



Final Drainage Report – Filing No. 1

Waterview East Commercial El Paso County, Colorado

Prepared for:

Heath Herber

Waterview Commercial Developers, LLC

2727 Glen Arbor Drive

Colorado Springs, CO 80920

Prepared by:

Kimley-Horn and Associates, Inc.

2 North Nevada Avenue, Suite 900

Colorado Springs, Colorado 80903

(719) 453-0180

Contact: Jessica McCallum, P.E.

Project #: 196195001

Prepared: July 16, 2026

EDARP File No.: SF269

Kimley»Horn

CERTIFICATION

DESIGN ENGINEER'S STATEMENT

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

SIGNATURE (Affix Seal): _____
Jessica McCallum, P.E.
Colorado P.E. No. 59054
Date

OWNER/DEVELOPER'S STATEMENT

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

Name of Developer

Authorized Signature Date

Printed Name

Title

Address:

EL PASO COUNTY

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

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

Conditions:

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INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The purpose of this Final Drainage Report – Filing No. 1 (FDR) is to provide the drainage design calculations and drainage exhibit for the infrastructure improvements for Filing No. 1 for the Waterview East Subdivision (“the Project”) for Waterview Commercial Developers, LLC. The Project is located within the jurisdictional limits of El Paso County (“the County”). Therefore, the hydrologic and grading design is based on the County’s criteria which are described in further detail within the report.

LOCATION

The Project is located within part of the West ½ of Section 9, Township 15 South, Range 65 West of the 6th Principal Meridian, County of El Paso, State of Colorado (“the Site”). The Site is bounded by Powers Boulevard (Highway 21) on the west, The Trails at Aspen Ridge Filing No. 1 to the east and to the south, and Bradley Road to the north. A vicinity map has been provided in the **Appendix A** of this report.

The Site is currently owned by Waterview East Developers, LLC. The site is currently being platted.

DESCRIPTION OF PROPERTY

The Site is approximately 22.1 acres consisting of undeveloped land with native vegetation and is characterized primarily by prairie grasses along with some area of scrub brush and a limited occurrence of small oaks. The Site does not currently provide water quality or detention for the Project area. The existing land use is undeveloped vacant land. There are no existing irrigation ditches on the Site.

The existing topography consists of slopes ranging from 1% to 33%.

According to NRCS soil mapping data, USCS Type A and B soils are the primary soil type within the site. Soils present at the Site consist mainly of “Blakeland loamy sand” which represent a moderate hazard for erosion. **Appendix B** contains detailed NRCS soil data.

The development of the overall site will include commercial developments, including a convenience store, restaurants, storage units and retail stores. The infrastructure improvements for Filing No. 1 consist of an internal private drive within a Tract, overlot grading of Lots 1 and 2, right turn lane on Legacy Hill Drive, extension of Frontside Drive, utility main extensions, and a private extended detention basin.

A Topographic field survey was completed and updated for the Project by Ridgeline Land Surveying dated February 7th, 2023 and additional topographic information was provided on March 3rd, 2026 which are the basis for design for the drainage improvements.

FLOODPLAIN STATEMENT

The Site is located outside the 100-year floodplain and within Zone X (an area of minimal flood hazard) as noted on the FEMA FIRM Map No. 08041C0768G revised on December 7, 2018 (See **Appendix B**).

DRAINAGE BASINS

KH Response:
Text updated

MAJOR BASIN DESCRIPTIONS

Appendix B

The western half of the Property lies within the Big Johnson drainage basin, and the eastern half of the Property lies within the West Fork of Jimmy Camp Creek drainage basin. The watershed is generally located in the central portion of El Paso County. Refer to **Appendix A** for the Flood Insurance Rate Map (FIRM) number 08041C0768G effective date, December 7, 2018. There was a Drainage Basin Planning Study conducted for the Big Johnson basin in February 1992; however, there has not been one conducted for the Sand Creek basin. Please see re the Appendix. **Appendix E**

KH Response:
Sentence revised

MASTER DRAINAGE REP

KH Response:
Text updated

Project not located within Sand Creek basin. Please revise.

The Waterview East commercial development project is part of the “Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge” Prepared by: Matrix Design Group September 2019. As outlined in the Master Drainage Plan, the “East Pond” was sized to include flows from the future “Commercial Lot south of Brad West of Legacy Drive”. The Offsite Commercial Development which consists of the **existing storm sewer stub** in the southeast portion of the Site. The allowable flows to the stub are 1.3 cfs and 19.4 cfs in the 5-year and 100-year event, respectively. The proposed 5-year and 100-year release rate from the proposed pond to the stub are 0.2 cfs and 10.9 cfs respectively.

KH Response:
Text updated

Please include size and specify whether private or public

As noted in the Master Drainage Plan, the eastern portion of the Site which is part of the West Fork Jimmy Camp Creek drainage basin will require on site detention. As noted in the Master Drainage Plan, the western portion of the Site which is part of the Big Johnson Reservoir drainage basin for future development will require on-site detention. This report sizes a permanent extended detention basin to treat Lots 1 and 2 and a portion of the west property for future commercial development. Offsite flows are addressed in the existing sub-basin descriptions below.

Excerpts from “Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge” Prepared by: Matrix Design Group June 2019 have been provided in **Appendix E**.

EXISTING SUB-BASIN DESCRIPTIONS

Historically, runoff from the Site is split almost directly down the center. The existing sub-basins were modified due to the overlot grading procedures during the early grading permit process. The site has been divided into onsite subbasins, EX-1-EX-9, and one offsite basin, OS-1.

Sub-Basin EX-1

KH Response:
Info on storm pipes
referenced updated

The on-site sub-basin EX-1 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 2.43 acres along the western property line. Drainage flows overland from east to west at slopes ranging from 6-8%. Flows are collected in the existing roadside ditch along Powers Blvd and travel south where they are conveyed west through an existing 60" CMP under Powers Blvd and into Big Johnson Reservoir. Runoff during the 5-year and 100-year events are 1.00 cfs and 6.38 cfs respectively.

KH Response:
Label added

Label inlet on map

Sub-Basin EX-2

The on-site sub-basin EX-2 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 3.22 acres comprising the northeast portion of the property. Drainage flows overland from west to east via an existing swale at slopes of 2-8%. Flows are collected in the existing temporary sediment basin and eventually discharge to the curb and gutter within Legacy Hill Drive and are conveyed to an existing 10' Type R curb inlet at the intersection of Legacy Drive and Frontside Drive. Flows are then carried through existing storm infrastructure into East Pond as outlined in the "Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge" Prepared by: Matrix Design Group September 2019. Runoff during the 5-year and 100-year events are 1.49 cfs and 9.51 cfs respectively.

Sub-Basin EX-3

The on-site sub-basin EX-3 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 0.63 acres comprising the east portion of the property. Drainage flows overland from west to east at slopes ranging from 6-15%. Flows are collected in the curb and gutter within Legacy Hill Drive and are conveyed to an existing 10' Type R curb inlet at the intersection of Legacy Drive and Frontside Drive. Flows are then carried through existing storm infrastructure into East Pond as outlined in the "Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge" Prepared by: Matrix Design Group September 2019. Runoff during the 5-year and 100-year events are 0.32 cfs and 2.02 cfs respectively.

Sub-Basin EX-4

The on-site sub-basin EX-4 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 2.63 acres comprising the central portion of the property. Drainage flows overland from west to east at slopes ranging from 2-25%. Flows are collected in the temporary sediment basin and eventually discharge to the curb and gutter within Legacy Hill Drive and are conveyed to an existing 10' Type R curb inlet at the intersection of Legacy Drive and Frontside Drive. Flows are then carried through existing storm infrastructure into East Pond as outlined in the "Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge" Prepared by: Matrix Design Group September 2019. Runoff during the 5-year and 100-year events are 1.33 cfs and 8.49 cfs respectively.

Sub-Basin EX-5

The on-site sub-basin EX-5 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 2.90 acres comprising the eastern property line. Drainage flows overland from west to east at slopes ranging from 5-15%. Flows are collected in the curb and gutter within Legacy Hill Drive and are conveyed to an existing 10' Type R curb inlet at the intersection of Legacy Drive and Frontside Drive. Flows are then carried through existing storm infrastructure into East Pond as outlined in the "Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge"

Prepared by: Matrix Design Group September 2019. Runoff during the 5-year and 100-year events are 1.54 cfs and 9.82 cfs respectively.

Sub-Basin EX-6

The on-site sub-basin EX-6 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 0.97 acres within the central portion of the property. Drainage flows overland from east to west at slopes ranging from 5-15%. Drainage flows overland from north to south via an existing swale at slopes of 1-15%. Flows are collected in the existing temporary sediment basin before ultimately discharging to the existing Powers Boulevard roadside ditch. Runoff during the 5-year and 100-year events are 0.55 cfs and 3.53 cfs respectively.

KH Response:
Text updated.
Elaborated on "historic drainage conditions"

Sub-Basin EX-7

The on-site sub-basin EX-7 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 7.18 acres within the central portion of the property. Drainage flows overland from east to west at slopes ranging from 5-15%. Drainage flows overland from north to south via an existing swale at slopes of 1-15%. Flows are collected in the existing temporary sediment basin before ultimately discharging to the existing Powers Boulevard roadside ditch. Runoff during the 5-year and 100-year events are 3.03 cfs and 19.38 cfs respectively.

as overland, thru swale, inlet, c&g? Tell us where and what happens with flow

Sub-Basin EX-8

The on-site sub-basin EX-8 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 1.17 acres within the southeast portion of the property. Drainage flows overland from east to west at slopes ranging from 5-10%. Flows are discharged to the southeast per historic drainage conditions. Runoff during the 5-year and 100-year events are 0.58 cfs and 3.73 cfs respectively.

Sub-Basin EX-9

The on-site sub-basin EX-9 is undeveloped consisting of overlot graded conditions and existing vegetation with an area of 0.32 acres along the south property line. Drainage flows overland from north to south at slopes of 33%. Flows are discharged to the south per historic drainage conditions. Runoff during the 5-year and 100-year events are 0.22 cfs and 1.42 cfs respectively.

Sub-Basin OS-1

The off-site sub-basin OS-1 is undeveloped consisting of native grasses and shrubs with an area of 0.47 acres comprising the northern boundary of the Site. Drainage flows overland from north to south at slopes ranging from 5-33%. Flows convey via a swale to the existing temporary sediment basin before ultimately collected via existing curb and gutter along Legacy Drive, which are conveyed to an existing 10' Type R curb inlet at the intersection of Legacy Drive and Frontside Drive. Flows are then carried through existing storm infrastructure into East Pond as outlined in the "Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge" Prepared by: Matrix Design Group September 2019. Runoff during the 5-year and 100-year events are 0.22 cfs and 1.42 cfs respectively.

Please review and revise as necessary. These values should match the 5-year and 100-year peak flows calculated in Appendix C.

Refer to **Appendix F** for the Existing Drainage Conditions Map.

PROPOSED SUB-BASIN DESCRIPTIONS

For the proposed condition, stormwater will generally maintain historic drainage patterns. Sub-basins A1, A2, FD 1, FD 2, PR 1, PR 2, and P will be routed to the proposed pond and will outfall from the pond to the existing storm sewer stub. Sub-basins UD1, UD2, FS1, and FS2 will follow historic drainage patterns and are excluded per the exclusions listed in the

KH Response:
Values revised to match data in Appendix C

respective sub-basin descriptions.

Sub-Basin A1

The on-site sub-basin A1 consists of native vegetation in the northeast portion of the site. Sub-Basin A1 encompasses Lot 1 which is to be developed into a future convenience store. Detailed drainage design of the convenience store and drainage basins will be provided with a separate Site Development Plan and Final Drainage Report submittal. The sub-basin has an area of 2.00 acres and a weighted imperviousness of 95%. Runoff in this basin will be collected by future proposed storm sewer infrastructure and routed to the 18" RCP storm sewer stub (Design Point A1) to discharge to the pond. Runoff during the 5-year and 100-year events are 5.92 cfs and 13.93 cfs respectively.

Sub-Basin A2

The on-site sub-basin A2 consists of native vegetation in the north portion of the site. Sub-Basin A2 encompasses Lot 2 which is to be developed into a commercial user. Detailed drainage design of the commercial store and drainage basins will be provided with a separate Site Development Plan and Final Drainage Report submittal. The sub-basin has an area of 1.50 acres and a weighted imperviousness of 95%. Runoff in this basin will be collected by future proposed storm sewer infrastructure and routed to the 18" RCP storm sewer stub (Design Point A2) to discharge to the pond. Runoff during the 5-year and 100-year events are 4.48 cfs and 10.32 cfs respectively.

Sub-Basin FD1

The on-site sub-basin FD1 consists of native vegetation in the northwest portion of the site and is a future development for commercial uses. The sub-basin has an area of 1.33 acres and a weighted imperviousness of 95%. Runoff in this basin will be collected by future proposed storm sewer infrastructure and routed to the 24" RCP storm sewer stub (Design Point FD1) to discharge to the pond. Runoff during the 5-year and 100-year events are 3.97 cfs and 9.16 cfs respectively.

Sub-Basin FD2

The on-site sub-basin FD2 consists of native vegetation in the west portion of the site and is a future development for commercial uses. The sub-basin has an area of 0.86 acres and a weighted imperviousness of 95%. Runoff in this basin will be collected by future proposed storm sewer infrastructure and routed to the 24" RCP storm sewer stub (Design Point FD2) to discharge to the pond. Runoff during the 5-year and 100-year events are 2.67 cfs and 6.15 cfs respectively.

Type R?

KH Response:
Text updated

Sub-Basin PR1

The on-site sub-basin PR1 consists of the proposed private drive. The sub-basin has an area of 0.26 acres and a weighted imperviousness of 100%. Runoff in this basin will be collected by curb and gutter and routed to a proposed private 10' Type 2 curb inlet (Design Point PR1) to discharge to the pond. Runoff during the 5-year and 100-year events are 1.02 cfs and 2.30 cfs respectively.

0.61 acres

KH Response:
Text updated

KH Response:
Text updated

Sub-Basin PR2

The on-site sub-basin PR2 consists of the proposed private drive. The sub-basin has an area of ~~0.26 acres~~ and a weighted imperviousness of 100%. Runoff in this basin will be collected by curb and gutter and routed to a proposed private 15' **Type 2** curb inlet (Design Point PR2) to discharge to the pond. Runoff during the 5-year and 100-year events are 2.38 cfs and 5.37 cfs respectively.

Type R?

Sub-Basin P

The on-site sub-basin P consists of the proposed private extended detention basin. The sub-basin has an area of 1.38 acres and a weighted imperviousness of 0%. Runoff in this basin will be collected by the pond and discharge from the proposed outlet structure (Design Point P) before outfalling to the existing storm sewer stub. Runoff during the 5-year and 100-year events are 0.82 cfs and 5.22 cfs respectively.

Sub-Basin FS1

The on-site sub-basin FS1 consists of the north portion of the proposed Frontside Drive extension. The sub-basin has an area of 0.31 acres and a weighted imperviousness of 100%. Runoff in this basin will be collected by curb and gutter and routed to an existing 10' **Type 2** curb inlet (Design Point FS1) following the Master Drainage Report design. Runoff during the 5-year and 100-year events are 1.23 cfs and 2.76 cfs respectively.

Include what flows the MDDP had designed the inlet for. Address if current flow is greater.

According to the El Paso County Engineering Criteria Manual, Section 1.7.1.B.2.1, This area classifies as "Excluded Roadway Redevelopment." Sub-Basin FS1 and Sub-Basin FS2 total 0.6 acres which is less than 1 acre of additional paved area per mile of roadway to an existing roadway. This area will follow the drainage patterns as described in the Master Report.

KH Response:
Inlet design flows added to report

Sub-Basin FS2

The on-site sub-basin FS2 consists of the south portion of the proposed Frontside Drive extension. The sub-basin has an area of 0.29 acres and a weighted imperviousness of 100%. Runoff in this basin will be collected by curb and gutter and routed to a proposed private 5' **Type 2** curb inlet (Design Point FS2) to discharge to the pond. Runoff during the 5-year and 100-year events are 1.15 cfs and 2.58 cfs respectively.

According to the El Paso County Engineering Criteria Manual, Section 1.7.1.B.2.1, This area classifies as "Excluded Roadway Redevelopment." Sub-Basin FS1 and Sub-Basin FS2 total 0.6 acres which is less than 1 acre of additional paved area per mile of roadway to an existing roadway. This area will follow the drainage patterns as described in the Master Report.

Sub-Basin UD1

The on-site sub-basin UD1 consists of native vegetation east of the proposed pond, the proposed right turn lane on Legacy Hill Drive, and a portion of the private drive connecting to Legacy Hill Drive. The sub-basin has an area of 0.70 acres and a weighted imperviousness of 16.5%. Runoff in this basin will flow offsite to Legacy Hill Drive and Frontside Drive curb and gutter and be routed to the existing 10' Type R curb inlet within Frontside Drive (Design Point FS1). Flows from this sub-basin will follow historic flow patterns. Runoff during the 5-year and 100-year events are 0.77 cfs and ~~4.63 cfs~~ respectively.

According to the El Paso County Engineering Criteria Manual, Section 1.7.1.B.2.1, This area

Please review and revise as necessary. This value should match the 100-year peak flow calculated in Appendix C.

classifies as “Excluded Roadway Redevelopment.” Sub-Basin UD1 consists of the added right-turn lane on Legal Hill Drive which totals 0.05 acres which is less than 1 acre of additional paved area per mile of roadway to an existing roadway. This area will follow the drainage patterns as described in the Master Report.

According to the El Paso County Engineering Criteria Manual, Section I.7.1.B.7, This area classifies as “Land Disturbance to Undeveloped Land that will Remain Undeveloped” for the portion of UD1 that is landscaped area and within a Tract (0.62 acres) This area will follow native drainage patterns and remain undeveloped with no buildings and therefore classifies as an exclusion.

KH Response:
Text updated to
"Frontside Drive"

A portion of the proposed private drive (0.03 acres) that connects to Legal Hill Drive is also not captured and routed to the proposed pond due to existing topography. According to the El Paso County Engineering Criteria Manual, Section I.1.7.C.1.a up to 20% of the Site, not to exceed one (1) acre may be excluded from the WQCV calculations. The total site area of UD1 private drive and UD2 is 0.06 acres.

Sub-Basin UD2

The on-site sub-basin UD2 consists of a small portion of the private drive connection to the extension of Frontside Drive. The sub-basin has an area of 0.03 acres and a weighted imperviousness of 100%. Runoff in this basin will flow offsite to Frontside Drive curb and gutter and be routed to the existing 10' Type R curb inlet within Frontside Drive (Design Point FS1). Flows from this sub-basin will follow historic flow patterns. Runoff during the 5-year and 100-year events are 0.13 cfs and 0.17 cfs respectively.

Sub-basin UD2 cannot be routed to the proposed pond due to existing topography. According to the El Paso County Engineering Criteria Manual, Section I.1.7.C.1.a up to 20% of the Site, not to exceed one (1) acre may be excluded from the WQCV calculations. The total site area of UD1 private drive and UD2 is 0.06 acres.

Refer to **Appendix F** for the Proposed Drainage Conditions Map.

DRAINAGE DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

The proposed storm facilities are designed to be in compliance with the El Paso County Drainage Criteria Manual, Volumes 1 and 2 (The “CRITERIA”) and the Mile High Flood Control District Manual (the “MANUAL”). Site drainage is not significantly impacted by such constraints as utilities or existing development.

HYDROLOGIC SOIL GROUP

According to NRCS soil mapping data, USCS Type A and B soils are the primary soil type within the site. Soils present at the Site consist mainly of “Blakeland loamy sand” which represent a moderate hazard for erosion. **Appendix B** contains detailed NRCS soil data.

HYDROLOGIC CRITERIA

The 5-year and 100-year design storm events were used in determining rainfall and runoff for the proposed drainage analysis per chapter 5 of the CRITERIA. Design runoff was calculated using the Rational Method for developed conditions as established in the CRITERIA and MANUAL. Runoff coefficients for the proposed development were determined using Table 5-1 of the CRITERIA by calculating weighted impervious values for each specific site basin. Based upon this approach, the drainage design provided for the Site is conservative and in keeping with the zoning and historic drainage concept for the area.

HYDRAULIC CRITERIA

Hydraulic design of the proposed storm sewer and inlets are provided in **Appendix D**. Applicable design methods were utilized to analyze & size the proposed pond and storm sewer infrastructure which includes the use of the UD-Detention spreadsheet, rational calculations spreadsheet, and FlowMaster.

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

- Minor Storm: 5-year Storm Event
- Major Storm: 100-year Storm Event

DETENTION

One full spectrum extended detention basin is proposed in order to maintain historic flows and water quality. Mile High Flood District UD-Detention Spreadsheet was utilized to design the pond outlet structures. The full spectrum extended detention basin is to be owned and maintained by The Waterview III Metropolitan District. The UD-Detention spreadsheet used to calculate WQCV and detention is included in **Appendix D**. Detailed information regarding exclusions and WQCV can be found in Step 2 of the Four-Step Process section below.

Detailed pond and outlet structure design can be found in the **Appendix D**. A pond summary table can be found below.

Pond	Contributing Basins	Total Contributing Basin Area (Acre)	WQCV (Ac-ft)	Total Volume Required (Ac-ft)	Total Volume Provided (Ac-ft)	100-YR Pond Outfall (CFS)
P	A1-A2, FD1-FD2, PR1-PR2, P	7.94	0.236	1.269	2.117	10.9

DRAINAGE FACILITY DESIGN

GENERAL CONCEPT

The proposed drainage patterns will be in general conformance with the historic drainage patterns. To maintain historic flows, one full spectrum detention pond is proposed and will

capture and control the flows from the proposed development at less than or equal to historic rates.

KH Response:
Text added

Existing and proposed Drainage Maps can be found in **Appendix F**.

2026

DRAINAGE FEE

The project is within the Big Johnson drainage basin, and the West Fork of Jimmy Camp Creek drainage basin which is a part of the El Paso County Drainage Basin Fee Program. Drainage fees consist of:

Drainage Basin	Drainage Basin Acreage	Drainage Fees per acre	Bridge Fees per acre
Big Johnson	11.60 acres	\$27,282	\$3,523
West Fork of Jimmy Camp Creek	9.83 acres	\$0	\$0

Total: \$357,338

THE FOUR STEP PROCESS

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

Step 1. Employ Runoff Reduction Practices – Currently the Site is vacant undeveloped land. Development of the Site will increase current runoff conditions due to increased imperviousness values. The proposed detention pond will be used to capture stormwater, provide water quality treatment, and maintain flows discharging off site at or below historic levels. Individual lot developments will be required to implement runoff reduction techniques and meet the Four Step Process.

Step 2. Provide a Water Quality Capture Volume – Permanent water quality measures and detention facilities will be necessary for the Project. One full spectrum extended detention basin will treat the areas not excluded with either the Excluded Roadway Redevelopment (ECM Section I.7.1.B.2.1), Land Disturbance to Undeveloped Land that will Remain Undeveloped (ECM Section I.7.1.B.7), or 20% exclusion not to exceed 1 acre. (ECM Section I.1.7.C.1.a.).

Step 3 Stabilize Drainageways– The Site is 5200 ft from Jimmy Camp Creek. There are no open channels on or adjacent to this site, therefore no stabilization will be necessary. All new and re-development projects are required to construct or participate in the funding of channel stabilization measures by paying the Drainage Basin fees required at the time of plat recordation.

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

SUMMARY

This report has been prepared in accordance with El Paso County stormwater criteria. It outlines the Site design for the 5-year and 100-year storm events drainage system. The drainage design presented within this report conforms to the criteria presented in the CRITERIA and the MANUAL. Additionally, the Site runoff and storm drain facilities will not adversely affect the downstream and surrounding developments.

REFERENCES

1. El Paso County “Engineering Criteria Manual” Volumes 1 & 2, dated October 31, 2018
2. Natural Resources Conservation Service, Web Soil Survey, dated April 29, 2022.
3. Flood Insurance Rate Map, El Paso County, Colorado and Incorporated Areas, Map Number 08041C0768G, Effective Date December 7, 2018, prepared by the Federal Emergency Management Agency (FEMA).
4. Master Development Drainage Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge” Prepared by: Matrix Design Group September 2019.

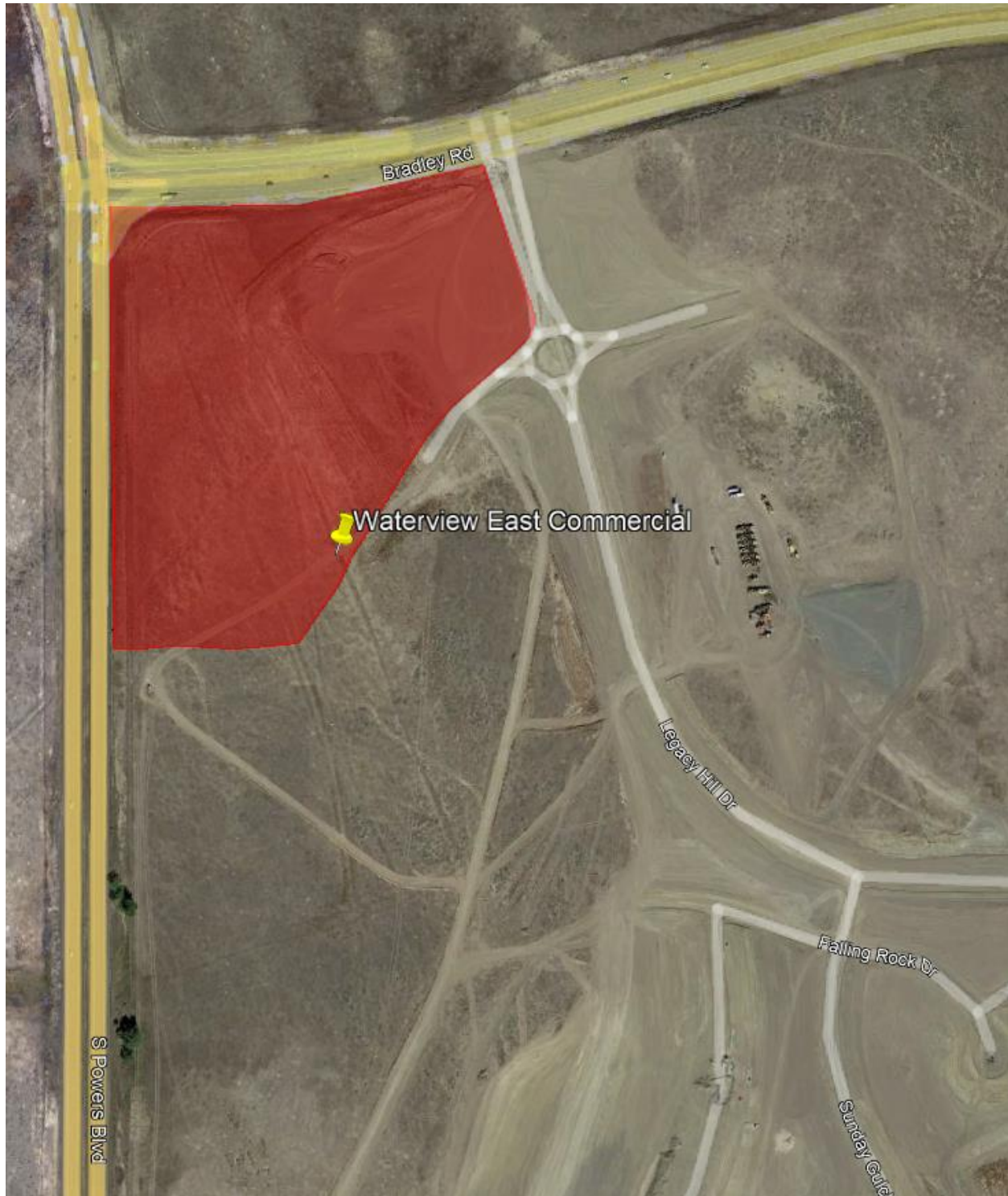
Provide comparison of what previous reports had as flows entering storm system from this site to what this report has.

KH Response:
Summary updated

APPENDIX

APPENDIX A – VICINITY MAP

Waterview East Commercial Vicinity Map (Not to Scale)

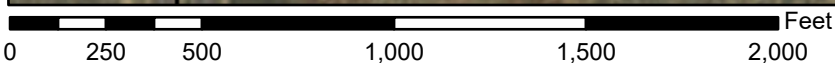


APPENDIX B – FEMA FIRM PANEL AND SOILS MAP

National Flood Hazard Layer FIRMette



104°41'3"W 38°45'44"N



1:6,000

104°40'25"W 38°45'16"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

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 Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



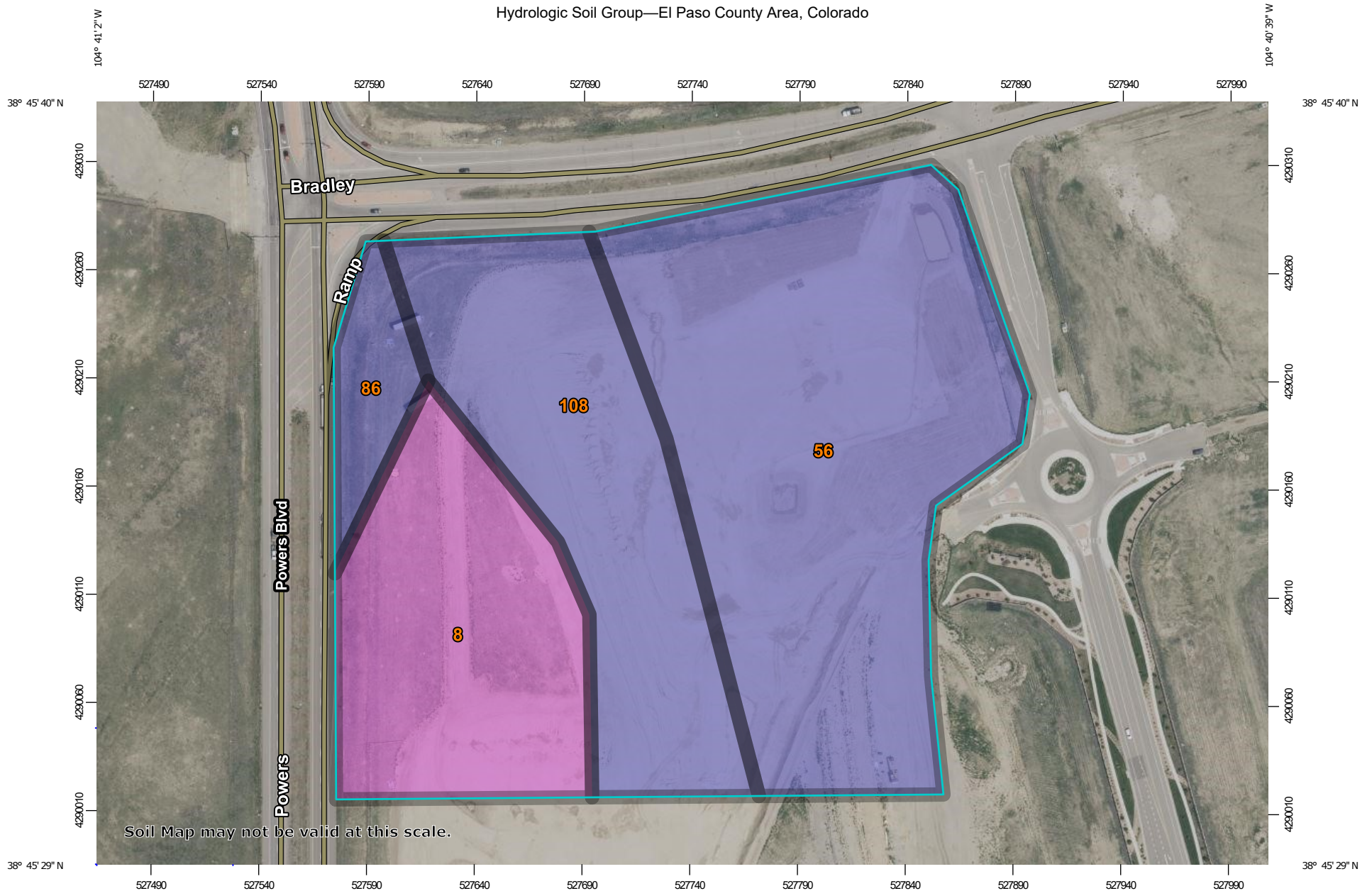
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

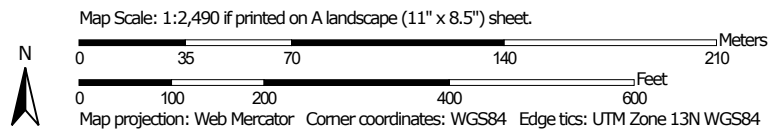
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **4/29/2022 at 2:29 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded 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.

Hydrologic Soil Group—El Paso County Area, Colorado



Soil Map may not be valid at this scale.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/10/2026
Page 1 of 4

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

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

Soil Rating Lines

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

Soil Rating Points

-  A
-  A/D
-  B
-  B/D

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

Water Features
 Streams and Canals
Transportation

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

Background
 Aerial Photography
MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 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
8	Blakeland loamy sand, 1 to 9 percent slopes	A	4.3	22.0%
56	Nelson-Tassel fine sandy loams, 3 to 18 percent slopes	B	9.2	47.3%
86	Stoneham sandy loam, 3 to 8 percent slopes	B	0.9	4.8%
108	Wiley silt loam, 3 to 9 percent slopes	B	5.1	25.9%
Totals for Area of Interest			19.5	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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX C – HYDROLOGIC CALCULATIONS

$$I = \frac{28.5 P_1}{(10 + T_c)^{0.786}}$$

Where:

C

KH Response:
Formula updated

I = rainfall intensity (inches per hour)

P₁ = one-hour rainfall depth (inches) from NOAA Atlas 14

Point Precipitation Frequency Estimates, Colorado Springs, CO

T_c = storm duration (minutes)

P₁ =

	<u>2-yr</u>	<u>5-yr</u>	<u>10-yr</u>	<u>100-yr</u>
	1.01	1.29	1.56	2.75

Time Intensity Frequency Tabulation

TIME	2 YR	5 YR	10 YR	100 YR
5	3.43	4.38	5.29	9.33
10	2.73	3.49	4.22	7.44
15	2.29	2.93	3.54	6.24
30	1.58	2.02	2.45	4.31
60	1.02	1.30	1.58	2.78
120	0.63	0.80	0.97	1.71

Soil Type

KH Response:
Spreadsheet
updated

For Commercial and HSG A&B:

$C_2 = 0.79$
 $C_5 = 0.81$
 $C_{10} = 0.83$
 $C_{100} = 0.888$

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

For Lawn and HSG A&B:

$C_2 = 0.02$
 $C_5 = 0.08$
 $C_{10} = 0.15$
 $C_{100} = 0.35$

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

For Paved and HSG A&B:

$C_{10} = 0.92$
 $C_{100} = 0.96$

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

KH Response:
Text updated

Weighted Imperviousness Calculations

Existing

Commercial

SUB-BASIN	AREA (SF)	AREA (Acres)	COMMERCIAL AREA	COMMERCIAL IMPERVIOUSNESS	ROOF				LANDSCAPE AREA	LANDSCAPE IMPERVIOUSNESS	LANDSCAPE				PAVEMENT AREA	PAVEMENT IMPERVIOUSNESS	PAVEMENT				WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS			
					C2	C5	C10	C100			C2	C5	C10	C100			C2	C5	C10	C100		C2	C5	C10	C100
EX1	106,009	2.43		95%	0.71	0.74	0.75	0.80	106,009	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX2	140,051	3.22		95%	0.71	0.74	0.75	0.80	140,051	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX3	27,246	0.63		95%	0.71	0.74	0.75	0.80	27,246	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX4	114,570	2.63		95%	0.71	0.74	0.75	0.80	114,570	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX5	126,148	2.90		95%	0.71	0.74	0.75	0.80	126,148	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX6	42,130	0.97		95%	0.71	0.74	0.75	0.80	42,130	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX7	312,684	7.18		95%	0.71	0.74	0.75	0.80	312,684	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX8	51,044	1.17		95%	0.71	0.74	0.75	0.80	51,044	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
EX9	13,732	0.32		95%	0.71	0.74	0.75	0.80	13,732	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
OS1	20,296	0.47		95%	0.71	0.74	0.75	0.80	20,296	0%	0.04	0.15	0.30	0.45		100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
Total	953,910	21.90	0	95%	0.71	0.74	0.75	0.80	953,910	0%	0.04	0.15	0.30	0.45	0	100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45

KH Response:
 Text updated

Waterview East Commercial Final Plat 1

Existing

McDonald's - Drainage Report																	
Proposed Runoff Calculations																	
					Forest & Meadow		2.50	Short Grass Pasture & Lawns				7.00	Grassed Waterway				15.00
Time of Concentration					Fallow or Cultivation		5.00	Nearly Bare Ground				10.00	Paved Area & Shallow Gutter				20.00
DESIGN POINT	SUB-BASIN DATA				INITIAL / OVERLAND TIME			TRAVEL TIME T(t)					T(c) CHECK (URBANIZED BASINS)			FINAL T(c)	
	DRAIN BASIN	AREA sq. ft.	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	min.	
EX1	EX1	106,009	2.43	0.15	100	4.0%	11.0	1215	1.0%	10.00	1.0	20.3	31.3	1315	17.3	17.3	
EX2	EX2	140,051	3.22	0.15	100	8.7%	8.5	520	3.0%	10.00	1.7	5.0	13.5	620	13.4	13.4	
EX3	EX3	27,246	0.63	0.15	100	4.0%	11.0	55	15.0%	10.00	3.9	0.2	11.2	155	10.9	10.9	
EX4	EX4	114,570	2.63	0.15	100	9.0%	8.4	341	5.0%	10.00	2.2	2.5	10.9	441	12.5	10.9	
EX5	EX5	126,148	2.90	0.15	100	19.0%	6.5	425	5.0%	10.00	2.2	3.2	9.7	525	12.9	9.7	
EX6	EX6	42,130	0.97	0.15	100	13.0%	7.4	75	6.0%	10.00	2.4	0.5	7.9	175	11.0	7.9	
EX7	EX7	312,684	7.18	0.15	100	25.0%	6.0	1040	1.0%	10.00	1.0	17.3	23.3	1140	16.3	16.3	
EX8	EX8	51,044	1.17	0.15	100	2.0%	13.8	140	1.0%	10.00	1.0	2.3	16.1	240	11.3	11.3	
EX9	EX9	13,732	0.32	0.15	25	33.0%	2.7	0	0.0%	10.00	0.2	0.0	5.0	25	10.1	5.0	
OS1	OS1	20,296	0.47	0.15	100	3.0%	12.1	355	2.5%	10.00	1.6	3.7	15.8	455	12.5	12.5	

KH Response:
 Text updated

Waterview East Commercial Final Plat 1

Existing

McDonald's Proposed Drainage Report Runoff Calculations (Rational Method Procedure) Design Storm 5 Year												
BASIN INFORMATION				DIRECT RUNOFF				CUMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
EX1	EX1	2.43	0.15	17.3	0.37	2.73	1.00					
EX2	EX2	3.22	0.15	13.4	0.48	3.08	1.49					
EX3	EX3	0.63	0.15	10.9	0.09	3.37	0.32					
EX4	EX4	2.63	0.15	10.9	0.39	3.37	1.33					
EX5	EX5	2.90	0.15	9.7	0.43	3.54	1.54					
EX6	EX6	0.97	0.15	7.9	0.15	3.81	0.55					
EX7	EX7	7.18	0.15	16.3	1.08	2.81	3.03					
EX8	EX8	1.17	0.15	11.3	0.18	3.32	0.58					
EX9	EX9	0.32	0.15	5.0	0.05	4.38	0.21					
OS1	OS1	0.47	0.15	12.5	0.07	3.18	0.22					

KH Response:
 Text updated

Waterview East Commercial Final Plat 1

Existing

McDonald's - Drainage Report

Proposed Runoff Calculations

Design Storm 100 Year

(Rational Method Procedure)

BASIN INFORMATION				DIRECT RUNOFF				CUMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
EX1	EX1	2.43	0.45	17.3	1.10	5.83	6.38					
EX2	EX2	3.22	0.45	13.4	1.45	6.58	9.51					
EX3	EX3	0.63	0.45	10.9	0.28	7.19	2.02					
EX4	EX4	2.63	0.45	10.9	1.18	7.18	8.49					
EX5	EX5	2.90	0.45	9.7	1.30	7.54	9.82					
EX6	EX6	0.97	0.45	7.9	0.44	8.11	3.53					
EX7	EX7	7.18	0.45	16.3	3.23	6.00	19.38					
EX8	EX8	1.17	0.45	11.3	0.53	7.08	3.73					
EX9	EX9	0.32	0.45	5.0	0.14	9.33	1.32					
OS1	OS1	0.47	0.45	12.5	0.21	6.78	1.42					

KH Response:
 Cumulative runoff
 formula updated to
 add DP7 to DP1

This DP should be larger than
 basin flows, as DP7 should
 combine with it or create a
 new DP for combined flow.

Existing

KH Response:
 Text updated

SUMMARY - ~~PROPOSED~~ RUNOFF TABLE						
DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)	CUMMULATIVE 5-YR RUNOFF (CFS)	CUMMULATIVE 100-YR RUNOFF (CFS)
EX1	EX1	2.43	1.00	6.38	1.00	6.38
EX2	EX2	3.22	1.49	9.51	1.49	9.51
EX3	EX3	0.63	0.32	2.02	0.32	2.02
EX4	EX4	2.63	1.33	8.49	1.33	8.49
EX5	EX5	2.90	1.54	9.82	1.54	9.82
EX6	EX6	0.97	0.55	3.53	0.55	3.53
EX7	EX7	7.18	3.03	19.38	0.00	0.00
EX8	EX8	1.17	0.58	3.73	0.58	3.73
EX9	EX9	0.32	0.21	1.32	0.21	1.32
OS1	OS1	0.47	0.22	1.42	0.22	1.42

This DP should be larger than
 basin flows, as it combines DP2
 thru DP 5 & OS-1, or create a
 new DP for combined flow

KH Response:
 Cumulative runoff
 formula updated to
 reflect sum of all
 upstream DPs

KH Response:
 Formula updated

KH Response:
Spreadsheet updated

For Commercial and HSG A&B:

$C_2 = 0.79$
 $C_5 = 0.81$
 $C_{10} = 0.83$
 $C_{100} = 0.888$

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

For Lawn and HSG A&B:

$C_2 = 0.02$
 $C_5 = 0.08$
 $C_{10} = 0.15$
 $C_{100} = 0.35$

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

For Paved and HSG A&B:

$C_{10} = 0.92$
 $C_{100} = 0.96$

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

KH Response:
Text updated

Weighted Imperviousness Calculations

Proposed

Commercial

SUB-BASIN	AREA (SF)	AREA (Acres)	COMMERCIAL AREA	COMMERCIAL IMPERVIOUSNESS	-ROOF-				LANDSCAPE AREA	LANDSCAPE IMPERVIOUSNESS	LANDSCAPE				PAVEMENT AREA	PAVEMENT IMPERVIOUSNESS	PAVEMENT				WEIGHTED IMPERVIOUSNESS	WEIGHTED COEFFICIENTS			
					C2	C5	C10	C100			C2	C5	C10	C100			C2	C5	C10	C100		C2	C5	C10	C100
A1	87,080	2.00	87,080	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	0	100%	0.89	0.90	0.90	0.95	95.0%	0.71	0.74	0.75	0.80
A2	65,455	1.50	65,455	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	0	100%	0.89	0.90	0.90	0.95	95.0%	0.71	0.74	0.75	0.80
FD 1	58,085	1.33	58,085	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	0	100%	0.89	0.90	0.90	0.95	95.0%	0.71	0.74	0.75	0.80
FD 2	37,475	0.86	37,475	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	0	100%	0.89	0.90	0.90	0.95	95.0%	0.71	0.74	0.75	0.80
PR 1	11,298	0.26	0	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	11,298	100%	0.89	0.90	0.90	0.95	100.0%	0.89	0.90	0.90	0.95
PR 2	26,381	0.61	0	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	26,381	100%	0.89	0.90	0.90	0.95	100.0%	0.89	0.90	0.90	0.95
P	60,255	1.38	0	95%	0.71	0.74	0.75	0.80	60,255	0%	0.04	0.15	0.30	0.45	0	100%	0.89	0.90	0.90	0.95	0.0%	0.04	0.15	0.30	0.45
A1-P	346,029	7.94	248,095	95%	0.71	0.74	0.75	0.80	60,255	0%	0.04	0.15	0.30	0.45	37,679	100%	0.89	0.90	0.90	0.95	79.0%	0.61	0.65	0.69	0.76
UD 1	30,463	0.70	0	95%	0.71	0.74	0.75	0.80	25,449	0%	0.04	0.15	0.30	0.45	5,014	100%	0.89	0.90	0.90	0.95	16.5%	0.18	0.27	0.40	0.53
UD 2	1,488	0.03	0	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	1,488	100%	0.89	0.90	0.90	0.95	100.0%	0.89	0.90	0.90	0.95
FS 1	13,589	0.31	0	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	13,589	100%	0.89	0.90	0.90	0.95	100.0%	0.89	0.90	0.90	0.95
FS 2	12,683	0.29	0	95%	0.71	0.74	0.75	0.80	0	0%	0.04	0.15	0.30	0.45	12,683	100%	0.89	0.90	0.90	0.95	100.0%	0.89	0.90	0.90	0.95
UD1-FS2	58,223	1.34	0	95%	0.71	0.74	0.75	0.80	25,449	0%	0.04	0.15	0.30	0.45	32,774	100%	0.89	0.90	0.90	0.95	56.3%	0.52	0.57	0.64	0.73

Waterview East Commercial Final Plat 1
Drainage Report
El Paso County, CO

3/10/2026
Calculated by: JJM

KH Response:
Text updated

Waterview East Commercial Final Plat 1

SUB-BASIN DATA				INITIAL / OVERLAND TIME				TRAVEL TIME T(t)				T(c) CHECK (URBANIZED BASINS)				FINAL T(c) min.
DESIGN POINT	DRAIN BASIN	AREA sq. ft.	AREA ac.	C(5)	Length ft.	Slope %	T(i) min	Length ft.	Slope %	Coeff.	Velocity fps	T(t) min.	COMP. T(c)	TOTAL LENGTH	L/180+10	
A1	A1	87,080	2.00	0.74	100	2.0%	5.2	275	2.0%	20.00	2.8	1.6	6.8	375	12.1	6.8
A2	A2	65,455	1.50	0.74	100	2.0%	5.2	250	2.0%	20.00	2.8	1.5	6.7	350	11.9	6.7
FD 1	FD 1	58,085	1.33	0.74	100	2.0%	5.2	250	2.0%	20.00	2.8	1.5	6.7	350	11.9	6.7
FD 2	FD 2	37,475	0.86	0.74	100	2.0%	5.2	110	2.0%	20.00	2.8	0.6	5.8	210	11.2	5.8
PR 1	PR 1	11,298	0.26	0.90	35	2.5%	1.6	375	1.8%	20.00	2.7	2.3	5.0	410	12.3	5.0
PR 2	PR 2	26,381	0.61	0.90	38	2.0%	1.8	453	3.0%	20.00	3.5	2.2	5.0	491	12.7	5.0
P	P	60,255	1.38	0.15	100	25.0%	6.0	250	25.0%	7.00	3.5	1.2	7.2	350	11.9	7.2
FS1	UD 1	30,463	0.70	0.27	15	2.0%	4.7	571	6.0%	20.00	4.9	1.9	6.6	586	13.3	6.6
FS1	UD 2	1,488	0.03	0.90	60	5.0%	1.7	0	0.0%	20.00	0.3	0.0	5.0	60	10.3	5.0
FS 1	FS 1	13,589	0.31	0.90	26	2.0%	1.5	350	2.0%	20.00	2.8	2.1	5.0	376	12.1	5.0
FS 2	FS 2	12,683	0.29	0.90	26	2.0%	1.5	350	2.0%	20.00	2.8	2.1	5.0	376	12.1	5.0

KH Response:
 Text updated

Waterview East Commercial Final Plat 1

~~McDonald's~~ - Drainage Report Proposed Runoff Calculations (Rational Method Procedure)												
BASIN INFORMATION				DIRECT RUNOFF				CUMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
A1	A1	2.00	0.74	6.8	1.48	4.00	5.92					
A2	A2	1.50	0.74	6.7	1.11	4.03	4.48					
FD 1	FD 1	1.33	0.74	6.7	0.99	4.03	3.97					
FD 2	FD 2	0.86	0.74	5.8	0.64	4.19	2.67					
PR 1	PR 1	0.26	0.90	5.0	0.23	4.38	1.02					
PR 2	PR 2	0.61	0.90	5.0	0.55	4.38	2.38					
P	P	1.38	0.15	7.2	0.21	3.93	0.82	7.2	5.2	3.93	20.44	cumulative runoff basins A1, A2, PR 1, PR 2, P, FD1, FD2
FS1	UD 1	0.70	0.27	6.6	0.19	4.03	0.77					
FS1	UD 2	0.03	0.90	5.0	0.03	4.38	0.13					
FS 1	FS 1	0.31	0.90	5.0	0.28	4.38	1.23					
FS 2	FS 2	0.29	0.90	5.0	0.26	4.38	1.15					

Need final cumulative flow for this DP

KH Response:
 Cumulative flow added.

Cumulative flows need to be added for various design points, to properly size storm system.

KH Response:
 Cumulative flow added.

KH Response:
 Text updated

Waterview East Commercial Final Plat 1

~~McDonald's~~ - Drainage Report
 Proposed Runoff Calculations
 (Rational Method Procedure)

Design Storm 100 Year

BASIN INFORMATION				DIRECT RUNOFF				CUMULATIVE RUNOFF				NOTES
DESIGN POINT	DRAIN BASIN	AREA ac.	RUNOFF COEFF	T(c) min	C x A	I in/hr	Q cfs	T(c) min	C x A	I in/hr	Q cfs	
A1	A1	2.00	0.80	6.8	1.60	8.52	13.63					
A2	A2	1.50	0.80	6.7	1.20	8.58	10.32					
FD 1	FD 1	1.33	0.80	6.7	1.07	8.58	9.16					
FD 2	FD 2	0.86	0.80	5.8	0.69	8.93	6.15					
PR 1	PR 1	0.26	0.95	5.0	0.25	9.33	2.30					
PR 2	PR 2	0.61	0.95	5.0	0.58	9.33	5.37					
P	P	1.38	0.45	7.2	0.62	8.38	5.22	7.2	6.0	5.33	32.00	cumulative runoff basins A1, A2, PR 1, PR 2, P, FD1, FD2
FS1	UD 1	0.70	0.76	6.6	0.53	8.60	4.54					
FS1	UD 2	0.03	0.53	5.0	0.02	9.33	0.17					
FS 1	FS 1	0.81	0.95	5.0	0.30	9.33	2.76					
FS 2	FS 2	0.29	0.95	5.0	0.28	9.33	2.58					

According to the Time of Concentration Calculation Table on Page 31 of this report,

$$C_{100}=0.53$$

$$C_{100}=0.95$$

Please review and revise the calculations as necessary so that runoff coefficients shown in this table match the values calculated in the table on Page 31.

KH Response:
 Formula updated to match values calculated in table on pg. 31

KH Response:
 Formula updated

Based on your calculated T_c for cumulative runoff,

$$I = 28.5(2.75)/((10+7.2)^{0.786}) = 8.38 \text{ in/hr}$$

Please verify that intensity formula used for this calculation is correct after addressing runoff coefficient comments on Page 30.

SUMMARY - PROPOSED RUNOFF TABLE						
DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)	CUMMULATIVE 5-YR RUNOFF (CFS)	CUMMULATIVE 100-YR RUNOFF (CFS)
A1	A1	2.00	5.92	13.63	5.92	13.63
A2	A2	1.50	4.48	10.32	4.48	10.32
FD 1	FD 1	1.33	3.97	9.16	3.97	9.16
FD 2	FD 2	0.86	2.67	6.15	2.67	6.15
PR 1	PR 1	0.26	1.02	2.30	1.02	2.30
PR 2	PR 2	0.61	2.38	5.37	2.38	5.37
P	P	1.38	0.82	5.22	20.44	32.00
FS1	UD 1	0.70	0.77	4.54	0.77	4.54
FS1	UD 2	0.03	0.13	0.17	0.13	0.17
FS 1	FS 1	0.31	1.23	2.76	1.23	2.76
FS 2	FS 2	0.29	1.15	2.58	1.15	2.58

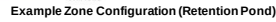
APPENDIX D – HYDRAULIC CALCULATIONS

- Provide inlet calculations
- Provide calculations for sizing of spillway riprap

KH Response:
Inlet and spillway rip rap
calculations added to
Appendix

MHFD-Detention, Version 4.08 (April 2026)

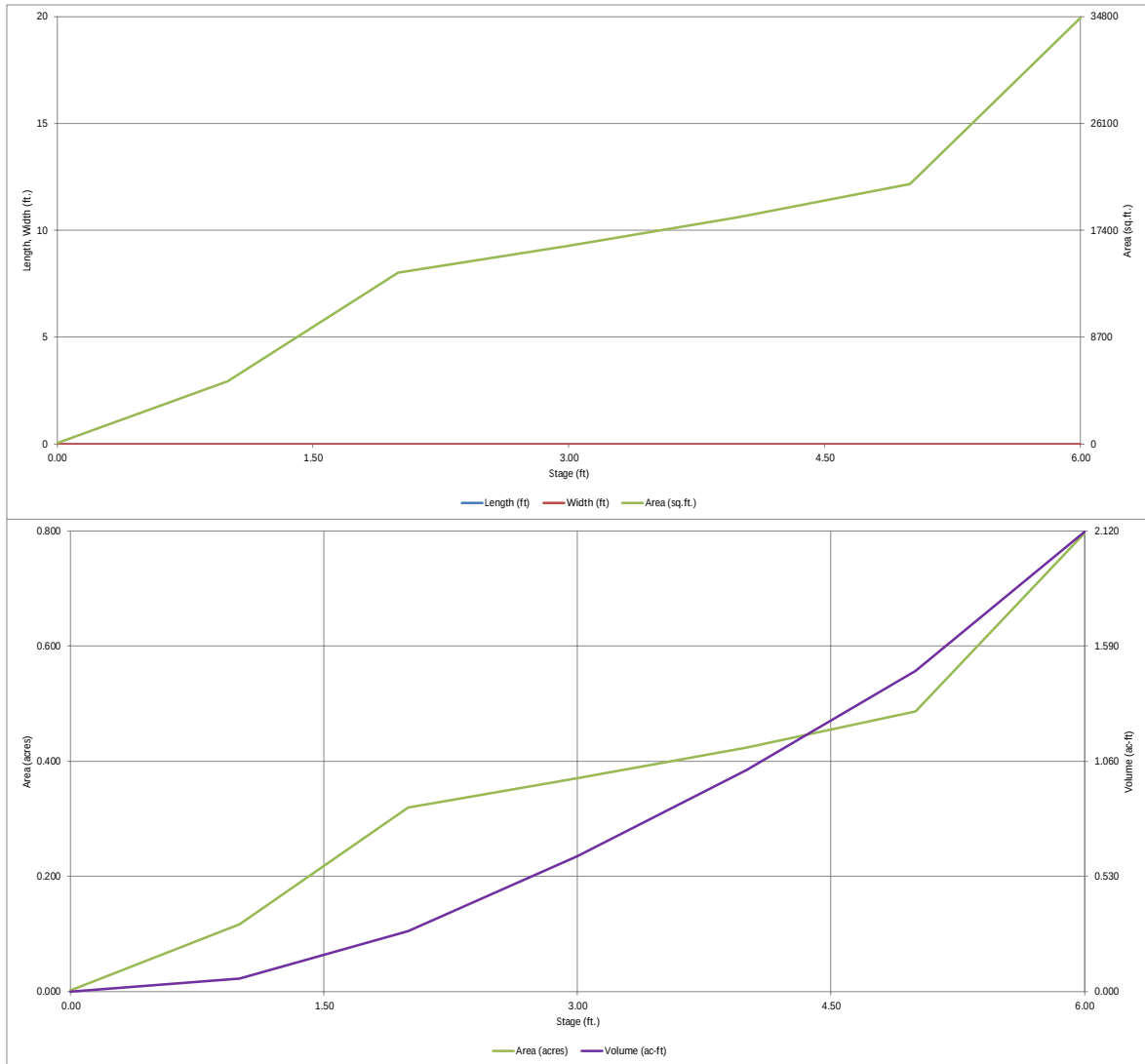
Basin ID: A1-A2, FD1-FD-2, PR1-PR2, P

[illegible]

KH Response:
"Pond P" added
to Basin ID

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)



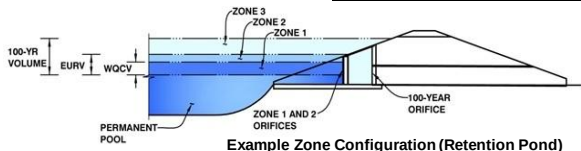
- ✓ = calcs match details in plans
✗ = calcs do not match details in plans

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)

Project: Waterview East Filing No. 1

Basin ID: A1-A2, FD1-FD-2, PR1-PR2, P



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.87	0.236	Orifice Plate
Zone 2 (EURV)	3.44	0.554	Orifice Plate
Zone 3 (100-year)	4.57	0.478	Weir&Pipe (Restrict)
Total (all zones)		1.269	

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

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

Calculated Parameters for Underdrain
Underdrain Orifice Area = N/A ft²
Underdrain Orifice Centroid = N/A feet

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

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate = 3.44 ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing = N/A inches
Orifice Plate: Orifice Area per Row = 1.63 sq. inches (diameter = 1-7/16 inches)

Calculated Parameters for Plate
WQ Orifice Area per Row = 1.132E-02 ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

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	1.15	1.80					
✓ Orifice Area (sq. inches)	1.63	1.63	1.63					

	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)

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

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = Not Selected N/A ft²
Vertical Orifice Centroid = Not Selected N/A feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Gate and Outlet Pipe OR Rectangular/Trapezoidal)

✓ Overflow Weir Front Edge Height, Ho = 3.50 ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 3.41 feet
✓ Overflow Weir Gate Slope = 0.00 H:V
Horiz. Length of Weir Sides = 2.91 feet
Overflow Gate Type = Type C Gate
Debris Clogging % = 50%

where did you get this value from? I see 3ft on the plans.

where did you get this value from? I see 4ft on the plans.

Calculated Parameters for Overflow Weir
Height of Gate Upper Edge = Not Selected N/A feet
Overflow Weir Slope = Not Selected N/A feet
Grate Open Area / 100-yr C = Not Selected N/A ft²
w/ Debris = 3.45 ft²

KH Response:
Dimensions in plan updated

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

✓ Depth to Invert of Outlet Pipe = 3.00 ft (distance below basin bottom at Stage = 0 ft)
✓ Outlet Pipe Diameter = 18.00 inches
✓ Restrictor Plate Height Above Pipe Invert = 18.00 inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = 1.77 ft²
Outlet Orifice Centroid = 0.75 feet
Half-Central Angle of Restrictor Plate on Pipe = 3.14 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

✓ Spillway Invert Stage = 4.16 ft (relative to basin bottom at Stage = 0 ft)
✓ Spillway Crest Length = 15.00 feet
✓ Spillway End Slopes = 4.00 H:V
✓ Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.74 feet
Stage at Top of Freeboard = 5.90 feet
Basin Area at Top of Freeboard = 0.77 acres
Basin Volume at Top of Freeboard = 2.04 acre-ft

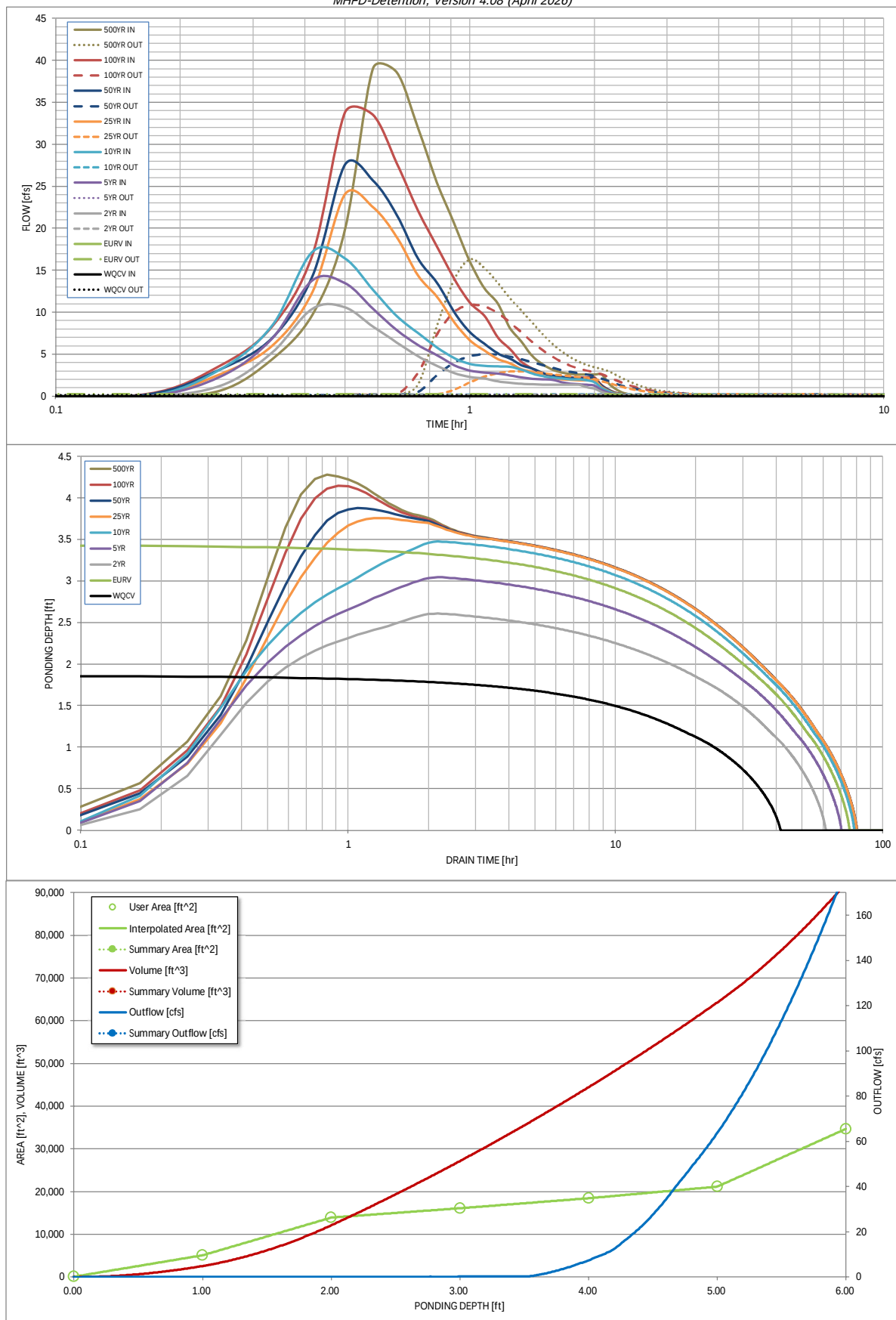
Routed Hydrograph Results

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

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.01	1.29	1.56	2.00	2.25	2.75	3.14
One-Hour Rainfall Depth (in)	N/A	N/A	1.01	1.29	1.56	2.00	2.25	2.75	3.14
CUHP Runoff Volume (acre-ft)	0.236	0.790	0.512	0.675	0.844	1.140	1.304	1.643	1.902
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	0.512	0.675	0.844	1.140	1.304	1.643	1.902
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	0.3	0.6	2.2	6.8	8.8	13.1	16.1
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.03	0.07	0.28	0.86	1.11	1.65	2.03
Peak Inflow Q (cfs)	N/A	N/A	10.6	13.8	17.2	24.1	27.6	33.8	39.0
Peak Outflow Q (cfs)	0.1	0.3	0.2	0.2	0.3	3.0	5.0	10.9	16.3
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.4	0.1	0.4	0.6	0.8	1.0
Structure Controlling Flow	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Gate 1 (fps)	N/A	N/A	N/A	N/A	N/A	0.4	0.7	1.5	2.0
Max Velocity through Gate 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	66	55	62	69	68	67	64	63
Time to Drain 99% of Inflow Volume (hours)	40	71	58	66	74	75	74	73	72
Maximum Ponding Depth (ft)	1.87	3.44	2.61	3.05	3.48	3.76	3.88	4.15	4.28
Area at Maximum Ponding Depth (acres)	0.29	0.39	0.35	0.37	0.40	0.41	0.42	0.43	0.44
Maximum Volume Stored (acre-ft)	0.239	0.792	0.480	0.638	0.804	0.920	0.966	1.081	1.142

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)



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	0.22	0.28	0.71
	0:15:00	0.00	0.00	1.26	2.38	3.25	2.67	3.26	3.69	4.45
	0:20:00	0.00	0.00	5.24	6.91	8.45	6.05	6.97	8.34	9.76
	0:25:00	0.00	0.00	10.45	13.81	17.22	12.47	14.33	16.90	19.88
	0:30:00	0.00	0.00	10.59	13.46	16.44	24.06	27.59	33.81	39.04
	0:35:00	0.00	0.00	8.28	10.41	12.67	22.53	25.72	33.51	38.59
	0:40:00	0.00	0.00	6.43	7.88	9.55	18.98	21.62	27.78	31.96
	0:45:00	0.00	0.00	4.77	6.12	7.53	14.40	16.40	22.13	25.47
	0:50:00	0.00	0.00	3.64	4.90	5.82	11.89	13.54	17.85	20.55
	0:55:00	0.00	0.00	2.79	3.72	4.55	8.80	10.04	13.98	16.10
	1:00:00	0.00	0.00	2.32	3.07	3.86	6.69	7.64	11.18	12.89
	1:05:00	0.00	0.00	2.14	2.82	3.63	5.48	6.27	9.60	11.09
	1:10:00	0.00	0.00	1.79	2.73	3.55	4.47	5.11	7.05	8.15
	1:15:00	0.00	0.00	1.61	2.49	3.53	3.94	4.49	5.64	6.52
	1:20:00	0.00	0.00	1.50	2.25	3.18	3.26	3.72	4.12	4.77
	1:25:00	0.00	0.00	1.45	2.11	2.70	2.91	3.31	3.30	3.81
	1:30:00	0.00	0.00	1.40	2.03	2.40	2.46	2.79	2.76	3.19
	1:35:00	0.00	0.00	1.38	1.98	2.23	2.20	2.49	2.46	2.84
	1:40:00	0.00	0.00	1.37	1.69	2.12	2.05	2.31	2.32	2.67
	1:45:00	0.00	0.00	1.37	1.53	2.05	1.97	2.22	2.26	2.61
	1:50:00	0.00	0.00	1.37	1.43	2.02	1.93	2.17	2.24	2.59
	1:55:00	0.00	0.00	1.09	1.38	1.93	1.91	2.15	2.24	2.59
	2:00:00	0.00	0.00	0.92	1.27	1.70	1.90	2.14	2.24	2.59
	2:05:00	0.00	0.00	0.54	0.74	1.00	1.12	1.26	1.32	1.53
	2:10:00	0.00	0.00	0.31	0.43	0.58	0.66	0.74	0.77	0.89
	2:15:00	0.00	0.00	0.16	0.23	0.31	0.36	0.40	0.42	0.49
	2:20:00	0.00	0.00	0.08	0.13	0.17	0.20	0.22	0.23	0.27
	2:25:00	0.00	0.00	0.03	0.05	0.07	0.09	0.10	0.10	0.11
	2:30:00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03
	2:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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 4.08 (April 2026)

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.

[illegible]



DATE STARTED: 3/11/2026

*This spreadsheet is based on the UD-BMP EDB tab. Yellow cells are for user input

Formulas

WQCV_{DESIGN}=
Input the proper drain time
coefficient (TBL 3-2, Ch. 3
Vol 3, USDCM)

$$a*((0.91*i^3 - 1.19i^2 + 0.78i)/12)*TCA$$

a= 1.0

12 hrs, a = 0.8

24 hrs, a= 0.9

40 hrs*, a=1.0

*Use 1.0 if there is No attenuation

Min. Forebay Vol

3%

Source: Tbl EDB 4 UDFCD

FOREBAY NAME	TOTAL CONTRIBUTING AREA (TCA) (ac)	i	WQCV _{DESIGN} (ac-ft)	V _{FMIN} (ac-ft)	V _{FMIN} (cf)	D _F (ft)	A _{FMIN} (SF)
A	5.09	0.95	0.19	0.0057	249.3	1.0	249.3
B	1.47	0.97	0.06	0.0017	75.0	1.0	75.0

Forebay A	Basin(s)	Area (acres)	Weighting Factors (A _i /A _{TOTAL})	i (I%/100%)	(Weighting Factors) * i
	A1	2.00	0.39	0.95	0.37
	A2	1.50	0.29	0.95	0.28
	PR 1	0.26	0.05	1.00	0.05
	FD1	1.33	0.26	0.95	0.25
	A _{TOTAL}	5.09	acres	i _{weighted}	0.95
Forebay B	Basin(s)	Area (acres)	Weighting Factors (A _i /A _{TOTAL})	i (I%/100%)	(Weighting Factors) * i
	PR 2	0.61	0.41	1.00	0.41
	FD 2	0.86	0.59	0.95	0.56
	B _{TOTAL}	1.47	acres	i _{weighted}	0.97

MINIMUM DIMENSIONS FOREBAY A

FOREBAY MINIMUM DIMENSIONS

- *Check Incoming Pipe size fits requirements of Figure 9-43
- * Sizing follows trapezoidal formula. Need to solve for base width

Min. Area (A)	249.30 SF
Incoming Pipe Diameter (D)	2.50 ft
$W_1 (2*D)$	5.00 ft
h_1	1.88 ft
h_2	2.00 ft
h_3	2.00 ft
h_0	0.67 ft
$H (E_{h_1})$	6.54 ft

$$W_2 = W_1 + [2 * H * \tan(30^\circ)]$$

$$\tan(30^\circ) = 0.58 \quad \text{*This formula ensures degree output}$$

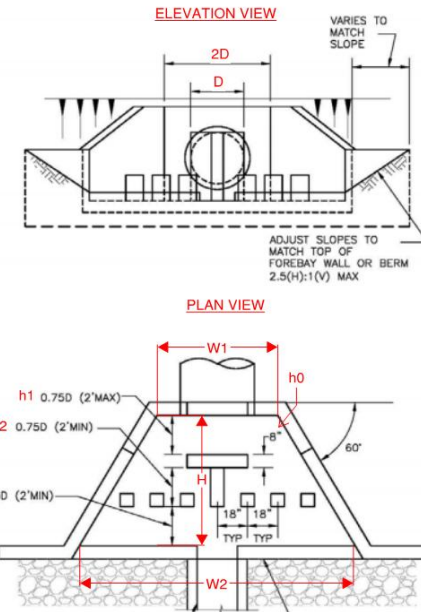
$$W_2 = 12.55 \text{ ft}$$

$$\text{Actual Area} = ((W_1 + W_2) / 2) * H$$

$$A = 57.42 \text{ SF}$$

Greater than minimum Area?

FORMULA
 $0.75D (2' \text{ MAX})$
 $0.75D (2' \text{ MIN.})$
 $0.75D (2' \text{ MIN.})$
 $*h_0 \text{ is a constant } 8''$



No. Calculate H using formula below

*If your actual area is smaller than the required forebay area, back-calculate H from required forebay area and determine h3 by subtracting all hi values

$$A = ((W_1 + W_2) / 2) * H$$

$$W_2 = W_1 + [2 * H * \tan(30^\circ)]$$

$$0 = \tan 30^\circ H^2 + W_1 H - A$$

$$0 = 196.08 \text{ Goal Seek}$$

$$\text{New } H = 23.7 \text{ ft}$$

$$\text{New } W_2 = 32.4 \text{ ft}$$

$$\text{New } h_3 = 19.2 \text{ ft}$$

$$A_{\text{PROVIDED}} = 63 \text{ SF from CAD}$$

$$\text{HEADWALL TOP ELEV.} = \text{Pipe IE} + 1.5 * D$$

$$\text{Pipe IE} = 5910.00 \text{ ft}$$

$$\text{HEADWALL TOP ELEV.} = 5913.75 \text{ ft}$$

FOREBAY NOTCH SIZING: FOREBAY A

Wall with Rect. Notch (W_N equation from UD-BMP spreadsheet)

Undet. 100-year Peak Discharge 35.41 cfs (input from StormCAD)

Forebay Discharge Flow % 2%

$$Q_F = \text{Undet. 100-yr discharge} * \text{Forebay Disch. \%}$$

$$Q_F = 0.71 \text{ cfs}$$

$$\text{Width of Notch}(W_N) = Q_F / (3.33 * D_F^{1.5}) * 12 + 0.2 * (D_F * 12)$$

$$D_F = 1 \text{ ft (Taken from input above)}$$

$$W_N = 5.0 \text{ in}$$

MINIMUM DIMENSIONS FOREBAY B

FOREBAY MINIMUM DIMENSIONS

- *Check Incoming Pipe size fits requirements of Figure 9-43
- * Sizing follows trapezoidal formula. Need to solve for base width

Min. Area (A)	74.96 SF
Incoming Pipe Diameter (D)	2.00 ft
$W_1 (2 \cdot D)$	4.00 ft
h_1	1.50 ft
h_2	2.00 ft
h_3	2.00 ft
h_0	0.67 ft
$H (E_{h_i})$	6.17 ft

$$W_2 = W_1 + [2 \cdot H \cdot \tan(30^\circ)]$$

$$\tan(30^\circ) = 0.58 \quad \text{*This formula ensures degree output}$$

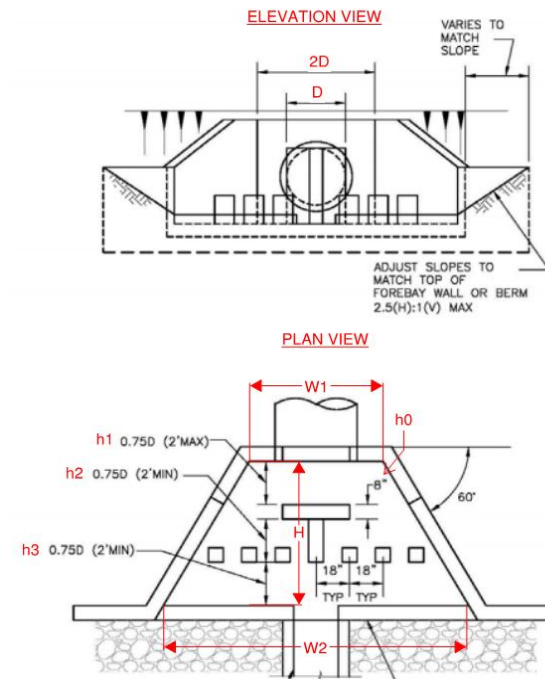
$$W_2 = 11.12 \text{ ft}$$

$$\text{Actual Area} = ((W_1 + W_2) / 2) \cdot H$$

$$A = 46.62 \text{ SF}$$

Greater than minimum Area?

FORMULA
 $0.75D (2' \text{ MAX})$
 $0.75D (2' \text{ MIN.})$
 $0.75D (2' \text{ MIN.})$
 $*h_0 \text{ is a constant } 8''$



No. Calculate W2 using formula below

*If your actual area is smaller than the required forebay area, back-calculate H from required forebay area and determine h3 by subtracting all hi values

$$A = ((W_1 + W_2) / 2) \cdot H$$

$$W_2 = W_1 + [2 \cdot H \cdot \tan(30^\circ)]$$

$$0 = \tan 30^\circ H^2 + W_1 H - A$$

$$0 = 330.46 \text{ Goal Seek}$$

$$\text{New } H = 23.3 \text{ ft}$$

$$\text{New } W_2 = 30.9 \text{ ft}$$

$$\text{New } h_3 = 19.1 \text{ ft}$$

$$A_{\text{PROVIDED}} = 50 \text{ SF from CAD}$$

$$\text{HEADWALL TOP ELEV.} = \text{Pipe IE} + 1.5 \cdot D$$

$$\text{Pipe IE} = 5910.00 \text{ ft}$$

$$\text{HEADWALL TOP ELEV.} = 5913.00 \text{ ft}$$

FOREBAY NOTCH SIZING: FOREBAY B

Wall with Rect. Notch (W_N equation from UD-BMP spreadsheet)
 Undet. 100-year Peak Discharge 11.52 cfs (input from StormCAD)
 Forebay Discharge Flow % 2%

$$Q_F = \text{Undet. 100-yr discharge} \cdot \text{Forebay Disch. \%}$$

$$Q_F = 0.23 \text{ cfs}$$

$$\text{Width of Notch}(W_N) = Q_F / (3.33 \cdot D_F^{1.5}) \cdot 12 + 0.2 \cdot (D_F \cdot 12)$$

$$D_F = 1 \text{ ft (Taken from input above)}$$

$$W_N = 3.2 \text{ in}$$

This spreadsheet is intended for sizing multiple forebays for a single site.

Designer Instructions

- 1 Make sure your imperviousness tab is set up and ordered correctly
- 2 Determine number of forebays required

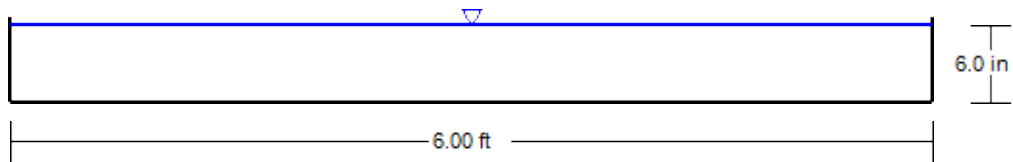
- 3 Set proper drain time coefficient
- 4 Set minimum forebay volume percent
- 5 Input proper forebay depth
- 6 Ensure that Sub basins are linking proper areas and %imperviousness values from Imperviousness sheet
- 7 Input pipe diameter to obtain minimum area required for trapezoidal SF
- 8 If minimum area is less than required forebay surface area, then a goal seek function will be used to solve a quadratic function. Refer to the note on the goal-seek cell.
- 9 Always check the first forebay quadratic solution. Generally the positive solution is the right answer. If there are two positive solutions, use engineering judgement to select the proper value

Worksheet for Trickle Channel

Project Description	
Friction Method	Manning
Solve For	Formula Discharge
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.011 ft/ft
Normal Depth	6.0 in
Bottom Width	6.00 ft
Results	
Discharge	20.44 cfs
Flow Area	3.0 ft ²
Wetted Perimeter	7.0 ft
Hydraulic Radius	5.1 in
Top Width	6.00 ft
Critical Depth	8.5 in
Critical Slope	0.004 ft/ft
Velocity	6.81 ft/s
Velocity Head	0.72 ft
Specific Energy	1.22 ft
Froude Number	1.699
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.0 in
Critical Depth	8.5 in
Channel Slope	0.011 ft/ft
Critical Slope	0.004 ft/ft

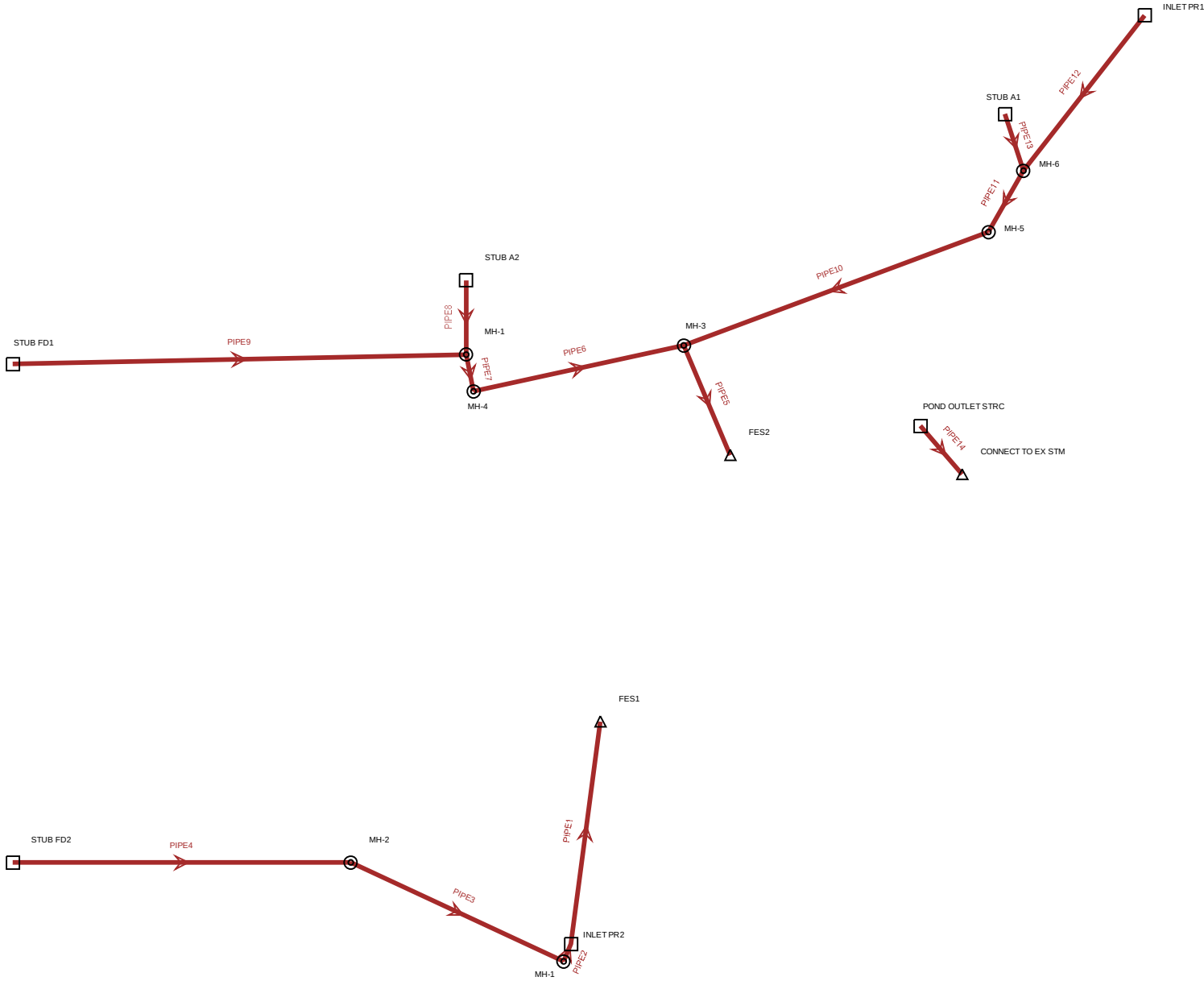
Cross Section for Trickle Channel

Project Description	
Friction Method	Manning
	Formula
Solve For	Discharge
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.011 ft/ft
Normal Depth	6.0 in
Bottom Width	6.00 ft
Discharge	20.44 cfs



V: 1
H: 1

Scenario: 100-Year



Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

KH Response:
Values updated to match what is shown in plans

5-Year

Catch Basin Table - Time: 0.00 hours

ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Inlet Type	Capture Efficiency (Calculated) (%)
65	INLET PR1	5,921.69	5,921.69	5,916.49	Full Capture	100.0
70	INLET PR2	5,919.42	5,919.42	5,913.49	Full Capture	100.0
72	POND OUTLET STRC	5,910.00	5,910.00	5,907.00	Full Capture	100.0
66	STUB A1	5,925.03	5,918.89	5,917.39	Full Capture	100.0
67	STUB A2	5,930.24	5,923.50	5,922.00	Full Capture	100.0
68	STUB FD1	5,934.62	5,925.99	5,923.99	Full Capture	100.0
69	STUB FD2	5,933.07	5,926.80	5,924.80	Full Capture	100.0
Hydraulic Grade Line (In) (ft)	Flow (Additional Subsurface) (cfs)					
5,916.84	1.02					
5,914.31	2.38					
5,907.17	0.20					
5,918.35	5.92					
5,922.83	4.48					
5,924.71	3.97					
5,925.38	2.67					

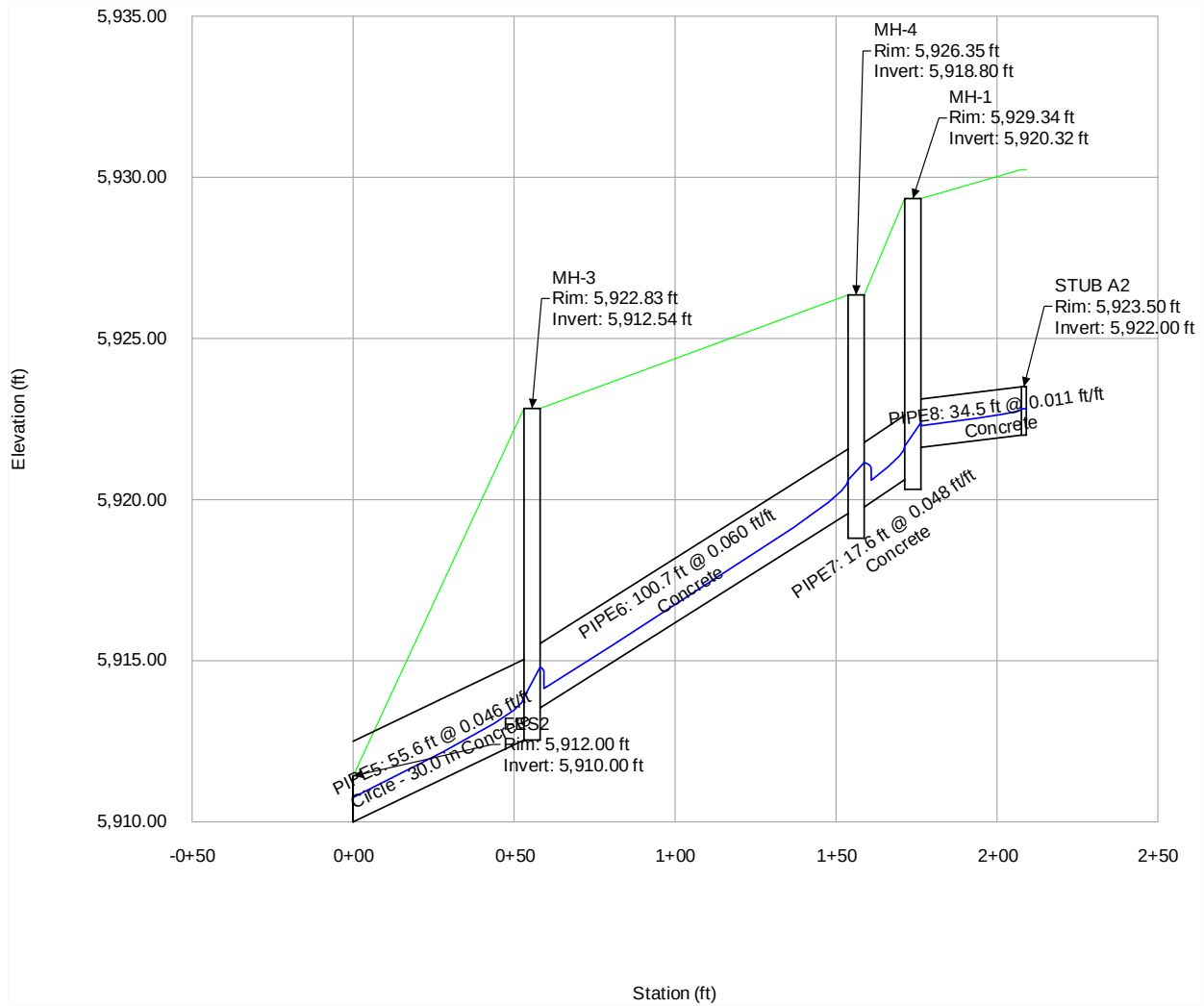
Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

KH Response:
Values updated to match what is shown in plans

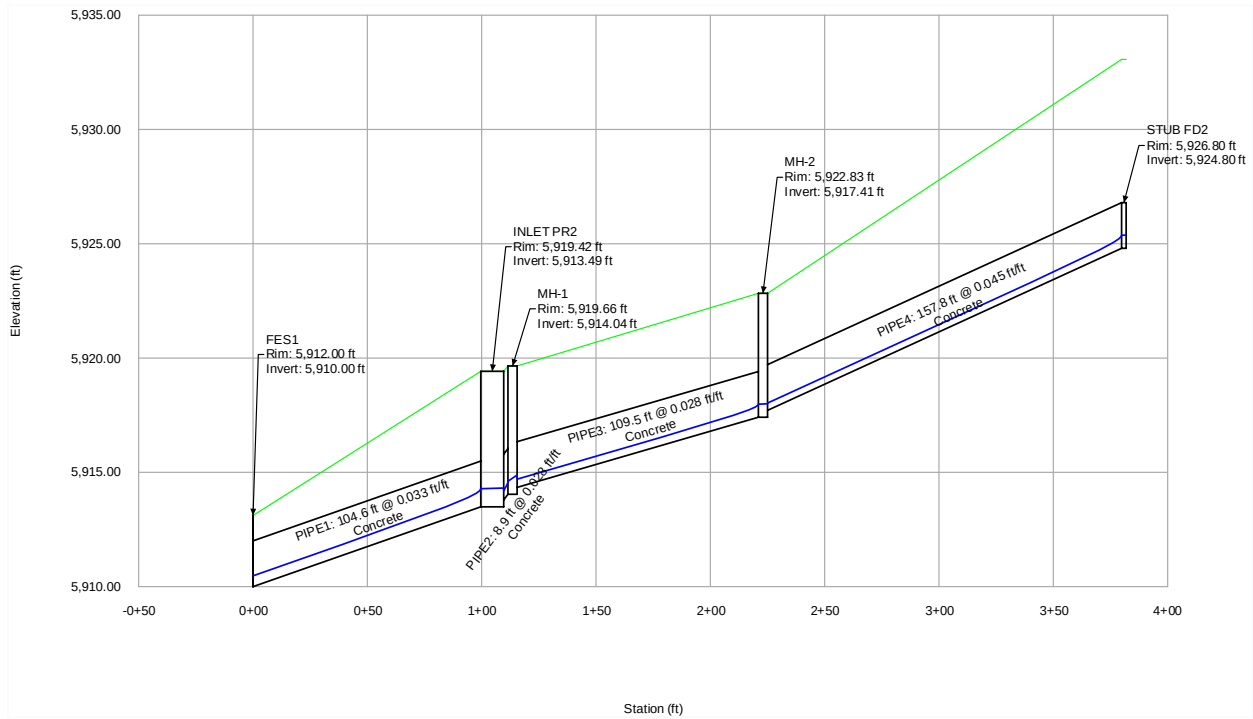
5-Year
Conduit Table - Time: 0.00 hours

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)
PIPE1	INLET PR2	5,913.49	FES1	5,910.00	104.6	0.033	24.0
PIPE2	MH-1	5,914.04	INLET PR2	5,913.79	8.9	0.028	24.0
PIPE3	MH-2	5,917.41	MH-1	5,914.34	109.5	0.028	24.0
PIPE4	STUB FD2	5,924.80	MH-2	5,917.71	157.8	0.045	24.0
PIPE5	MH-3	5,912.54	FES2	5,910.00	55.6	0.046	30.0
PIPE6	MH-4	5,919.57	MH-3	5,913.53	100.7	0.060	24.0
PIPE7	MH-1	5,920.62	MH-4	5,919.77	17.6	0.048	24.0
PIPE8	STUB A2	5,922.00	MH-1	5,921.62	34.5	0.011	18.0
PIPE9	STUB FD1	5,923.99	MH-1	5,921.46	211.6	0.012	24.0
PIPE10	MH-5	5,914.94	MH-3	5,913.53	151.7	0.009	24.0
PIPE11	MH-6	5,915.44	MH-5	5,915.14	32.9	0.009	24.0
PIPE12	INLET PR1	5,916.49	MH-6	5,915.64	91.9	0.009	24.0
PIPE13	STUB A1	5,917.39	MH-6	5,915.72	27.9	0.060	18.0
PIPE14	POND OUTLET STRC	5,907.00	CONNECT TO EX STM	5,906.14	29.8	0.029	18.0
Manning's n	Flow (cfs)	Velocity (ft/s)	Flow / Capacity (Design) (%)				
0.013	5.05	8.92	12.2				
0.013	2.67	6.97	7.0				
0.013	2.67	6.96	7.0				
0.013	2.67	8.21	5.6				
0.013	15.39	13.43	17.6				
0.013	8.45	12.74	15.3				
0.013	8.45	11.79	17.0				
0.013	4.48	5.92	40.6				
0.013	3.97	5.78	16.0				
0.013	6.94	6.15	31.9				
0.013	6.94	6.15	31.9				
0.013	1.02	3.54	4.7				
0.013	5.92	11.83	23.0				
0.013	0.20	3.36	1.1				

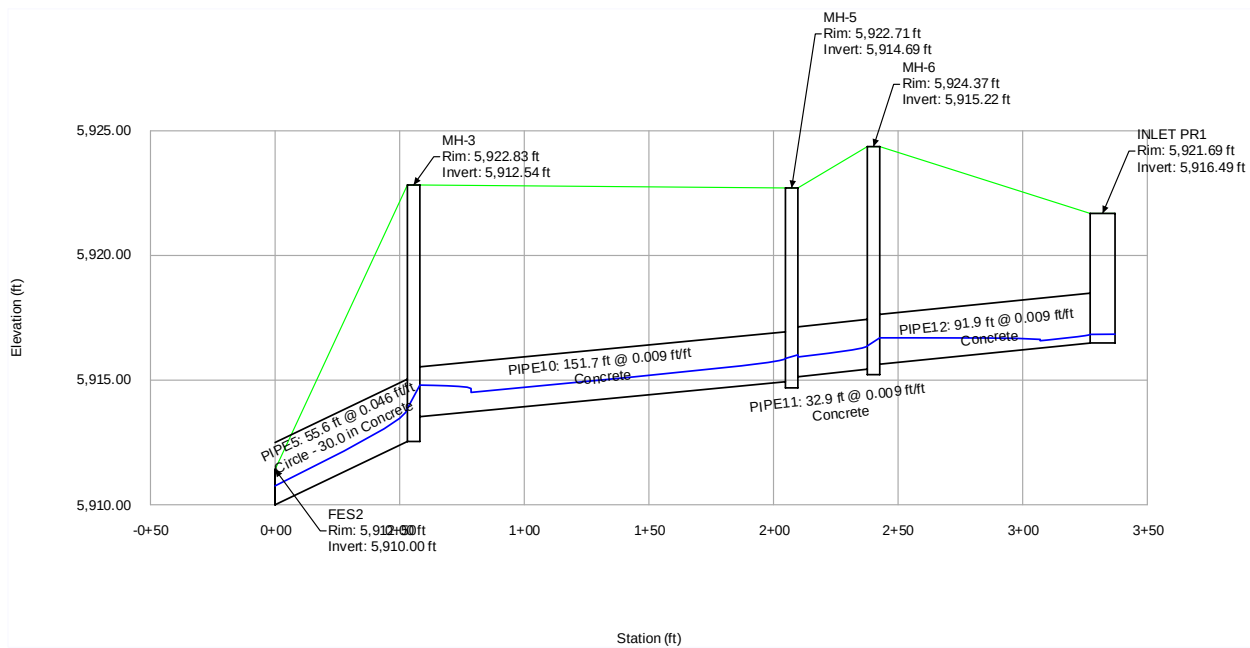
Engineering Profile - STM NW (5-year)



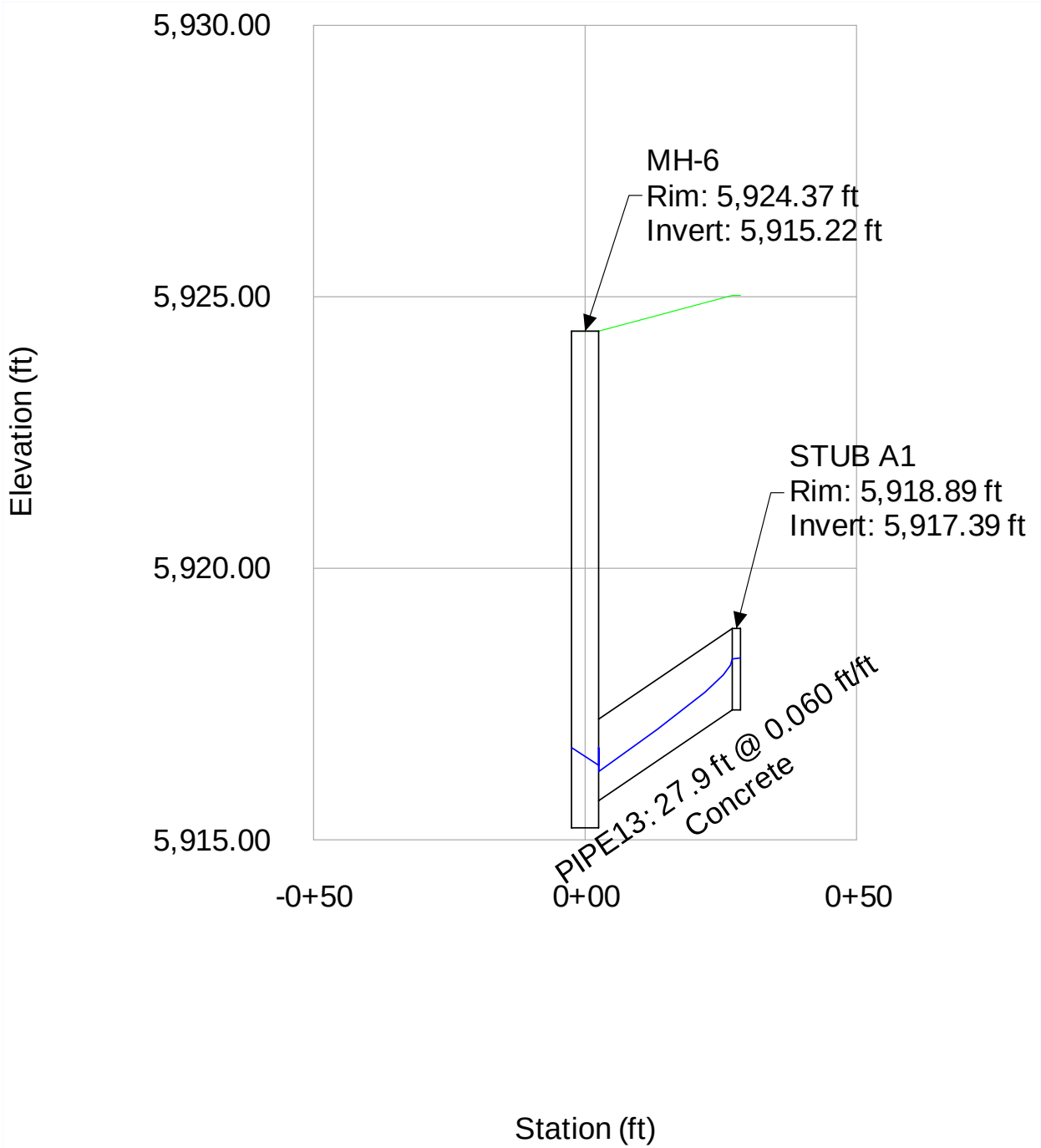
Engineering Profile - STM South (5-year)



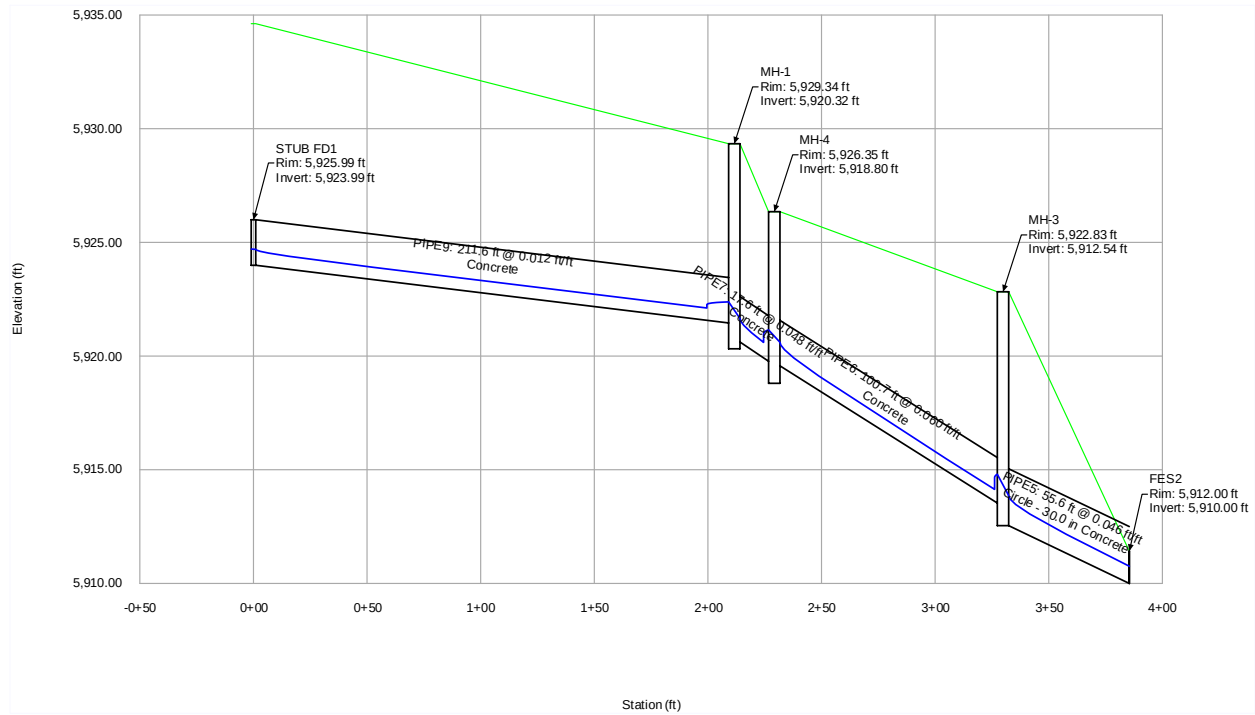
Engineering Profile - STM NE (5-year)



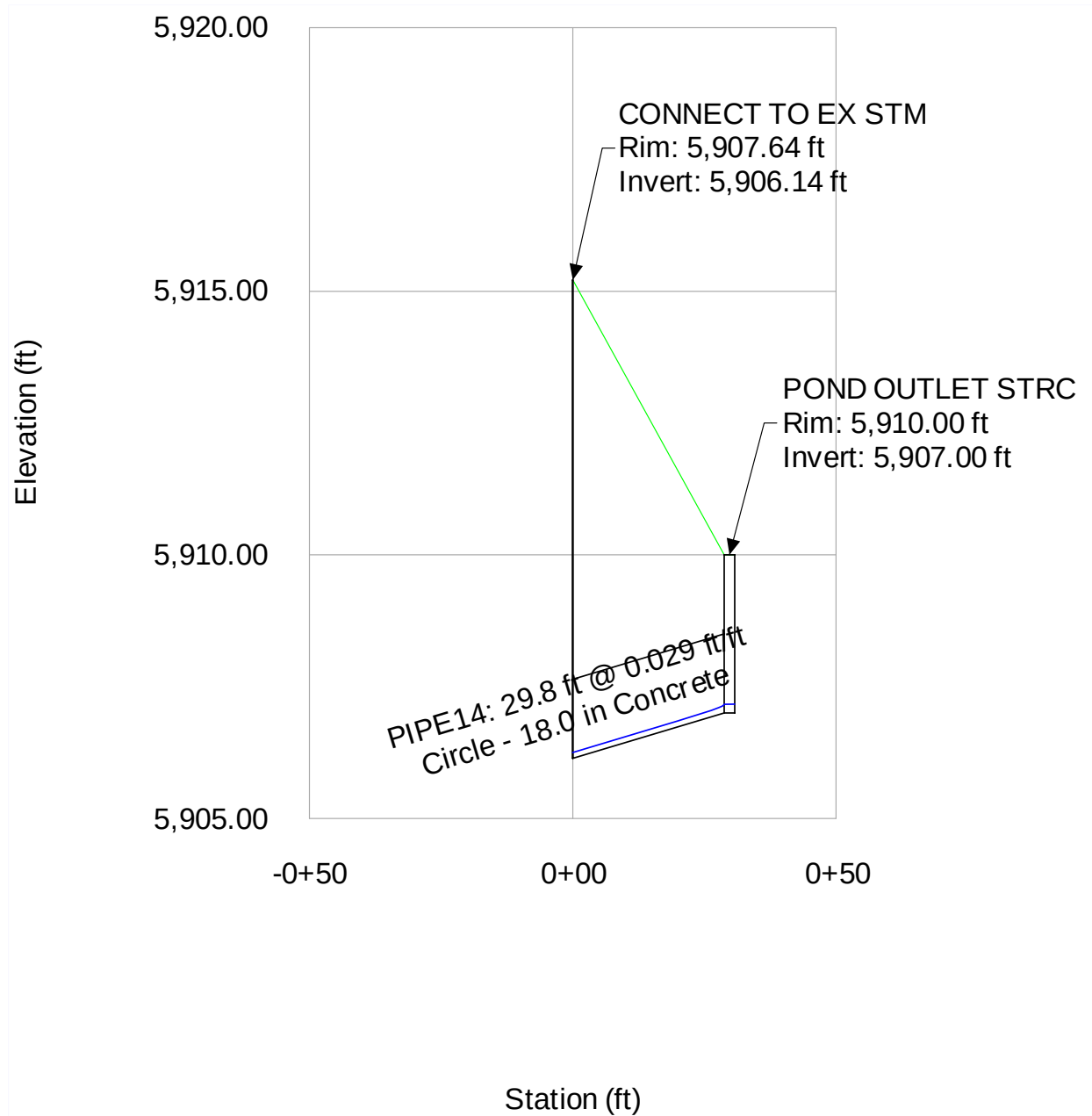
Engineering Profile - STM NE Stub (5-year)



Engineering Profile - STM West (5-year)



Engineering Profile - Outfall (5-year)



Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

KH Response:
Values updated to match what is shown in plans

100-year

Catch Basin Table - Time: 0.00 hours

ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Inlet Type	Capture Efficiency (Calculated) (%)
65	INLET PR1	5,921.69	5,921.69	5,916.49	Full Capture	100.0
70	INLET PR2	5,919.42	5,919.42	5,913.49	Full Capture	100.0
72	POND OUTLET STRC	5,910.00	5,910.00	5,907.00	Full Capture	100.0
66	STUB A1	5,925.03	5,918.89	5,917.39	Full Capture	100.0
67	STUB A2	5,930.24	5,923.50	5,922.00	Full Capture	100.0
68	STUB FD1	5,934.62	5,925.99	5,923.99	Full Capture	100.0
69	STUB FD2	5,933.07	5,926.80	5,924.80	Full Capture	100.0
Hydraulic Grade Line (In) (ft)	Flow (Additional Subsurface) (cfs)					
5,917.91	2.30					
5,914.76	5.37					
5,908.30	10.90					
5,918.81	13.63					
5,924.03	10.32					
5,925.10	9.16					
5,925.69	6.15					

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

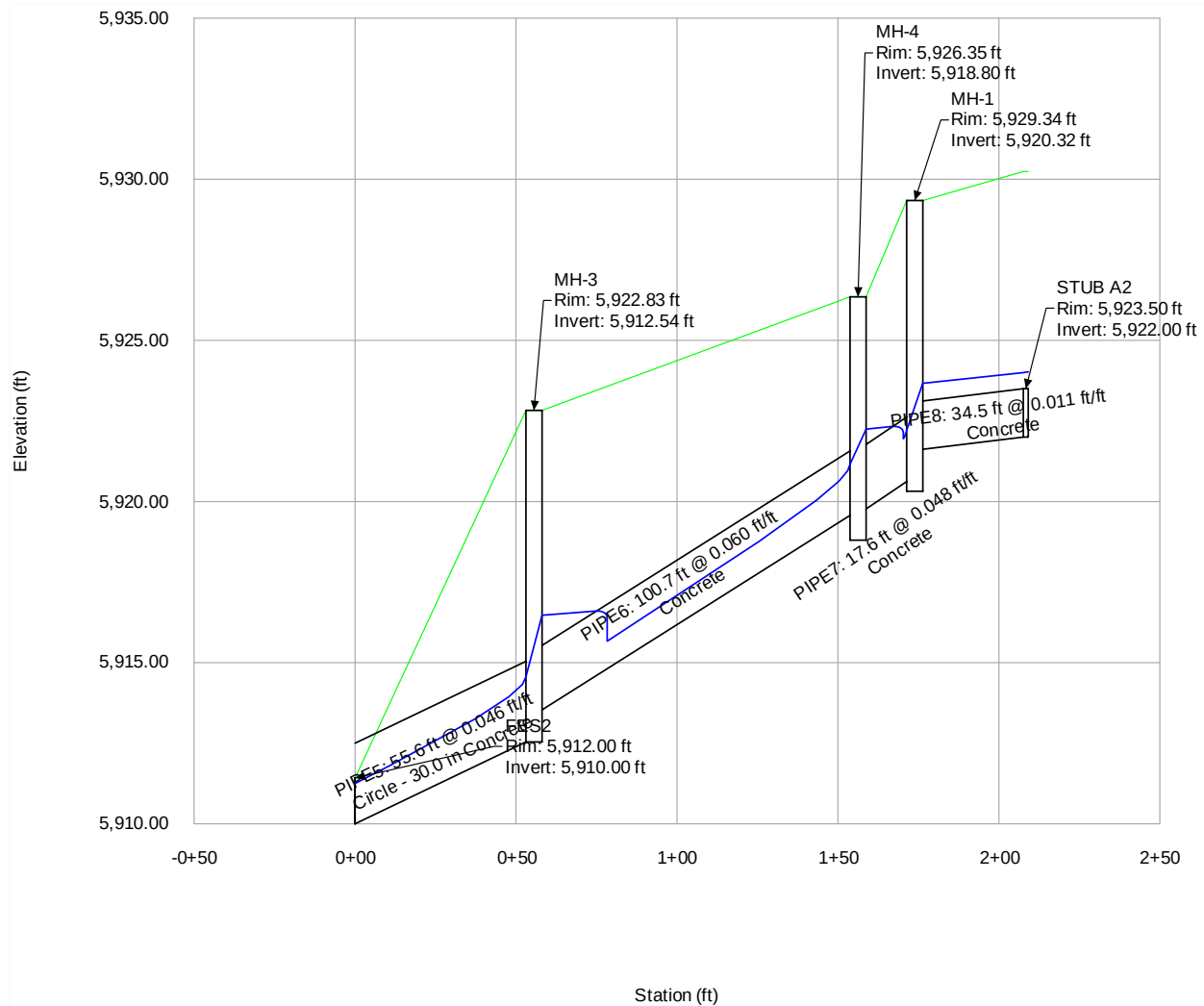
KH Response:
Values updated to match what is shown in plans

100-year

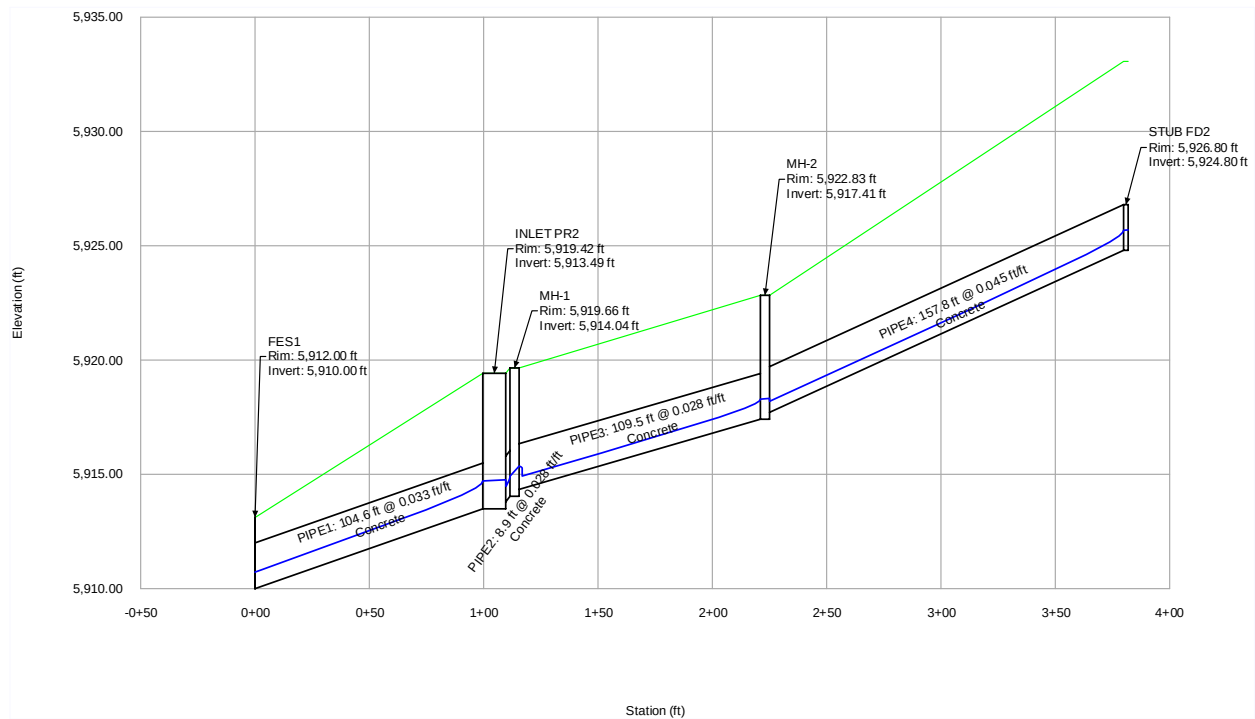
Conduit Table - Time: 0.00 hours

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)
PIPE1	INLET PR2	5,913.49	FES1	5,910.00	104.6	0.033	24.0
PIPE2	MH-1	5,914.04	INLET PR2	5,913.79	8.9	0.028	24.0
PIPE3	MH-2	5,917.41	MH-1	5,914.34	109.5	0.028	24.0
PIPE4	STUB FD2	5,924.80	MH-2	5,917.71	157.8	0.045	24.0
PIPE5	MH-3	5,912.54	FES2	5,910.00	55.6	0.046	30.0
PIPE6	MH-4	5,919.57	MH-3	5,913.53	100.7	0.060	24.0
PIPE7	MH-1	5,920.62	MH-4	5,919.77	17.6	0.048	24.0
PIPE8	STUB A2	5,922.00	MH-1	5,921.62	34.5	0.011	18.0
PIPE9	STUB FD1	5,923.99	MH-1	5,921.46	211.6	0.012	24.0
PIPE10	MH-5	5,914.94	MH-3	5,913.53	151.7	0.009	24.0
PIPE11	MH-6	5,915.44	MH-5	5,915.14	32.9	0.009	24.0
PIPE12	INLET PR1	5,916.49	MH-6	5,915.64	91.9	0.009	24.0
PIPE13	STUB A1	5,917.39	MH-6	5,915.72	27.9	0.060	18.0
PIPE14	POND OUTLET STRC	5,907.00	CONNECT TO EX STM	5,906.14	29.8	0.029	18.0
Manning's n	Flow (cfs)	Velocity (ft/s)	Flow / Capacity (Design) (%)				
0.013	11.52	11.27	27.9				
0.013	6.15	8.88	16.2				
0.013	6.15	8.87	16.2				
0.013	6.15	10.49	12.8				
0.013	35.41	16.91	40.4				
0.013	19.48	16.09	35.2				
0.013	19.48	14.85	39.2				
0.013	10.32	5.84	93.5				
0.013	9.16	7.30	37.0				
0.013	15.93	5.07	73.3				
0.013	15.93	5.07	73.3				
0.013	2.30	4.50	10.6				
0.013	13.63	14.76	53.0				
0.013	10.90	10.61	61.0				

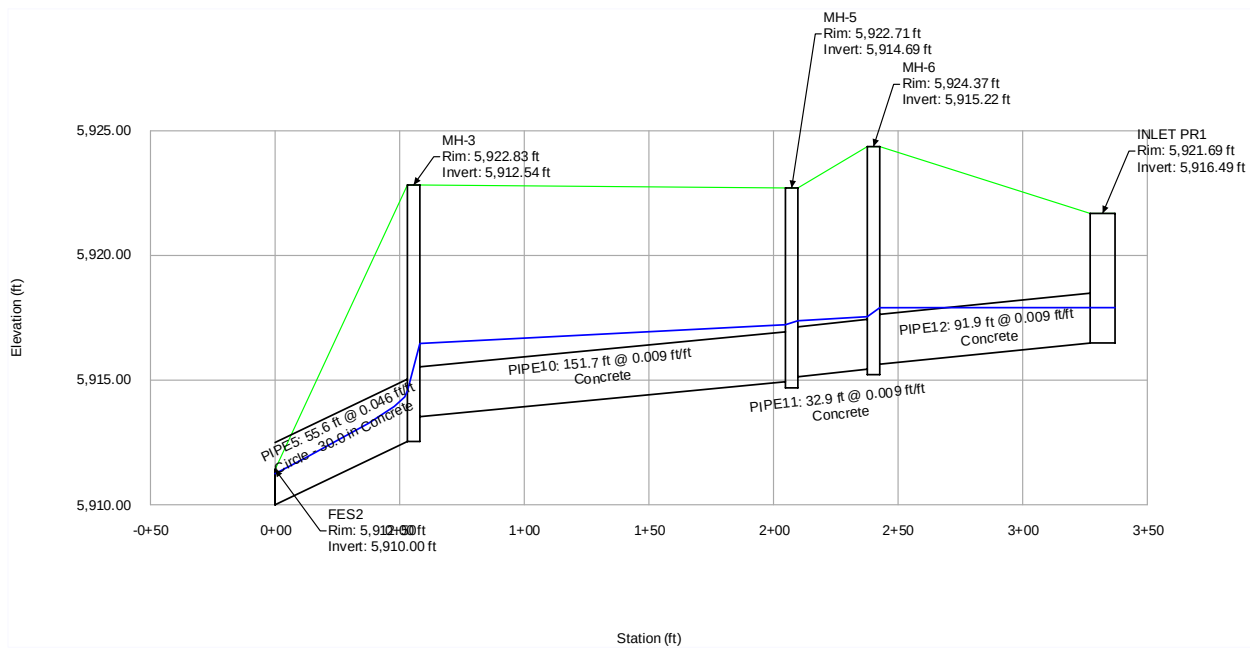
Engineering Profile - STM NW (100-year)



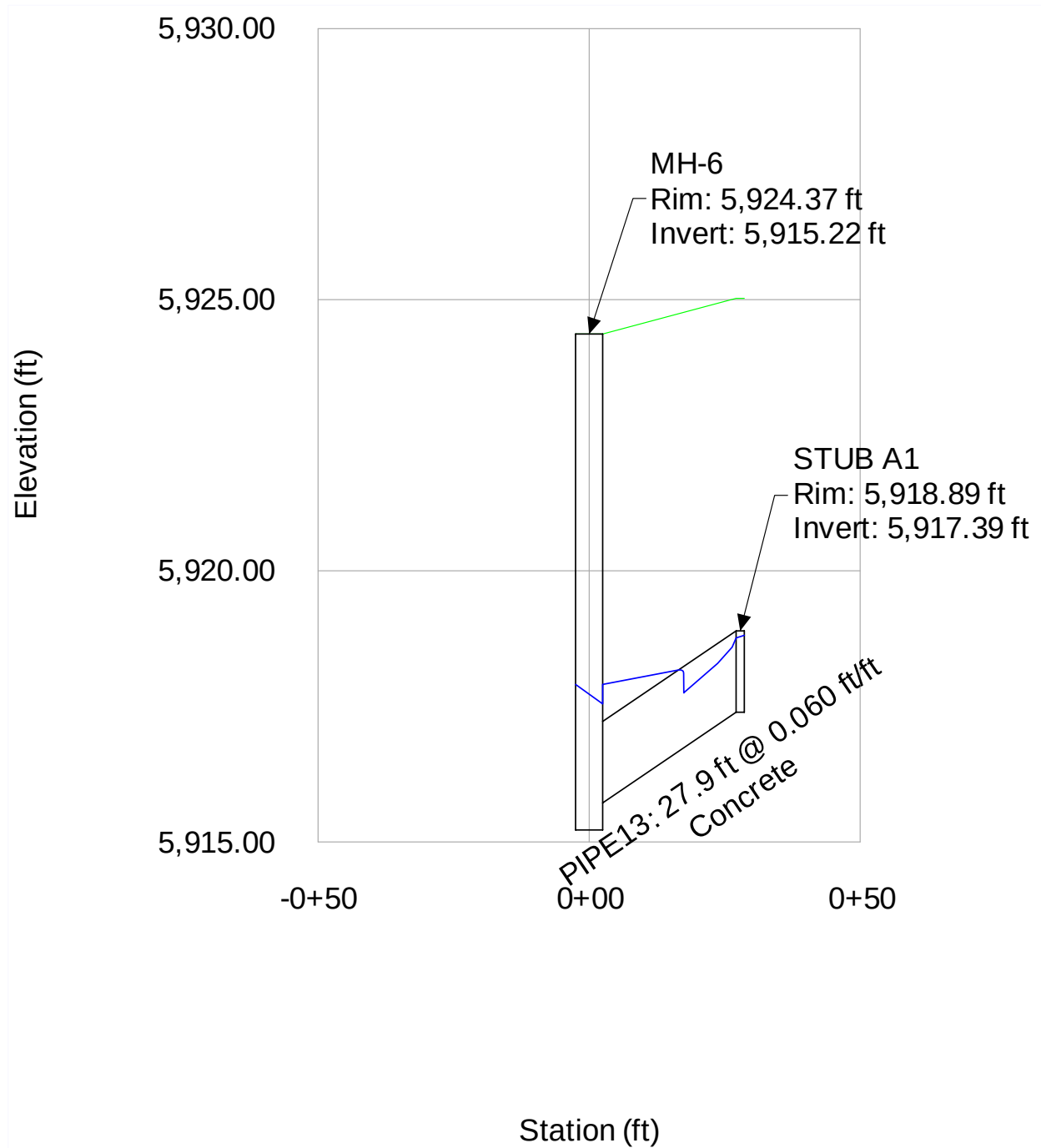
Engineering Profile - STM South (100-year)



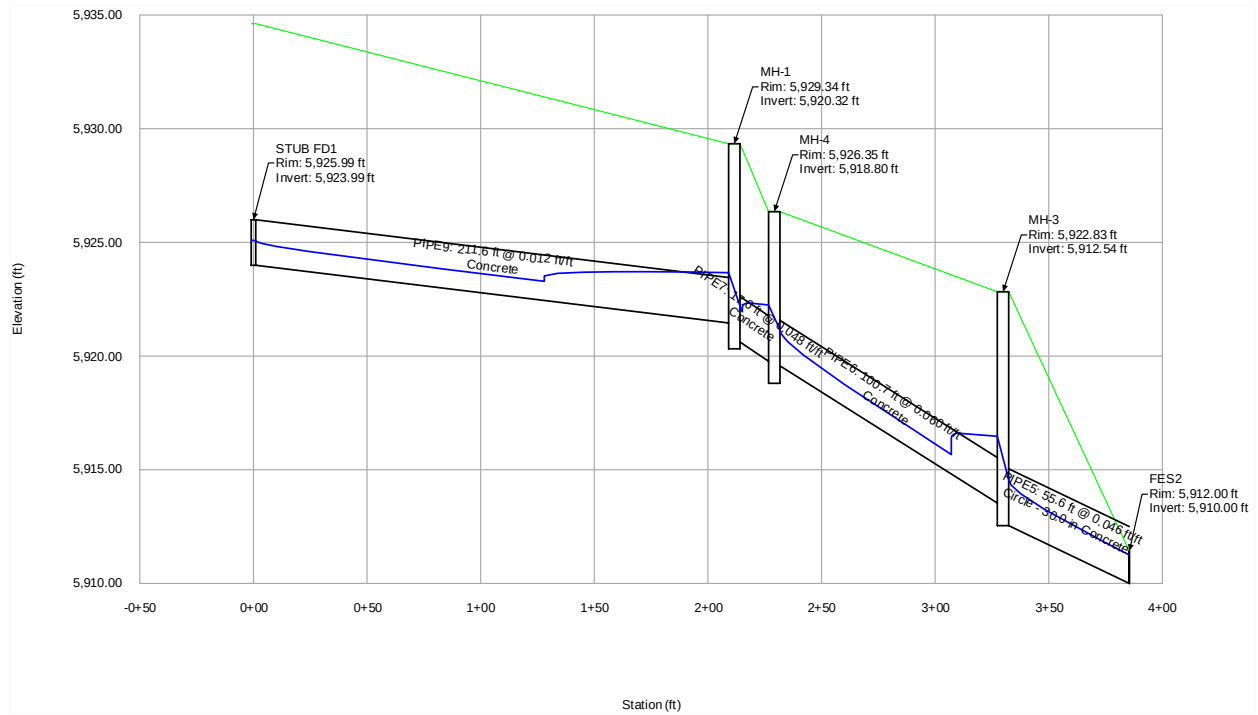
Engineering Profile - STM NE (100-year)



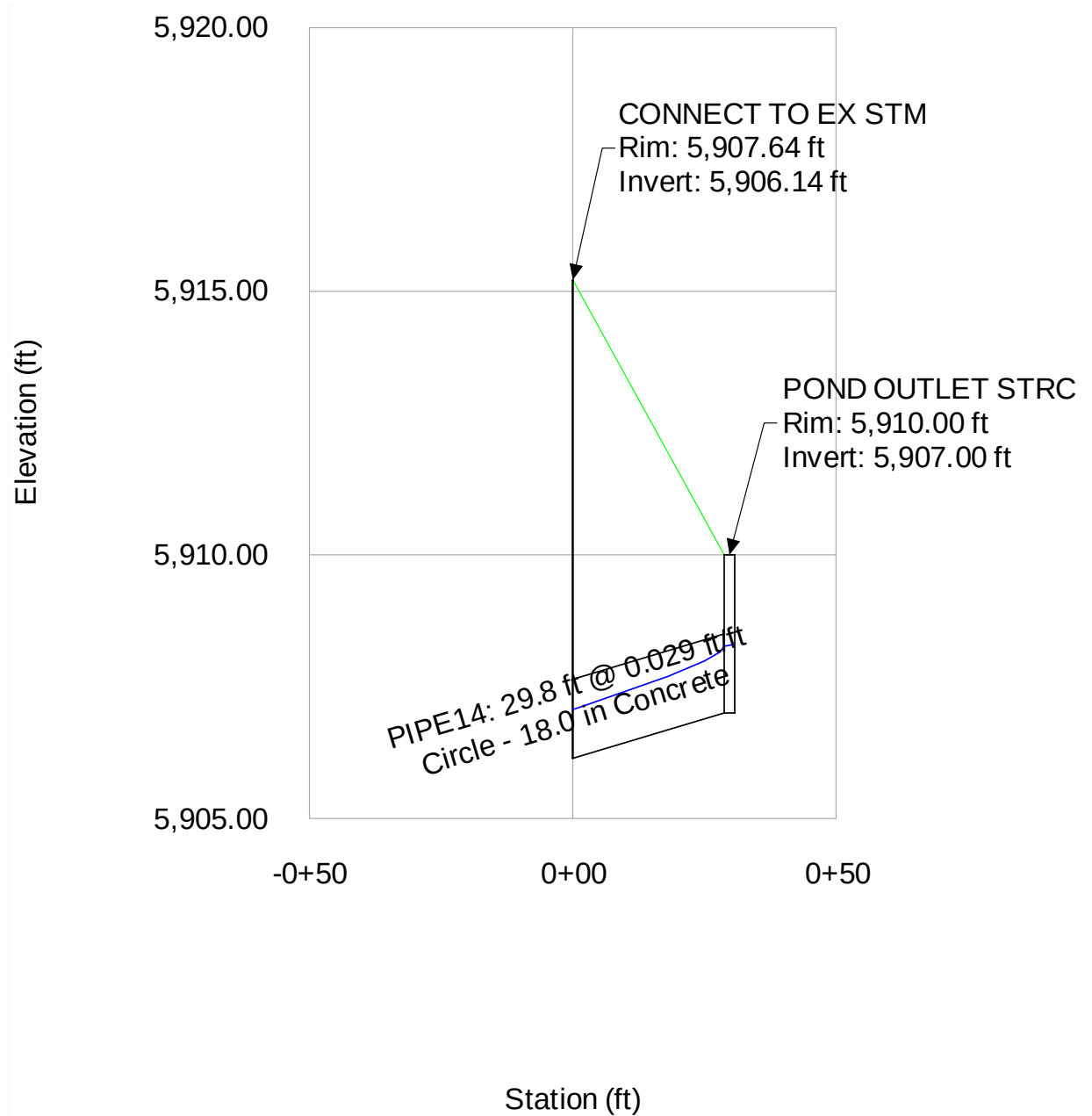
Engineering Profile - STM NE Stub (100-year)



Engineering Profile - STM West (100-year)



Engineering Profile - STM West (100-year)



Engineering Profile - STM Outfall (100-year)

APPENDIX E – MASTER DEVELOPMENT DRAINAGE PLANS

b. The **fully developed conditions** for the site are as follows:

1. **Big Johnson Reservoir:**

Under proposed conditions, developed flows for the westernmost drainage basin (Big Johnson Reservoir) will be directed into a proposed full spectrum detention pond on the west side of the site approximately 2,030 feet south of the intersection of Bradley Road and Powers Boulevard. Sub-basins and Design Points within this major basin are summarized in Tables 3.3, 3.4, and 3.5 below:

Table 3.3 <u>Trails at Aspen Ridge</u> Big Johnson Reservoir Proposed Conditions - Sub-basin Summary			
Basin	Area	Q5	Q100
	acres	cfs	cfs
Big Johnson Reservoir	14.1	21.2	46.8
N			
O	11.7	17.4	38.4
P	8.52	22.0	43.9
Q	2.4	4.2	8.8
OS-2	11.4	1.7	11.7

Table 3.4 <u>Trails at Aspen Ridge</u> Big Johnson Reservoir Proposed Design Point Summary					
Design Point	Sub-Basins	Downstream Design Point	Total Area (ac.)	Q(5) (cfs)	Q(100) (cfs)
N	N	P	14.1	21.2	46.8
O	O	P	11.7	17.4	38.4
P (Into West Pond)	N, O, P	West Pond Discharge	34.7	47.6	101.5
West Pond Discharge (UD-Detention)	N, O, P	Powers Ditch		1.0	28.3
Q	Q	Powers Ditch	2.4	4.9	10.3
OS-2 (This sub-basin is just southeast of the Powers and Bradley intersection. Flows which might have flowed across TAR to the Powers ditch will be diverted to the ditch prior to entering the TAR property.)	OS-2	Powers Ditch	11.4	1.7	11.7

Table 3.8 Trails at Aspen Ridge West Fork - Jimmy Camp Creek Proposed Design Point Flow Description	
Design Point	Description
OS-1	- This design point is at the downstream end of the offsite sub-basin north of Bradley Road. Flows in this sub-basin will sheet flow to the road ditch running along Bradley and Powers Boulevard. Once channelized in the ditch flows will be directed to a proposed 24-inch RCP storm pipe sleeved into one of the existing 42-inch CMP cross road pipes and conveyed on to design point A. - Please note that approximately 7.3 acres of the area tributary to this design point have been diverted from the Big Johnson Reservoir by CDOT construction of Powers Boulevard. Future development of that portion of the tributary sub-basin must redirect these flows to the Big Johnson Reservoir to maintain compliance with the two relevant DBPS reports. - Development of the OS-1 Sub-basin will require onsite detention and an FDR.
A	- This design point is at the manhole (MH-3) receiving flows from DP OS-1 to the north and flows from Sub-basin A captured in the two pairs of inlets on Frontside Drive to the east and west of its intersection with Legacy Drive. These flows will be conveyed on via 30-inch storm pipe to design point B. - Flows from the required onsite detention from the two commercial lots on either side of Legacy Drive will be picked up in the back of the inlets. A 24-inch storm pipe will be stubbed out for the west commercial lot (Inlet 1-A) and an 18-inch will be stubbed out for the east commercial lot (Inlet 3-A).
B	- This design point is at a manhole (MH-108) just downstream of an on-grade inlet (1-B) capturing gutter flows from the west half of Legacy Drive reflected in Sub-basin B. These flows are carried downstream via 30-inch storm pipe to design point C.
C	- This design point is a manhole (MH-6) which combines storm sewer flows from design point B with storm sewer flows from Sub-basin C. Flows in Sub-basin C will sheet flow off the residential lots and into the street curb and gutter. The road gutters will convey these flows on to be captured in four pairs of sump inlets (1-C through 8-C) and conveyed to the design point. The combined flows will be conveyed downstream via 42-inch storm pipe to design point D.
D	- This design point is at a manhole (MH-117) just downstream of an at-grade inlet (1-D) capturing flows from Sub-basin D. Flows in Sub-basin D will sheet flow to the Legacy Road curb and gutter. These gutter flows are captured in the at-grade inlet and combined with storm sewer flows from design point C and carried on via 42-inch storm pipe to design point E.
E	- This design point is located at a manhole (MH-15) just downstream of a pair of sump inlets capturing flows from Sub-basin E. Flows in Sub-basin E will sheet flow across the park area until being captured in the curb and gutter along Falling Rock Drive. Concentrated gutter flows will then be captured by the sump inlets and conveyed on via storm sewer to the design point. These flows will be combined with flows from design point D and carried on via 48-inch storm pipe to design point G.

Project Name:
Project Location:
Designer
Notes:

Trails at Aspen Ridge (Waterview II)
El Paso County, CO
JTS
Proposed Condition

Average Channel Velocity
Average Slope for Initial Flow

4 ft/s
0.04 ft/ft

(If specific channel vel is used, this will be ignored)
(If Elevations are used, this will be ignored)

Channel Flow Type Key						
Heavy Meadow	2					
Tillage/Field	3					
Short Pasture and Lawns	4					
Nearly Bare Ground	5					
Grassed Waterway	6					
Paved Areas	7					

Sub-basin	Comments	Area		Rational 'C' Values														Flow Lengths				Average		Channel Flow		Velocity	Channel	Tc	Rainfall Intensity & Rational Flow Rate					SWMM Values	
		sf	acres	Surface Type 1 Residential 1/8 or less (65% Imp.)			Surface Type 2 Pavement (100% Imp.)			Surface Type 3 Park (7% Imp.)			Surface Type 4 Undeveloped (2% Imp.)			Composite		Percent Impervious	Initial	True Initial	Channel	True Channel	Average (decimal)	Initial	Average (%)	Channel Flow Type (See Key above) Ground Type			Total	i5	Q5	i100	Q100	Q5	Q100
				C5	C100	Area (SF)	C5	C100	Area (SF)	C5	C100	Area	C5	C100	Area	C5	C100		ft	Length ft	ft	Length ft	Slope	Tc (min)	Slope	Ground Type	(ft/s)	Tc (min)	(min)	in/hr	cfs	in/hr	cfs	cfs	cfs
West Fork-Jimmy Camp Creek OS-1	- The most northwestern portion of this basin (7.268 Acres) outside of the proposed Trails at Aspen Ridge development was rerouted out of the Big Johnson Reservoir basin by CDOT construction of Powers Boulevard and Bradley Road. Future development of the rerouted area will require routing the flows back to the Big Johnson Reservoir to return the area to compliance with the relevant DBPS studies.	853,954	19.60	0.45	0.59		0.90	0.96		0.65	0.80		0.09	0.36	853954	0.09	0.36	2.00	780.00	300.00	300.00	780.00	0.10	23.57	1.40	5	1.2	11.0	34.6	2.23	4.0	3.75	26.7	1.1	16.2
A	-Drainage area is upstream of two pairs of inlets near roundabout at intersection of Frontside Dr. and Legacy Dr. -Development of adjacent commercial lots will require FDR and onsite detention. -Note: The Commercial development will have 95% impervious (per DCM), but since it is required to detain prior to discharging to storm sewer the C values reflect undeveloped commercial areas.	804,622	18.47	0.45	0.59	22315	0.90	0.96	78609	0.65	0.80		0.09	0.36	703698	0.18	0.42	13.32	861.00	300.00	869.00	1430.00	0.06	26.77	1.10	7	2.1	11.4	38.1	2.10	7.0	3.54	28.0	5.0	34.6
B	- At grade inlet approximately 400 feet downstream of roundabout.	46,101	1.06	0.45	0.59	46101	0.90	0.96		0.65	0.80		0.09	0.36		0.45	0.59	65.00	185.00	185.00	400.00	400.00	0.04	9.86	3.40	7	3.7	1.8	11.7	3.86	1.9	6.48	4.1	2.5	7.0
C	- Includes the area north of Moose Meadow Street and between Beartrack Point and Sidewinder Drive and four pairs of sump inlets	648,154	14.88	0.45	0.59	627120	0.90	0.96	21034	0.65	0.80		0.09	0.36		0.46	0.60	66.14	162.00	162.00	822.00	822.00	0.05	8.51	3.29	7	3.6	3.8	12.3	3.77	26.3	6.34	57.2	19.5	58.9
D	-drainage area upstream of at grade inlet approximately 575 feet south of Moose Meadow Street.	96,065	2.21	0.45	0.59		0.90	0.96	14,978	0.65	0.80	81087	0.09	0.36		0.69	0.82	21.50	473.00	300.00	555.00	728.00	0.06	8.85	4.00	7	4.0	3.0	11.9	3.83	5.9	6.44	11.8	4.1	14.2
E	- Located at a pair of sump inlets at the intersection of Sunday Gulch and Falling Rock Drive.	373,189	8.57	0.45	0.59	49513	0.90	0.96	40601	0.65	0.80	283075	0.09	0.36		0.65	0.79	24.81	859.00	300.00	1450.00	2009.00	0.07	12.39	4.00	7	4.0	8.4	20.8	2.96	16.6	4.97	33.9	12.8	39.1
F	-Represents area captured by at grade inlets on Lazy Ridge Drive and Wagon Hammer Drive, as well as sump inlets west of the intersection of Lookout Court and Sunday Gulch.	569,234	13.07	0.45	0.59	569234	0.90	0.96		0.65	0.80		0.09	0.36		0.45	0.59	65.00	332.00	300.00	868.00	900.00	0.07	11.14	2.00	7	2.8	5.3	16.4	3.32	19.7	5.57	43.3	15.4	46.2
G	-At grade inlet on the east side of Sunday Gulch near intersection with Lookout Court.	48,227	1.11	0.45	0.59	48227	0.90	0.96		0.65	0.80		0.09	0.36		0.45	0.59	65.00	80.00	80.00	667.00	667.00	0.05	6.12	2.45	7	3.1	3.6	9.7	4.15	2.1	6.97	4.6	2.1	6.1
H	-This represents the area draining to Buffalo Horn Drive with the exception any flow by from the at grade inlets in Sub-basin F.	1,022,296	23.47	0.45	0.59	921233	0.90	0.96	39,492	0.65	0.80	61571	0.09	0.36		0.48	0.62	62.86	250.00	250.00	1074.00	1074.00	0.04	11.13	2.00	7	2.8	6.3	17.5	3.22	36.6	5.42	79.1	26.8	80.4

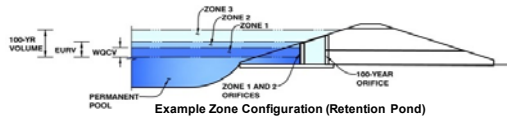
		Area		Rational 'C' Values														Flow Lengths						Channel Flow				Tc	Rainfall Intensity & Rational Flow Rate					SWMM Values	
Sub-basin	Comments	sf	acres	Surface Type 1 Residential 1/8 or less (65% Imp.)			Surface Type 2 Pavement (100% Imp.)			Surface Type 3 Park (7% Imp.)			Surface Type 4 Undeveloped (2% Imp.)			Composite		Percent Impervious	Initial	True	Channel	True Channel	Average (decimal)	Initial	Average (%)	Channel Flow Type (See Key above) Ground Type	Velocity (ft/s)	Channel	Total	i5	Q5	i100	Q100	Q5	Q100
				C5	C100	Area (SF)	C5	C100	Area (SF)	C5	C100	Area	C5	C100	Area	C5	C100		ft	Length ft	ft	Length ft	Slope	Tc (min)	Slope		Tc (min)	(min)	in/hr	cfs	in/hr	cfs		cfs	
I	-Represents area draining to the proposed sump inlet at the end of the cul-de-sac on Falling Rock Drive.	344,236	7.90	0.45	0.59	305401	0.90	0.96	31104	0.65	0.80	7731	0.09	0.36		0.50	0.63	66.86	153.00	153.00	1104.00	1104.00	0.05	7.88	2.61	7	3.2	5.7	13.6	3.62	14.3	6.08	30.4	10.5	31.8
J	-Represents drainage area tributary to sump inlets near intersection of Redshirt Point and Big Johnson Drive.	229,049	5.26	0.45	0.59	70187	0.90	0.96	158,862	0.65	0.80		0.09	0.36		0.76	0.85	89.28	266.00	266.00	909.00	909.00	0.09	4.77	3.20	7	3.6	4.2	9.0	4.27	17.2	7.17	32.2	11.1	32.7
K	-This sub-basin is tributary to the future sump inlets near the intersection of Big Johnson Drive and Roundhouse Drive.	1,414,842	32.48	0.45	0.59	1414842	0.90	0.96		0.65	0.80		0.09	0.36		0.45	0.59	65.00	400.00	300.00	1400.00	1500.00	0.06	13.26	3.50	7	3.7	6.7	19.9	3.02	44.5	5.07	98.0	33.3	101.7
Marksheffel Tributary to Jimmy Camp Creek	-Represents entire drainage area to the Northeast Pond.	330,836	7.59	0.45	0.59	259741	0.90	0.96		0.65	0.80	71095	0.09	0.36		0.49	0.64	52.54	290.00	290.00	490.00	490.00	0.05	10.88	5.40	7	4.6	1.8	12.6	3.73	14.1	6.27	30.5		
West Fork-Jimmy Camp Creek	Drainage area in and around East Full Spectrum Detention Pond	447,971	10.29	0.45	0.59		0.90	0.96		0.65	0.80	447971	0.09	0.36		0.65	0.80	7.00	437.00	300.00	10.00	147.00	0.06	9.32	1.00	7	2.0	1.2	10.5	4.02	27.1	6.75	56.0	14.2	61.8
Big Johnson Reservoir	-Represents area upstream of sump inlets near intersection of Natural Bridge Trail and Blue Miner Street.	614,283	14.10	0.45	0.59	614283	0.90	0.96		0.65	0.80		0.09	0.36		0.45	0.59	65.00	150.00	150.00	1229.00	1229.00	0.03	9.94	2.50	7	3.2	6.5	16.4	3.32	21.2	5.58	46.8		
O	-Represents area upstream of sump inlet at intersection of Rainy Creek Trail and Triple Tree Loop	510,492	11.72	0.45	0.59	510,492	0.90	0.96	0	0.65	0.80	0	0.09	0.36	0	0.45	0.59	65.00	104.00	104.00	1230.00	1230.00	0.02	9.47	1.40	7	2.4	8.7	18.1	3.17	16.8	5.32	37.1		
P	-Drainage area in and around the West Pond.	370,936	8.52	0.45	0.59		0.90	0.96	70,884	0.65	0.80	300052	0.09	0.36		0.70	0.83	24.77	560.00	300.00	378.00	638.00	0.06	9.43	2.00	7	2.8	3.8	13.2	3.67	22.0	6.16	43.9		
Q	-This area is infeasible to detain and discharges to the Powers Boulevard Ditch -Less than one acre (0.31 Acres) of developed area is within the Big Johnson Reservoir Basin, therefore, compliance with the county's MS4 permit is maintained.	106,017	2.43	0.45	0.59	38,063	0.90	0.96	0	0.65	0.80	67,954	0.09	0.36	0	0.58	0.72	27.82	143.00	143.00	687.00	687.00	0.06	6.08	3.35	4	1.3	9.0	15.1	3.45	4.9	5.80	10.3		
R	-This area is infeasible to detain and discharges to the swale at the southeast corner of the property. -Less than one acre (0.67 Acres) of developed area is within the West Fork Jimmy Camp Creek Basin, therefore, compliance with the county's MS4 permit is maintained.	81,300	1.87	0.45	0.59		0.90	0.96		0.65	0.80	81300	0.09	0.36		0.65	0.80	7.00	21.00	21.00	220.00	220.00	0.33	1.16	10.00	5	3.2	1.2	5.0	5.10	6.2	8.58	12.9	1.7	7.8
OS-2	- Commercially zoned lot just southeast of the intersection of Bradley and Powers. This area will be required to provide its own detention which must discharge to the Powers Boulevard Ditch.	498,467	11.44	0.45	0.59		0.90	0.96		0.65	0.80		0.09	0.36	498467	0.09	0.36	2.00	971.00	300.00	1411.00	2082.00	0.04	34.50	2.83	5	1.7	20.7	55.2	1.67	1.7	2.81	11.7		

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge

Basin ID: Approximated future detention for Commercial lot South of Bradley Road and West of Legacy Drive



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	13.43	acres
Watershed Length =	894	ft
Watershed Slope =	0.070	ft/ft
Watershed Imperviousness =	95.00%	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
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.501	acre-feet
Excess Urban Runoff Volume (EURV) =	1.436	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.234	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.600	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	1.926	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	2.252	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	2.517	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	2.867	acre-feet
500-yr Runoff Volume (P1 = 3.55 in.) =	4.110	acre-feet
Approximate 2-yr Detention Volume =	1.158	acre-feet
Approximate 5-yr Detention Volume =	1.504	acre-feet
Approximate 10-yr Detention Volume =	1.831	acre-feet
Approximate 25-yr Detention Volume =	1.964	acre-feet
Approximate 50-yr Detention Volume =	2.037	acre-feet
Approximate 100-yr Detention Volume =	2.102	acre-feet

Optional User Override	1-hr Precipitation
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.55	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.501	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.935	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.666	acre-feet
Total Detention Basin Volume =	2.102	acre-feet
Initial Surcharge Volume (ISV) =	65	ft³
Initial Surcharge Depth (ISD) =	0.33	ft
Total Available Detention Depth (H _{total}) =	4.00	ft
Depth of Trickle Channel (H _{TC}) =	0.50	ft
Slope of Trickle Channel (S _{TC}) =	0.005	ft/ft
Slopes of Main Basin Sides (S _{main}) =	4	H:V
Basin Length-to-Width Ratio (R _{L/W}) =	2	
Initial Surcharge Area (A _{ISV}) =	198	ft²
Surcharge Volume Length (L _{ISV}) =	14.1	ft
Surcharge Volume Width (W _{ISV}) =	14.1	ft
Depth of Basin Floor (H _{100OR}) =	1.22	ft
Length of Basin Floor (L _{100OR}) =	262.3	ft
Width of Basin Floor (W _{100OR}) =	135.8	ft
Area of Basin Floor (A _{100OR}) =	35,621	ft²
Volume of Basin Floor (V _{100OR}) =	15,609	ft³
Depth of Main Basin (H _{MAIN}) =	1.95	ft
Length of Main Basin (L _{MAIN}) =	278.0	ft
Width of Main Basin (W _{MAIN}) =	151.4	ft
Area of Main Basin (A _{MAIN}) =	42,086	ft²
Volume of Main Basin (V _{MAIN}) =	75,793	ft³
Calculated Total Basin Volume (V _{total}) =	2.102	acre-feet

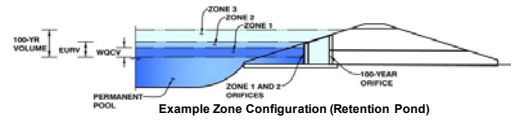
Depth Increment =	0.1	ft							
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	0.00		14.1	14.1	198		0.005		
ISV	0.33		14.1	14.1	198		0.005	63	0.001
	0.40		14.1	14.1	198		0.005	77	0.002
	0.50		14.1	14.1	198		0.005	97	0.002
	0.60		14.1	14.1	198		0.005	117	0.003
	0.70		14.1	14.1	198		0.005	137	0.003
	0.80		14.1	14.1	198		0.005	157	0.004
	0.90		26.3	20.1	528		0.012	186	0.004
	1.00		46.7	30.1	1,405		0.032	279	0.006
	1.10		67.1	40.1	2,690		0.062	480	0.011
	1.20		87.5	50.1	4,383		0.101	830	0.019
	1.30		107.9	60.1	6,484		0.149	1,370	0.031
	1.40		128.3	70.1	8,992		0.206	2,141	0.049
	1.50		148.7	80.1	11,909		0.273	3,182	0.073
	1.60		169.1	90.1	15,234		0.350	4,536	0.104
	1.70		189.5	100.1	18,967		0.435	6,243	0.143
	1.80		209.9	110.1	23,108		0.530	8,343	0.192
	1.90		230.3	120.1	27,656		0.635	10,878	0.250
	2.00		250.7	130.1	32,613		0.749	13,888	0.319
Floor	2.05		260.9	135.1	35,245		0.809	15,584	0.358
	2.10		262.8	136.2	35,790		0.822	17,724	0.407
	2.20		263.6	137.0	36,110		0.829	21,319	0.489
Zone 1 (WQCV)	2.22		263.7	137.2	36,174		0.830	22,042	0.506
	2.30		264.4	137.8	36,431		0.836	24,946	0.573
	2.40		265.2	138.6	36,753		0.844	28,605	0.657
	2.50		266.0	139.4	37,077		0.851	32,297	0.741
	2.60		266.8	140.2	37,402		0.859	36,021	0.827
	2.70		267.6	141.0	37,728		0.866	39,777	0.913
	2.80		268.4	141.8	38,056		0.874	43,566	1.000
	2.90		269.2	142.6	38,384		0.881	47,388	1.088
	3.00		270.0	143.4	38,715		0.889	51,243	1.176
	3.10		270.8	144.2	39,046		0.896	55,131	1.266
	3.20		271.6	145.0	39,378		0.904	59,053	1.356
Zone 2 (EURV)	3.29		272.3	145.7	39,679		0.911	62,610	1.437
	3.30		272.4	145.8	39,712		0.912	63,007	1.446
	3.40		273.2	146.6	40,048		0.919	66,995	1.538
	3.50		274.0	147.4	40,384		0.927	71,017	1.630
	3.60		274.8	148.2	40,722		0.935	75,072	1.723
	3.70		275.6	149.0	41,061		0.943	79,161	1.817
	3.80		276.4	149.8	41,401		0.950	83,284	1.912
	3.90		277.2	150.6	41,743		0.958	87,441	2.007
Zone 3 (100-year)	4.00		278.0	151.4	42,086		0.966	91,633	2.104
	4.10		278.8	152.2	42,430		0.974	95,858	2.201
	4.20		279.6	153.0	42,775		0.982	100,119	2.298
	4.30		280.4	153.8	43,122		0.990	104,413	2.397
	4.40		281.2	154.6	43,470		0.998	108,743	2.496
	4.50		282.0	155.4	43,819		1.006	113,107	2.597
	4.60		282.8	156.2	44,170		1.014	117,507	2.698
	4.70		283.6	157.0	44,521		1.022	121,941	2.799
	4.80		284.4	157.8	44,874		1.030	126,411	2.902
	4.90		285.2	158.6	45,229		1.038	130,916	3.005
	5.00		286.0	159.4	45,585		1.046	135,457	3.110
	5.10		286.8	160.2	45,941		1.055	140,033	3.215
	5.20		287.6	161.0	46,300		1.063	144,645	3.321
	5.30		288.4	161.8	46,659		1.071	149,293	3.427
	5.40		289.2	162.6	47,020		1.079	153,977	3.535
	5.50		290.0	163.4	47,382		1.088	158,697	3.643
	5.60		290.8	164.2	47,745		1.096	163,454	3.752
	5.70		291.6	165.0	48,110		1.104	168,246	3.862
	5.80		292.4	165.8	48,476		1.113	173,076	3.973
	5.90		293.2	166.6	48,843		1.121	177,942	4.085

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge

Basin ID: West Fork of Jimmy Camp Creek: East Pond(located in Sub-basin M)



Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	157.90	acres
Watershed Length =	3.742	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	45.40%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	87.0%	percent
Percentage Hydrologic Soil Groups C/D =	13.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	2.553	acre-feet
Excess Urban Runoff Volume (EURV) =	7.491	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	6.103	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	8.512	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	11.664	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	16.728	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	20.230	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	24.794	2.52 inches
500-yr Runoff Volume (P1 = 3.55 in.) =	38.509	3.55 inches
Approximate 2-yr Detention Volume =	5.710	acre-feet
Approximate 5-yr Detention Volume =	7.997	acre-feet
Approximate 10-yr Detention Volume =	10.523	acre-feet
Approximate 25-yr Detention Volume =	11.595	acre-feet
Approximate 50-yr Detention Volume =	12.129	acre-feet
Approximate 100-yr Detention Volume =	13.732	acre-feet

Stage-Storage Calculation

Zone 1 Volume (V_{QVCV}) =	2.553	acre-feet
Zone 2 Volume ($E_{URV} - \text{Zone 1}$) =	4.938	acre-feet
Zone 3 Volume ($100\text{-year} - \text{Zones 1 \& 2}$) =	6.241	acre-feet
Total Detention Basin Volume =	13.732	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_{ov}) =	user	ft ²
Surcharge Volume Length (L_{ov}) =	user	ft
Surcharge Volume Width (W_{ov}) =	user	ft
Depth of Basin Floor (H_{flood}) =	user	ft
Length of Basin Floor (L_{flood}) =	user	ft
Width of Basin Floor (W_{flood}) =	user	ft
Area of Basin Floor (A_{flood}) =	user	ft ²
Volume of Basin Floor (V_{flood}) =	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

[illegible]



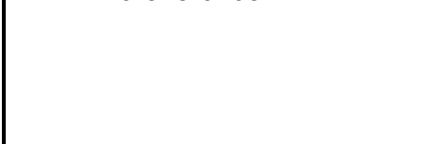
Trails at Aspen Ridge Big Johnson Reservoir Proposed Design Point Summary					
Design Point	Sub-Basins	Downstream Design Point	Total Area (ac.)	Q(5) (cfs)	Q(100) (cfs)
N	N	P	14.1	21.2	46.8
O	O	P	11.7	16.8	37.1
P (Into West Pond)	N, O, P	West Pond Discharge	34.3	47.1	100.6
West Pond Discharge (UD-Detention)	N, O, P	Powers Ditch		1.0	28.3
Q	O	Powers Ditch	2.4	4.9	10.3
OS-2	OS-2	Powers Ditch	11.4	1.7	11.7

Trails at Aspen Ridge Marksheffel Tributary to Jimmy Camp Creek Proposed Design Point Summary					
Design Point	Sub-Basins	Downstream Design Point	Total Area (ac.)	Q(5) (cfs)	Q(100) (cfs)
L	L	Northeast Pond Discharge	7.6	14.1	30.5
Northeast Pond Discharge	L	Bradley Road Ditch	0.3	0.8	8
BR1	BR1	Bradley Road Ditch	0.3	0.8	1.6
BR2	BR2	Bradley Road Ditch	2.8	2.9	7.4

VERTICAL BENCHMARK:

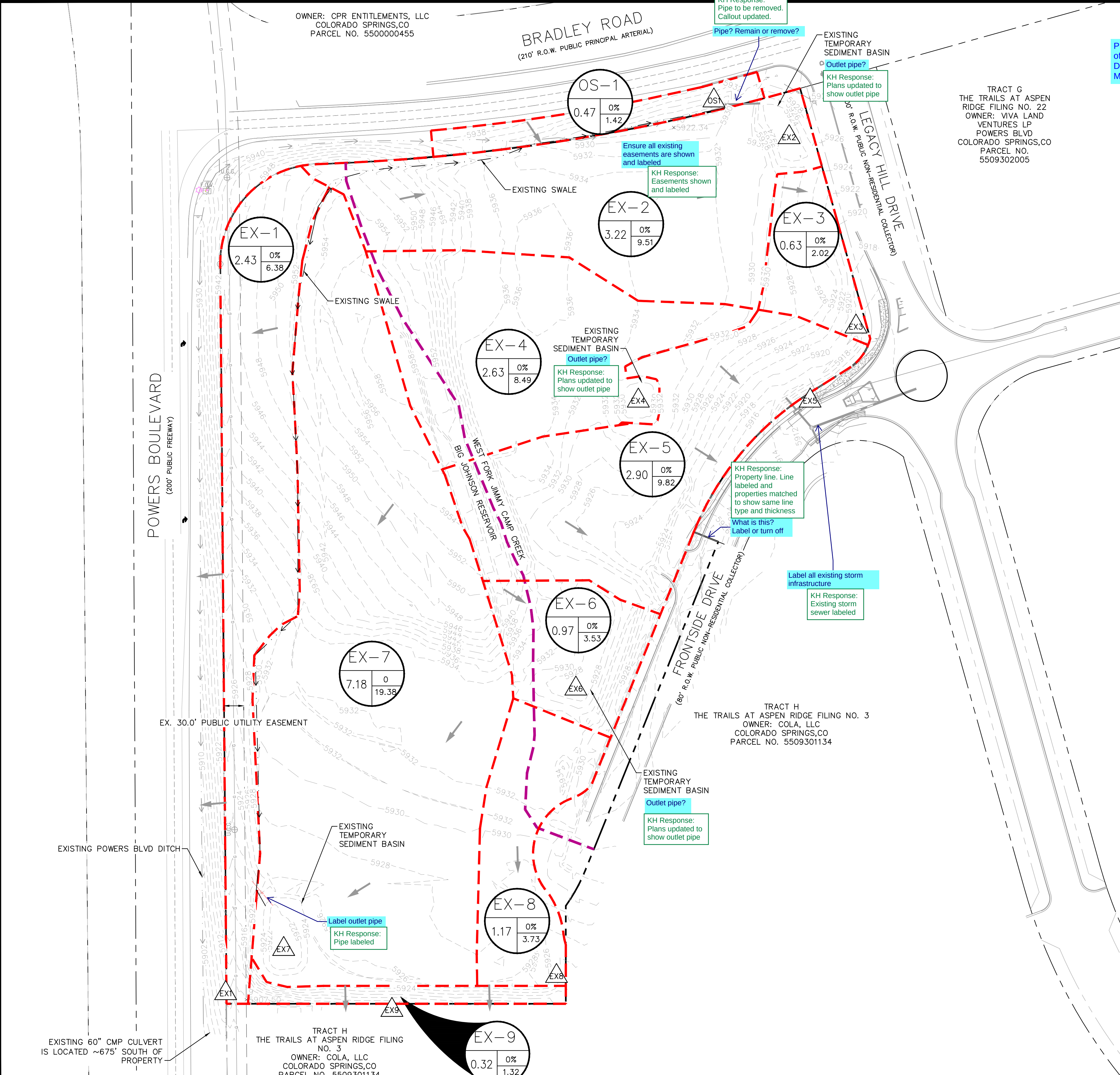
BASIS OF BEARING:

PREPARED UNDER MY
DIRECT SUPERVISION, FOR
AND ON BEHALF OF MATRIX
DESIGN GROUP, INC.

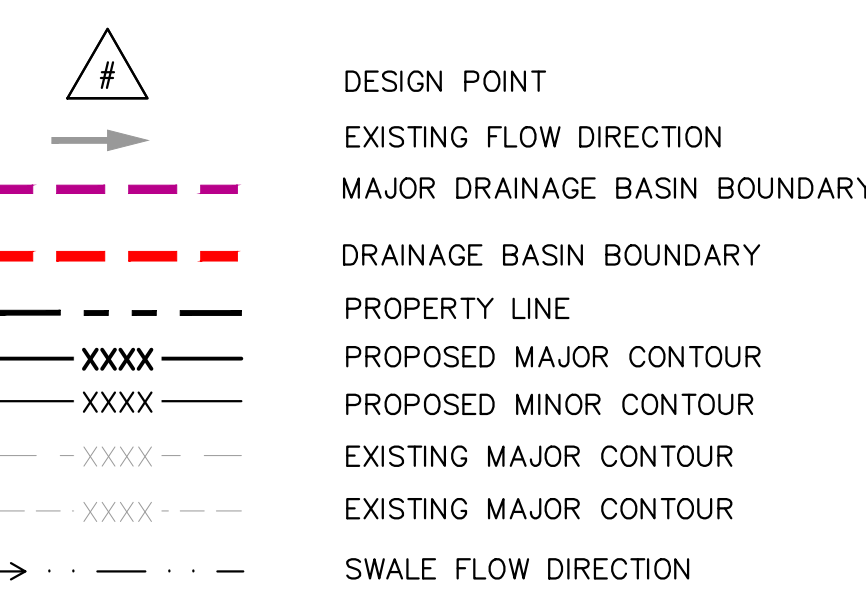
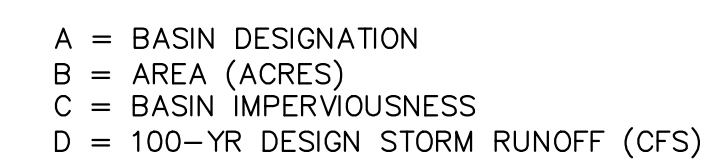


COLA, LLC.			
TRAILS AT ASPEN RIDGE: FILING #1 & PUD			
MDDP-AMENDMENT & PRELIMINARY DRAINAGE REPORT			
DESIGNED BY: JTS DRAWN BY: JTS CHECKED BY: JTS	SCALE	DATE ISSUED: September 2019 HORIZ VERT. SHEET NO. 2 OF 2 SHEETS	DR-02

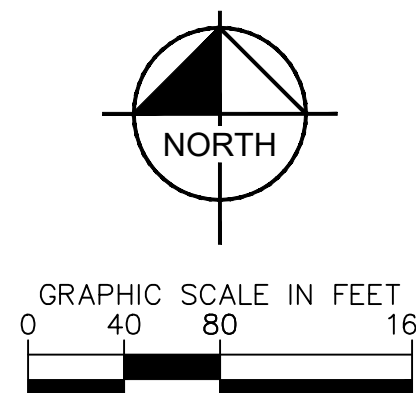
APPENDIX F – DRAINAGE EXHIBITS



KH Response:
Paths shown and
labeled



SUMMARY - PROPOSED RUNOFF TABLE						
DESIGN POINT	BASIN DESIGNATION	BASIN AREA (ACRES)	DIRECT 5-YR RUNOFF (CFS)	DIRECT 100-YR RUNOFF (CFS)	CUMMULATIVE 5-YR RUNOFF (CFS)	CUMMULATIVE 100-YR RUNOFF (CFS)
EX1	EX1	2.43	1.00	6.38	1.00	6.38
EX2	EX2	3.22	1.49	9.51	9.51	9.51
EX3	EX3	0.63	0.32	2.02	0.32	2.02
EX4	EX4	2.63	1.33	8.49	1.33	8.49
EX5	EX5	2.90	1.54	9.82	1.54	9.82
EX6	EX6	0.97	0.55	3.53	0.55	3.53
EX7	EX7	7.18	3.03	19.38	0.00	0.00
EX8	EX8	1.17	0.58	3.73	0.58	3.73
EX9	EX9	0.32	0.21	1.32	0.21	1.32



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

WATERVIEW EAST COMMERCIAL

CONSTRUCTION DOCUMENTS

EXISTING DRAINAGE MAP

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

PROJECT NO.
196195000

SHEET

DR-EX

V2_Drainage Report - Final.pdf Markup Summary

7/24/2026 1:41:37 PM (1)

Subject: Callout
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 1:41:37 PM
Status:
Color: 
Layer:
Space:

Appendix B

KH Response:
Text updated

7/24/2026 1:42:45 PM (1)

Subject: Line
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 1:42:45 PM
Status:
Color: 
Layer:
Space:

KH Response:
Text updated

7/24/2026 2:00:24 PM (1)

Subject: Line
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 2:00:24 PM
Status:
Color: 
Layer:
Space:

KH Response:
Text updated

7/24/2026 2:10:26 PM (1)

Subject: Callout
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 2:10:26 PM
Status:
Color: 
Layer:
Space:

Project not located within Sand Creek basin.
Please revise.

7/24/2026 2:10:35 PM (1)

Subject: Line
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 2:10:35 PM
Status:
Color: 
Layer:
Space:

KH Response:
Text updated
to Appendix E

7/24/2026 2:10:47 PM (1)

age Basin Planning
are has not been on
ix. **Appendix E**

RAINAGE REPO

Subject: Callout
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 2:10:47 PM
Status:
Color: 
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Appendix E

KH Response:
Text updated
to Appendix E

7/24/2026 2:24:29 PM (1)

Drainage Plan Amendment for "Ridge" Prepared by: Matrix Design, Inc. The "East Pond" was sized Bradley Road and West of Lega of the Site represented in this FI **existing storm sewer stub** in the are 1.3 cfs and 19.4 cfs in the 5- and 100-year release rate from respectively.

As noted in the Master Drainage

Subject: Highlight
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 2:24:29 PM
Status:
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existing storm sewer stub

KH Response:
Size included.
specified as public

7/24/2026 2:39:01 PM (1)

image shows ov
per historic dr
nd **1.42 cfs** res

Subject: Highlight
Page Label: 7
Author: Laura Besler
Date: 7/24/2026 2:39:01 PM
Status:
Color: 
Layer:
Space:

1.42 cfs

KH Response:
Values revised
to match data
in Appendix C

7/24/2026 2:40:41 PM (1)

to the sou
re **0.22** cf:

Subject: Highlight
Page Label: 7
Author: Laura Besler
Date: 7/24/2026 2:40:41 PM
Status:
Color: 
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Space:

0.22

KH Response:
Values revised
to match data
in Appendix C

7/24/2026 2:40:45 PM (1)

ie souln
22 cfs ar

Subject: Highlight
Page Label: 7
Author: Laura Besler
Date: 7/24/2
Status:
Color: 
Layer:
Space:

cfs

KH Response:
Values revised
to match data
in Appendix C

7/24/2026 2:56:24 PM (1)

Site a watershed water quality assessment for the site, project water is contained within the watershed.

Watershed Assessment Report - 2/2021

The Watershed Assessment Report is a part of the State Department of Environmental Protection's Watershed Assessment Program. The report provides information on the watershed's water quality, land use, and other factors that affect the watershed's health. The report is used to develop a watershed management plan and to monitor the watershed's health over time.

Watershed Assessment Report - 2/2021

Subject: Callout
Page Label: 5
Author: Laura Besler
Date: 7/24/2026 2:56:24 PM
Status:
Color: 
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Please include size and specify whether private or public

KH Response:
Size included.
specified as
private/public

7/24/2026 2:56:39 PM (1)

is overland
adside ditch
ing 60" CMP
00-year

Subject: Highlight
Page Label: 6
Author: Laura Besler
Date: 7/24/2026 2:56:39 PM
Status:
Color: 
Layer:
Space:

60" CMP

7/24/2026 3:00:27 PM (1)

age flows over
existing roadside
an existing 60
ar and 100-yea

Subject: Highlight
Page Label: 6
Author: Laura Besler
Date: 7/24/2026 3:00:27 PM
Status:
Color: 
Layer:
Space:

existing

KH Response:
Size included.
specified as public

7/24/2026 3:13:12 PM (1)


Sub-Basin PR2
The on-site sub-basin PR2 con:
0.26 acres and a weighted imp:
curb and gutter and routed to i

Subject: Callout
Page Label: 9
Author: Laura Besler
Date: 7/24/2026 3:13:12 PM
Status:
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Layer:
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0.61 acres

7/24/2026 3:27:38 PM (1)

Sub-Basin PR
The on-site sub
~~0.26 acres~~ and
curb and gutter
discharge to th

Subject: Line
Page Label: 9
Author: Laura Besler
Date: 7/24/2026 3:27:38 PM
Status:
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Layer:
Space:

KH Response:
Text updated

7/24/2026 3:34:45 PM (1)

using to typ
sin will follow l
and 4.63 cfs re:
unity Engineer

Subject: Line
Page Label: 9
Author: Laura Besler
Date: 7/24/2026 3:34:45 PM
Status:
Color: 
Layer:
Space:

KH Response:
Values revised to match
data in Appendix C

7/24/2026 4:03:37 PM (1)


ECT 5-YR DIRECT 10
IOFF (CFS) RUNOFF /

Subject: Line
Page Label: 29
Author: Laura Besler
Date: 7/24/2026 4:03:37 PM
Status:
Color: 
Layer:
Space:

7/24/2026 4:28:54 PM (1)

McDonald's - L
~~Proposed Run~~
(Rational Method

Subject: Line
Page Label: 28
Author: Laura Besler
Date: 7/24/2026 4:28:54 PM
Status:
Color: 
Layer:
Space:

KH Response
 Text updated

KH Response:
Text updated

7/24/2026 4:28:57 PM (1)

Existing

Subject: Callout
Page Label: 28
Author: Laura Besler
Date: 7/24/2026 4:28:57 PM
Status:
Color: 
Layer:
Space:

KH Response
Text update

KH Response:
Text updated

Existing

7/24/2026 4:29:04 PM (1)

WATERVIEW EAST COMMERCIAL FINAL PLAT 1							
McDonald's - Drainage Report						Design Date: 10/20/2017	
Proposed Runoff Calculations							
Rational Method Procedure							
BASIN INFORMATION				DESIGN RUNOFF			
DESIGN POINT	DRAIN BASIN	AREA, AC	RUNOFF COEFF	TD, IN	CA, H	T, MIN	Q, CFS
000	000	2.63	0.66	1.73	3.00	0.80	1.0

Subject: Callout
Page Label: 28
Author: Laura Besler
Date: 7/24/2026 4:29:04 PM
Status:
Color: 
Layer: KH Response:
Space: Text updated

KH Response:
Text updated

Waterview East Commercial Final Plat 1

7/24/2026 4:29:22 PM (1)

Existing

Subject: Callout
Page Label: 27
Author: Laura Besler
Date: 7/24/2026 4:29:22 PM
Status:
Color: 
Layer:
Space:

KH Response
Text updated

KH Response:
Text updated

Existing

7/24/2026 4:29:29 PM (1)

Waterview East Commercial Final Plat 1					
McDonald's - Drainage Report Proposed Runoff Calculations (Rational Method Procedure)				Design storm: 5	
Inputs/Assumptions				Output/Results	
Drainage Area (A)	Runoff Coefficient (C)	Runoff Time (T _r)	Peak Runoff (Q _p)	Peak Discharge (Q _p)	Peak Discharge (Q _p)
0.000	0.000	0.000	0.000	0.000	0.000

Subject: Callout
Page Label: 27
Author: Laura Besler
Date: 7/24/2026 4:29:29 PM
Status:
Color: 
Layer:
Space:

KH Response
Text updated

KH Response:
Text updated

Waterview East Commercial Final Plat 1

7/24/2026 4:29:34 PM (1)

~~McDonald's - Dra~~
Proposed Runoff
(Rational Method Proc

Subject: Line
Page Label: 27
Author: Laura Besler
Date: 7/24/2026 4:29:34 PM
Status:
Color: 
Layer:
Space:

KH Response
Text updated

KH Response:
Text updated

7/24/2026 4:29:39 PM (1)

McDonald's - I
Proposed Runoff
(Rational Method)

Subject: Line
Page Label: 27
Author: Laura Besler
Date: 7/24/2026 4:29:39 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Text updated

7/24/2026 4:29:45 PM (1)

McDonald's - Dra
Proposed Runoff
Time of Concentr

Subject: Line
Page Label: 26
Author: Laura Besler
Date: 7/24/2026 4:29:45 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Text updated

7/24/2026 4:29:51 PM (1)

Existing

Subject: Callout
Page Label: 26
Author: Laura Besler
Date: 7/24/2026 4:29:51 PM
Status:
Color: ■
Layer:
Space:

Existing

KH Response:
Text updated

7/24/2026 4:29:54 PM (1)

McDonald's - I
Proposed Run
Time of Conce

Subject: Line
Page Label: 26
Author: Laura Besler
Date: 7/24/2026 4:29:54 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Text updated

7/24/2026 4:30:02 PM (1)

Waterview East Commercial Final Plat 1

Appendix 1: Stormwater Report									
Proposed Runoff Calculations									
Area of Watershed: 10.0000									
Slope: 0.0000									
Time of Concentration: 0.0000									
Runoff Coefficient: 0.0000									
Peak Runoff: 0.0000									
Average Rainfall: 0.0000									
Total Runoff: 0.0000									

Subject: Callout
Page Label: 26
Author: Laura Besler
Date: 7/24/2026 4:30:02 PM
Status:
Color: ■
Layer:
Space:

Waterview East Commercial Final Plat 1

KH Response:
Text updated

7/24/2026 4:30:23 PM (1)

Waterview East Commercial Final Plat 1

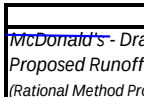
Appendix 1: Stormwater Report									
Proposed Runoff Calculations									
Area of Watershed: 10.0000									
Slope: 0.0000									
Time of Concentration: 0.0000									
Runoff Coefficient: 0.0000									
Peak Runoff: 0.0000									
Average Rainfall: 0.0000									
Total Runoff: 0.0000									

Subject: Callout
Page Label: 32
Author: Laura Besler
Date: 7/24/2026 4:30:23 PM
Status:
Color: ■
Layer:
Space:

Waterview East Commercial Final Plat 1

KH Response:
Text updated

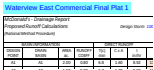
7/24/2026 4:30:31 PM (1)



Subject: Line
Page Label: 32
Author: Laura Besler
Date: 7/24/2026 4:30:31 PM
Status:
Color:
Layer:
Space:

KH Response:
Text updated

7/24/2026 4:30:35 PM (1)

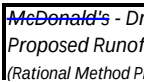


Subject: Callout
Page Label: 33
Author: Laura Besler
Date: 7/24/2026 4:30:35 PM
Status:
Color:
Layer:
Space:

Waterview East Commercial Final Plat 1

KH Response:
Text updated

7/24/2026 4:30:40 PM (1)



Subject: Line
Page Label: 33
Author: Laura Besler
Date: 7/24/2026 4:30:40 PM
Status:
Color:
Layer:
Space:

KH Response:
Text updated

7/27/2026 9:00:05 AM (1)



Subject: Cloud+
Page Label: 25
Author: Laura Besler
Date: 7/27/2026 9:00:05 AM
Status:
Color:
Layer:
Space:

For Paved and HSG A&B:

C10=0.92
C100=0.96

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

KH Response:
Spreadsheet updated

7/27/2026 9:00:46 AM (1)



Subject: Cloud+
Page Label: 25
Author: Laura Besler
Date: 7/27/2026 9:00:46 AM
Status:
Color:
Layer:
Space:

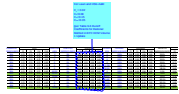
For Lawn and HSG A&B:

C2 = 0.02
C5=0.08
C10=0.15
C100=0.35

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

KH Response:
Spreadsheet updated

7/27/2026 9:06:02 AM (1)



Subject: Cloud+
Page Label: 30
Author: Laura Besler
Date: 7/27/2026 9:06:02 AM
Status:
Color: 
Layer:
Space:

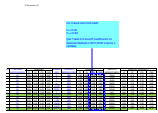
KH Response:
Spreadsheet updated

For Lawn and HSG A&B:

C2 = 0.02
C5=0.08
C10=0.15
C100=0.35

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

7/27/2026 9:06:34 AM (1)



Subject: Cloud+
Page Label: 30
Author: Laura Besler
Date: 7/27/2026 9:06:34 AM
Status:
Color: 
Layer:
Space:

KH Response:
Spreadsheet updated

For Paved and HSG A&B:

C10=0.92
C100=0.96

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

7/27/2026 10:30:33 AM (1)

0.76

Subject: Highlight
Page Label: 33
Author: Laura Besler
Date: 7/27/2026 10:30:33 AM
Status:
Color: 
Layer:
Space:

0.76

7/27/2026 10:33:25 AM (1)

0.53

Subject: Highlight
Page Label: 33
Author: Laura Besler
Date: 7/27/2026 10:33:25 AM
Status:
Color: 
Layer:
Space:

KH Response:
Formula updated to
match values
calculated in table on
pg. 31

7/27/2026 10:36:51 AM (1)

5.33

Subject: Highlight
Page Label: 33
Author: Laura Besler
Date: 7/27/2026 10:36:51 AM
Status:
Color: 
Layer:
Space:

KH Response:
Formula updated

5.33

7/27/2026 11:00:05 AM (1)

5,921.69
5,919.42
5,910.00

Subject: Highlight
Page Label: 49
Author: Laura Besler
Date: 7/27/2026 11:00:05 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,919.42

7/27/2026 11:03:28 AM (1)			
5,919.42	Subject: Highlight Page Label: 49 Author: Laura Besler Date: 7/27/2026 11:03:28 AM Status: Color: Layer: Space:	KH Response: Values updated to match what is shown in plans	5,910.00
5,910.00			
5,918.89			

7/27/2026 11:10:38 AM (1)			
5,921.00	FL	Subject: Highlight Page Label: 49 Author: Laura Besler Date: 7/27/2026 11:10:38 AM Status: Color:  Layer: Space: KH Response: Values updated to match what is shown in plans	5,923.99
5,922.00	FL		
5,923.99	FL		
5,924.80	FL		

7/27/2026 11:26:11 AM (1)			
(Stop)		Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:26:11 AM Status: Color:  Layer: Space:	5,910.00
(ft)			
5,910.00			
5,913.79			
5,914.24			
KH Response: Values updated to match what is shown in plans			

7/27/2026 11:26:13 AM (1)			
(ft)		Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:26:13 AM Status: Color:  Layer: Space:	104.6
104.6			
8.9			
KH Response: Values updated to match what is shown in plans			

7/27/2026 11:26:15 AM (1)

(ft/ft)		Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:26:15 AM Status: Color:  Layer: Space:	0.033
0.033			
0.028			

KH Response:
Values updated
to match what is
shown in plans

7/27/2026 11:27:36 AM (1)			
5,910.00	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:27:36 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	5,917.71
5,914.34			
5,917.71			
5,910.00			
5,912.52			

7/27/2026 11:27:40 AM (1)		
0.028	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:27:40 AM Status: Color:  Layer: Space:	0.045
0.045		KH Response: Values updated to match what is shown in plans
0.046		

7/27/2026 11:31:22 AM (1)		
5,917.71	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:31:22 AM Status: Color:  Layer: Space:	5,910.00
5,910.00		KH Response: Values updated to match what is shown in plans
5,913.53		
5,910.77		

7/27/2026 11:31:26 AM (1)		
157.8	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:31:26 AM Status: Color:  Layer: Space:	55.6
55.6		KH Response: Values updated to match what is shown in plans
100.7		

7/27/2026 11:31:29 AM (1)		
0.045	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:31:29 AM Status: Color:  Layer: Space:	0.046
0.046		KH Response: Values updated to match what is shown in plans
0.060		

7/27/2026 11:32:23 AM (1)		
100.7	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:32:23 AM Status: Color:  Layer: Space:	17.6
17.6		KH Response: Values updated to match what is shown in plans
34.5		

7/27/2026 11:32:25 AM (1)		
0.060	Subject: Highlight Page Label: 50 Author: Laura Besler Date: 7/27/2026 11:32:25 AM Status: Color:  Layer: Space:	0.048
0.048		KH Response: Values updated to match what is shown in plans
0.011		

7/27/2026 11:33:03 AM (1)

17.6
34.5
211.6

Subject: Highlight
Page Label: 50
Author: Laura Besler
Date: 7/27/2026 11:33:03 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

34.5

7/27/2026 11:33:07 AM (1)

0.048
0.011
0.012

Subject: Highlight
Page Label: 50
Author: Laura Besler
Date: 7/27/2026 11:33:07 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

0.011

7/27/2026 11:34:06 AM (1)

5,922.00
5,923.99
5,914.94
5,915.44

Subject: Highlight
Page Label: 50
Author: Laura Besler
Date: 7/27/2026 11:34:06 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,923.99

7/27/2026 11:39:01 AM (1)

29.8

Subject: Highlight
Page Label: 50
Author: Laura Besler
Date: 7/27/2026 11:39:01 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

29.8

7/27/2026 11:39:03 AM (1)

0.000
0.029

Subject: Highlight
Page Label: 50
Author: Laura Besler
Date: 7/27/2026 11:39:03 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

0.029

7/27/2026 11:41:13 AM (1)

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

5 Year			
Station	Profile	Plan	Notes
1+00.00	10.00	10.00	10.00
1+01.00	10.00	10.00	10.00
1+02.00	10.00	10.00	10.00
1+03.00	10.00	10.00	10.00
1+04.00	10.00	10.00	10.00
1+05.00	10.00	10.00	10.00
1+06.00	10.00	10.00	10.00
1+07.00	10.00	10.00	10.00
1+08.00	10.00	10.00	10.00
1+09.00	10.00	10.00	10.00
1+10.00	10.00	10.00	10.00

Subject: Callout
Page Label: 49
Author: Laura Besler
Date: 7/27/2026 11:41:13 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

7/27/2026 11:41:17 AM (1)

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

Contract Table - Time & Effort					
Activity	Unit	Quantity	Unit Price	Total Price	Notes
1.00	hr	1.00	100.00	100.00	
2.00	hr	2.00	100.00	200.00	
3.00	hr	3.00	100.00	300.00	
4.00	hr	4.00	100.00	400.00	
5.00	hr	5.00	100.00	500.00	
6.00	hr	6.00	100.00	600.00	
7.00	hr	7.00	100.00	700.00	
8.00	hr	8.00	100.00	800.00	
9.00	hr	9.00	100.00	900.00	
10.00	hr	10.00	100.00	1,000.00	
11.00	hr	11.00	100.00	1,100.00	
12.00	hr	12.00	100.00	1,200.00	
13.00	hr	13.00	100.00	1,300.00	
14.00	hr	14.00	100.00	1,400.00	
15.00	hr	15.00	100.00	1,500.00	
16.00	hr	16.00	100.00	1,600.00	
17.00	hr	17.00	100.00	1,700.00	
18.00	hr	18.00	100.00	1,800.00	
19.00	hr	19.00	100.00	1,900.00	
20.00	hr	20.00	100.00	2,000.00	
21.00	hr	21.00	100.00	2,100.00	
22.00	hr	22.00	100.00	2,200.00	
23.00	hr	23.00	100.00	2,300.00	
24.00	hr	24.00	100.00	2,400.00	
25.00	hr	25.00	100.00	2,500.00	
26.00	hr	26.00	100.00	2,600.00	
27.00	hr	27.00	100.00	2,700.00	
28.00	hr	28.00	100.00	2,800.00	
29.00	hr	29.00	100.00	2,900.00	
30.00	hr	30.00	100.00	3,000.00	
31.00	hr	31.00	100.00	3,100.00	
32.00	hr	32.00	100.00	3,200.00	
33.00	hr	33.00	100.00	3,300.00	
34.00	hr	34.00	100.00	3,400.00	
35.00	hr	35.00	100.00	3,500.00	
36.00	hr	36.00	100.00	3,600.00	
37.00	hr	37.00	100.00	3,700.00	
38.00	hr	38.00	100.00	3,800.00	
39.00	hr	39.00	100.00	3,900.00	
40.00	hr	40.00	100.00	4,000.00	
41.00	hr	41.00	100.00	4,100.00	
42.00	hr	42.00	100.00	4,200.00	
43.00	hr	43.00	100.00	4,300.00	
44.00	hr	44.00	100.00	4,400.00	
45.00	hr	45.00	100.00	4,500.00	
46.00	hr	46.00	100.00	4,600.00	
47.00	hr	47.00	100.00	4,700.00	
48.00	hr	48.00	100.00	4,800.00	
49.00	hr	49.00	100.00	4,900.00	
50.00	hr	50.00	100.00	5,000.00	
51.00	hr	51.00	100.00	5,100.00	
52.00	hr	52.00	100.00	5,200.00	
53.00	hr	53.00	100.00	5,300.00	
54.00	hr	54.00	100.00	5,400.00	
55.00	hr	55.00	100.00	5,500.00	
56.00	hr	56.00	100.00	5,600.00	
57.00	hr	57.00	100.00	5,700.00	
58.00	hr	58.00	100.00	5,800.00	
59.00	hr	59.00	100.00	5,900.00	
60.00	hr	60.00	100.00	6,000.00	
61.00	hr	61.00	100.00	6,100.00	
62.00	hr	62.00	100.00	6,200.00	
63.00	hr	63.00	100.00	6,300.00	
64.00	hr	64.00	100.00	6,400.00	
65.00	hr	65.00	100.00	6,500.00	
66.00	hr	66.00	100.00	6,600.00	
67.00	hr	67.00	100.00	6,700.00	
68.00	hr	68.00	100.00	6,800.00	
69.00	hr	69.00	100.00	6,900.00	
70.00	hr	70.00	100.00	7,000.00	
71.00	hr	71.00	100.00	7,100.00	
72.00	hr	72.00	100.00	7,200.00	
73.00	hr	73.00	100.00	7,300.00	
74.00	hr	74.00	100.00	7,400.00	
75.00	hr	75.00	100.00	7,500.00	
76.00	hr	76.00	100.00	7,600.00	
77.00	hr	77.00	100.00	7,700.00	
78.00	hr	78.00	100.00	7,800.00	
79.00	hr	79.00	100.00	7,900.00	
80.00	hr	80.00	100.00	8,000.00	
81.00	hr	81.00	100.00	8,100.00	
82.00	hr	82.00	100.00	8,200.00	
83.00	hr	83.00	100.00	8,300.00	
84.00	hr	84.00	100.00	8,400.00	
85.00	hr	85.00	100.00	8,500.00	
86.00	hr	86.00	100.00	8,600.00	
87.00	hr	87.00	100.00	8,700.00	
88.00	hr	88.00	100.00	8,800.00	
89.00	hr	89.00	100.00	8,900.00	
90.00	hr	90.00	100.00	9,000.00	
91.00	hr	91.00	100.00	9,100.00	
92.00	hr	92.00	100.00	9,200.00	
93.00	hr	93.00	100.00	9,300.00	
94.00	hr	94.00	100.00	9,400.00	
95.00	hr	95.00	100.00	9,500.00	
96.00	hr	96.00	100.00	9,600.00	
97.00	hr	97.00	100.00	9,700.00	
98.00	hr	98.00	100.00	9,800.00	
99.00	hr	99.00	100.00	9,900.00	
100.00	hr	100.00	100.00	10,000.00	

Subject: Callout
Page Label: 50
Author: Laura Besler
Date: 7/27/2026 11:41:17 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

7/27/2026 11:44:47 AM (1)

5,921.69
5,919.42
5,910.00

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:44:47 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,919.42

7/27/2026 11:44:57 AM (1)

5,921.69
5,919.42
5,910.00

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:44:57 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,919.42

7/27/2026 11:45:00 AM (1)

5,919.42
5,910.00
5,925.03

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:45:00 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,910.00

7/27/2026 11:45:02 AM (1)

5,919.42
5,910.00
5,918.89

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:45:02 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,910.00

7/27/2026 11:45:06 AM (1)

5,910.00
5,925.03
5,930.24
5,924.62

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:45:06 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,925.03

7/27/2026 11:45:10 AM (1)

5,923.50
5,925.99
5,926.80

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:45:10 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,925.99

7/27/2026 11:45:13 AM (1)

5,934.62
5,933.07

Subject: Highlight
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:45:13 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,933.07

7/27/2026 11:47:09 AM (1)

(ft)
5,910.00
5,913.79
5,914.24

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:47:09 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,910.00

7/27/2026 11:47:12 AM (1)

(ft)
104.6
8.9

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:47:12 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

104.6

7/27/2026 11:47:14 AM (1)

ft/ft)
0.033
0.028

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:47:14 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

0.033

7/27/2026 11:47:19 AM (1)

5,914.34
5,917.71
5,910.00
5,912.52

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:47:19 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

5,917.71

7/27/2026 11:47:29 AM (1)			
0.028	Subject: Highlight Page Label: 58 Author: Laura Besler Date: 7/27/2026 11:47:29 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	0.045
0.045			
0.046			

7/27/2026 11:47:32 AM (1)			
0.045	Subject: Highlight Page Label: 58 Author: Laura Besler Date: 7/27/2026 11:47:32 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	0.046
0.046			
0.060			

7/27/2026 11:47:36 AM (1)			
157.8	Subject: Highlight Page Label: 58 Author: Laura Besler Date: 7/27/2026 11:47:36 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	55.6
55.6			
100.7			

7/27/2026 11:47:38 AM (1)			
5,914.54	Subject: Highlight Page Label: 58 Author: Laura Besler Date: 7/27/2026 11:47:38 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	5,910.00
5,917.71			
5,910.00			
5,913.53			
5,910.77			

7/27/2026 11:47:43 AM (1)			
100.7	Subject: Highlight Page Label: 58 Author: Laura Besler Date: 7/27/2026 11:47:43 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	17.6
17.6			
34.5			

7/27/2026 11:47:45 AM (1)			
17.6	Subject: Highlight Page Label: 58 Author: Laura Besler Date: 7/27/2026 11:47:45 AM Status: Color:  Layer: Space:	KH Response: Values updated to match what is shown in plans	34.5
34.5			
211.6			

7/27/2026 11:47:52 AM (1)

0.060
0.048
0.011

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:47:52 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

0.04

7/27/2026 11:47:58 AM (1)

0.048
0.011
0.012

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:47:58 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

0.011

7/27/2026 11:48:46 AM (1)

29.8

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:48:46 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

29.8

7/27/2026 11:48:51 AM (1)

0.000
0.029

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:48:51 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

0.029

7/27/2026 11:49:51 AM (1)

5,920.62
5,922.00
5,923.99
5,914.94
5,915.44
5,916.40

Subject: Highlight
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:49:51 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

MH-1
5,923.99

7/27/2026 11:51:31 AM (1)

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

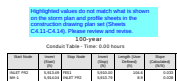
Sheet	Value	Value	Value	Value	Value
Storm Plan	5,920.62	5,922.00	5,923.99	5,914.94	5,915.44
Profile Sheet	5,920.62	5,922.00	5,923.99	5,914.94	5,915.44

Subject: Callout
Page Label: 57
Author: Laura Besler
Date: 7/27/2026 11:51:31 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

7/27/2026 11:51:35 AM (1)



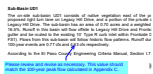
Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

Subject: Callout
Page Label: 58
Author: Laura Besler
Date: 7/27/2026 11:51:35 AM
Status:
Color: 
Layer:
Space:

KH Response:
Values updated
to match what is
shown in plans

Highlighted values do not match what is shown on the storm plan and profile sheets in the construction drawing plan set (Sheets C4.11-C4.14). Please review and revise.

7/27/2026 1:15:34 PM (1)



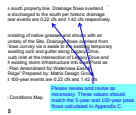
Please review and revise as necessary. This value should match the 100-year peak flow calculated in Appendix C.

Subject: Callout
Page Label: 9
Author: Laura Besler
Date: 7/27/2026 1:15:34 PM
Status:
Color: 
Layer:
Space:

KH Response:
Values revised to match
data in Appendix C

Please review and revise as necessary. This value should match the 100-year peak flow calculated in Appendix C.

7/27/2026 1:16:15 PM (1)



Please review and revise as necessary. These values should match the 5-year and 100-year peak flows calculated in Appendix C.

Subject: Callout
Page Label: 7
Author: Laura Besler
Date: 7/27/2026 1:16:15 PM
Status:
Color: 
Layer:
Space:

KH Response:
Values revised to match
data in Appendix C

Please review and revise as necessary. These values should match the 5-year and 100-year peak flows calculated in Appendix C.

7/27/2026 1:16:40 PM (1)



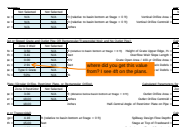
Please specify whether storm pipes referenced in each sub-basin description are private or public.

Subject: Callout
Page Label: 6
Author: Laura Besler
Date: 7/27/2026 1:16:40 PM
Status:
Color: 
Layer:
Space:

KH Response:
Info on storm pipes
referenced updated

Please specify whether storm pipes referenced in each sub-basin description are private or public.

8/5/2026 10:07:43 AM (1)



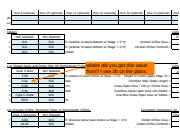
where did you get this value from? I see 4ft on the plans.

Subject: SW - Textbox with Arrow
Page Label: 38
Author: Glenn Reese - EPC Stormwater
Date: 8/5/2026 10:07:43 AM
Status:
Color: 
Layer:
Space:

KH Response:
Dimensions in plans
updated

where did you get this value from? I see 4ft on the plans.

8/5/2026 10:07:48 AM (1)



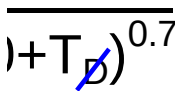
where did you get this value from? I see 3ft on the plans.

Subject: SW - Textbox with Arrow
Page Label: 38
Author: Glenn Reese - EPC Stormwater
Date: 8/5/2026 10:07:48 AM
Status:
Color: 
Layer:
Space:

KH Response:
Dimensions in plans
updated

where did you get this value from? I see 3ft on the plans.

8/5/2026 10:17:10 AM (1)

 **Subject:** Line
Page Label: 24
Author: Laura Besler
Date: 8/5/2026 10:17:10 AM
Status:
Color: 
Layer:
Space:

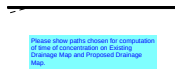
KH Response:
Formula updated

8/5/2026 10:17:20 AM (1)

 **Subject:** Callout
Page Label: 24
Author: Laura Besler
Date: 8/5/2026 10:17:20 AM
Status:
Color: 
Layer:
Space:

C

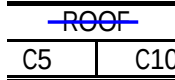
8/5/2026 10:52:16 AM (1)

 **Subject:** Callout
Page Label: [1] DR-EX
Author: Laura Besler
Date: 8/5/2026 10:52:16 AM
Status:
Color: 
Layer:
Space:

Please show paths chosen for computation of time of concentration on Existing Drainage Map and Proposed Drainage Map.

KH Response:
Paths shown and labeled

8/5/2026 2:48:18 PM (1)

 **Subject:** Line
Page Label: 30
Author: Laura Besler
Date: 8/5/2026 2:48:18 PM
Status:
Color: 
Layer:
Space:

Commercial

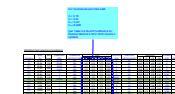
KH Response:
Text updated

8/5/2026 2:50:20 PM (1)

 **Subject:** Callout
Page Label: 30
Author: Laura Besler
Date: 8/5/2026 2:50:20 PM
Status:
Color: 
Layer:
Space:

Commercial

8/5/2026 2:50:41 PM (1)

 **Subject:** Cloud+
Page Label: 30
Author: Laura Besler
Date: 8/5/2026 2:50:41 PM
Status:
Color: 
Layer:
Space:

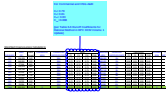
For Commercial and HSG A&B:

C2= 0.79
C5= 0.81
C10= 0.83
C100=0.888

KH Response:
Spreadsheet updated

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

8/5/2026 2:51:40 PM (1)



Subject: Cloud+
Page Label: 25
Author: Laura Besler
Date: 8/5/2026 2:51:40 PM
Status:
Color:
Layer:
Space:

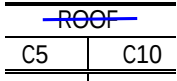
KH Response:
Spreadsheet updated

For Commercial and HSG A&B:

C2= 0.79
C5= 0.81
C10= 0.83
C100=0.888

(per Table 6-6 Runoff Coefficients for Rational Method in EPC DCM Volume 1 Update)

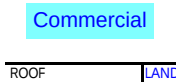
8/5/2026 2:51:48 PM (1)



Subject: Line
Page Label: 25
Author: Laura Besler
Date: 8/5/2026 2:51:48 PM
Status:
Color:
Layer:
Space:

KH Response:
Text updated

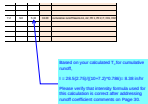
8/5/2026 2:52:00 PM (1)



Subject: Callout
Page Label: 25
Author: Laura Besler
Date: 8/5/2026 2:52:00 PM
Status:
Color:
Layer:
Space:

Commercial

8/5/2026 2:55:15 PM (1)



Subject: Callout
Page Label: 33
Author: Laura Besler
Date: 8/5/2026 2:55:15 PM
Status:
Color:
Layer:
Space:

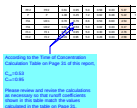
KH Response:
Formula updated

Based on your calculated TC for cumulative runoff,

$$I = 28.5(2.75)/((10+7.2)^{0.786}) = 8.38 \text{ in/hr}$$

Please verify that intensity formula used for this calculation is correct after addressing runoff coefficient comments on Page 30.

8/5/2026 2:55:31 PM (1)



Subject: Callout
Page Label: 33
Author: Laura Besler
Date: 8/5/2026 2:55:31 PM
Status:
Color:
Layer:
Space:

KH Response:
Formula updated to
match values
calculated in table on
pg. 31

According to the Time of Concentration Calculation Table on Page 31 of this report,

C100=0.53
C100=0.95

Please review and revise the calculations as necessary so that runoff coefficients shown in this table match the values calculated in the table on Page 31.

8/5/2026 3:00:48 PM (1)

veloped consisting of overlot graded condi
s comprising the northeast portion of the
an existing swale at slopes of 2-8%. Flow
in and eventually discharge to the curb ar
to an existing 10' Type R curb inlet at the
lows are then carried through existing slo
siter Development Drainage Plan Amend
age Plan for Trails at Aspen Ridge" Prepa
off during the 5-year and 100-year event

Subject: Highlight
Page Label: 6
Author: CDurham
Date: 8/5/2026 3:00:48 PM
Status:
Color: 
Layer:
Space:

xisting 10' Type R curb inlet

8/5/2026 3:00:57 PM (1)

mean enough an existing curb line
ring the 5-year and 100-year
[Label inlet on map](#)

Subject: Callout
Page Label: 6
Author: CDurham
Date: 8/5/2026 3:00:57 PM
Status:
Color: 
Layer:
Space:

Label inlet on map

KH Response:
Label added

8/5/2026 3:03:38 PM (1)

Development Drainage Plan Amend
age Plan for Trails at Aspen Ridge" Prepa
off during the 5-year and 100-year event

Subject: Highlight
Page Label: 7
Author: CDurham
Date: 8/5/2026 3:03:38 PM
Status:
Color: 
Layer:
Space:

historic drainage
conditions

8/5/2026 3:05:19 PM (1)

sin EX-8
site sub-basin EX-8 is undeveloped cons
on with an area of 1.17 acres within the
ermland from east to west at slopes rangir
st per historic drainage conditions. Runo
and 3.73 cfs respectively.

Subject: Highlight
Page Label: 7
Author: CDurham
Date: 8/5/2026 3:05:19 PM
Status:
Color: 
Layer:
Space:

historic drainage conditions

8/5/2026 3:05:39 PM (1)

regulation with an area of 0.07 acres along the existing property line. Drainage from central
basin sub-basin EX-8 is undeveloped consisting of overlot graded conditions comprising the
northeast portion of the property. Drainage flows are collected in a 2-8% slope to the
existing 10' Type R curb inlet at the intersection of the property line and the existing
storm infrastructure. Runoff during the 5-year and 100-year events are 0.07 cfs and 0.07 cfs
respectively.

Subject: Callout
Page Label: 7
Author: CDurham
Date: 8/5/2026 3:05:39 PM
Status:
Color: 
Layer:
Space:

KH Response:
Text updated.
Elaborated on "historic
drainage conditions"

as overland, thru swale, inlet, c&g? Tell us where
and what happens with flow

8/5/2026 3:05:44 PM (1)

Development Drainage Plan Amend
age Plan for Trails at Aspen Ridge" Prepa
off during the 5-year and 100-year event

Subject: Highlight
Page Label: 7
Author: CDurham
Date: 8/5/2026 3:05:44 PM
Status:
Color: 
Layer:
Space:

historic drainage
conditions

8/5/2026 3:07:31 PM (1)

This DP should be larger than basin flows, as DP7 should combine with it or create a new DP for combined flow.

SUMMARY - PROPOSED				
DESIGN FLOW	DESIGN PERMANENT FLOW	DESIGN AREA (ACRES)	DIRECT S-10 FANOUT (CFS)	DP FLOW
100	100	2.51	1.00	1.00
100	100	2.22	1.41	1.41
100	100	1.63	0.52	0.52
100	100	0.24	0.04	0.04

Subject: Callout
Page Label: 29
Author: CDurham
Date: 8/5/2026 3:07:31 PM
Status:
Color: ■
Layer:
Space:

KH Response:
DP7 added to
cumulative flow of
DP1

This DP should be larger than basin flows, as DP7 should combine with it or create a new DP for combined flow.

8/5/2026 3:08:08 PM (1)

Existing

DESIGN FLOW	DESIGN PERMANENT FLOW	DESIGN AREA (ACRES)	DIRECT S-10 FANOUT (CFS)	DP FLOW
100	100	2.51	1.00	1.00
100	100	2.22	1.41	1.41
100	100	1.63	0.52	0.52
100	100	0.24	0.04	0.04

Subject: Text Box
Page Label: 25
Author: CDurham
Date: 8/5/2026 3:08:08 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Text updated

Existing

8/5/2026 3:08:21 PM (1)

Proposed

DESIGN FLOW	DESIGN PERMANENT FLOW	DESIGN AREA (ACRES)	DIRECT S-10 FANOUT (CFS)	DP FLOW
100	100	2.51	1.00	1.00
100	100	2.22	1.41	1.41
100	100	1.63	0.52	0.52
100	100	0.24	0.04	0.04

Subject: Text Box
Page Label: 30
Author: CDurham
Date: 8/5/2026 3:08:21 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Text updated

Proposed

8/5/2026 3:09:09 PM (1)

This DP should be larger than basin flows, as it combines DP2 thru DP 5 & OS-1, or create a new DP for combined flow.

DESIGN FLOW	DESIGN PERMANENT FLOW	DESIGN AREA (ACRES)	DIRECT S-10 FANOUT (CFS)	DP FLOW
100	100	2.51	1.00	1.00
100	100	2.22	1.41	1.41
100	100	1.63	0.52	0.52
100	100	0.24	0.04	0.04

Subject: Callout
Page Label: 29
Author: CDurham
Date: 8/5/2026 3:09:09 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Spreadsheet
updated to show
cumulative flow

This DP should be larger than basin flows, as it combines DP2 thru DP 5 & OS-1, or create a new DP for combined flow

8/5/2026 3:13:55 PM (1)

Need final cumulative flow for this DP

DESIGN FLOW	DESIGN PERMANENT FLOW	DESIGN AREA (ACRES)	DIRECT S-10 FANOUT (CFS)	DP FLOW
100	100	2.51	1.00	1.00
100	100	2.22	1.41	1.41
100	100	1.63	0.52	0.52
100	100	0.24	0.04	0.04

Subject: Cloud+
Page Label: 32
Author: CDurham
Date: 8/5/2026 3:13:55 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Cumulative
flow added.

Need final cumulative flow for this DP

8/5/2026 3:24:32 PM (1)

Label all existing storm infrastructure

DESIGN FLOW	DESIGN PERMANENT FLOW	DESIGN AREA (ACRES)	DIRECT S-10 FANOUT (CFS)	DP FLOW
100	100	2.51	1.00	1.00
100	100	2.22	1.41	1.41
100	100	1.63	0.52	0.52
100	100	0.24	0.04	0.04

Subject: Callout
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:24:32 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Existing storm
sewer labeled

Label all existing storm infrastructure

8/5/2026 3:25:40 PM (1)



Subject: Callout
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:25:40 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Pipe labeled

Label outlet pipe

8/5/2026 3:26:42 PM (1)

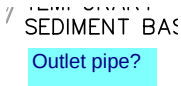


Subject: Callout
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:26:42 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Property line. Line
labeled and
properties matched
to show same line
type and thickness

What is this? Label or turn off

8/5/2026 3:26:59 PM (1)

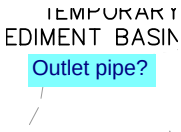


Subject: Text Box
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:26:59 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Plans updated to
show outlet pipe

Outlet pipe?

8/5/2026 3:27:09 PM (1)

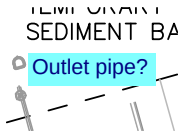


Subject: Text Box
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:27:09 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Plans updated to
show outlet pipe

Outlet pipe?

8/5/2026 3:27:36 PM (1)

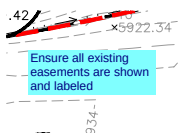


Subject: Text Box
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:27:36 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Plans updated to
show outlet pipe

Outlet pipe?

8/5/2026 3:29:12 PM (1)



Subject: Text Box
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:29:12 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Easements shown
and labeled

Ensure all existing easements are shown and labeled

8/5/2026 3:30:48 PM (1)



Subject: Text Box
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:30:48 PM
Status:
Color: ■
Layer:
Space:

KH Response:
All of Tract C shown
on additional sheet

Include all of Tract C - Proposed drainage map
needs to include entire area covered by plat

8/5/2026 3:32:45 PM (1)

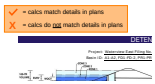


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:32:45 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Slopes steeper
than 4:1 shown

Provide slopes, anything steeper than 4:1

8/5/2026 3:37:32 PM (1)



Subject: MHFD Calcs
Page Label: 38
Author: Glenn Reese - EPC Stormwater
Date: 8/5/2026 3:37:32 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Dimensions in
plan updated

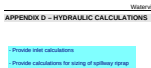
8/5/2026 3:37:42 PM (1)



Subject: Checkmark
Page Label: 38
Author: Glenn Reese - EPC Stormwater
Date: 8/5/2026 3:37:42 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Dimensions in
plan updated

8/5/2026 3:38:38 PM (1)



Subject: Text Box
Page Label: 35
Author: CDurham
Date: 8/5/2026 3:38:38 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Inlet and spillway rip rap
calculations added to
Appendix

- Provide inlet calculations

- Provide calculations for sizing of spillway riprap

8/5/2026 3:39:38 PM (1)

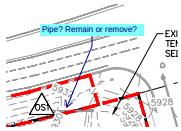


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:39:38 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Line removed

What is this line? Label or turn off

8/5/2026 3:40:27 PM (1)

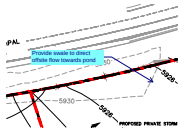


Subject: Callout
Page Label: [1] DR-EX
Author: CDurham
Date: 8/5/2026 3:40:27 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Pipe to be removed.
Callout updated.

Pipe? Remain or remove?

8/5/2026 3:41:21 PM (1)

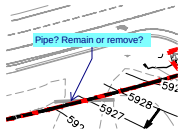


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:41:21 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Off site flow accounted for
traveling to proposed Pond
P with updated grading. No
swale required

Provide swale to direct offsite flow towards pond

8/5/2026 3:41:27 PM (1)

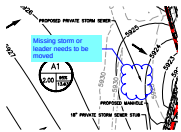


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:41:27 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Pipe to be removed.
Callout updated

Pipe? Remain or remove?

8/5/2026 3:42:38 PM (1)

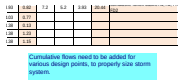


Subject: Cloud+
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:42:38 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Label removed

Missing storm or leader needs to be moved

8/5/2026 3:43:56 PM (1)



Subject: Text Box
Page Label: 32
Author: CDurham
Date: 8/5/2026 3:43:56 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Cumulative
flow added.

Cumulative flows need to be added for various
design points, to properly size storm system.

8/5/2026 3:46:56 PM (1)

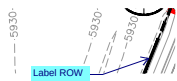


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:46:56 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Existing CL of
ditch removed

What is this line? Please label or turn off.

8/5/2026 3:53:51 PM (1)

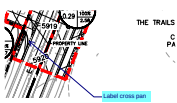


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:53:51 PM
Status:
Color: 
Layer:
Space:

KH Response:
Label added

Label ROW

8/5/2026 3:54:31 PM (1)

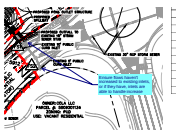


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:54:31 PM
Status:
Color: 
Layer:
Space:

KH Response:
Label added

Label cross pan

8/5/2026 3:55:25 PM (1)

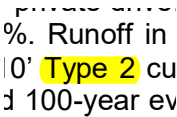


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 3:55:25 PM
Status:
Color: 
Layer:
Space:

KH Response:
Inlet calculations
updated to
handle
increased flow

Ensure flows haven't increased to existing inlets, or
if they have, inlets are able to handle increase

8/5/2026 3:58:32 PM (1)

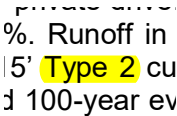


Subject: Highlight
Page Label: 8
Author: CDurham
Date: 8/5/2026 3:58:32 PM
Status:
Color: 
Layer:
Space:

KH Response:
Text updated

Type 2

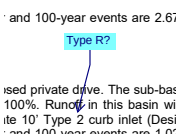
8/5/2026 3:59:07 PM (1)



Subject: Highlight
Page Label: 9
Author: CDurham
Date: 8/5/2026 3:59:07 PM
Status:
Color: 
Layer:
Space:

Type 2

8/5/2026 3:59:14 PM (1)



Subject: Callout
Page Label: 8
Author: CDurham
Date: 8/5/2026 3:59:14 PM
Status:
Color: 
Layer:
Space:

KH Response:
Text updated

Type R?

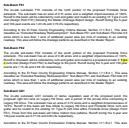
8/5/2026 3:59:52 PM (1)

...ness of 100%
10' Type 2 cur
...ing the 5-yea

Subject: Highlight
Page Label: 9
Author: CDurham
Date: 8/5/2026 3:59:52 PM
Status:
Color: 
Layer:
Space:

Type 2

8/5/2026 4:01:17 PM (1)



Subject: Highlight
Page Label: 9
Author: CDurham
Date: 8/5/2026 4:01:17 PM
Status:
Color: 
Layer:
Space:

Type 2

KH Response:
Text updated

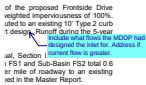
8/5/2026 4:01:23 PM (1)



Subject: Callout
Page Label: 9
Author: CDurham
Date: 8/5/2026 4:01:23 PM
Status:
Color: 
Layer:
Space:

Type R?

8/5/2026 4:02:11 PM (1)



Subject: Callout
Page Label: 9
Author: CDurham
Date: 8/5/2026 4:02:11 PM
Status:
Color: 
Layer:
Space:

Include what flows the MDDP had designed the inlet for. Address if current flow is greater.

KH Response:
Inlet design flows
added to report

8/5/2026 4:02:35 PM (1)

to Legal Hill
phy. Accordi

Subject: Highlight
Page Label: 10
Author: CDurham
Date: 8/5/2026 4:02:35 PM
Status:
Color: 
Layer:
Space:

Legal

KH Response:
Text updated to
"Frontside Drive"

8/5/2026 4:21:58 PM (1)

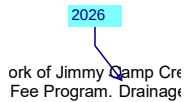


Subject: SW - Textbox with Arrow
Page Label: 36
Author: Glenn Reese - EPC Stormwater
Date: 8/5/2026 4:21:58 PM
Status:
Color: 
Layer:
Space:

So the intent of "Basin ID" here is actually the name of the pond. So input "Pond P" here. You can leave the trib drainage basins in parenthesis next to "Pond P" though if you want to.

KH Response:
"Pond P" added
to Basin ID

8/5/2026 4:22:33 PM (1)



Subject: Callout
Page Label: 12
Author: CDurham
Date: 8/5/2026 4:22:33 PM
Status:
Color: ■
Layer:
Space:

2026

KH Response:
Text added

8/5/2026 4:23:35 PM (1)

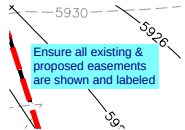


Subject: Text Box
Page Label: 13
Author: CDurham
Date: 8/5/2026 4:23:35 PM
Status:
Color: ■
Layer:
Space:

Provide comparison of what previous reports had as flows entering storm system from this site to what this report has.

KH Response:
Summary updated

8/5/2026 4:30:54 PM (1)



Subject: Text Box
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 4:30:54 PM
Status:
Color: ■
Layer:
Space:

Ensure all existing & proposed easements are shown and labeled

KH Response:
Easements shown and labeled

8/5/2026 4:31:14 PM (1)

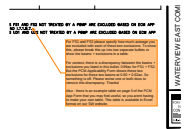


Subject: Callout
Page Label: [1] DR-1
Author: CDurham
Date: 8/5/2026 4:31:14 PM
Status:
Color: ■
Layer:
Space:

Include road names

KH Response:
Road names added

8/6/2026 8:37:51 AM (1)



Subject: SW - Textbox with Arrow
Page Label: [1] DR-1
Author: Glenn Reese - EPC Stormwater
Date: 8/6/2026 8:37:51 AM
Status:
Color: ■
Layer:
Space:

For FS1 and FS2 please specify how much acreage you are excluded with each of these two exclusions. To show this, please break this up into two separate bullets or show the basins + exclusions in a table.

KH Response:
Notes updated to reflect changes in exclusion area corresponding with PCM Form

For context: there is a discrepancy between the basins + exclusions you listed in this bullet: 0.99ac for FS1 + FS2. But the PCM Applicability Form shows these two exclusions for these two basins at 0.60 + 0.62ac. So something is off. Please revise one or both docs to remove this discrepancy. Thanks!

Also - there is an example table on page 5 of the PCM App Form that you may find useful, so you arent having to make your own table. This table is available in Excel format on our SW website.

8/6/2026 8:37:55 AM (1)

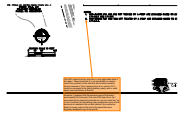


Subject: SW - Textbox with Arrow
Page Label: [1] DR-1
Author: Glenn Reese - EPC Stormwater
Date: 8/6/2026 8:37:55 AM
Status:
Color: ■
Layer:
Space:

KH Response:
Notes updated to reflect changes
in exclusion area corresponding
with PCM Form

Similarly there is a discrepancy between this bullet and what is shown in the Notes on page 3 of the PCM Form. The PCM Form states that only 0.06ac from these basins utilizes this exclusion, but this bullet here implies that the entire basins are using this exclusion (so 0.73ac). Please rectify this discrepancy.

8/6/2026 9:15:15 AM (1)



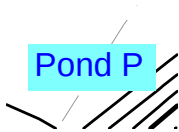
Subject: SW - Textbox with Arrow
Page Label: [1] DR-1
Author: Glenn Reese - EPC Stormwater
Date: 8/6/2026 9:15:15 AM
Status:
Color: ■
Layer:
Space:

KH Response:
Grading updated. Note changed to
reflect relevant exclusion area

The MS4 states that this exclusion is only applicable when it has been: "determined that it is not practicable to capture runoff from portions of the site that will not drain towards control measures." But it appears that all or most of UD 1 could be conveyed to the pond relatively easily with a small swale near the bottom of that hill.

However, it appears that the pervious area of that basin would qualify for Exclusion G on the PCM App Form. So I recommend just using that exclusion so you can save the "up to 1ac" exclusion for something later (sometimes more of that exclusion is needed at the as-built phase if the contractor doesn't convey parts of the site to the pond that were originally designed to go to the pond).

8/18/2026 4:09:12 PM (1)

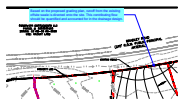


Subject: Text Box
Page Label: [1] DR-1
Author: CDurham
Date: 8/18/2026 4:09:12 PM
Status:
Color: ■
Layer:
Space:

KH Response:
Text added

Pond P

8/19/2026 10:00:08 AM (1)



Subject: Callout
Page Label: [1] DR-1
Author: Laura Besler
Date: 8/19/2026 10:00:08 AM
Status:
Color: ■
Layer:
Space:

KH Response:
Off site flow accounted for

Based on the proposed grading plan, runoff from the existing offsite swale is directed onto the site. This contributing flow should be quantified and accounted for in the drainage design.