIN ENGINEERING

ASCENT CHURCH

PROPOSED 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 / Q5 / Q100

DESIGN POINT DESIGNATION — 1

DRAINAGE BASIN

TC PATH

PROPOSED 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)
1A	0.05	41%	0.41	0.60	5.3	0.1	0.3
1B	1.03	10%	0.15	0.41	12.9	0.6	2.6
2	0.48	35%	0.32	0.53	5.0	0.8	2.2
3	1.23	47%	0.41	0.59	19.6	1.6	3.8
4	0.07	47%	0.38	0.55	6.2	0.1	0.3
5A	0.14	58%	0.55	0.70	6.1	0.4	0.8
5B	0.14	51%	0.50	0.66	7.4	0.3	0.7
6	1.41	35%	0.35	0.55	7.8	2.3	5.9
7	0.12	27%	0.29	0.51	5.0	0.2	0.5
8	0.63	49%	0.48	0.65	10.5	1.2	2.8
9	1.08	47%	0.45	0.62	10.0	2.0	4.7
10	1.58	91%	0.82	0.90	5.0	6.7	12.3
11	2.23	61%	0.58	0.72	14.0	4.7	9.8

PROPOSED CONDITIONS - DESIGN POINT SUMMARY TABLE

DP#	$Q_{5\text{-YR}}$	$Q_{100\text{-YR}}$
1	0.1	0.3
2	0.7	2.8
3	0.8	2.2
4	2.1	5.1
5	0.1	0.3
6	3.0	9.5
7	1.2	2.8
8	1.4	5.1
9	3.3	9.5
10	4.7	9.8
11	9.3	20.3

NOTES

1. PROPOSED IMPROVEMENTS WITHIN DEER CREEK ROW, MICROSCOPE WAY ROW AND WOODMOOR DRIVE ROW ARE DESIGNED & COMPLETED BY OTHERS. REFER TO EPC PROJECT NUMBER 17-067-90. THOSE IMPROVEMENTS ARE SHOWN AS EXISTING & ARE SHOWN FOR REFERENCE ONLY.
2. PROPOSED SITE GRADING ALONG MICROSCOPE WAY DAYLIGHTS TO PROPOSED IMPROVEMENTS LINEWORK PROVIDED BY AECOM FOR PROJECT 17-067-90.

N

30 15 0 30 60

ORIGINAL SCALE: 1" = 30'

PROPOSED DRAINAGE MAP

ASCENT CHURCH

JOB NO. 25023 | SHEET 2

LOCATION: EPC

04/17/2026

ALL TERRAIN ENGINEERING

ASCENT CHURCH

PCM APPLICABILITY MAP

1B
1.03 | 0.6 / 2.6

4
0.07 | 0.1 / 0.3

1A
0.05 | 0.1 / 0.3

5A
0.22 | 0.4 / 0.8

3
1.23 | 1.6 / 3.8

2
0.48 | 0.8 / 2.2

basin summary states this area is excluded using I.7.B.7, please add hatching

Also just FYI: for new projects reference the updated appendix I (in effect 5/4/26), so this exclusion would be I.6.1.B.7 now. Projects already in review can use the old references.

5B
0.15 | 0.3 / 0.7

6
1.40 | 2.3 / 5.9

11
2.23 | 4.7 / 9.8

8
0.63 | 1.2 / 2.8

10
1.58 | 6.7 / 12.3

7
0.12 | 0.2 / 0.5

9
1.08 | 2.0 / 4.7

LEGEND

- DRAINAGE BASIN
- DETAINED AREA — I.7.1.B.7
- EXCLUDED AREA: I.7.B.7
- EXCLUDED AREA: I.7.C.1.A
- EXISTING/UNDISTURBED AREA

30 15 0 30 60

ORIGINAL SCALE: 1" = 30'

PCM APPLICABILITY MAP

ASCENT CHURCH

JOB NO. 25023
LOCATION: EPC
04/17/2026

SHEET 1

ALL TERRAIN ENGINEERING

V2_Drainage Report - Final.pdf Markup Summary

eschoenheit (9)

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Stamp and signatures

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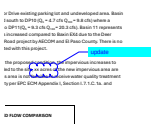

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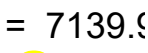
update



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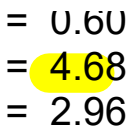

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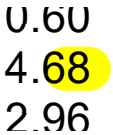

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0.035

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GEC Plan missing forebay

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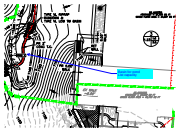
GEC Plan missing forebay



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Author: eschoenheit
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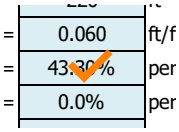
Basin for pond
List capacity

EPC Stormwater- Zachary (13)



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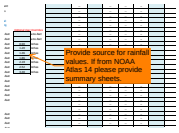

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Page Label: 37
Author: EPC Stormwater- Zachary
Date: 5/14/2026 11:25:46 AM
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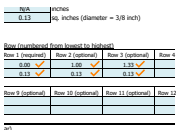
Layer:
Space:

Provide source for rainfall values. If from NOAA Atlas 14 please provide summary sheets.



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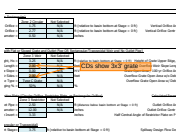

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Date: 5/14/2026 1:25:31 PM
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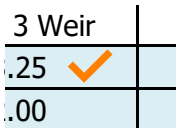
2.00



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Page Label: 39
Author: EPC Stormwater- Zachary
Date: 5/14/2026 12:36:33 PM
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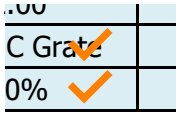

Subject: Checkmark
Page Label: 39
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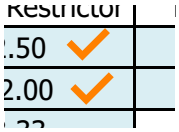

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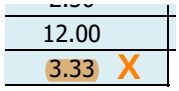

Subject: Group
Page Label: 39
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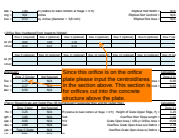

Subject: SW - Textbox with Arrow
Page Label: 39
Author: EPC Stormwater- Zachary
Date: 5/14/2026 1:13:24 PM
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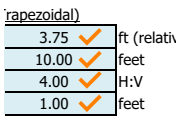
Since this orifice is on the orifice plate please input the centroid/area in the section above. This section is for orifices cut into the concrete structure above the plate.



Subject: Checkmark
Page Label: 39
Author: EPC Stormwater- Zachary
Date: 5/14/2026 1:18:48 PM
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Subject: SW - Textbox with Arrow
Page Label: [1] PCM Applicability Map
Author: EPC Stormwater- Zachary
Date: 5/14/2026 11:13:17 AM
Status:
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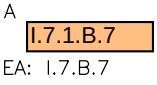
basin summary states this area is excluded using I.7.B.7, please add hatching

Also just FYI: for new projects reference the updated appendix I (in effect 5/4/26), so this exclusion would be I.6.1.B.7 now. Projects already in review can use the old references.



Subject: SW - Textbox
Page Label: [1] PCM Applicability Map
Author: EPC Stormwater- Zachary
Date: 5/12/2026 5:36:02 PM
Status:
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I.7.1.B.7