PRELIMINARY DRAINAGE REPORT FOR CREEKRIDGE AT FLYING HORSE FILING NO. 1

Prepared for:
Pulpit Rock Investments LLC
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

Prepared by:
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Job no. 1171.78

PRELIMINARY DRAINAGE REPORT FOR
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Engineer's Statement

This report and plan for the drainage design of **Creekridge at Flying Horse Filing No. 1** was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal): _____

David L. Gibson, Colorado P.E. No. 46477 Date:

Developer's Statement

Pulpit Rock Investments LLC hereby certifies that the drainage facilities for **Creekridge at Flying Horse No. 1** shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.4.701 of the City Code; and cannot, on behalf of **Pulpit Rock Investments LLC,** guarantee that final drainage design review will absolve **Pulpit Rock Investments LLC** and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Pulpit Rock Investments LLC
Name of Developer

_____
Authorized Signature Date

Adam Doyle
Printed Name

Land Development Manager
Title

2138 Flying Horse Club Drive Colorado Springs CO 80921
Address:

City of Colorado Springs Statement:

Filed in accordance with Section 7.4.701 of the Code of the City of Colorado Springs, 2023, as amended.

_____ _____
For SWENT Manager Date

Conditions:

PRELIMINARY DRAINAGE REPORT FOR
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PRELIMINARY DRAINAGE REPORT FOR
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INTRODUCTION / SITE DESCRIPTION

This document is the Preliminary Drainage Report for Creekridge at Flying Horse Filing No. 1. The current site is undeveloped. The purpose of this report is to evaluate existing drainage conditions and proposed developed conditions in accordance with the requirements of the Colorado Springs Drainage Criteria Manual. Proposed land use will include single family detached dwellings.

Creekridge at Flying Horse Filing No. 1

TOTAL SITE (PLATTED) AREA: 19.686 AC – Residential lots, tracts and ROW.

TOTAL SITE DISTURBANCE AREA: 17.23 AC

Creekridge at Flying Horse Filing No. 1 is a tract of land located in a portion of the south half of section 16 and the north half of section 21, Township 12 South, Range 66 West of the 6th P.M., in the City of Colorado Springs, El Paso County, Colorado.

This drainage report is in conformance with the City of Colorado Springs Drainage Criteria Manual Volume 1 dated May 2014 (and updated January 2021) and Volume 2 dated May 2014 (and updated December 2020) as included in the reference section of this report. Rainfall depths are taken from NOAA Atlas 14, Volume 8, Version 2 for the 2, 5, and 100 year events. All hydrologic and hydraulic calculations are completed using the current DCM Vol. 1, Chapter 6 figure 6.5 and conform to the criteria, charts, and requirements for City of Colorado Springs using the rational method and excel spreadsheets including MHFD-Inlet and MHFD-BMP spreadsheets. See appendix.

No portions of the site are within a Streamside Overlay Zone.

This site is vacant with native grasses. The on-site soils are of Hydrologic Group “B” (Tomah-Crowfoot complex & Stapleton Sandy Loam) as determined by the “Web Soil Survey National Cooperative Soil Survey”, prepared by the Natural Resources Conservation Service (see map in Appendix).

Proposed street classifications used within project:
55’ Public ROW Residential roadways
30’ Public ROW Residential roadways
A vicinity map is included in the Appendix of the report.

PREVIOUS STUDIES

This site, or a portion of the site, was previously analyzed in the following reports as further described in the existing Drainage Conditions section below.

1. "Final Drainage Report Downtown Flying Horse Filing No. 1 Preliminary Drainage Report for Downtown Flying Horse Future Filings" by Classic Consulting dated January 2023

2. "Amendment #1 to Final Drainage Report Downtown Flying Horse Filing No. 1, Preliminary Drainage Report for Downtown Flying Horse Future Filings" by Classic Consulting dated August 2025.

The Creekridge Filing No. 1 development was previously part of the Downtown Flying Horse proposed development and is portions of the previously shown future filings of Downtown Flying Horse.

EXISTING DRAINAGE CONDITIONS

The site drainage was partially analyzed in the reports listed above. Overall, the site drains to the south towards New Life Drive and existing Downtown Flying Horse Filing No. 1 Tract A existing Pond. Currently there is an existing 48" public RCP Storm sewer stub located in Somerstone Drive that was constructed with Downtown Flying Horse Filing No. 1. The property was evaluated with a residential land use assumed for the property in all prior approved reports listed above. The site is predominantly located within the Elkhorn Drainage Basin with portions of slope located in the Black Squirrel Creek Drainage Basin.

Refer to Historic Drainage Plan included in the Appendix of the report for a summary of historic runoff for the basins depicted on the historic plan.

Offsite Drainage conditions affecting the site include various offsite basins from future Creekridge Filings OS-1 thru OS-14.

BASIN	AREA (AC)	Q_5 (cfs)	Q_{100} (cfs)	Land Use Description	Routing	Ownership	Discussion	Cardinal Direction	Emergency Overflow
OS-1	1.50	3.4	6.8	RES 1/16	DP-8 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-2	2.70	4.9	10.0	RES 1/16	PIPE 13	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-3	1.55	2.9	5.8	RES 1/16	DP-6 10' TYPE 2 INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	NORTH	N/A
OS-4	3.40	6.2	12.6	RES 1/16	DP-9 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-5	0.13	0.4	0.7	RES 1/16	DP-8 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	NORTH	N/A
OS-6	3.21	0.9	6.4	PARK	PIPE 18	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	SOUTH	N/A
OS-7	0.07	0.3	0.6	PAVEMENT	PIPE 18	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-8	0.43	0.4	1.3	RES 1/16	DP-11 10' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-9	4.10	8.2	16.6	RES 1/16	PIPE 25	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	NORTH	N/A
OS-10	0.77	1.9	3.9	RES 1/16	PIPE 25	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	SOUTH	N/A
OS-11	0.11	0.3	0.6	RES 1/16	DP-10 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	NORTH	N/A
OS-12	12.78	35.8	65.2	COMMERCIAL	PIPE 28	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-13	3.00	3.1	8.4	RES 1/16	PIPE 4	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-14	24.64	5.3	39.3	HISTORIC	PIPE 28	PUBLIC	SURFACE ROUTING OVER LANDSCAPE TO EXISTING ROAD DITCH	SOUTH	N/A
EX-1	41.53	8.4	61.8	HISTORIC	N/A	N/A	SHEET FLOW TO EXISTING 42" STORM STUB	SOUTH	N/A
EX-2	5.62	1.7	12.5	HISTORIC	N/A	N/A	SHEET FLOW TO BLACK SQUIRREL CREEK	NORTH	N/A
EX-3	3.85	1.2	8.6	HISTORIC	N/A	N/A	SHEET FLOW TO BLACK SQUIRREL CREEK	NORTH	N/A
EX-4	32.48	7.0	51.7	HISTORIC	N/A	N/A	SHEET FLOW TO EXISTING INTERQUEST PARKWAY ROADSIDE	SOUTH EAST	N/A

Existing basin analysis done with Downtown at Flying Horse Filing No. 1 and contains areas outside of proposed Creekridge filings. Total area will be larger than proposed analysis.

PROPOSED DRAINAGE DISCUSSION

On-site flows are described as follows:

Refer to Proposed Drainage Map for Developed Conditions included in the Appendix of the report.

NOTE: Per the drainage map, all proposed inlets are sump unless otherwise specified. All manholes, inlets, pipes and appurtenances are per City of Colorado Springs standard details and conform to the current Drainage Criteria manual (DCM). All facilities are public within ROW or Easement. All proposed pipes to be RCP. An HGL analysis for all storm pipes will be provided with the Final Drainage Report.

PRELIMINARY DRAINAGE REPORT FOR
CREEKRIDGE AT FLYING HORSE FILING NO. 1

BASIN	AREA (AC)	Q_5 (cfs)	Q_{100} (cfs)	Land Use Description	Routing	Ownership	Discussion	Cardinal Direction	Emergency Overflow
A	2.77	4.7	9.8	RES 1/16	DP-1 10' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
B	1.55	2.8	5.8	RES 1/16	DP-2 10' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
C	1.02	1.8	3.9	PAVEMENT	DP-3 5' TYPE 2 INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	OVERTOP CURB TO NEXT DOWNSTREAM INLET
D	1.83	3.4	6.9	RES 1/16	DP-4 5' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AREAS TO INLET	SOUTH	N/A
E	2.87	5.3	10.7	RES 1/16	DP-5 10' TYPE 2 INLET	PUBLIC	SURFACE ROUTING OVER PAVED AREAS TO INLET	SOUTH	OVERTOP CURB TO NEXT DOWNSTREAM INLET
F	0.33	1.5	2.7	PAVEMENT	DP-6 10' TYPE 2 INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	OVERTOP NEAREST HIGHPOINT TO NEXT DOWNSTREAM INLET
G	0.28	1.3	2.3	PAVEMENT	DP-7 5' TYPE 2 INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	OVERTOP NEAREST HIGHPOINT TO NEXT DOWNSTREAM INLET
H	0.64	2.2	4.0	PAVEMENT	DP-8 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
I	1.23	2.4	5.2	RES 1/16	PIPE 18	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
J	0.18	2.8	3.9	PAVEMENT	DP-9 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
K	0.20	0.9	1.7	PAVEMENT	DP-10 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
L	0.22	1.0	1.8	PAVEMENT	DP-11 10' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
M	3.85	1.2	8.6	HISTORIC	N/A	PRIVATE	SURFACE ROUTING OVER UNDISTURBED LAND TO BLACK SQUIRREL CREEK	NORTH	N/A
N	0.06	0.3	0.5	PAVEMENT	DP-9 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
O	0.56	1.1	2.4	RES 1/16	PIPE 18	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	SOUTH	N/A
P	0.96	1.8	3.6	RES 1/16	PIPE 13	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
Q	0.87	0.5	2.1	RES 1/16	PIPE 4	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A

BASIN	AREA (AC)	Q_5 (cfs)	Q_{100} (cfs)	Land Use Description	Routing	Ownership	Discussion	Cardinal Direction	Emergency Overflow
OS-1	1.50	3.4	6.8	RES 1/16	DP-8 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-2	2.70	4.9	10.0	RES 1/16	PIPE 13	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-3	1.55	2.9	5.8	RES 1/16	DP-6 10' TYPE 2 INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	NORTH	N/A
OS-4	3.40	6.2	12.6	RES 1/16	DP-9 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-5	0.13	0.4	0.7	RES 1/16	DP-8 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	NORTH	N/A
OS-6	3.21	0.9	6.4	PARK	PIPE 18	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	SOUTH	N/A
OS-7	0.07	0.3	0.6	PAVEMENT	PIPE 18	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-8	0.43	0.4	1.3	RES 1/16	DP-11 10' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-9	4.10	8.2	16.6	RES 1/16	PIPE 25	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	NORTH	N/A
OS-10	0.77	1.9	3.9	RES 1/16	PIPE 25	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	SOUTH	N/A
OS-11	0.11	0.3	0.6	RES 1/16	DP-10 15' TYPE 2 AT GRADE INLET	PUBLIC	SURFACE ROUTING OVER LANDSCAPE	NORTH	N/A
OS-12	12.78	35.8	65.2	COMMERCIAL	PIPE 28	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-13	3.00	3.1	8.4	RES 1/16	PIPE 4	PUBLIC	SURFACE ROUTING OVER LANDSCAPE AND PAVED AREA TO INLET	SOUTH	N/A
OS-14	24.64	5.3	39.3	HISTORIC	PIPE 28	PUBLIC	SURFACE ROUTING OVER LANDSCAPE TO EXISTING ROAD DITCH	SOUTH	N/A

Compliance with other drainage studies:

Creekridge at Flying Horse was accounted for with the development of Downtown Flying Horse Filing No. 1 Developed flows are routed to an existing private Full Spectrum Detention (FSD) as shown in the Final Drainage Report Downtown Flying Horse Filing No. 1. Creekridge at Flying Horse Filing No. 1 is depicted as a portion of Basin OS-12, OS-10, OS-9 and OS-11 in the Final Drainage Report Downtown Flying Horse Filing No. 1. With the construction of Downtown Flying Horse Filing No 1 a public 48" RCP storm pipe was stubbed at the current end of Somerstone Drive in anticipation of the development of Creekridge. Per the Downtown Flying Horse design report, this 48" RCP pipe was shown as **Pipe 8** and anticipated flow of **Q_5 = 29.9 cfs, Q_{100} = 66.0 cfs**. This compares to this report developed flow calculations shown as **Pipe 24 Q_5 = 39.3 cfs, Q_{100} = 84.6 cfs.** While flows are larger than anticipated, the existing 48" public RCP storm sewer does have capacity for the developed flow. See appendix **Pipe Run 24 100-year calculations**. With the construction of Downtown Flying Horse Filing No 1 a public 36" RCP storm pipe was stubbed to the north of Somerstone Drive in

anticipation of the development of Creek ridge. Per the Downtown Flying Horse design report, this 36" RCP pipe was shown as **Pipe 7** and anticipated flow of **Q_5 = 16.0 cfs, Q_{100} = 38.0 cfs**. This compares to this reports

developed flows shown as **Pipe 25 Q_5 = 9.7 cfs, Q_{100} = 19.7 cfs.** This flow is less than anticipated. These two individual stubs combine and are represented by Downtown Flying Horse Pipe 9 **Q_5 = 44.2 cfs, Q_{100} = 99.9 cfs.** This is represented in the Creekridge at Flying Horse Filing No. 1 PDR as Pipe 26 **Q_5 = 46.3 cfs, Q_{100} = 98.9 cfs.** The existing 48" public RCP storm sewer that routes flows from proposed Creekridge at Flying Horse is below anticipated flows in the 100-year event. Pipes have been designed for the major storm (100 year) so exceeding design flows for the minor storm (5-year event) does not impact capacity as pipes are designed to carry the lager major storm.

Pipe 27 **Q_5 = 35.8 cfs, Q_{100} = 65.2 cfs** is future Creekridge and Downtown Flying Horse Development tributary to the existing 42" public RCP storm sewer stub at the intersection of New Life Drive and Somerstone Drive represented by Basin OS-12. This compares to Pipe 21 **Q_5 = 40.3 cfs, Q_{100} = 79.1 cfs** in the Final Drainage Report of Downtown Flying Horse Filing No. 1.

Basin M **Q_5 = 1.2 cfs, Q_{100} = 8.6 cfs** is existing vegetated slope that drains towards Black Squirrel Creek. This contains Preble Mouse habitat and will not be disturbed. This compares to Basin EX-4 and Design Point E-3 **Q_5 = 1.2 cfs, Q_{100} = 8.6 cfs.**

All storm pipes, inlets, and manhole systems within Creekridge Filing No. 1 are public. An HGL analysis for all storm pipes will be provided with the Final Drainage Report.

Existing Pond Evaluation

The Final Drainage Report Downtown Flying Horse Filing No. 1, Preliminary Drainage Report for Downtown Flying Horse Future Filings accounted for the area shown in this report as Creekridge at Flying Horse Filing No. 1 and future Creekridge Filings ("OS" Basins) but the assumed land use shown in the Downtown Flying Horse report and this report vary. The Downtown Flying Horse assumed a variety of single family residential, multi-family residential, open space, and commercial. Creekridge has been rezoned for a medium density zoning (R-Flex Medium) and medium density compact residential lots are proposed. Due to the change in assumed land use, the design of the existing Permanent Control Measure for the site has been evaluated to

ensure capacity and available WQSV for green infrastructure. An updated MHFD-Detention spreadsheet has been included. This report will now be used as future development takes place in future Creekridge at Flying Horse and Downtown Flying Horse for discussions of compliance of developments moving forward. The current pond configuration data used in the current MHFD-Detention spreadsheet shows this PCM is in compliance with drain time and release rates and no modifications are proposed to the PCM. Peak outflow per the analysis in this report shows a release rate of **Q_5 = 1.9 cfs, Q_{100} = 34.8 cfs.** This compares to the original PCM design report of **Q_5 = 1.6 cfs, Q_{100} = 34.2 cfs.**

FOUR STEP PROCESS/DETENTION

Total disturbance area is 17.23 acres and the 4-step process and detention criteria will apply.

Per the approved Final Drainage Report Downtown Flying Horse Filing No. 1 Preliminary Drainage Report for Downtown Flying Horse Future Filings detention for Creekridge Filing No. 1 will be provided in an existing private full spectrum extended detention permanent control measure located in Tract A of Downtown Flying Horse Filing No. 1.

The site adheres to this Four Step Process as follows:

1. **VOLUME REDUCTION:**

   All developed runoff from the proposed site will be collected in a proposed public or private on-site storm system. This site is in compliance with the Green Infrastructure Manual and Policy Clarification for WQCV Reduction, see Appendix for calculations and exhibit. A planned infiltration area will be located in the existing private permanent control measure located in Downtown Flying Horse Filing No. 1 Tract A in the wetted area during the water quality event. Reviewing the design reports for this pond and a re-evaluation for updated land use by Classic Consulting, the wetted area during the water quality event minus concrete trickle channel is calculated as 42,680 sf. RPA used by Creekridge Filing 1 is 15,900 sf. The water quality volume reduction for Creekridge Filing No. 1 is 15% and Green Infrastructure Criteria of 10% reduction in WQCV will be met. The previously approved Lot 1 Downtown Flying Horse Filing No. 1 will utilize 5,227 sf, with a total RPA being utilized by both subdivision of 21,127 sf. The combined volume reduction for Creekridge at Flying Horse Filing No.1 and Lot 1 Downtown Flying Horse Filing No. 1 is 10% and Green Infrastructure Criteria will be met. The remaining 21,553 sf of wetted area during the water quality event will be utilized for future Creekridge at Flying Horse and Downtown Flying Horse

development tributary to the private pond in Tract A. The re-evaluation for this pond lists the total anticipated area tributary area as 60.61 acres with a weighed impervious acreage of 69%.

The disturbance associated with Creekridge Filing No. 1 tributary to the pond 1 is 15.57 acres of that 60.61 acres assumed to be treated by the pond. Effective imperviousness of Creekridge Filing No. 1 is calculated as 71.20%. All planned infiltration areas (PIA's) shall be clearly depicted and labeled on the Grading and Erosion Control plans.

2. **WQCV:**

STEP 2 SUMMARY TABLE			
AREA ID	**Associated Disturbance Area (ac)**	**Treatment Method**	**Ownership/Maintenance**
ALL OR PORTIONS OF BASIN A, B, C, D, E, F, G, H, I, J, K, L, N	15.19	Extended Detention Basin	Private (Metro Disctrict)
PORTION OF BASINS B, OS-1, OS-3, OS-4, OS-5, OS-6, OS-7, OS-8, OS-11	2.04	Undeveloped Land Exclusion	Private (Metro Disctrict)
TOTAL DISTURBANCE	**17.23**		
TOTAL DISTURBANCE WITH EXCLUSIONS	**15.19**	**661,459**	**(SF)**
TOTAL TREATED AREA	**15.19**	TOTAL DISTURBANCE WITH EXCLUSIONS MINUS NOT TREATED AREA	
% TREATED	**100.00%**		

3. **STABILIZE STREAM CHANNELS:**

This site will utilize an existing storm sewer south of the site along with proposed storm systems within the development. These facilities will intercept and direct the on-site development flows directly to the existing pond. The existing drainageways will generally see a reduction in flows based on much of the tributary areas being captured on-site and routed to the pond. All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage Basin fees paid, at the time of platting, go towards channel stabilization within the drainage basin. The majority of this site is within the Elkhorn Basin. A small portion is within the Black Squirrel Creek Basin. Required improvements to Black Squirrel Creek have been installed during the development of Flying Horse No. 4 Palermo Filings No's 3, 4, & 5 Black Squirrel Creek Channel Improvements. Assurances have been posted and are tied to the Flying Horse Palermo Development.

Black Squirrel Creek is to be dedicated to the City of Colorado Springs per the approved stormwater plans.

4. **SOURCE CONTROL** – All new and redevelopment that includes outdoor storage or the potential for the introduction of contaminants to the City's MS4 shall be required to implement site specific and/or source control measure to protect receiving waters. The subject site will be required to implement Source Control CCMs applicable to residential activities as recommended in MHFD Volume 3 Chapter 5 listed as:
    a. Disposal of Household Waste
    b. Illicit Discharge Controls
    c. Good Housekeeping
    d. Use of Pesticides, Herbicides, and Fertilizers
    e. Landscape Maintenance.

The site development includes a final landscape plan (provided by others) that will provide for final site stabilization of all disturbed areas within the development.

FLOODPLAIN STATEMENT

No portion of the platted site with the development, Creekridge at Flying Horse Filing No. 1, is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0295G and 08041C 0506G effective date, December 7, 2018 (See Appendix).

DRAINAGE AND BRIDGE FEES

ELKHORN BASIN & BLACK SQUIRREL BASIN

The total platted area of Filing No. 1 is 19.686 acres. This subdivision is located within two drainage basins, Elkhorn Basin and The Black Squirrel Creek Basin. See appendix for included basin map. The respective areas within each basin area:

Black Squirrel Creek:	3.803 acres
Elkhorn Basin:	15.883 acres

Elkhorn Drainage Basin

15.883 acres of Filing 1 is included in the Elkhorn Drainage Basin which is a closed basin per the annexation agreements for the area. No fees will be paid.

Black Squirrel Creek Drainage Bsin

The remaining 3.803 acres of Filing No. 1 lie within the Black Squirrel Creek Drainage Basin.

$20,862/acre x 3.803 acres (Drainage 2026)	$	79,338.19
$5,846/acre x 3.803 acres (Pond Land 2026)	$	22,232.34

Black Squirrel Fees Filing No. 1 **$101,570.53**

VARIANCES

No variances are proposed at this time.

SUMMARY

The proposed Creekridge at Flying Horse Filing No. 1 development will continue to direct drainage flows as previously approved in prior reports. The current proposal will not adversely affect any downstream or surrounding developments or drainage patterns. This report is in conformance with the previously approved Final Drainage Report(s) for this area and site. The rational method was used to perform calculations for this project, as included in the Appendix of this report utilizing table 6-6 of the DCM Volume 1. All calculations provided in the Appendix of this report are referenced from DCM and/or MHFD required charts, tables, and graphs. All hydrologic and hydraulic criteria have been met and conform with the requirements of the current City of Colorado Springs DCM.

PREPARED BY:
Classic Consulting Engineers & Surveyors, LLC

David L Gibson, P.E.
Project Manager

REFERENCES

1. City of Colorado Springs Drainage Criteria Manual Volume 1, dated May 2014, revised January 2021.

2. City of Colorado Springs Drainage Criteria Manual Volume 2, dated May 2014, revised December 2020

3. Mile High Flood Control District Urban Storm Drainage Criteria Manual Volume 3 dated December 2010 with March 2024 revisions.

4. "Web Soil Survey National Cooperative Soil Survey", by Natural Resources Conservation Service.

5. "Flood Insurance Rate Maps", dated December 7, 2018.

3. "Final Drainage Report for Reserve at Northcreek and Addendum to the Master Development Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2" by Catamount Engineering dated June, 2017

4. "Master Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2" by Classic Consulting Engineers & Surveyors dated September 2016.

5. "Master Development Drainage Plan Update for Fairlane Technological Park Interquest South (Lot 4, Fairlane Technology Parking Filing No. 2) and Final Drainage Report for Lots 1 & 2 Interquest Filing No. 6" by Classic Consulting Engineers & Surveyors dated April 2007.

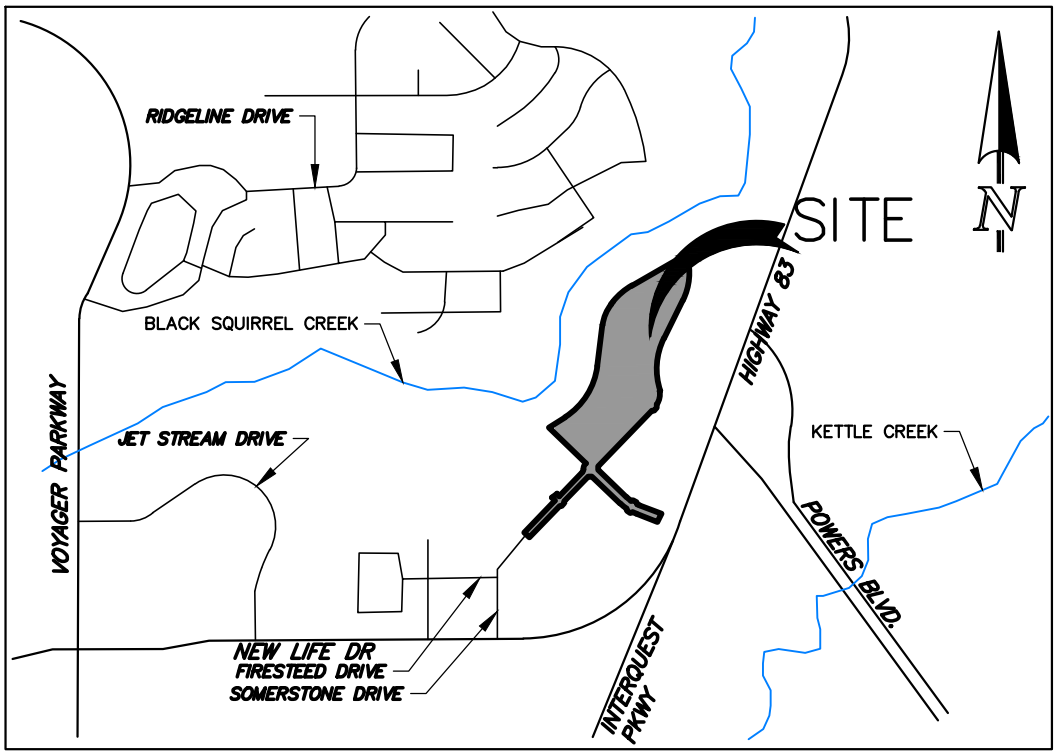
6. "Preliminary/Final Drainage Report for Wildwood at Northgate Filing No. 1 & 2" by JR Engineering dated June 2004

7. "Final Drainage Report Downtown Flying Horse Filing No. 1 Preliminary Drainage Report for Downtown Flying Horse Future Filings" by Classic Consulting dated January 2023

8. "Amendment #1 to Final Drainage Report Downtown Flying Horse Filing No. 1, Preliminary Drainage Report for Downtown Flying Horse Future Filings" by Classic Consulting dated August 2025.

APPENDIX

VICINITY MAP

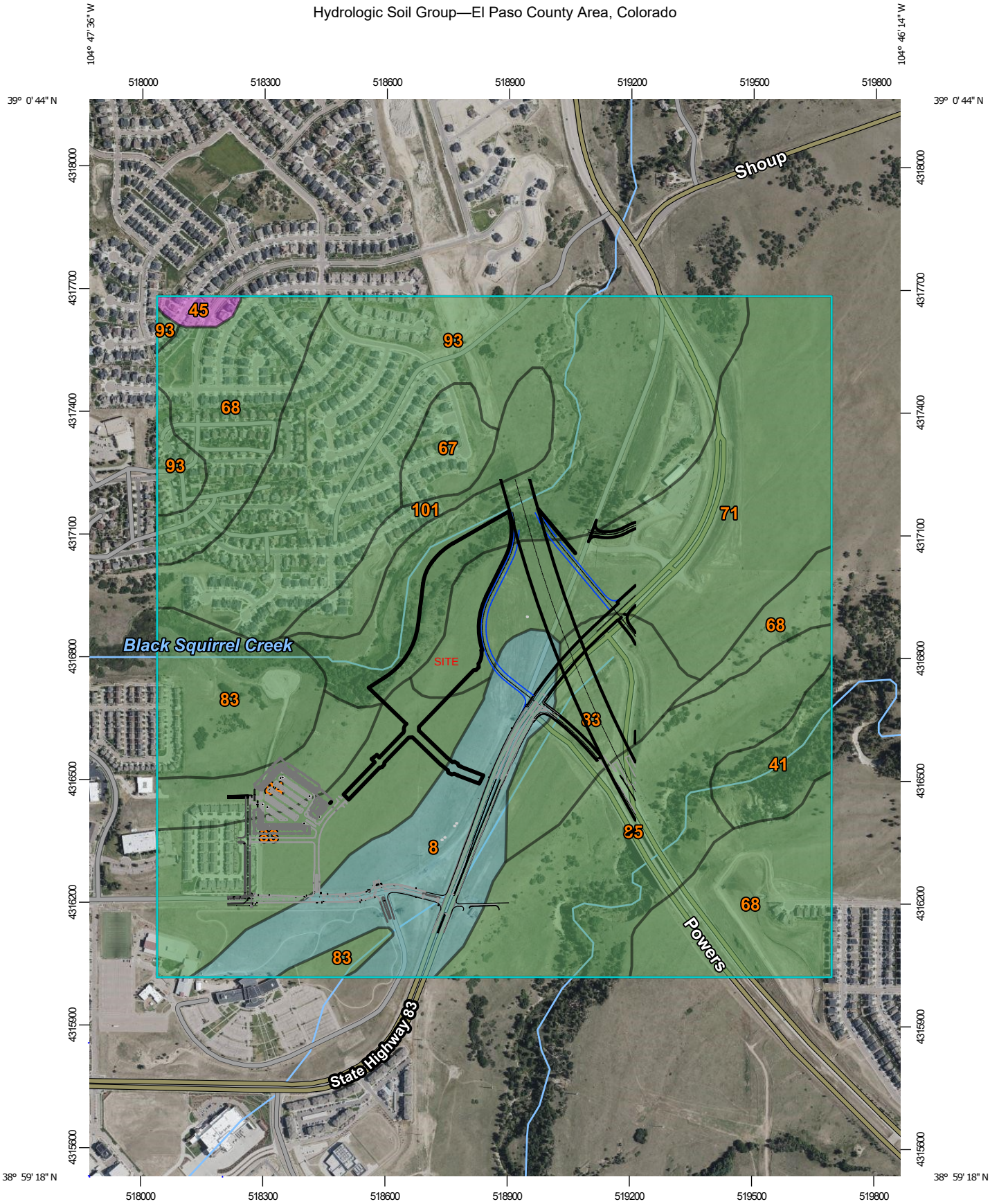


VICINITY MAP

N.T.S

SOILS MAP (S.C.S SURVEY)

Hydrologic Soil Group—El Paso County Area, Colorado



Map Scale: 1:12,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

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

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	60.0	8.8%
41	Kettle gravelly loamy sand, 8 to 40 percent slopes	B	14.8	2.2%
45	Kutch clay loam, 5 to 20 percent slopes	C	3.2	0.5%
67	Peyton sandy loam, 5 to 9 percent slopes	B	11.4	1.7%
68	Peyton-Pring complex, 3 to 8 percent slopes	B	85.8	12.5%
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	100.9	14.7%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	120.6	17.6%
84	Stapleton sandy loam, 8 to 15 percent slopes	B	17.8	2.6%
85	Stapleton-Bernal sandy loams, 3 to 20 percent slopes	B	72.1	10.5%
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	179.4	26.2%
101	Ustic Torrifluvents, loamy	B	18.0	2.6%
Totals for Area of Interest			**684.0**	**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

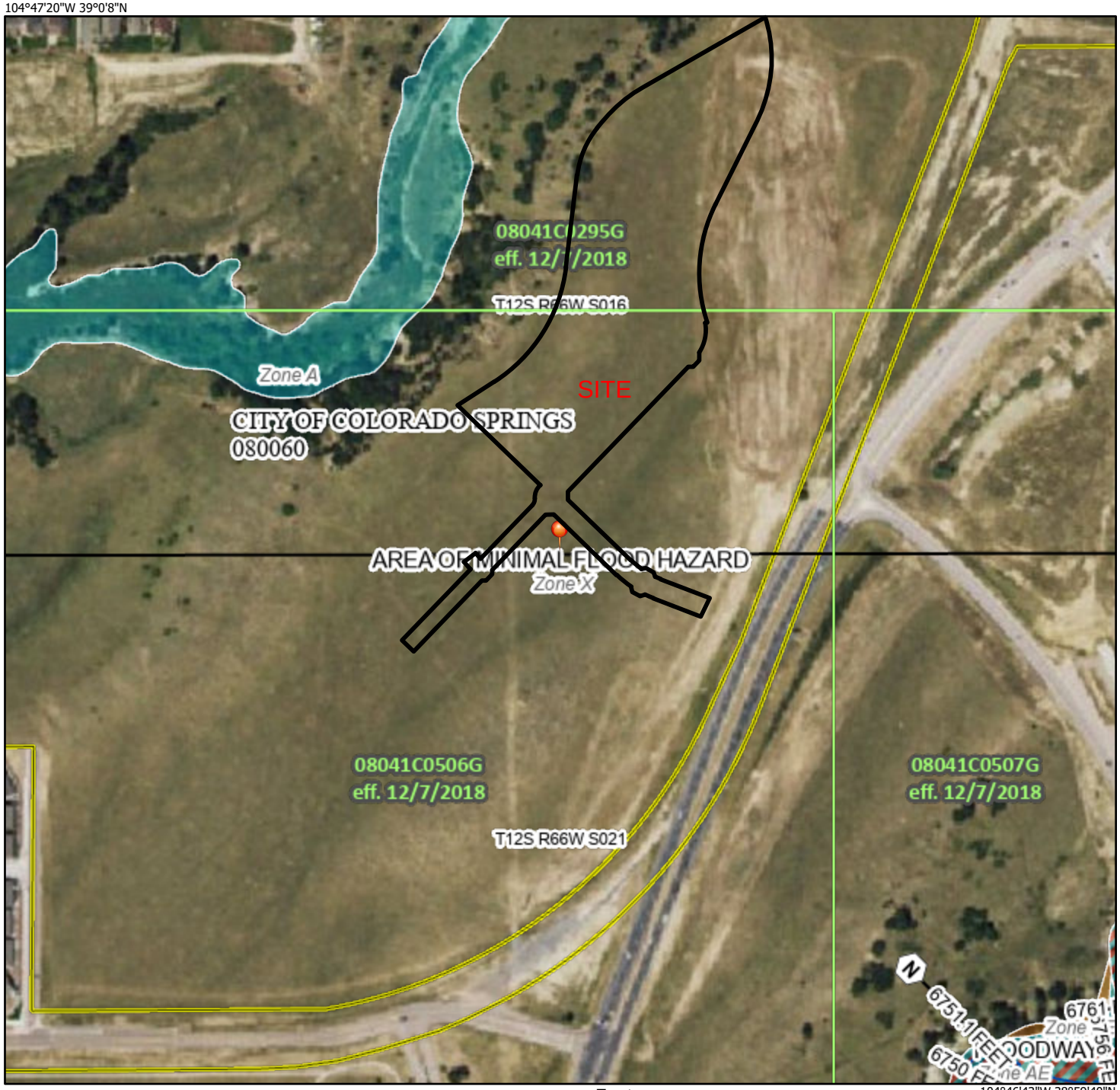
Tie-break Rule: Higher

F.E.M.A. MAP

National Flood Hazard Layer FIRMette

FEMA

104°47'20"W 39°0'8"N



104°46'43"W 38°59'40"N

Feet

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

SPECIAL FLOOD HAZARD AREAS

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

OTHER AREAS OF FLOOD HAZARD

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

OTHER AREAS

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

GENERAL STRUCTURES

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

OTHER FEATURES

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

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/29/2026 at 4:04 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.

DRAINAGE CALCULATIONS

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/25/26*
CALCULATED BY: *DLG*

BASIN RUNOFF COEFFICIENT SUMMARY

		C VALUE DCM TABLE 6-6						C VALUE DCM TABLE 6-6						WEIGHTED "C" VALUE			WEIGHTED CA			WEIGHTED IMP.
BASIN	TOTAL AREA (AC)	LAND USE	PERCENT IMP.	AREA (AC)	C(2)	C(5)	C(100)	LAND USE	PERCENT IMP.	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)	PERCENT
A	2.77	RES 1/16	75.0%	2.50	0.51	0.54	0.65	LANDSCAPE	7.0%	0.27	0.02	0.08	0.35	0.46	0.50	0.62	1.28	1.37	1.72	68.4%
B	1.55	RES 1/16	75.0%	1.55	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.79	0.84	1.01	75.0%
C	1.02	PAVEMENT	100.0%	0.53	0.89	0.90	0.96	LANDSCAPE	7.0%	0.49	0.02	0.08	0.35	0.47	0.51	0.67	0.48	0.52	0.68	55.3%
D	1.83	RES 1/16	75.0%	1.83	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.93	0.99	1.19	75.0%
E	2.87	RES 1/16	75.0%	2.87	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	1.46	1.55	1.87	75.0%
F	0.33	PAVEMENT	100.0%	0.33	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.29	0.30	0.32	100.0%
G	0.28	PAVEMENT	100.0%	0.28	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.25	0.25	0.27	100.0%
H	0.64	PAVEMENT	100.0%	0.64	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.57	0.58	0.61	100.0%
I	1.23	RES 1/16	75.0%	1.06	0.51	0.54	0.65	LANDSCAPE	7.0%	0.17	0.02	0.08	0.35	0.44	0.48	0.61	0.54	0.59	0.75	65.6%
J	0.18	PAVEMENT	100.0%	0.64	0.89	0.90	0.96	LANDSCAPE	7.0%	-0.46	0.02	0.08	0.35	3.11	3.00	2.52	0.56	0.54	0.45	337.7%
K	0.20	PAVEMENT	100.0%	0.20	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.18	0.18	0.19	100.0%
L	0.22	PAVEMENT	100.0%	0.22	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.20	0.20	0.21	100.0%
M	3.85	HISTORIC	100.0%	0.00	0.89	0.90	0.96	UNDEVELOPED	2.0%	3.85	0.02	0.08	0.35	0.02	0.08	0.35	0.08	0.31	1.35	2.0%
N	0.06	PAVEMENT	100.0%	0.06	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.05	0.05	0.06	100.0%
O	0.56	RES 1/16	75.0%	0.45	0.51	0.54	0.65	LANDSCAPE	7.0%	0.11	0.02	0.08	0.35	0.41	0.45	0.59	0.23	0.25	0.33	61.6%
P	0.96	RES 1/16	75.0%	0.96	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.49	0.52	0.62	75.0%
Q	0.87	RES 1/16	75.0%	0.20	0.51	0.54	0.65	LANDSCAPE	7.0%	0.67	0.02	0.08	0.35	0.13	0.19	0.42	0.12	0.16	0.36	22.6%
OS-1	1.50	RES 1/16	75.0%	1.50	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.77	0.81	0.98	75.0%
OS-2	2.70	RES 1/16	75.0%	2.70	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	1.38	1.46	1.76	75.0%
OS-3	1.55	RES 1/16	75.0%	1.55	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.79	0.84	1.01	75.0%
OS-4	3.40	RES 1/16	75.0%	3.40	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	1.73	1.84	2.21	75.0%
OS-5	0.13	RES 1/16	75.0%	0.13	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.07	0.07	0.08	75.0%
OS-6	3.21	PARK	75.0%	0.00	0.51	0.54	0.65	LANDSCAPE	7.0%	3.21	0.02	0.08	0.35	0.02	0.08	0.35	0.06	0.26	1.12	7.0%
OS-7	0.07	PAVEMENT	100.0%	0.07	0.89	0.90	0.96	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.89	0.90	0.96	0.06	0.06	0.07	100.0%
OS-8	0.43	RES 1/16	75.0%	0.13	0.51	0.54	0.65	LANDSCAPE	7.0%	0.30	0.02	0.08	0.35	0.17	0.22	0.44	0.07	0.09	0.19	27.6%
OS-9	4.10	RES 1/16	75.0%	4.10	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	2.09	2.21	2.67	75.0%
OS-10	0.77	RES 1/16	75.0%	0.77	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.39	0.42	0.50	75.0%
OS-11	0.11	RES 1/16	75.0%	0.11	0.51	0.54	0.65	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.51	0.54	0.65	0.06	0.06	0.07	75.0%
OS-12	12.78	COMMERCIAL	95.0%	12.78	0.80	0.82	0.89	LANDSCAPE	7.0%	0.00	0.02	0.08	0.35	0.80	0.82	0.89	10.22	10.48	11.37	95.0%
OS-13	3.00	RES 1/16	75.0%	1.45	0.51	0.54	0.65	LANDSCAPE	7.0%	1.55	0.02	0.08	0.35	0.26	0.30	0.50	0.77	0.91	1.49	39.9%
OS-14	24.64	HISTORIC	100.0%	0.00	0.89	0.90	0.96	UNDEVELOPED	2.0%	24.64	0.02	0.08	0.35	0.02	0.08	0.35	0.49	1.97	8.62	2.0%
EX-1	41.53	HISTORIC	100.0%	0.00	0.89	0.90	0.96	UNDEVELOPED	2.0%	41.53	0.02	0.08	0.35	0.02	0.08	0.35	0.83	3.32	14.54	2.0%
EX-2	5.62	HISTORIC	100.0%	0.00	0.89	0.90	0.96	UNDEVELOPED	2.0%	5.62	0.02	0.08	0.35	0.02	0.08	0.35	0.11	0.45	1.97	2.0%
EX-3	3.85	HISTORIC	100.0%	0.00	0.89	0.90	0.96	UNDEVELOPED	2.0%	3.85	0.02	0.08	0.35	0.02	0.08	0.35	0.08	0.31	1.35	2.0%
EX-4	32.48	HISTORIC	100.0%	0.00	0.89	0.90	0.96	UNDEVELOPED	2.0%	32.48	0.02	0.08	0.35	0.02	0.08	0.35	0.65	2.60	11.37	2.0%

JOB NAME:	*CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER:	*1171.78*
DATE:	*09/25/26*
CALC'D BY:	*DLG*

Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

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

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

*For buried riprap, select C_v value based on type of vegetative cover.

BASIN RUNOFF SUMMARY

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	1.28	1.37	1.72	0.08	100	2	14.7	300	2.5%	3.2	1.6	16.2	2.72	3.40	5.71	3.5	**4.7**	**9.8**
B	0.79	0.84	1.01	0.08	100	2	14.7	300	2.5%	3.2	1.6	16.2	2.72	3.40	5.71	2.1	**2.8**	**5.8**
C	0.48	0.52	0.68	0.08	100	2	14.7	300	2.5%	3.2	1.6	16.2	2.72	3.40	5.71	1.3	**1.8**	**3.9**
D	0.93	0.99	1.19	0.08	100	2	14.7	150	2.5%	3.2	0.8	15.4	2.78	3.48	5.84	2.6	**3.4**	**6.9**
E	1.46	1.55	1.87	0.08	100	2	14.7	300	2.5%	3.2	1.6	16.2	2.72	3.40	5.71	4.0	**5.3**	**10.7**
F	0.29	0.30	0.32	0.08	0	0.5	0.0	300	2.0%	2.8	1.8	5.0	4.12	5.17	8.68	1.2	**1.5**	**2.7**
G	0.25	0.25	0.27	0.08	0	0	0.0	100	2.0%	2.8	0.6	5.0	4.12	5.17	8.68	1.0	**1.3**	**2.3**
H	0.57	0.58	0.61	0.08	50	1	10.4	300	2.5%	3.2	1.6	11.9	3.08	3.86	6.49	1.8	**2.2**	**4.0**
I	0.54	0.59	0.75	0.08	50	2	8.2	300	2.0%	2.8	1.8	10.0	3.29	4.13	6.93	1.8	**2.4**	**5.2**
J	0.56	0.54	0.45	0.08	0	0	0.0	200	2.0%	2.8	1.2	5.0	4.12	5.17	8.68	2.3	**2.8**	**3.9**
K	0.18	0.18	0.19	0.08	0	0	0.0	200	2.0%	2.8	1.2	5.0	4.12	5.17	8.68	0.7	**0.9**	**1.7**
L	0.20	0.20	0.21	0.08	0	0	0.0	200	2.0%	2.8	1.2	5.0	4.12	5.17	8.68	0.8	**1.0**	**1.8**
M	0.08	0.31	1.35	0.08	300	50	12.6	0	0.0%	0.0	0.0	12.6	3.02	3.78	6.35	0.2	**1.2**	**8.6**
N	0.05	0.05	0.06	0.08	0	0	0.0	50	1.0%	2.0	0.4	5.0	4.12	5.17	8.68	0.2	**0.3**	**0.5**
O	0.23	0.25	0.33	0.08	50	2	8.2	50	2.0%	2.8	0.3	8.5	3.48	4.37	7.33	0.8	**1.1**	**2.4**
P	0.49	0.52	0.62	0.08	100	2	14.7	300	2.5%	3.2	1.6	16.2	2.72	3.40	5.71	1.3	**1.8**	**3.6**

JOB NAME:	*CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER:	*1171.78*
DATE:	*09/25/26*
CALC'D BY:	*DLG*

Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

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

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

*For buried riprap, select C_v value based on type of vegetative cover.

BASIN RUNOFF SUMMARY

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

BASIN	WEIGHTED CA(2)	WEIGHTED CA(5)	WEIGHTED CA(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL FLOW Length (ft)	STREET / CHANNEL FLOW Slope (%)	STREET / CHANNEL FLOW Velocity (fps)	STREET / CHANNEL FLOW Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	TOTAL FLOWS Q(5) (cfs)	TOTAL FLOWS Q(100) (cfs)
Q	0.12	0.16	0.36	0.08	100	2	14.7	300	2.5%	3.2	1.6	16.2	2.72	3.40	5.71	0.3	**0.5**	**2.1**
OS-1	0.77	0.81	0.98	0.08	50	2	8.2	300	3.0%	3.5	1.4	9.7	3.33	4.18	7.01	2.5	**3.4**	**6.8**
OS-2	1.38	1.46	1.76	0.08	100	2	14.7	300	2.0%	2.8	1.8	16.4	2.70	3.39	5.68	3.7	**4.9**	**10.0**
OS-3	0.79	0.84	1.01	0.08	100	2	14.7	300	3.0%	3.5	1.4	16.1	2.73	3.42	5.73	2.2	**2.9**	**5.8**
OS-4	1.73	1.84	2.21	0.08	100	2	14.7	300	2.0%	2.8	1.8	16.4	2.70	3.39	5.68	4.7	**6.2**	**12.6**
OS-5	0.07	0.07	0.08	0.08	0	0	0.0	300	3.0%	3.5	1.4	5.0	4.12	5.17	8.68	0.3	**0.4**	**0.7**
OS-6	0.06	0.26	1.12	0.08	100	2	14.7	300	2.0%	2.8	1.8	16.4	2.70	3.39	5.68	0.2	**0.9**	**6.4**
OS-7	0.06	0.06	0.07	0.08	0	0	0.0	300	2.0%	2.8	1.8	5.0	4.12	5.17	8.68	0.3	**0.3**	**0.6**
OS-8	0.07	0.09	0.19	0.08	50	2	8.2	300	2.0%	2.8	1.8	10.0	3.29	4.13	6.93	0.2	**0.4**	**1.3**
OS-9	2.09	2.21	2.67	0.08	75	2	11.5	300	2.0%	2.8	1.8	13.3	2.95	3.70	6.21	6.2	**8.2**	**16.6**
OS-10	0.39	0.42	0.50	0.08	25	1	5.8	300	3.0%	3.5	1.4	7.3	3.67	4.61	7.74	1.4	**1.9**	**3.9**
OS-11	0.06	0.06	0.07	0.08	0	0	0.0	300	3.0%	3.5	1.4	5.0	4.12	5.17	8.68	0.2	**0.3**	**0.6**
OS-12	10.22	10.48	11.37	0.08	100	2	14.7	300	3.0%	3.5	1.4	16.1	2.73	3.42	5.73	27.9	**35.8**	**65.2**
OS-13	0.77	0.91	1.49	0.08	100	2	14.7	300	2.0%	2.8	1.8	16.4	2.70	3.39	5.68	2.1	**3.1**	**8.4**
OS-14	0.49	1.97	8.62	0.08	100	1	18.4	1000	1.3%	2.3	7.3	25.7	2.17	2.71	4.55	1.1	**5.3**	**39.3**
EX-1	0.83	3.32	14.54	0.08	300	8	23.1	1000	2.0%	2.8	5.9	29.0	2.03	2.53	4.25	1.7	**8.4**	**61.8**

JOB NAME:	*CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER:	*1171.78*
DATE:	*09/25/26*
CALC'D BY:	*DLG*

Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

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

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

*For buried riprap, select C_v value based on type of vegetative cover.

BASIN RUNOFF SUMMARY

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
EX-2	0.11	0.45	1.97	0.08	300	50	12.6	0	0.0%	0.0	0.0	12.6	3.02	3.78	6.35	0.3	**1.7**	**12.5**
EX-3	0.08	0.31	1.35	0.08	300	50	12.6	0	0.0%	0.0	0.0	12.6	3.02	3.78	6.35	0.2	**1.2**	**8.6**
EX-4	0.65	2.60	11.37	0.08	100	1	18.4	1000	1.3%	2.3	7.3	25.7	2.17	2.71	4.55	1.4	**7.0**	**51.7**

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/24/26*
CALCULATED BY: *DLG*

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

*ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED

SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Facility/ Inlet Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	BASIN A	1.37	1.72	16.2	3.40	5.71	4.7	9.8	10' TYPE 2 PUBLIC
2	BASIN B	0.84	1.01	16.2	3.40	5.71	2.8	5.8	10' TYPE 2 PUBLIC
3	BASIN C	0.52	0.68	16.2	3.40	5.71	1.8	3.9	5' TYPE 2 PUBLIC
4	BASIN D	0.99	1.19	15.4	3.48	5.84	3.4	6.9	15' TYPE 2 PUBLIC
5	BASIN E & FLOW-BY DP 1	1.67	2.41	16.2	3.40	5.71	5.7	13.8	10' TYPE 2 PUBLIC
6	BASIN F & BASIN OS-3	1.13	1.32	16.1	3.42	5.73	3.9	7.6	10' TYPE 2 PUBLIC
7	BASIN G	0.25	0.27	5.0	5.17	8.68	1.3	2.3	5' TYPE 2 PUBLIC
8	BASIN H, BASIN C, OS-1, OS-5 & FLOW-BY DP 2	1.97	2.46	16.2	3.40	5.71	6.7	14.0	15' TYPE 2 PUBLIC
9	BASIN J, N, OS-4 & FLOW-BY DP 8	2.46	3.25	16.2	3.40	5.71	8.4	18.5	15' TYPE 2 PUBLIC
10	BASIN K FLOW-BY DP 9	0.33	1.21	16.2	3.40	5.71	1.1	6.9	15' TYPE 2 PUBLIC
11	BASIN L & OS-8	0.29	0.40	10.0	4.13	6.93	1.2	2.8	10' TYPE 2 PUBLIC
EX1	BASIN EX-2	3.32	14.54	29.0	2.53	4.25	8.4	61.8	N/A
EX2	BASIN EX-3	0.45	1.97	12.6	3.78	6.35	1.7	12.5	N/A

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/24/26*
CALCULATED BY: *DLG*

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

*ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED

SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Facility/ Inlet Size*
					I(5)	I(100)	Q(5)	Q(100)	
EX3	BASIN EX-4	0.31	1.35	12.6	3.78	6.35	1.2	8.6	N/A

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/24/26*
CALCULATED BY: *DLG*

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM SLOPE.
REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.
PIPES ARE TO BE PRIVATE UNLESS OTHERWISE NOTED.
PRIVATE STORM MATERIALS TO BE RCP OR DOUBLE WALL POLYPROPYLENE (DWPP) TO BE SELECTED BY CONTRACTOR

PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins / Design Point/Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP 1 INTERCEPTED	1.26	1.17	16.2	3.40	5.71	4.3	6.7	18" PUBLIC RCP
2	DP 2 INTERCEPTED	0.84	0.90	16.2	3.40	5.71	2.8	5.1	18" PUBLIC RCP
3	PIPE 1 & 2	2.10	2.07	16.2	3.40	5.71	7.1	11.8	24" PUBLIC RCP
4	BASIN Q & OS-13 INTERCEPTED	1.07	1.85	16.4	3.39	5.68	3.6	10.5	18" PUBLIC RCP
5	PIPE 3 & 4	3.17	3.92	19.5	3.12	5.24	9.9	20.5	24" PUBLIC RCP
6	DP 4 INTERCEPTED	0.99	1.14	15.4	3.48	5.84	3.4	6.7	18" PUBLIC RCP
7	PIPE 5 & 6	4.16	5.06	19.5	3.12	5.24	13.0	26.5	24" PUBLIC RCP
8	DP 5	1.67	2.41	16.2	3.40	5.71	5.7	13.8	24" PUBLIC RCP
9	PIPE 7 & 8	5.82	7.47	22.5	2.91	4.89	16.9	36.5	30" PUBLIC RCP
10	DP 6	1.13	1.32	16.1	3.42	5.73	3.9	7.6	24" PUBLIC RCP
11	DP 7	0.25	0.27	5.0	5.17	8.68	1.3	2.3	18" PUBLIC RCP
12	PIPE 10 & 11	1.39	1.59	16.1	3.42	5.73	4.7	9.1	24" PUBLIC RCP
13	BASIN P & OS-2	1.98	2.38	16.4	3.39	5.68	6.7	13.5	24" PUBLIC RCP

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/24/26*
CALCULATED BY: *DLG*

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM SLOPE.
REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.
PIPES ARE TO BE PRIVATE UNLESS OTHERWISE NOTED.
PRIVATE STORM MATERIALS TO BE RCP OR DOUBLE WALL POLYPROPYLENE (DWPP) TO BE SELECTED BY CONTRACTOR

PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins / Design Point/Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
14	PIPE 12 & 13	3.36	3.97	16.4	3.39	5.68	11.4	22.6	30" PUBLIC RCP
14A	DP 3	0.52	0.68	16.2	3.40	5.71	1.8	3.9	18" PUBLIC RCP
15	PIPE 9 & 14	9.19	11.44	26.3	2.68	4.50	24.6	51.4	36" PUBLIC RCP
16	DP 8 INTERCEPTED	1.95	1.94	16.2	3.40	5.71	6.6	11.1	24" PUBLIC RCP
17	PIPE 15 & 16	11.14	13.38	26.3	2.68	4.50	29.8	60.2	36" PUBLIC RCP
18	BASIN I, O, FLOW-BY DP 4, OS-6 & OS-7	1.16	2.32	16.4	3.39	5.68	3.9	13.2	24" PUBLIC RCP
19	PIPE 17 & 18	12.30	15.70	26.3	2.68	4.50	32.9	70.6	42" PUBLIC RCP
20	DP 9 INTERCEPTED	2.31	2.24	16.2	3.40	5.71	7.9	12.8	24" PUBLIC RCP
21	PIPE 19 & 20	14.61	17.94	28.1	2.58	4.33	37.7	77.6	42" PUBLIC RCP
22	DP 10 INTERCEPTED	0.33	1.21	16.2	3.40	5.71	1.1	6.9	18" PUBLIC RCP
23	DP 11 INTERCEPTED	0.29	0.40	10.0	4.13	6.93	1.2	2.8	18" PUBLIC RCP
24	PIPE 21,22,23	15.23	19.55	28.1	2.58	4.33	39.3	84.6	EX 48" PUBLIC RCP
25	BASIN OS-9 & OS-10	2.63	3.17	13.3	3.70	6.21	9.7	19.7	EX. 36" PUBLIC RCP

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/24/26*
CALCULATED BY: *DLG*

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM SLOPE.
REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.
PIPES ARE TO BE PRIVATE UNLESS OTHERWISE NOTED.
PRIVATE STORM MATERIALS TO BE RCP OR DOUBLE WALL POLYPROPYLENE (DWPP) TO BE SELECTED BY CONTRACTOR

PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins / Design Point/Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
26	PIPE 24 & 25	17.86	22.72	27.8	2.60	4.36	46.3	98.9	EX 48" PUBLIC RCP
27	BASIN OS-12	10.48	11.37	16.1	3.42	5.73	35.8	65.2	EX 42" PUBLIC RCP

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	DP 1 AT GRADE	DP 2 AT GRADE
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	4.70	2.80
Major Peak Flow, Q (cfs)	9.80	5.80

Bypass (Carry-Over) Flow from Upstream Inlets must be organized from upstream (left) to downstream (right) in order for

Receive Bypass Flow from:		
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)		
Major Bypass Flow Received, Q_b (cfs)		

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	4.70	2.80
Major Total Design Peak Flow, Q (cfs)	9.80	5.80
Minor Inlet Interception Capacity, Q_a (cfs)	4.32	2.80
Major Inlet Interception Capacity, Q_a (cfs)	6.67	5.18
Minor Flow Bypassed Downstream, Qb (cfs)	0.38	0.00
Major Flow Bypassed Downstream, Qb (cfs)	3.13	0.62
Minor Flow Capture Percentage, C%	92%	100%
Major Flow Capture Percentage, C%	68%	89%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	DP 3 INLET	DP 4 AT GRADE
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	1.80	3.40
Major Peak Flow, Q (cfs)	3.90	6.90

Bypass (Carry-Over) Flow from Upstream bypass flows to be linked.

Receive Bypass Flow from:		
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)		
Major Bypass Flow Received, Q_b (cfs)		

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	1.80	3.40
Major Total Design Peak Flow, Q (cfs)	3.90	6.90
Minor Inlet Interception Capacity, Q_a (cfs)	6.27	3.40
Major Inlet Interception Capacity, Q_a (cfs)	9.48	6.79
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	0.00
Major Flow Bypassed Downstream, Qb (cfs)	N/A	0.11
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	98%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	DP 5 INLET	DP 6 INLET
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	5.30	3.90
Major Peak Flow, Q (cfs)	10.70	7.60

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	DP 1 AT GRADE	
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.38	
Major Bypass Flow Received, Q_b (cfs)	3.13	

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	5.68	3.90
Major Total Design Peak Flow, Q (cfs)	13.83	7.60
Minor Inlet Interception Capacity, Q_a (cfs)	9.65	9.65
Major Inlet Interception Capacity, Q_a (cfs)	17.21	17.21
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	N/A
Major Flow Bypassed Downstream, Qb (cfs)	N/A	N/A
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	100%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	DP 7 INLET	DP 8 AT GRADE
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	1.30	6.70
Major Peak Flow, Q (cfs)	2.30	13.38

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:		DP 2 AT GRADE
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)		0.00
Major Bypass Flow Received, Q_b (cfs)		0.62

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	1.30	6.70
Major Total Design Peak Flow, Q (cfs)	2.30	14.00
Minor Inlet Interception Capacity, Q_a (cfs)	6.27	6.62
Major Inlet Interception Capacity, Q_a (cfs)	9.48	10.99
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	0.08
Major Flow Bypassed Downstream, Qb (cfs)	N/A	3.01
Minor Flow Capture Percentage, C%	100%	99%
Major Flow Capture Percentage, C%	100%	79%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	DP 9 AT GRADE	DP 10 AT GRADE
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	8.32	0.60
Major Peak Flow, Q (cfs)	15.49	1.10

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	DP 8 AT GRADE	DP 9 AT GRADE
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.08	0.50
Major Bypass Flow Received, Q_b (cfs)	3.01	5.80

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	8.40	1.10
Major Total Design Peak Flow, Q (cfs)	18.50	6.90
Minor Inlet Interception Capacity, Q_a (cfs)	7.89	1.10
Major Inlet Interception Capacity, Q_a (cfs)	12.70	6.79
Minor Flow Bypassed Downstream, Qb (cfs)	0.50	0.00
Major Flow Bypassed Downstream, Qb (cfs)	5.80	0.11
Minor Flow Capture Percentage, C%	94%	100%
Major Flow Capture Percentage, C%	69%	98%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	DP 11 AT GRADE
Inlet Application (Street or Area)	STREET
Hydraulic Condition	On Grade
Inlet Type	CDOT Type R Curb Opening
Number of Inlet Units	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	1.20
Major Peak Flow, Q (cfs)	2.80

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	
Bypass Flow Description (Optional):	
Minor Bypass Flow Received, Q_b (cfs)	
Major Bypass Flow Received, Q_b (cfs)	

CALCULATED OUTPUT

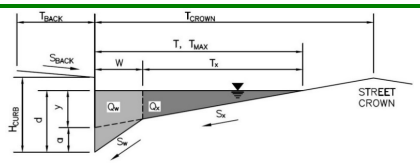
Minor Total Design Peak Flow, Q (cfs)	1.20
Major Total Design Peak Flow, Q (cfs)	2.80
Minor Inlet Interception Capacity, Q_a (cfs)	1.20
Major Inlet Interception Capacity, Q_a (cfs)	2.80
Minor Flow Bypassed Downstream, Qb (cfs)	0.00
Major Flow Bypassed Downstream, Qb (cfs)	0.00
Minor Flow Capture Percentage, C%	100%
Major Flow Capture Percentage, C%	100%

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 1 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	11.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

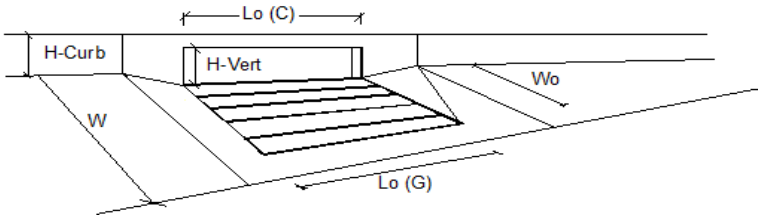
	Minor Storm	Major Storm	
Q_{allow} =	**5.1**	**34.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.70 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 9.80 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



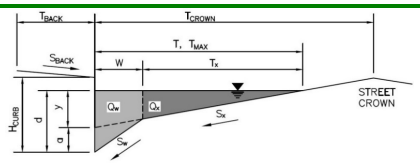
Design Information (Input)		MINOR	MAJOR	
Type of Inlet CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**4.3**	**6.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.4**	**3.1**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**92**	**68**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 2 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	11.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

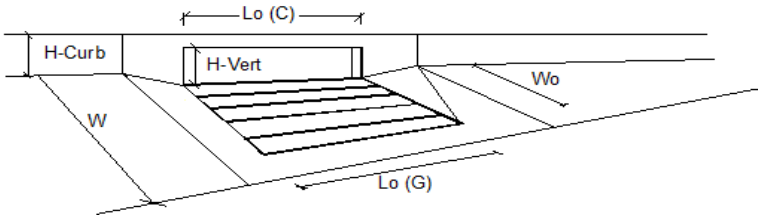
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**5.4**	**23.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.80 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 5.80 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



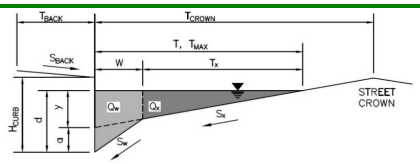
Design Information (Input)		MINOR	MAJOR	
Type of Inlet CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**2.8**	**5.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.6**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**89**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 3 INLET



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	11.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

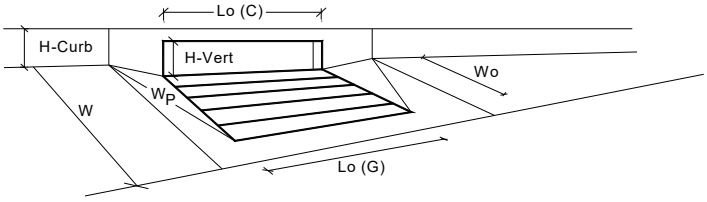
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



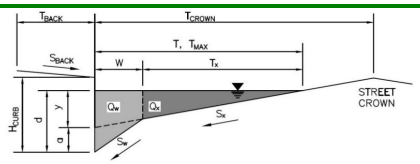
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	7.8	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.37	0.52	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**6.3**	**9.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.8	3.9	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 4 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	19.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	19.0	19.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

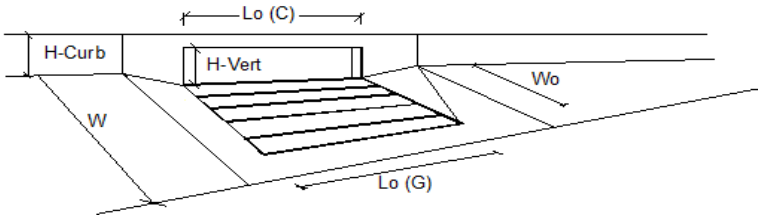
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**19.8**	**44.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.40 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.90 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



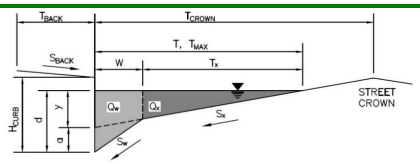
Design Information (Input)		MINOR	MAJOR	
Type of Inlet CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**3.4**	**6.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**98**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 5 INLET



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	11.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

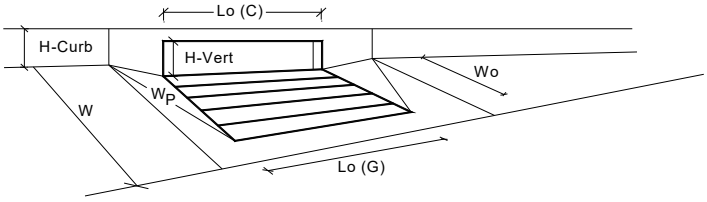
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



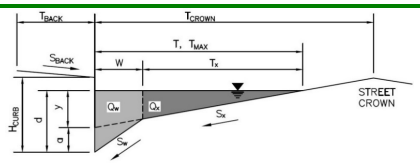
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	7.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.52	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.93	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**9.7**	**17.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		$Q_{PEAK\ REQUIRED}$ =	5.7	13.8	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 6 INLET



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

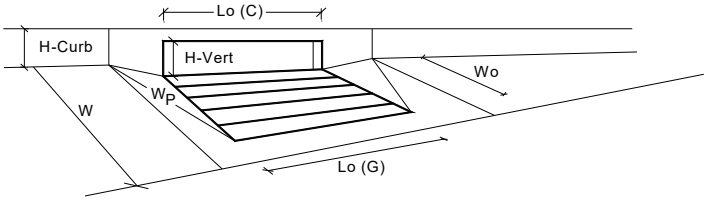
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



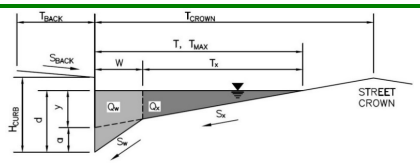
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	7.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.52	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.93	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**9.7**	**17.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		$Q_{PEAK\ REQUIRED}$ =	3.9	7.6	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 7 INLET



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

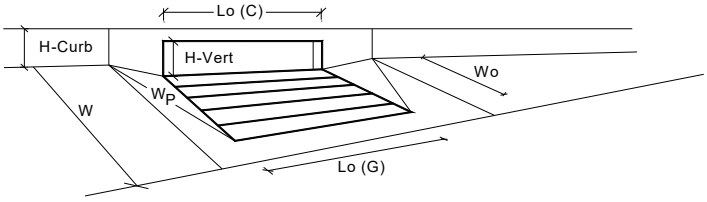
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



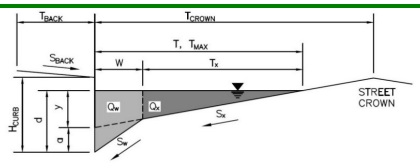
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	7.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.52	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**6.3**	**9.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		$Q_{PEAK\ REQUIRED}$ =	1.3	2.3	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 8 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.025	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	11.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

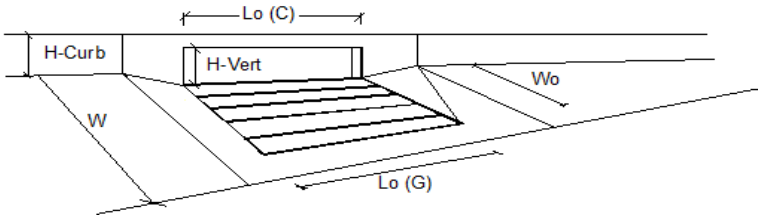
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**5.7**	**32.3**	**cfs**

WARNING: MINOR STORM max. allowable capacity is less than the design peak flow of 6.70 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 14.00 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

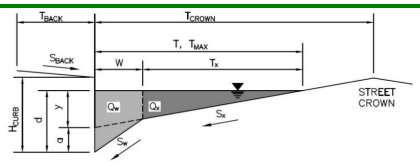
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR & MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**6.6**	**11.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**3.0**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**99**	**79**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 9 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

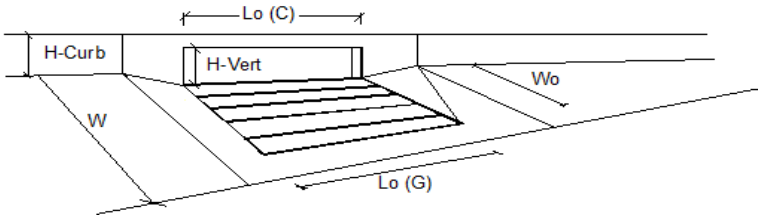
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**24.1**	**45.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 8.40 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 18.50 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



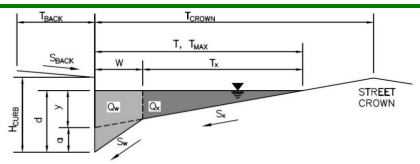
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**7.9**	**12.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.5**	**5.8**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**94**	**69**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 10 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

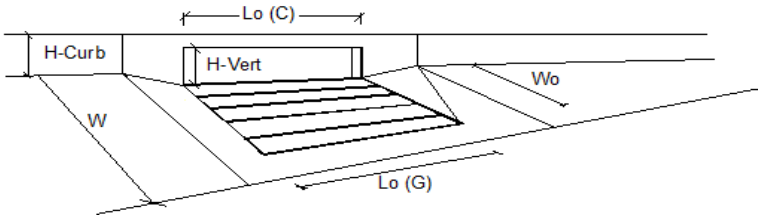
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**24.1**	**25.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.10 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.90 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



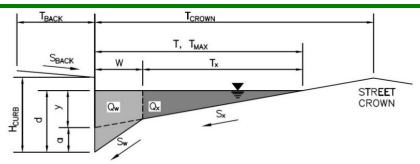
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**1.1**	**6.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**98**	**%**

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: CREEKRIDGE AT FLYING HORSE FILING NO. 1

Inlet ID: DP 11 AT GRADE



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.8	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

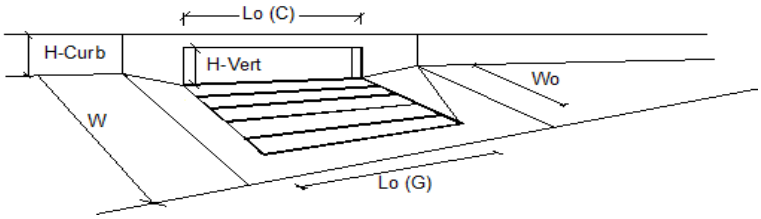
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**24.1**	**45.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.20 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.80 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**1.2**	**2.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**100**	**%**

PIPE RUN 1 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	4.30 cfs

Results	
Normal Depth	8.0 in
Flow Area	0.8 ft²
Wetted Perimeter	2.2 ft
Hydraulic Radius	4.2 in
Top Width	1.49 ft
Critical Depth	9.5 in
Percent Full	44.6 %
Critical Slope	0.006 ft/ft
Velocity	5.65 ft/s
Velocity Head	0.50 ft
Specific Energy	1.16 ft
Froude Number	1.393
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	44.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.0 in
Critical Depth	9.5 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 2 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	2.80 cfs

Results	
Normal Depth	6.3 in
Flow Area	0.6 ft²
Wetted Perimeter	1.9 ft
Hydraulic Radius	3.5 in
Top Width	1.43 ft
Critical Depth	7.6 in
Percent Full	35.3 %
Critical Slope	0.005 ft/ft
Velocity	5.03 ft/s
Velocity Head	0.39 ft
Specific Energy	0.92 ft
Froude Number	1.423
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	35.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.3 in
Critical Depth	7.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 3 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	7.10 cfs

Results	
Normal Depth	9.2 in
Flow Area	1.1 ft²
Wetted Perimeter	2.7 ft
Hydraulic Radius	5.0 in
Top Width	1.95 ft
Critical Depth	11.4 in
Percent Full	38.5 %
Critical Slope	0.005 ft/ft
Velocity	6.37 ft/s
Velocity Head	0.63 ft
Specific Energy	1.40 ft
Froude Number	1.485
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	38.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.2 in
Critical Depth	11.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 4 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	3.60 cfs

Results	
Normal Depth	7.3 in
Flow Area	0.7 ft²
Wetted Perimeter	2.1 ft
Hydraulic Radius	3.9 in
Top Width	1.47 ft
Critical Depth	8.7 in
Percent Full	40.4 %
Critical Slope	0.005 ft/ft
Velocity	5.39 ft/s
Velocity Head	0.45 ft
Specific Energy	1.06 ft
Froude Number	1.409
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	40.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.3 in
Critical Depth	8.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 5 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	9.90 cfs

Results	
Normal Depth	11.1 in
Flow Area	1.4 ft²
Wetted Perimeter	3.0 ft
Hydraulic Radius	5.7 in
Top Width	1.99 ft
Critical Depth	13.5 in
Percent Full	46.3 %
Critical Slope	0.005 ft/ft
Velocity	6.96 ft/s
Velocity Head	0.75 ft
Specific Energy	1.68 ft
Froude Number	1.454
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	46.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.1 in
Critical Depth	13.5 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 6 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	3.40 cfs

Results	
Normal Depth	7.0 in
Flow Area	0.6 ft²
Wetted Perimeter	2.0 ft
Hydraulic Radius	3.8 in
Top Width	1.46 ft
Critical Depth	8.4 in
Percent Full	39.1 %
Critical Slope	0.005 ft/ft
Velocity	5.30 ft/s
Velocity Head	0.44 ft
Specific Energy	1.02 ft
Froude Number	1.413
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	39.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.0 in
Critical Depth	8.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 7 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	13.00 cfs

Results	
Normal Depth	13.0 in
Flow Area	1.7 ft²
Wetted Perimeter	3.3 ft
Hydraulic Radius	6.3 in
Top Width	1.99 ft
Critical Depth	15.6 in
Percent Full	54.4 %
Critical Slope	0.006 ft/ft
Velocity	7.45 ft/s
Velocity Head	0.86 ft
Specific Energy	1.95 ft
Froude Number	1.404
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.003 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	54.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.0 in
Critical Depth	15.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 8 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	5.70 cfs

Results	
Normal Depth	8.2 in
Flow Area	1.0 ft²
Wetted Perimeter	2.5 ft
Hydraulic Radius	4.6 in
Top Width	1.90 ft
Critical Depth	10.1 in
Percent Full	34.2 %
Critical Slope	0.005 ft/ft
Velocity	6.00 ft/s
Velocity Head	0.56 ft
Specific Energy	1.24 ft
Froude Number	1.495
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	34.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.2 in
Critical Depth	10.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 9 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	30.0 in
Discharge	16.90 cfs

Results	
Normal Depth	13.4 in
Flow Area	2.1 ft²
Wetted Perimeter	3.7 ft
Hydraulic Radius	7.0 in
Top Width	2.49 ft
Critical Depth	16.7 in
Percent Full	44.7 %
Critical Slope	0.005 ft/ft
Velocity	7.95 ft/s
Velocity Head	0.98 ft
Specific Energy	2.10 ft
Froude Number	1.516
Maximum Discharge	44.12 cfs
Discharge Full	41.01 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	44.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.4 in
Critical Depth	16.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 10 5YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	3.90 cfs

Results	
Normal Depth	6.7 in
Flow Area	0.7 ft²
Wetted Perimeter	2.2 ft
Hydraulic Radius	3.9 in
Top Width	1.80 ft
Critical Depth	8.3 in
Percent Full	28.1 %
Critical Slope	0.004 ft/ft
Velocity	5.39 ft/s
Velocity Head	0.45 ft
Specific Energy	1.01 ft
Froude Number	1.498
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	28.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.7 in
Critical Depth	8.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 11 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	1.30 cfs

Results	
Normal Depth	4.3 in
Flow Area	0.3 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.5 in
Top Width	1.28 ft
Critical Depth	5.1 in
Percent Full	23.8 %
Critical Slope	0.005 ft/ft
Velocity	4.04 ft/s
Velocity Head	0.25 ft
Specific Energy	0.61 ft
Froude Number	1.420
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	23.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.3 in
Critical Depth	5.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 12 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	4.70 cfs

Results	
Normal Depth	7.4 in
Flow Area	0.8 ft²
Wetted Perimeter	2.4 ft
Hydraulic Radius	4.2 in
Top Width	1.85 ft
Critical Depth	9.2 in
Percent Full	30.9 %
Critical Slope	0.005 ft/ft
Velocity	5.68 ft/s
Velocity Head	0.50 ft
Specific Energy	1.12 ft
Froude Number	1.498
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	30.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.4 in
Critical Depth	9.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 13 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	6.70 cfs

Results	
Normal Depth	8.9 in
Flow Area	1.1 ft²
Wetted Perimeter	2.6 ft
Hydraulic Radius	4.9 in
Top Width	1.93 ft
Critical Depth	11.0 in
Percent Full	37.3 %
Critical Slope	0.005 ft/ft
Velocity	6.27 ft/s
Velocity Head	0.61 ft
Specific Energy	1.36 ft
Froude Number	1.489
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	37.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.9 in
Critical Depth	11.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 14 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	30.0 in
Discharge	11.40 cfs

Results	
Normal Depth	10.8 in
Flow Area	1.6 ft²
Wetted Perimeter	3.2 ft
Hydraulic Radius	5.9 in
Top Width	2.40 ft
Critical Depth	13.6 in
Percent Full	36.0 %
Critical Slope	0.004 ft/ft
Velocity	7.15 ft/s
Velocity Head	0.80 ft
Specific Energy	1.70 ft
Froude Number	1.548
Maximum Discharge	44.12 cfs
Discharge Full	41.01 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	36.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.8 in
Critical Depth	13.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 15 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	36.0 in
Discharge	24.60 cfs

Results	
Normal Depth	15.1 in
Flow Area	2.8 ft²
Wetted Perimeter	4.2 ft
Hydraulic Radius	8.0 in
Top Width	2.96 ft
Critical Depth	19.2 in
Percent Full	42.0 %
Critical Slope	0.004 ft/ft
Velocity	8.72 ft/s
Velocity Head	1.18 ft
Specific Energy	2.44 ft
Froude Number	1.576
Maximum Discharge	71.74 cfs
Discharge Full	66.69 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	42.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.1 in
Critical Depth	19.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 16 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	6.60 cfs

Results	
Normal Depth	8.9 in
Flow Area	1.1 ft²
Wetted Perimeter	2.6 ft
Hydraulic Radius	4.8 in
Top Width	1.93 ft
Critical Depth	10.9 in
Percent Full	37.0 %
Critical Slope	0.005 ft/ft
Velocity	6.25 ft/s
Velocity Head	0.61 ft
Specific Energy	1.35 ft
Froude Number	1.488
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	37.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.9 in
Critical Depth	10.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 17 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	36.0 in
Discharge	29.80 cfs

Results	
Normal Depth	16.9 in
Flow Area	3.2 ft²
Wetted Perimeter	4.5 ft
Hydraulic Radius	8.6 in
Top Width	2.99 ft
Critical Depth	21.2 in
Percent Full	46.8 %
Critical Slope	0.005 ft/ft
Velocity	9.17 ft/s
Velocity Head	1.31 ft
Specific Energy	2.71 ft
Froude Number	1.552
Maximum Discharge	71.74 cfs
Discharge Full	66.69 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	46.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.9 in
Critical Depth	21.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 18 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	3.90 cfs

Results	
Normal Depth	6.7 in
Flow Area	0.7 ft²
Wetted Perimeter	2.2 ft
Hydraulic Radius	3.9 in
Top Width	1.80 ft
Critical Depth	8.3 in
Percent Full	28.1 %
Critical Slope	0.004 ft/ft
Velocity	5.39 ft/s
Velocity Head	0.45 ft
Specific Energy	1.01 ft
Froude Number	1.498
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	28.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.7 in
Critical Depth	8.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 19 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	42.0 in
Discharge	32.90 cfs

Results	
Normal Depth	16.5 in
Flow Area	3.5 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	8.9 in
Top Width	3.42 ft
Critical Depth	21.3 in
Percent Full	39.4 %
Critical Slope	0.004 ft/ft
Velocity	9.36 ft/s
Velocity Head	1.36 ft
Specific Energy	2.74 ft
Froude Number	1.627
Maximum Discharge	108.22 cfs
Discharge Full	100.60 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	39.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.5 in
Critical Depth	21.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 20 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	7.90 cfs

Results	
Normal Depth	9.8 in
Flow Area	1.2 ft²
Wetted Perimeter	2.8 ft
Hydraulic Radius	5.2 in
Top Width	1.97 ft
Critical Depth	12.0 in
Percent Full	40.8 %
Critical Slope	0.005 ft/ft
Velocity	6.56 ft/s
Velocity Head	0.67 ft
Specific Energy	1.48 ft
Froude Number	1.477
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	40.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.8 in
Critical Depth	12.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 21 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	42.0 in
Discharge	37.70 cfs

Results	
Normal Depth	17.8 in
Flow Area	3.9 ft²
Wetted Perimeter	5.0 ft
Hydraulic Radius	9.4 in
Top Width	3.46 ft
Critical Depth	22.9 in
Percent Full	42.4 %
Critical Slope	0.004 ft/ft
Velocity	9.71 ft/s
Velocity Head	1.46 ft
Specific Energy	2.95 ft
Froude Number	1.615
Maximum Discharge	108.22 cfs
Discharge Full	100.60 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	42.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.8 in
Critical Depth	22.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 22 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	1.10 cfs

Results	
Normal Depth	3.9 in
Flow Area	0.3 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.3 in
Top Width	1.24 ft
Critical Depth	4.7 in
Percent Full	21.9 %
Critical Slope	0.005 ft/ft
Velocity	3.85 ft/s
Velocity Head	0.23 ft
Specific Energy	0.56 ft
Froude Number	1.416
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	21.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.9 in
Critical Depth	4.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 23 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	1.20 cfs

Results	
Normal Depth	4.1 in
Flow Area	0.3 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.4 in
Top Width	1.26 ft
Critical Depth	4.9 in
Percent Full	22.8 %
Critical Slope	0.005 ft/ft
Velocity	3.95 ft/s
Velocity Head	0.24 ft
Specific Energy	0.58 ft
Froude Number	1.418
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	22.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.1 in
Critical Depth	4.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 24 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	48.0 in
Discharge	39.30 cfs

Results	
Normal Depth	17.2 in
Flow Area	4.0 ft²
Wetted Perimeter	5.1 ft
Hydraulic Radius	9.4 in
Top Width	3.83 ft
Critical Depth	22.4 in
Percent Full	35.7 %
Critical Slope	0.004 ft/ft
Velocity	9.74 ft/s
Velocity Head	1.47 ft
Specific Energy	2.90 ft
Froude Number	1.674
Maximum Discharge	154.51 cfs
Discharge Full	143.64 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	35.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.2 in
Critical Depth	22.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 25 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	36.0 in
Discharge	9.70 cfs

Results	
Normal Depth	9.3 in
Flow Area	1.4 ft²
Wetted Perimeter	3.2 ft
Hydraulic Radius	5.4 in
Top Width	2.62 ft
Critical Depth	11.8 in
Percent Full	25.8 %
Critical Slope	0.004 ft/ft
Velocity	6.73 ft/s
Velocity Head	0.70 ft
Specific Energy	1.48 ft
Froude Number	1.600
Maximum Discharge	71.74 cfs
Discharge Full	66.69 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	25.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.3 in
Critical Depth	11.8 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 26 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	48.0 in
Discharge	46.30 cfs

Results	
Normal Depth	18.7 in
Flow Area	4.5 ft²
Wetted Perimeter	5.4 ft
Hydraulic Radius	10.1 in
Top Width	3.90 ft
Critical Depth	24.5 in
Percent Full	39.0 %
Critical Slope	0.004 ft/ft
Velocity	10.19 ft/s
Velocity Head	1.61 ft
Specific Energy	3.18 ft
Froude Number	1.665
Maximum Discharge	154.51 cfs
Discharge Full	143.64 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	39.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.7 in
Critical Depth	24.5 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 27 5 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	42.0 in
Discharge	35.80 cfs

Results	
Normal Depth	17.3 in
Flow Area	3.7 ft²
Wetted Perimeter	4.9 ft
Hydraulic Radius	9.2 in
Top Width	3.45 ft
Critical Depth	22.3 in
Percent Full	41.2 %
Critical Slope	0.004 ft/ft
Velocity	9.57 ft/s
Velocity Head	1.42 ft
Specific Energy	2.87 ft
Froude Number	1.620
Maximum Discharge	108.22 cfs
Discharge Full	100.60 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	41.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.3 in
Critical Depth	22.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 1 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	6.70 cfs

Results	
Normal Depth	10.4 in
Flow Area	1.1 ft²
Wetted Perimeter	2.6 ft
Hydraulic Radius	4.9 in
Top Width	1.48 ft
Critical Depth	12.0 in
Percent Full	58.0 %
Critical Slope	0.007 ft/ft
Velocity	6.30 ft/s
Velocity Head	0.62 ft
Specific Energy	1.49 ft
Froude Number	1.311
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.004 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	58.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.4 in
Critical Depth	12.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.007 ft/ft

PIPE RUN 2 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	5.10 cfs

Results	
Normal Depth	8.8 in
Flow Area	0.9 ft²
Wetted Perimeter	2.3 ft
Hydraulic Radius	4.4 in
Top Width	1.50 ft
Critical Depth	10.4 in
Percent Full	49.1 %
Critical Slope	0.006 ft/ft
Velocity	5.90 ft/s
Velocity Head	0.54 ft
Specific Energy	1.28 ft
Froude Number	1.371
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	49.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.8 in
Critical Depth	10.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 3 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	11.80 cfs

Results	
Normal Depth	12.3 in
Flow Area	1.6 ft²
Wetted Perimeter	3.2 ft
Hydraulic Radius	6.1 in
Top Width	2.00 ft
Critical Depth	14.8 in
Percent Full	51.3 %
Critical Slope	0.006 ft/ft
Velocity	7.28 ft/s
Velocity Head	0.82 ft
Specific Energy	1.85 ft
Froude Number	1.425
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.003 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	51.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.3 in
Critical Depth	14.8 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 4 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	10.50 cfs

Results	
Normal Depth	14.7 in
Flow Area	1.5 ft²
Wetted Perimeter	3.4 ft
Hydraulic Radius	5.5 in
Top Width	1.15 ft
Critical Depth	14.9 in
Percent Full	81.9 %
Critical Slope	0.010 ft/ft
Velocity	6.78 ft/s
Velocity Head	0.71 ft
Specific Energy	1.94 ft
Froude Number	1.031
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.010 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	81.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	14.7 in
Critical Depth	14.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.010 ft/ft

PIPE RUN 5 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	20.50 cfs

Results	
Normal Depth	17.9 in
Flow Area	2.5 ft²
Wetted Perimeter	4.2 ft
Hydraulic Radius	7.2 in
Top Width	1.74 ft
Critical Depth	19.5 in
Percent Full	74.6 %
Critical Slope	0.008 ft/ft
Velocity	8.16 ft/s
Velocity Head	1.03 ft
Specific Energy	2.53 ft
Froude Number	1.197
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.008 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	74.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.9 in
Critical Depth	19.5 in
Channel Slope	0.010 ft/ft
Critical Slope	0.008 ft/ft

PIPE RUN 6 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	6.70 cfs

Results	
Normal Depth	10.4 in
Flow Area	1.1 ft²
Wetted Perimeter	2.6 ft
Hydraulic Radius	4.9 in
Top Width	1.48 ft
Critical Depth	12.0 in
Percent Full	58.0 %
Critical Slope	0.007 ft/ft
Velocity	6.30 ft/s
Velocity Head	0.62 ft
Specific Energy	1.49 ft
Froude Number	1.311
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.004 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	58.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.4 in
Critical Depth	12.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.007 ft/ft

PIPE RUN 7 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	26.50 cfs

Results	
Normal Depth	21.6 in
Flow Area	3.0 ft²
Wetted Perimeter	5.0 ft
Hydraulic Radius	7.2 in
Top Width	1.20 ft
Critical Depth	20.9 in
Percent Full	89.9 %
Critical Slope	0.010 ft/ft
Velocity	8.10 ft/s
Velocity Head	1.02 ft
Specific Energy	2.82 ft
Froude Number	0.908
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.011 ft/ft
Flow Type	Subcritical

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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	60.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	21.6 in
Critical Depth	20.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.010 ft/ft

PIPE RUN 8 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	13.80 cfs

Results	
Normal Depth	13.5 in
Flow Area	1.8 ft²
Wetted Perimeter	3.4 ft
Hydraulic Radius	6.4 in
Top Width	1.98 ft
Critical Depth	16.1 in
Percent Full	56.4 %
Critical Slope	0.006 ft/ft
Velocity	7.56 ft/s
Velocity Head	0.89 ft
Specific Energy	2.02 ft
Froude Number	1.388
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.004 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	56.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.5 in
Critical Depth	16.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 9 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	30.0 in
Discharge	36.50 cfs

Results	
Normal Depth	22.0 in
Flow Area	3.9 ft²
Wetted Perimeter	5.1 ft
Hydraulic Radius	9.0 in
Top Width	2.21 ft
Critical Depth	24.6 in
Percent Full	73.5 %
Critical Slope	0.008 ft/ft
Velocity	9.44 ft/s
Velocity Head	1.39 ft
Specific Energy	3.22 ft
Froude Number	1.258
Maximum Discharge	44.12 cfs
Discharge Full	41.01 cfs
Slope Full	0.008 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	73.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	22.0 in
Critical Depth	24.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.008 ft/ft

PIPE RUN 10 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	7.60 cfs

Results	
Normal Depth	9.6 in
Flow Area	1.2 ft²
Wetted Perimeter	2.7 ft
Hydraulic Radius	5.1 in
Top Width	1.96 ft
Critical Depth	11.8 in
Percent Full	39.9 %
Critical Slope	0.005 ft/ft
Velocity	6.49 ft/s
Velocity Head	0.65 ft
Specific Energy	1.45 ft
Froude Number	1.480
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	39.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	9.6 in
Critical Depth	11.8 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 11 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	2.30 cfs

Results	
Normal Depth	5.7 in
Flow Area	0.5 ft²
Wetted Perimeter	1.8 ft
Hydraulic Radius	3.2 in
Top Width	1.40 ft
Critical Depth	6.9 in
Percent Full	31.8 %
Critical Slope	0.005 ft/ft
Velocity	4.76 ft/s
Velocity Head	0.35 ft
Specific Energy	0.83 ft
Froude Number	1.427
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.000 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	31.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.7 in
Critical Depth	6.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 12 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	9.10 cfs

Results	
Normal Depth	10.6 in
Flow Area	1.3 ft²
Wetted Perimeter	2.9 ft
Hydraulic Radius	5.5 in
Top Width	1.99 ft
Critical Depth	12.9 in
Percent Full	44.1 %
Critical Slope	0.005 ft/ft
Velocity	6.81 ft/s
Velocity Head	0.72 ft
Specific Energy	1.60 ft
Froude Number	1.464
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	44.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.6 in
Critical Depth	12.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 13 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	13.50 cfs

Results	
Normal Depth	13.4 in
Flow Area	1.8 ft²
Wetted Perimeter	3.4 ft
Hydraulic Radius	6.4 in
Top Width	1.99 ft
Critical Depth	15.9 in
Percent Full	55.6 %
Critical Slope	0.006 ft/ft
Velocity	7.52 ft/s
Velocity Head	0.88 ft
Specific Energy	1.99 ft
Froude Number	1.394
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.004 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	55.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.4 in
Critical Depth	15.9 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 14 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	30.0 in
Discharge	22.60 cfs

Results	
Normal Depth	15.9 in
Flow Area	2.6 ft²
Wetted Perimeter	4.1 ft
Hydraulic Radius	7.8 in
Top Width	2.50 ft
Critical Depth	19.4 in
Percent Full	53.0 %
Critical Slope	0.005 ft/ft
Velocity	8.56 ft/s
Velocity Head	1.14 ft
Specific Energy	2.46 ft
Froude Number	1.467
Maximum Discharge	44.12 cfs
Discharge Full	41.01 cfs
Slope Full	0.003 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	53.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.9 in
Critical Depth	19.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 15 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	36.0 in
Discharge	51.40 cfs

Results	
Normal Depth	23.7 in
Flow Area	4.9 ft²
Wetted Perimeter	5.7 ft
Hydraulic Radius	10.4 in
Top Width	2.84 ft
Critical Depth	28.0 in
Percent Full	65.9 %
Critical Slope	0.007 ft/ft
Velocity	10.41 ft/s
Velocity Head	1.68 ft
Specific Energy	3.66 ft
Froude Number	1.393
Maximum Discharge	71.74 cfs
Discharge Full	66.69 cfs
Slope Full	0.006 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	65.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	23.7 in
Critical Depth	28.0 in
Channel Slope	0.010 ft/ft
Critical Slope	0.007 ft/ft

PIPE RUN 16 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	11.10 cfs

Results	
Normal Depth	11.9 in
Flow Area	1.5 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	6.0 in
Top Width	2.00 ft
Critical Depth	14.3 in
Percent Full	49.5 %
Critical Slope	0.005 ft/ft
Velocity	7.17 ft/s
Velocity Head	0.80 ft
Specific Energy	1.79 ft
Froude Number	1.435
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.002 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	49.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.9 in
Critical Depth	14.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 17 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	36.0 in
Discharge	60.20 cfs

Results	
Normal Depth	26.8 in
Flow Area	5.6 ft²
Wetted Perimeter	6.2 ft
Hydraulic Radius	10.8 in
Top Width	2.62 ft
Critical Depth	30.1 in
Percent Full	74.3 %
Critical Slope	0.008 ft/ft
Velocity	10.68 ft/s
Velocity Head	1.77 ft
Specific Energy	4.00 ft
Froude Number	1.284
Maximum Discharge	71.74 cfs
Discharge Full	66.69 cfs
Slope Full	0.008 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	74.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	26.8 in
Critical Depth	30.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.008 ft/ft

PIPE RUN 18 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	13.20 cfs

Results	
Normal Depth	13.2 in
Flow Area	1.8 ft²
Wetted Perimeter	3.3 ft
Hydraulic Radius	6.3 in
Top Width	1.99 ft
Critical Depth	15.7 in
Percent Full	54.9 %
Critical Slope	0.006 ft/ft
Velocity	7.48 ft/s
Velocity Head	0.87 ft
Specific Energy	1.97 ft
Froude Number	1.400
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.003 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	54.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.2 in
Critical Depth	15.7 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 19 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	42.0 in
Discharge	70.60 cfs

Results	
Normal Depth	25.9 in
Flow Area	6.2 ft²
Wetted Perimeter	6.3 ft
Hydraulic Radius	11.8 in
Top Width	3.40 ft
Critical Depth	31.6 in
Percent Full	61.7 %
Critical Slope	0.006 ft/ft
Velocity	11.32 ft/s
Velocity Head	1.99 ft
Specific Energy	4.15 ft
Froude Number	1.474
Maximum Discharge	108.22 cfs
Discharge Full	100.60 cfs
Slope Full	0.005 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	61.7 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	25.9 in
Critical Depth	31.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 20 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	24.0 in
Discharge	12.80 cfs

Results	
Normal Depth	12.9 in
Flow Area	1.7 ft²
Wetted Perimeter	3.3 ft
Hydraulic Radius	6.3 in
Top Width	1.99 ft
Critical Depth	15.4 in
Percent Full	53.8 %
Critical Slope	0.006 ft/ft
Velocity	7.42 ft/s
Velocity Head	0.86 ft
Specific Energy	1.93 ft
Froude Number	1.407
Maximum Discharge	24.33 cfs
Discharge Full	22.62 cfs
Slope Full	0.003 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	53.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.9 in
Critical Depth	15.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 21 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	42.0 in
Discharge	77.60 cfs

Results	
Normal Depth	27.7 in
Flow Area	6.7 ft²
Wetted Perimeter	6.6 ft
Hydraulic Radius	12.2 in
Top Width	3.32 ft
Critical Depth	33.1 in
Percent Full	65.9 %
Critical Slope	0.006 ft/ft
Velocity	11.54 ft/s
Velocity Head	2.07 ft
Specific Energy	4.38 ft
Froude Number	1.429
Maximum Discharge	108.22 cfs
Discharge Full	100.60 cfs
Slope Full	0.006 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	65.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	27.7 in
Critical Depth	33.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 22 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	6.90 cfs

Results	
Normal Depth	10.6 in
Flow Area	1.1 ft²
Wetted Perimeter	2.6 ft
Hydraulic Radius	5.0 in
Top Width	1.47 ft
Critical Depth	12.2 in
Percent Full	59.1 %
Critical Slope	0.007 ft/ft
Velocity	6.34 ft/s
Velocity Head	0.63 ft
Specific Energy	1.51 ft
Froude Number	1.302
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.004 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	59.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.6 in
Critical Depth	12.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.007 ft/ft

PIPE RUN 23 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	18.0 in
Discharge	2.80 cfs

Results	
Normal Depth	6.3 in
Flow Area	0.6 ft²
Wetted Perimeter	1.9 ft
Hydraulic Radius	3.5 in
Top Width	1.43 ft
Critical Depth	7.6 in
Percent Full	35.3 %
Critical Slope	0.005 ft/ft
Velocity	5.03 ft/s
Velocity Head	0.39 ft
Specific Energy	0.92 ft
Froude Number	1.423
Maximum Discharge	11.30 cfs
Discharge Full	10.50 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	35.3 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.3 in
Critical Depth	7.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 24 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	48.0 in
Discharge	84.60 cfs

Results	
Normal Depth	26.5 in
Flow Area	7.1 ft²
Wetted Perimeter	6.7 ft
Hydraulic Radius	12.7 in
Top Width	3.98 ft
Critical Depth	33.5 in
Percent Full	55.2 %
Critical Slope	0.005 ft/ft
Velocity	11.90 ft/s
Velocity Head	2.20 ft
Specific Energy	4.41 ft
Froude Number	1.569
Maximum Discharge	154.51 cfs
Discharge Full	143.64 cfs
Slope Full	0.003 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	55.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	26.5 in
Critical Depth	33.5 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

PIPE RUN 25 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	36.0 in
Discharge	19.70 cfs

Results	
Normal Depth	13.4 in
Flow Area	2.4 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	7.3 in
Top Width	2.90 ft
Critical Depth	17.1 in
Percent Full	37.2 %
Critical Slope	0.004 ft/ft
Velocity	8.21 ft/s
Velocity Head	1.05 ft
Specific Energy	2.17 ft
Froude Number	1.592
Maximum Discharge	71.74 cfs
Discharge Full	66.69 cfs
Slope Full	0.001 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	37.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.4 in
Critical Depth	17.1 in
Channel Slope	0.010 ft/ft
Critical Slope	0.004 ft/ft

PIPE RUN 26 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	48.0 in
Discharge	98.90 cfs

Results	
Normal Depth	29.3 in
Flow Area	8.0 ft²
Wetted Perimeter	7.2 ft
Hydraulic Radius	13.4 in
Top Width	3.90 ft
Critical Depth	36.2 in
Percent Full	61.0 %
Critical Slope	0.006 ft/ft
Velocity	12.32 ft/s
Velocity Head	2.36 ft
Specific Energy	4.80 ft
Froude Number	1.515
Maximum Discharge	154.51 cfs
Discharge Full	143.64 cfs
Slope Full	0.005 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	61.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	29.3 in
Critical Depth	36.2 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

PIPE RUN 27 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	42.0 in
Discharge	65.20 cfs

Results	
Normal Depth	24.6 in
Flow Area	5.9 ft²
Wetted Perimeter	6.1 ft
Hydraulic Radius	11.5 in
Top Width	3.45 ft
Critical Depth	30.4 in
Percent Full	58.6 %
Critical Slope	0.006 ft/ft
Velocity	11.12 ft/s
Velocity Head	1.92 ft
Specific Energy	3.97 ft
Froude Number	1.504
Maximum Discharge	108.22 cfs
Discharge Full	100.60 cfs
Slope Full	0.004 ft/ft
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
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	58.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	24.6 in
Critical Depth	30.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.006 ft/ft

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Sep 24 2026

PIPE 28 CULVERT

Invert Elev Dn (ft)	=	6836.82
Pipe Length (ft)	=	87.93
Slope (%)	=	1.00
Invert Elev Up (ft)	=	6837.70
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

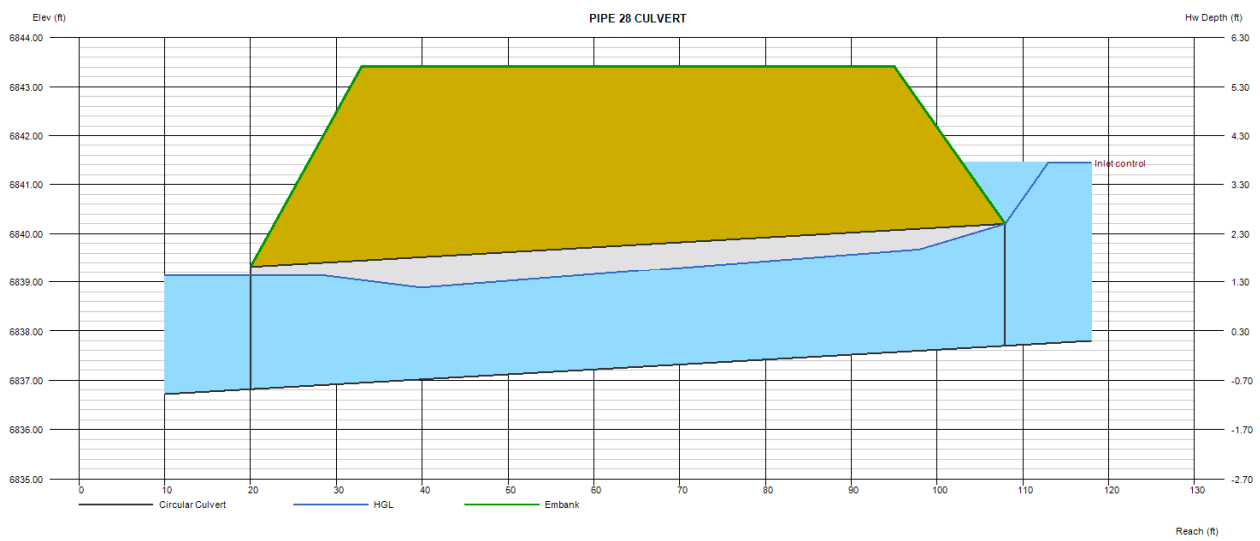
Top Elevation (ft)	=	6843.42
Top Width (ft)	=	62.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	39.30
Qmax (cfs)	=	39.30
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	39.30
Qpipe (cfs)	=	39.30
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	8.30
Veloc Up (ft/s)	=	8.88
HGL Dn (ft)	=	6839.13
HGL Up (ft)	=	6839.81
Hw Elev (ft)	=	6841.45
Hw/D (ft)	=	1.50
Flow Regime	=	Inlet Control

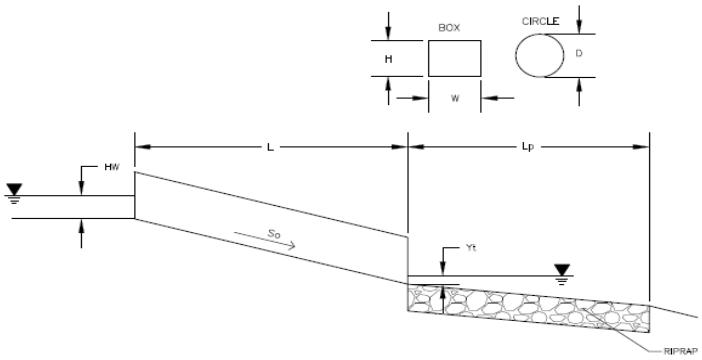


DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.01 (April 2025)

Project: _____

ID: _____



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

Design Information:			
Design Discharge	Q =	39	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	30	inches
Inlet Edge Type (Choose from pull-down list)		Grooved Edge Projecting	
OR:			
Box Culvert:		**OR**	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	6837.7	ft
Outlet Elevation **OR** Slope	Elev OUT =	6836.82	ft
Culvert Length	L =	87.93	ft
Manning's Roughness	n =	0.012	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	5	ft/s
Calculated Results:			
Culvert Cross Sectional Area Available	A =	4.91	ft^2
Culvert Normal Depth	Y_n =	1.81	ft
Culvert Critical Depth	Y_c =	2.11	ft
Froude Number	Fr =	1.38	
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	0.69	
Sum of All Loss Coefficients	k_s =	1.89	ft
Headwater:			
Inlet Control Headwater	HW_I =	3.70	ft
Outlet Control Headwater	HW_O =	3.27	ft
Design Headwater Elevation	**HW =**	**6841.40**	**ft**
Headwater/Diameter OR Headwater/Rise Ratio	**HW/D =**	**1.48**	
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	3.95	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	1.00	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	3.55	
Flow Area at Max Channel Velocity	A_t =	7.80	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	**L_p =**	**19**	**ft**
Width of Riprap Protection at Downstream End	**T =**	**8**	**ft**
Adjusted Diameter for Supercritical Flow	Da =	2.16	ft
Minimum Theoretical Riprap Size	d_{50} min=	9	in
Nominal Riprap Size	d_{50} nominal=	9	in
MHFD Riprap Type	**Type =**	**L**	

EXISTING POND EVALUATION

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

JOB NAME:	*CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER:	*1171.78*
DATE:	*09/23/26*
CALCULATED BY:	*DLG*

POND TRIBUTARY AREAS WEIGHTED IMPERVIOUS

TRIBUTARY BASIN	TOTAL AREA (AC)	WEIGHTED IMP. IMP %
A	2.77	**68.4%**
B	1.55	**75.0%**
C	1.02	**55.3%**
D	1.83	**75.0%**
E	2.87	**75.0%**
F	0.33	**100.0%**
G	0.28	**100.0%**
H	0.64	**100.0%**
I	1.23	**65.6%**
J	0.18	**75.0%**
K	0.20	**100.0%**
L	0.22	**100.0%**
N	0.06	**100.0%**
O	0.56	**61.6%**
P	0.96	**75.0%**
Q	0.87	**22.6%**
	15.57	**71.2%**

JOB NAME: *CREEKRIDGE AT FLYING HORSE FILING NO. 1*
JOB NUMBER: *1171.78*
DATE: *09/23/26*
CALCULATED BY: *DLG*

POND TRIBUTARY AREAS WEIGHTED IMPERVIOUS

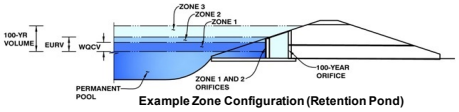
TRIBUTARY BASIN	TOTAL AREA (AC)	WEIGHTED IMP. IMP %
A	2.77	**68.4%**
B	1.55	**75.0%**
C	1.02	**55.3%**
D	1.83	**75.0%**
E	2.87	**75.0%**
F	0.33	**100.0%**
G	0.28	**100.0%**
H	0.64	**100.0%**
I	1.23	**65.6%**
J	0.18	**75.0%**
K	0.20	**100.0%**
L	0.22	**100.0%**
N	0.06	**100.0%**
O	0.56	**61.6%**
P	0.96	**75.0%**
Q	0.87	**22.6%**
OS-1	1.50	**75.0%**
OS-2	2.70	**75.0%**
OS-3	1.55	**75.0%**
OS-4	3.40	**75.0%**
OS-5	0.13	**75.0%**
OS-6	3.21	**7.0%**
OS-7	0.07	**100.0%**
OS-8	0.43	**27.6%**
OS-9	4.10	**75.0%**
OS-11	0.11	**75.0%**
OS-12	12.78	**95.0%**
OS-13	3.00	**39.9%**
DTFH	12.06	**56.9%**
	60.61	**69.0%**

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **CREEKRIDGE AT FLYING HORSE FILING NO. 1**

Basin ID: **EX POND 1 EVALUATION**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	60.61	acres
Watershed Length =	3,000	ft
Watershed Length to Centroid =	1,500	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	69.00%	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
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

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

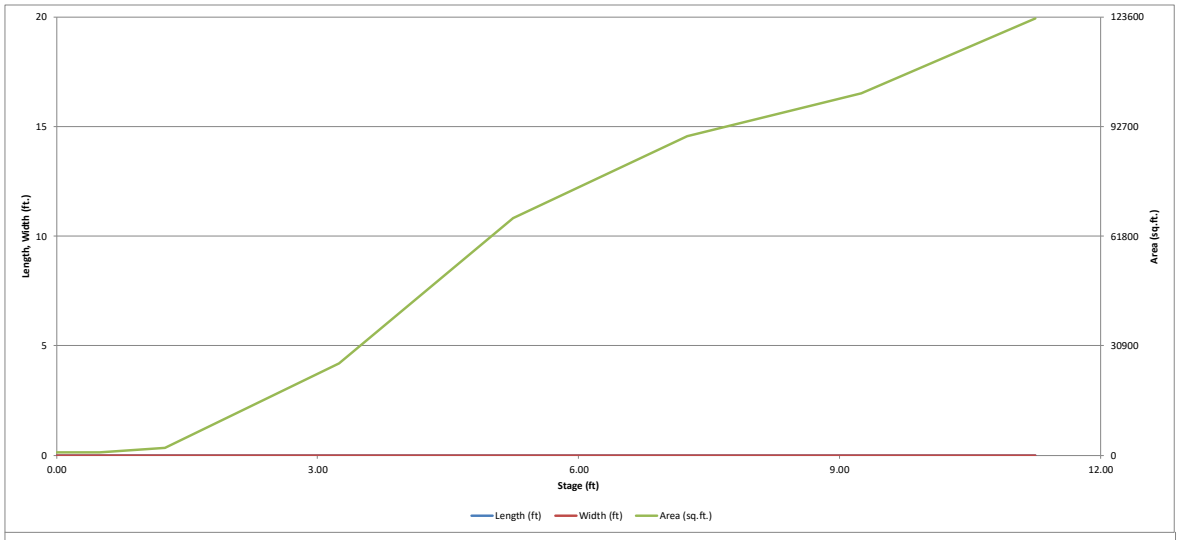
			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.367	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	4.588	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.03 in.) =	3.477	acre-feet	1.03	inches
5-yr Runoff Volume (P1 = 1.32 in.) =	4.802	acre-feet	1.32	inches
10-yr Runoff Volume (P1 = 1.59 in.) =	6.105	acre-feet	1.59	inches
25-yr Runoff Volume (P1 = 2.01 in.) =	8.481	acre-feet	2.01	inches
50-yr Runoff Volume (P1 = 2.38 in.) =	10.431	acre-feet	2.38	inches
100-yr Runoff Volume (P1 = 2.77 in.) =	12.640	acre-feet	2.77	inches
500-yr Runoff Volume (P1 = 3.84 in.) =	18.431	acre-feet	3.84	inches
Approximate 2-yr Detention Volume =	3.098	acre-feet		
Approximate 5-yr Detention Volume =	4.202	acre-feet		
Approximate 10-yr Detention Volume =	5.487	acre-feet		
Approximate 25-yr Detention Volume =	6.524	acre-feet		
Approximate 50-yr Detention Volume =	7.145	acre-feet		
Approximate 100-yr Detention Volume =	7.967	acre-feet		

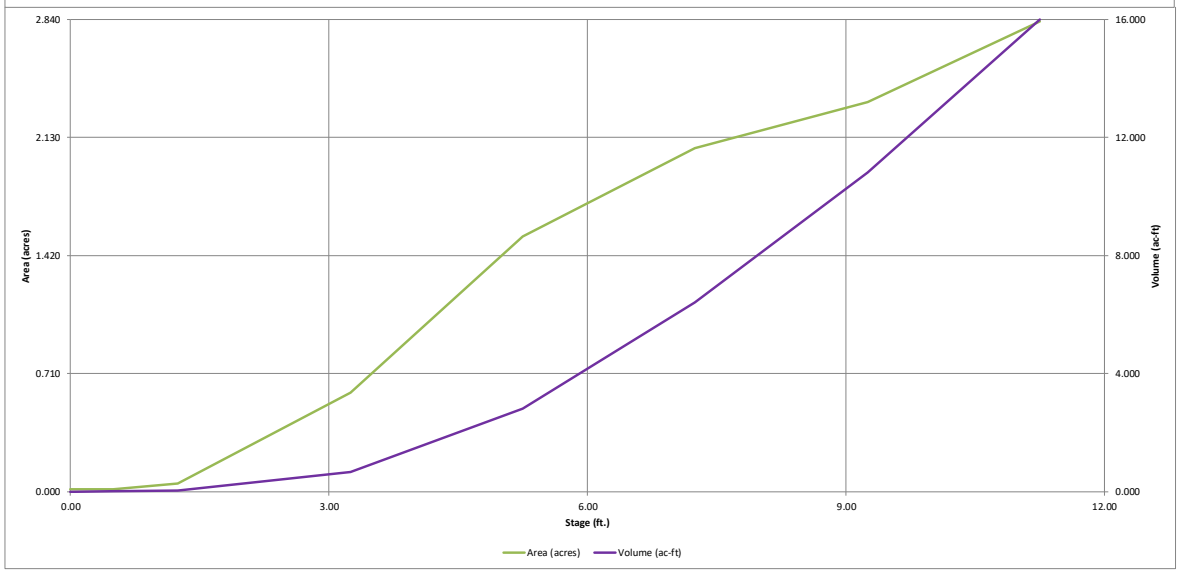
Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.367	acre-feet
Zone 2 Volume (EURV - Zone 1) =	3.221	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.380	acre-feet
Total Detention Basin Volume =	7.967	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = 2.00 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	--	--	--	800	0.018		
6801.25	--	0.50	--	--	--	800	0.018	400	0.009
6802	--	1.25	--	--	--	2,100	0.048	1,487	0.034
6804	--	3.25	--	--	--	25,963	0.596	29,550	0.678
6806	--	5.25	--	--	--	66,908	1.536	122,421	2.810
6808	--	7.25	--	--	--	89,961	2.065	279,290	6.412
6810	--	9.25	--	--	--	102,099	2.344	471,350	10.821
6812	--	11.25	--	--	--	123,213	2.829	696,662	15.993


20
15
10
5
0
Length, Width (ft.)
123600
92700
61800
30900
0
Area (sq.ft.)
0.00
3.00
6.00
9.00
12.00
Stage (ft)
Length (ft)
Width (ft)
Area (sq.ft.)

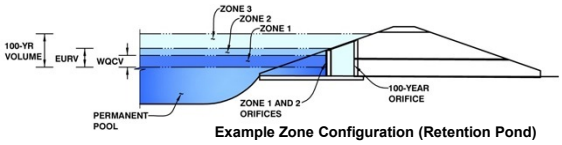

2.840
2.130
1.420
0.710
0.000
Area (acres)
16.000
12.000
8.000
4.000
0.000
Volume (ac-ft)
0.00
3.00
6.00
9.00
12.00
Stage (ft.)
Area (acres)
Volume (ac-ft)

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **CREEKRIDGE AT FLYING HORSE FILING NO. 1**

Basin ID: **EX POND 1 EVALUATION**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.12	1.367	Orifice Plate
Zone 2 (EURV)	6.32	3.221	Orifice Plate
Zone 3 (100-year)	7.99	3.380	Weir&Pipe (Restrict)
Total (all zones)		7.967	

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

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

Calculated Parameters for Underdrain

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

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	7.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	21.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.80	3.60	5.40				
Orifice Area (sq. inches)	4.00	4.50	14.00	14.00				

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	7.00	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	8.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	7.00	N/A	feet
Overflow Weir Slope Length =	4.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	8.81	N/A	
Overflow Grate Open Area w/o Debris =	22.27	N/A	ft^2
Overflow Grate Open Area w/ Debris =	11.14	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	18.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	2.53	N/A	ft^2
Outlet Orifice Centroid =	0.83	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.09	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.25	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	75.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.91	feet
Stage at Top of Freeboard =	11.16	feet
Basin Area at Top of Freeboard =	2.81	acres
Basin Volume at Top of Freeboard =	15.74	acre-ft

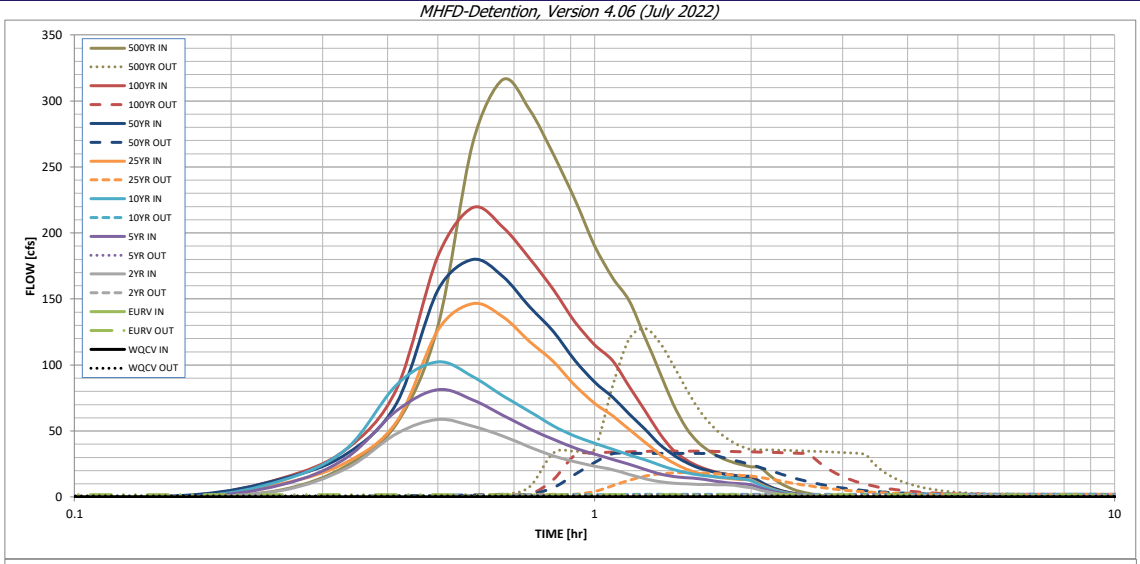
Routed Hydrograph Results

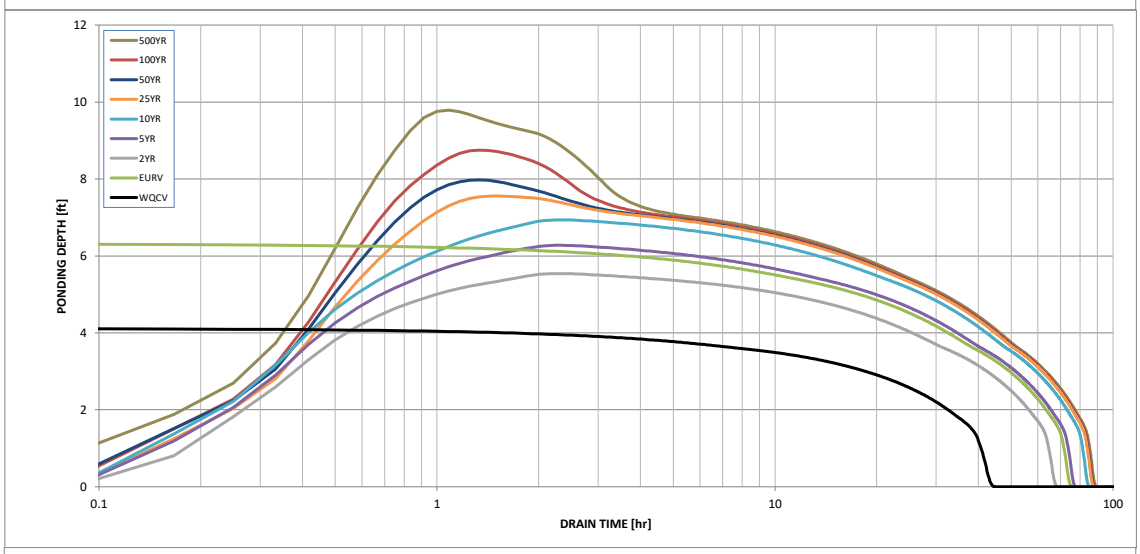
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

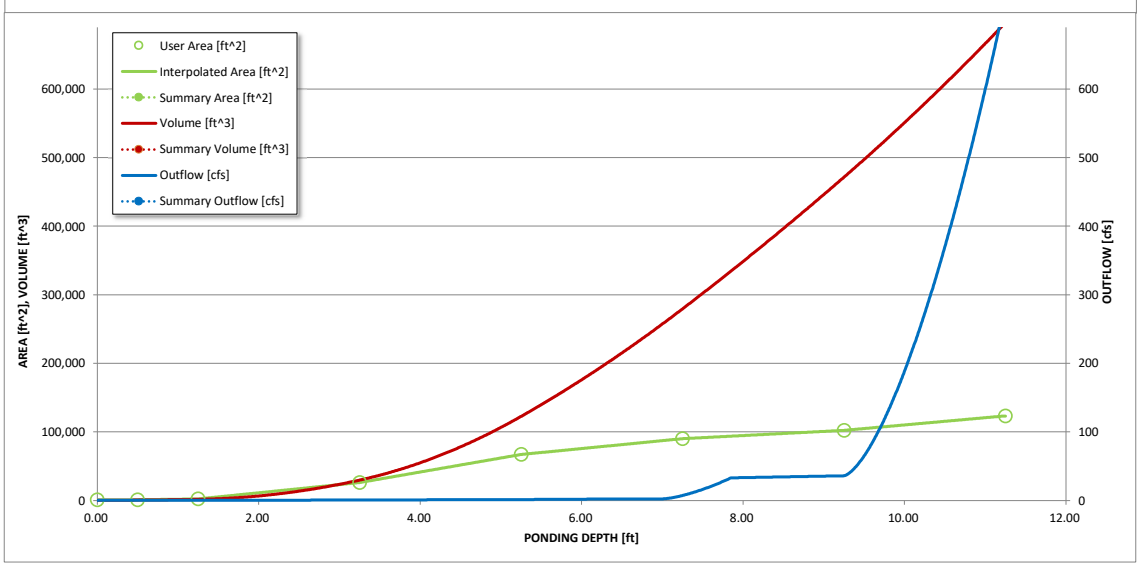
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.03	1.32	1.59	2.01	2.38	2.77	3.84
CUHP Runoff Volume (acre-ft) =	1.367	4.588	3.477	4.802	6.105	8.481	10.431	12.640	18.431
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	3.477	4.802	6.105	8.481	10.431	12.640	18.431
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.8	9.9	19.6	48.2	66.1	88.2	141.9
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.16	0.32	0.80	1.09	1.46	2.34
Peak Inflow Q (cfs) =	N/A	N/A	58.8	81.4	102.3	146.4	179.9	219.2	316.1
Peak Outflow Q (cfs) =	0.8	1.9	1.4	1.9	2.1	18.5	33.1	34.8	127.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.1	0.4	0.5	0.4	0.9
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.7	1.4	1.4	1.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	64	59	66	72	71	69	68	63
Time to Drain 99% of Inflow Volume (hours) =	**42**	70	64	72	78	79	78	78	76
Maximum Ponding Depth (ft) =	4.12	6.32	5.54	6.28	6.94	7.56	7.98	8.75	9.79
Area at Maximum Ponding Depth (acres) =	1.00	1.82	1.61	1.81	1.98	2.11	2.17	2.27	2.47
Maximum Volume Stored (acre-ft) =	1.375	4.605	3.267	4.515	5.764	7.037	7.935	9.666	12.097

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	1.46	1.11	5.53
	0:15:00	0.00	0.00	4.91	9.19	12.38	9.95	13.65	14.19	23.59
	0:20:00	0.00	0.00	21.57	29.61	36.50	26.20	32.46	36.31	55.91
	0:25:00	0.00	0.00	48.09	65.48	85.26	57.22	71.43	82.27	129.31
	0:30:00	0.00	0.00	58.79	81.35	102.26	126.24	156.60	182.34	268.02
	0:35:00	0.00	0.00	53.58	73.61	91.22	146.36	179.87	219.21	316.14
	0:40:00	0.00	0.00	46.12	61.85	76.75	136.51	166.97	204.36	293.64
	0:45:00	0.00	0.00	37.99	51.70	64.87	117.94	144.19	180.82	259.56
	0:50:00	0.00	0.00	31.20	43.62	53.82	102.60	125.35	157.24	225.43
	0:55:00	0.00	0.00	26.62	37.14	46.11	84.61	103.48	132.76	190.68
	1:00:00	0.00	0.00	23.46	32.45	40.84	71.15	87.24	115.42	166.07
	1:05:00	0.00	0.00	20.74	28.50	36.24	61.54	75.61	103.21	148.59
	1:10:00	0.00	0.00	17.15	24.85	31.92	51.10	62.94	83.75	121.05
	1:15:00	0.00	0.00	13.90	20.88	28.22	41.59	51.37	65.58	95.36
	1:20:00	0.00	0.00	11.70	17.55	24.41	32.50	40.10	48.45	70.66
	1:25:00	0.00	0.00	10.55	15.68	20.93	25.93	31.98	35.81	52.50
	1:30:00	0.00	0.00	9.95	14.68	18.51	21.25	26.15	28.12	41.38
	1:35:00	0.00	0.00	9.62	14.01	16.89	18.12	22.20	23.42	34.53
	1:40:00	0.00	0.00	9.42	12.63	15.74	16.07	19.59	20.21	29.83
	1:45:00	0.00	0.00	9.27	11.42	14.95	14.73	17.88	18.06	26.67
	1:50:00	0.00	0.00	9.16	10.58	14.39	13.83	16.72	16.55	24.45
	1:55:00	0.00	0.00	8.04	9.96	13.63	13.21	15.92	15.55	22.96
	2:00:00	0.00	0.00	6.99	9.23	12.34	12.82	15.42	15.04	22.20
	2:05:00	0.00	0.00	5.23	6.93	9.16	9.70	11.64	11.39	16.79
	2:10:00	0.00	0.00	3.68	4.85	6.38	6.75	8.09	7.96	11.72
	2:15:00	0.00	0.00	2.57	3.39	4.48	4.74	5.68	5.63	8.28
	2:20:00	0.00	0.00	1.78	2.32	3.10	3.29	3.94	3.92	5.76
	2:25:00	0.00	0.00	1.19	1.53	2.09	2.22	2.66	2.64	3.88
	2:30:00	0.00	0.00	0.77	1.02	1.40	1.51	1.80	1.79	2.63
	2:35:00	0.00	0.00	0.46	0.65	0.87	0.97	1.15	1.15	1.68
	2:40:00	0.00	0.00	0.24	0.37	0.47	0.55	0.65	0.65	0.94
	2:45:00	0.00	0.00	0.10	0.16	0.20	0.25	0.29	0.29	0.42
	2:50:00	0.00	0.00	0.03	0.04	0.05	0.06	0.07	0.07	0.10
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

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

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

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

GREEN INFRASTRUCTURE EXHIBIT

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer:	**DLG**
Company:	**CLASSIC CONSULTING ENGINEERS**
Date:	**September 23, 2026**
Project:	**CREEKRIDGE AT FLYING HORSE FILING NO. 1**
Location:	**POND PIA FILING 1 ONLY**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth	0.60	inches
Depth of Average Runoff Producing Storm, d_6 =	0.43	inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA	UIA:RPA								DCIA	SPA
Area ID	1-1	1-2	1-3								RES FIL 1	SPA RES FIL 1
Downstream Design Point ID	POND	POND	POND								POND	POND
Downstream BMP Type	EDB	EDB	EDB								EDB	EDB
DCIA (ft^2)	--	--	--								155,855	--
UIA (ft^2)	61,400	61,400	61,400								--	--
RPA (ft^2)	5,300	5,300	5,300								--	--
SPA (ft^2)	--	--	--								--	305,504
HSG A (%)	0%	0%	0%								--	0%
HSG B (%)	100%	100%	100%								--	100%
HSG C/D (%)	0%	0%	0%								--	0%
Average Slope of RPA (ft/ft)	0.010	0.010	0.010								--	--
UIA:RPA Interface Width (ft)	70.00	70.00	70.00								--	--

CALCULATED RUNOFF RESULTS

Area ID	1-1	1-2	1-3								RES FIL 1	SPA RES FIL 1
UIA:RPA Area (ft^2)	66,700	66,700	66,700								--	--
L / W Ratio	13.61	13.61	13.61								--	--
UIA / Area	0.9205	0.9205	0.9205								--	--
Runoff (in)	0.33	0.33	0.33								0.50	0.00
Runoff (ft^3)	1854	1854	1854								6494	0
Runoff Reduction (ft^3)	704	704	704								0	15275

CALCULATED WQCV RESULTS

Area ID	1-1	1-2	1-3								RES FIL 1	SPA RES FIL 1
WQCV (ft^3)	2558	2558	2558								6494	0
WQCV Reduction (ft^3)	704	704	704								0	0
WQCV Reduction (%)	28%	28%	28%								0%	0%
Untreated WQCV (ft^3)	1854	1854	1854								6494	0

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	POND											
DCIA (ft^2)	155,855											
UIA (ft^2)	184,200											
RPA (ft^2)	15,900											
SPA (ft^2)	305,504											
Total Area (ft^2)	661,459											
Total Impervious Area (ft^2)	340,055											
WQCV (ft^3)	14,169											
WQCV Reduction (ft^3)	2,112											
WQCV Reduction (%)	15%											
Untreated WQCV (ft^3)	12,057											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	661,459
Total Impervious Area (ft^2)	340,055
WQCV (ft^3)	14,169
WQCV Reduction (ft^3)	2,112
WQCV Reduction (%)	15%
Untreated WQCV (ft^3)	12,057

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer:	**DLG**
Company:	**CLASSIC CONSULTING ENGINEERS**
Date:	**September 24, 2026**
Project:	**CREEKRIDGE AT FLYING HORSE FILING NO. 1**
Location:	**CREEKRIDGE FILING NO. 1 AND DOWNTOWN FLYING HORSE FILING NO.1 COMBO**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.60 inches

Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA					SPA	DCIA	DCIA	SPA
Area ID	1-1	1-2	1-3	DTFH					SPA APT	APT	RES	SPA RES
Downstream Design Point ID	POND	POND	POND	POND					POND	POND	POND	POND
Downstream BMP Type	EDB	EDB	EDB	EDB					EDB	EDB	EDB	EDB
DCIA (ft^2)	--	--	--	--					--	298,500	155,855	--
UIA (ft^2)	61,400	61,400	61,400	54,014					--	--	--	--
RPA (ft^2)	5,300	5,300	5,300	5,227					--	--	--	--
SPA (ft^2)	--	--	--	--					10,401	--	--	305,504
HSG A (%)	0%	0%	0%	0%					0%	--	--	0%
HSG B (%)	100%	100%	100%	100%					100%	--	--	100%
HSG C/D (%)	0%	0%	0%	0%					0%	--	--	0%
Average Slope of RPA (ft/ft)	0.010	0.010	0.010	0.100					--	--	--	--
UIA:RPA Interface Width (ft)	70.00	70.00	70.00	70.00					--	--	--	--

CALCULATED RUNOFF RESULTS

Area ID	1-1	1-2	1-3	DTFH					SPA APT	APT	RES	SPA RES
UIA:RPA Area (ft^2)	66,700	66,700	66,700	59,241					--	--	--	--
L / W Ratio	13.61	13.61	13.61	12.09					--	--	--	--
UIA / Area	0.9205	0.9205	0.9205	0.9118					--	--	--	--
Runoff (in)	0.33	0.33	0.33	0.33					0.00	0.50	0.50	0.00
Runoff (ft^3)	1854	1854	1854	1616					0	12438	6494	0
Runoff Reduction (ft^3)	704	704	704	634					520	0	0	15275

CALCULATED WQCV RESULTS

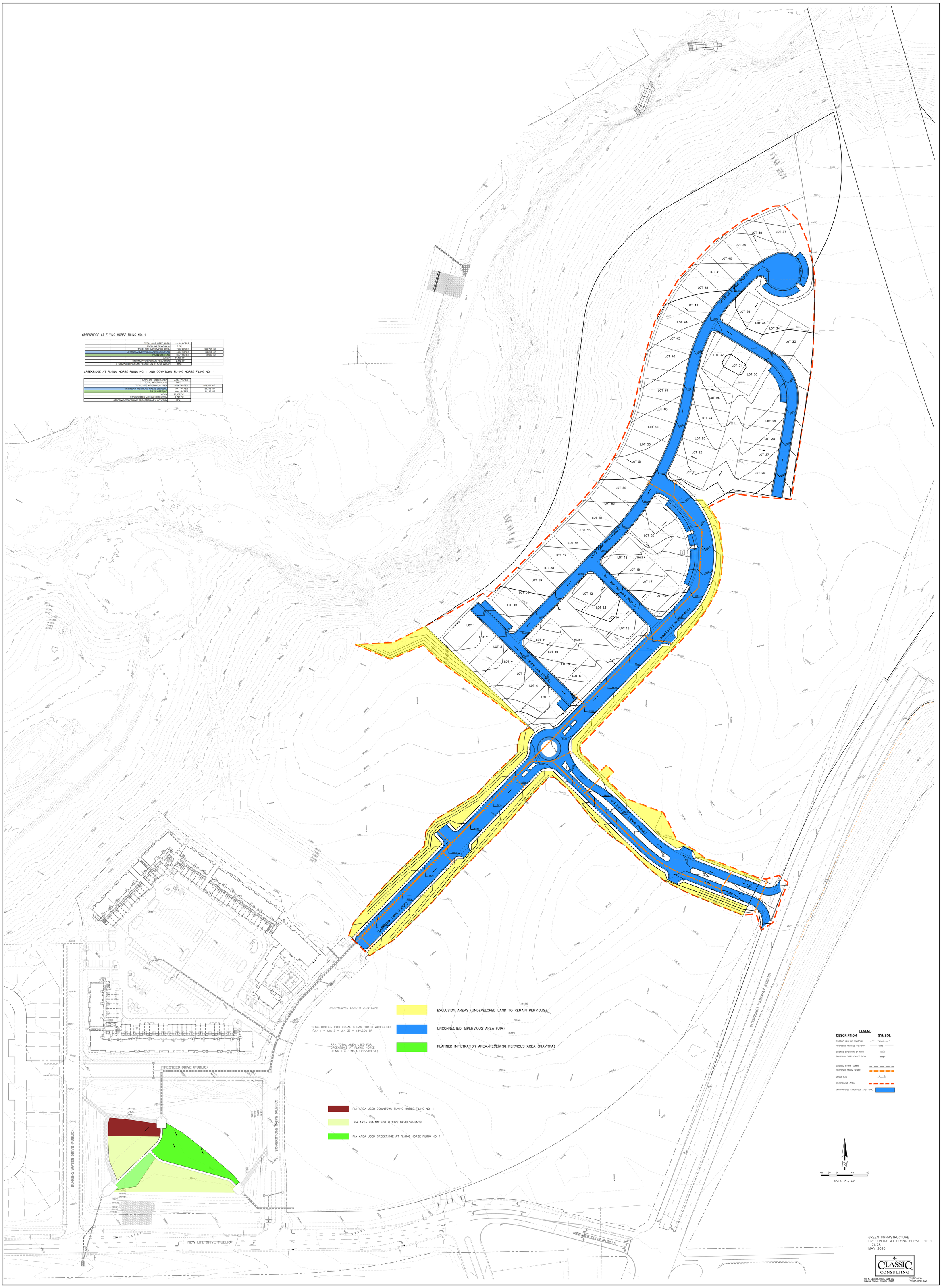
Area ID	1-1	1-2	1-3	DTFH					SPA APT	APT	RES	SPA RES
WQCV (ft^3)	2558	2558	2558	2251					0	12438	6494	0
WQCV Reduction (ft^3)	704	704	704	634					0	0	0	0
WQCV Reduction (%)	28%	28%	28%	28%					0%	0%	0%	0%
Untreated WQCV (ft^3)	1854	1854	1854	1616					0	12438	6494	0

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	POND											
DCIA (ft^2)	454,355											
UIA (ft^2)	238,214											
RPA (ft^2)	21,127											
SPA (ft^2)	315,905											
Total Area (ft^2)	1,029,601											
Total Impervious Area (ft^2)	692,569											
WQCV (ft^3)	28,857											
WQCV Reduction (ft^3)	2,746											
WQCV Reduction (%)	10%											
Untreated WQCV (ft^3)	26,111											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	1,029,601
Total Impervious Area (ft^2)	692,569
WQCV (ft^3)	28,857
WQCV Reduction (ft^3)	2,746
WQCV Reduction (%)	10%
Untreated WQCV (ft^3)	26,111



CREEKRIDGE AT FLYING HORSE FILING NO. 1

TOTAL DISTURBED AREA	15.18 ACRES	
TOTAL IMPERVIOUS %	51%	
TOTAL SITE IMPERVIOUS AREA	7.80 ACRES	339,768 SF
UPSTREAM IMERVIOUS AREAS (BLUE) AC	4.23 ACRES	184,200 SF
PIA (IN GREE) AC	0.37 ACRES	15,900 SF
WQCV	14,189 CF	
STORMWATER VOLUME REDUCTION	2,112 CF	
STORMWATER VOLUME REDUCTION AT % OF WQCV	15%	

CREEKRIDGE AT FLYING HORSE FILING NO. 1 AND DOWNTOWN FLYING HORSE FILING NO. 1

TOTAL DISTURBED AREA	23.63 ACRES	
TOTAL IMPERVIOUS %	71%	
TOTAL SITE IMPERVIOUS AREA	15.90 ACRES	692,569 SF
UPSTREAM IMERVIOUS AREAS (BLUE) AC	9.41 ACRES	235,212 SF
PIA (IN GREE) AC	0.48 ACRES	21,127 SF
WQCV	26,857 CF	
STORMWATER VOLUME REDUCTION	2,746 CF	
STORMWATER VOLUME REDUCTION AT % OF WQCV	10%	

This sheet Included for reference only, previously approved

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer:	**DLG**
Company:	**Classic Consulting**
Date:	**August 2, 2022**
Project:	**Downtown Flying Horse Filing No. 1**
Location:	

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth	0.53	inches
Depth of Average Runoff Producing Storm, d_6 =	0.43	inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA										
Area ID	FIL 1											
Downstream Design Point ID	POND											
Downstream BMP Type	EDB											
DCIA (ft^2)	--	--										
UIA (ft^2)	54,014											
RPA (ft^2)	5,401											
SPA (ft^2)	--	--										
HSG A (%)	0%											
HSG B (%)	100%											
HSG C/D (%)	0%											
Average Slope of RPA (ft/ft)	0.020											
UIA:RPA Interface Width (ft)	250.00											

CALCULATED RUNOFF RESULTS

Area ID	FIL 1											
UIA:RPA Area (ft^2)	59,415											
L / W Ratio	0.95											
UIA / Area	0.9091											
Runoff (in)	0.27											
Runoff (ft^3)	1338											
Runoff Reduction (ft^3)	598											

CALCULATED WQCV RESULTS

Area ID	FIL 1											
WQCV (ft^3)	2251											
WQCV Reduction (ft^3)	913											
WQCV Reduction (%)	41%											
Untreated WQCV (ft^3)	1338											

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	POND											
DCIA (ft^2)	0											
UIA (ft^2)	54,014											
RPA (ft^2)	5,401											
SPA (ft^2)	0											
Total Area (ft^2)	59,415											
Total Impervious Area (ft^2)	54,014											
WQCV (ft^3)	2,251											
WQCV Reduction (ft^3)	913											
WQCV Reduction (%)	41%											
Untreated WQCV (ft^3)	1,338											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	59,415
Total Impervious Area (ft^2)	54,014
WQCV (ft^3)	2,251
WQCV Reduction (ft^3)	913
WQCV Reduction (%)	41%
Untreated WQCV (ft^3)	1,338

JOB NAME:	*DOWNTOWN FLYING HORSE FIL. NO. 1*
JOB NUMBER:	*2573.40*
DATE:	*11/11/22*
CALCULATED BY:	*DLG*

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE.
REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

GREEN INFRASTRUCTURE CALCULATIONS

PCM	Contributing Basins	Impervious Area Total (acre)	20% of Impervious Area (acre)	10% of 20% Impervious Area (acre) = Min. Receiving Pervious Area (RPA) required	Total WQ Event Wetted Area (acre)	Remain WQ Event Wetted Area (acre)
1	A, B, C, D, E, F, J, K, L, M, N, R, S	6.560	1.31	0.13	1.28	1.15

This sheet Included for reference only, previously approved

GREEN INFRASTRUCTURE CALCULATIONS

PCM	Contributing Basins	Impervious Area Total (acre)	20% of Impervious Area (acre)	10% of 20% Impervious Area (acre) = Min. Receiving Pervious Area (RPA) required	Total WQ Event Wetted Area (acre)	Remain WQ Event Wetted Area (acre)
1	A, B, C, D, E, F, G, H, I, J, K, L, M, N, R, S	6.197	1.24	0.12	1.24	1.12

This sheet Included for reference only, previously approved

LOT 1
6.512
AC

FRESTEED DRIVE (57' PUBLIC ROW)

SOMERSTONE DRIVE
(57' PUBLIC ROW)

EXISTING RUNNING
WATER DRIVE (60'
PUBLIC ROW)

FILING 1 TOTAL AREA, = 11.824 ac
TOTAL IMPERVIOUS AREA = 6.197 ac
TOTAL SITE IMPERVIOUS = 52%
UPSTREAM IMPERVIOUS AREA = 1.239 ac
PIA (WQCV WETTED AREA 10% TOTAL) = 0.124 ac
WQCV, cf = 2,251 cf
STORWATER REDUCTION, cf = 913 cf
STORMWATER REDUCTION AS % WQCV = 41%

N

50 25 0 50 100

SCALE: 1" = 50'

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(719)785-0799 (Fax)

DOWNTOWN FLYING HORSE FILING NO. 1
GREEN INFRASTRUCTURE EXHIBIT

DESIGNED BY	DLG	SCALE	DATE
DRAWN BY	DLG	(H) 1"= 50'	SHEET 1 OF 1
CHECKED BY		(V) 1"= N/A	JOB NO. 2573.40

EXISTING CONDITIONS DRAINAGE MAPS:

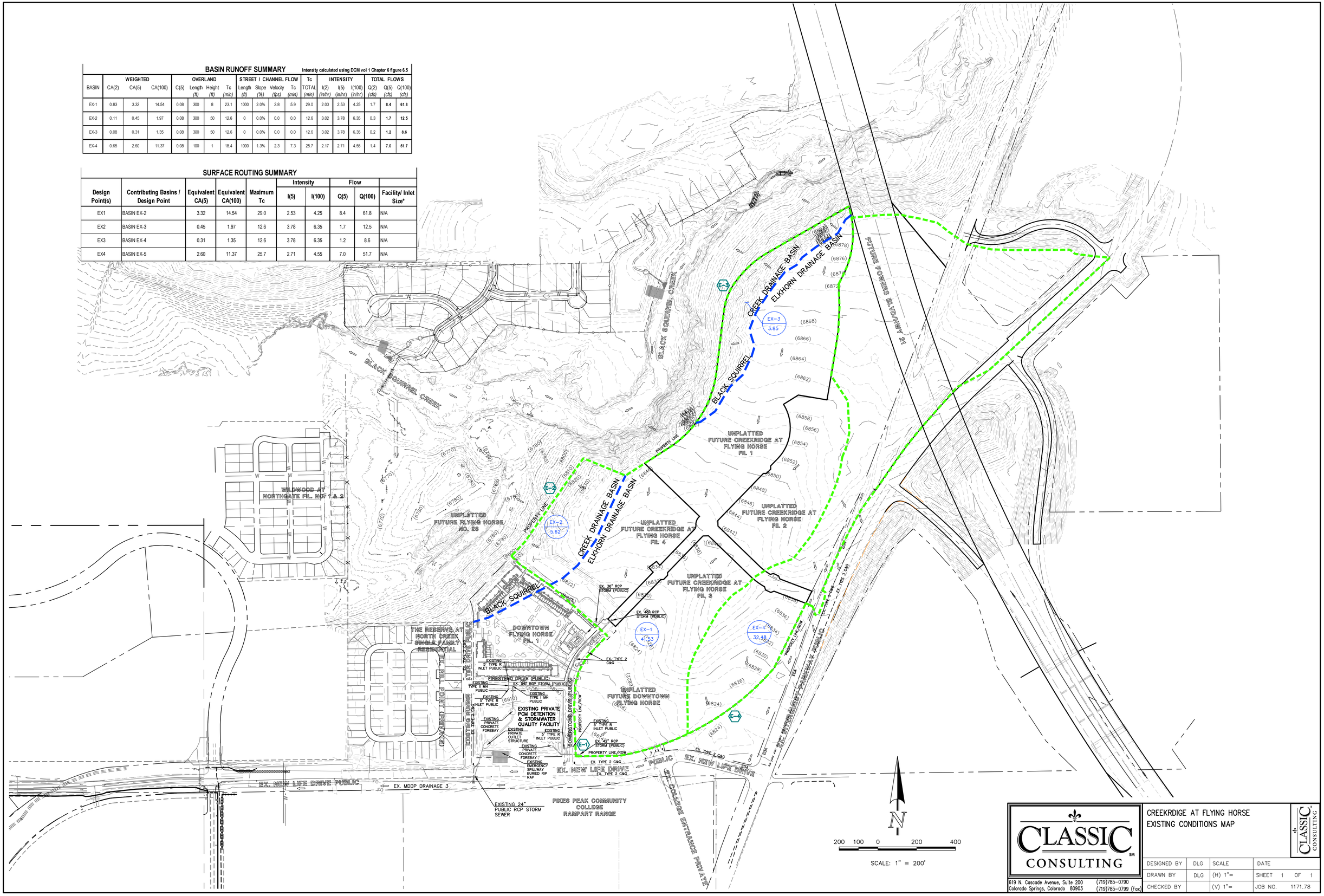
BASIN RUNOFF SUMMARY

Intensity calculated using DCM vol 1 Chapter 6 figure 6.5

BASIN	WEIGHTED CA(2)	WEIGHTED CA(5)	WEIGHTED CA(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL FLOW Length (ft)	STREET / CHANNEL FLOW Slope (%)	STREET / CHANNEL FLOW Velocity (fps)	STREET / CHANNEL FLOW Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	TOTAL FLOWS Q(5) (cfs)	TOTAL FLOWS Q(100) (cfs)
EX-1	0.83	3.32	14.54	0.08	300	8	23.1	1000	2.0%	2.8	5.9	29.0	2.03	2.53	4.25	1.7	**8.4**	**61.8**
EX-2	0.11	0.45	1.97	0.08	300	50	12.6	0	0.0%	0.0	0.0	12.6	3.02	3.78	6.35	0.3	**1.7**	**12.5**
EX-3	0.08	0.31	1.35	0.08	300	50	12.6	0	0.0%	0.0	0.0	12.6	3.02	3.78	6.35	0.2	**1.2**	**8.6**
EX-4	0.65	2.60	11.37	0.08	100	1	18.4	1000	1.3%	2.3	7.3	25.7	2.17	2.71	4.55	1.4	**7.0**	**51.7**

SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Facility/ Inlet Size*
EX1	BASIN EX-2	3.32	14.54	29.0	2.53	4.25	8.4	61.8	N/A
EX2	BASIN EX-3	0.45	1.97	12.6	3.78	6.35	1.7	12.5	N/A
EX3	BASIN EX-4	0.31	1.35	12.6	3.78	6.35	1.2	8.6	N/A
EX4	BASIN EX-5	2.60	11.37	25.7	2.71	4.55	7.0	51.7	N/A



CLASSIC CONSULTING

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Colorado Springs, Colorado 80903 (719)785-0799 (Fax)

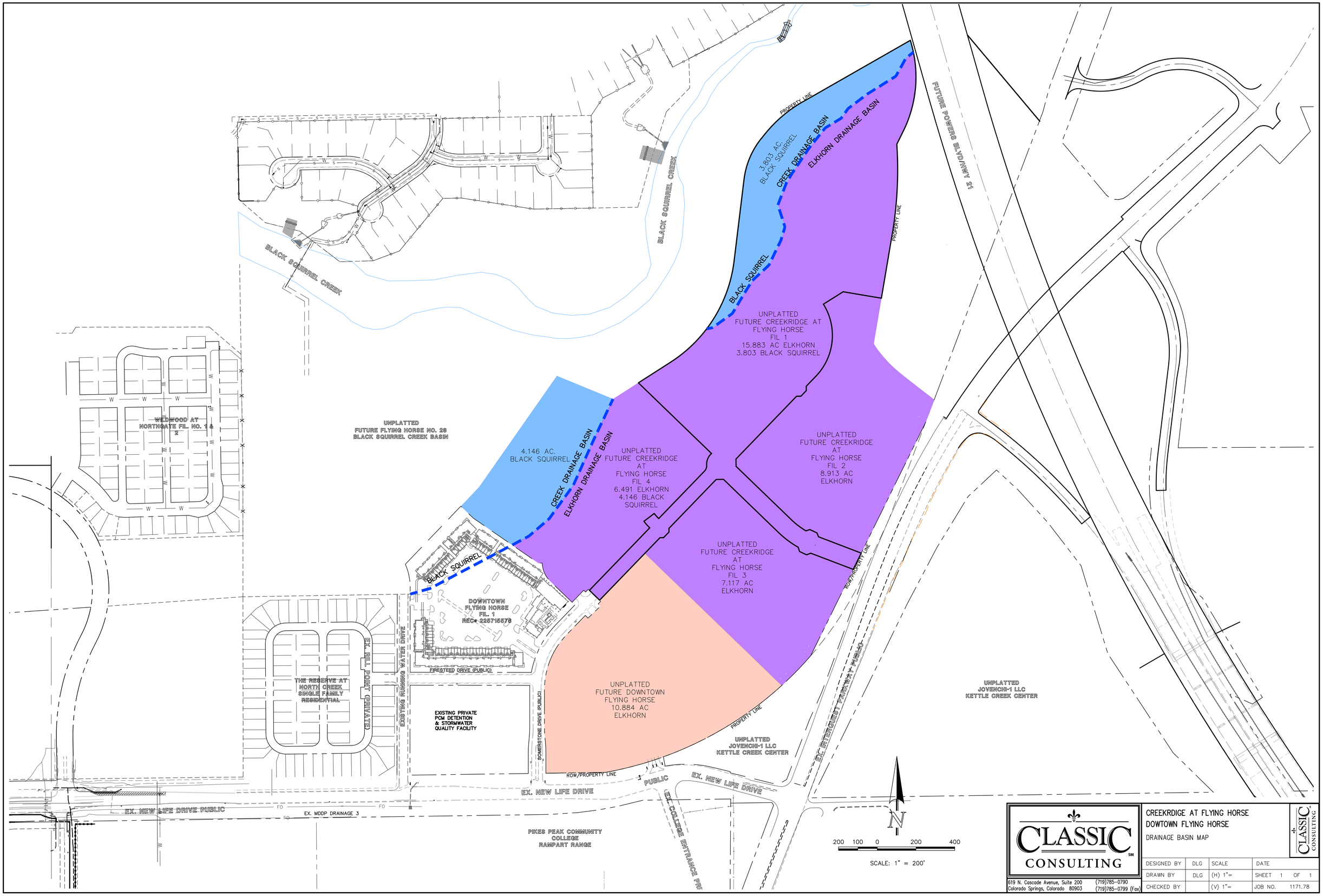
CREEKRDIGE AT FLYING HORSE
EXISTING CONDITIONS MAP

DESIGNED BY	DLG	SCALE	DATE
DRAWN BY	DLG	(H) 1"=	SHEET 1 OF 1
CHECKED BY		(V) 1"=	JOB NO. 1171.78

N:\1171.78\REPORTS\FINAL DRAINAGE REPORT\PDR 1171.78 EX DM.dwg, 9/23/2026 3:53:20 PM, 1:1

BLACK SQUIRREL CREEK
AND
ELKHORN DRAINAGE
BASIN EXHIBIT

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS



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(719)785-0790
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CREEKRDIGE AT FLYING HORSE
DOWTOWN FLYING HORSE
DRAINAGE BASIN MAP

DESIGNED BY	DLG	SCALE	DATE
DRAWN BY	DLG	(H) 1"=	SHEET 1 OF 1
CHECKED BY		(V) 1"=	JOB NO. 1171.78

N:\1171.78\REPORTS\FINAL DRAINAGE REPORT\Creekridge Drainage Basin 07-13-2026.dwg, 9/24/2026 11:44:39 AM, 1:1

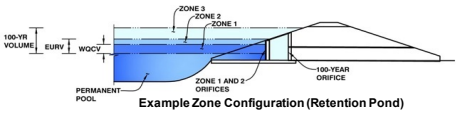
REFERENCE REPORTS & MAPS

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: DOWNTOWN FLYING HORSE FILING NO. 1 AMENDMENT # 1

Basin ID: POND 1



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	63.02	acres
Watershed Length =	3,000	ft
Watershed Length to Centroid =	1,500	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	57.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

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

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.203	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	3.939	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.03 in.) =	2.978	acre-feet	1.03	inches
5-yr Runoff Volume (P1 = 1.32 in.) =	4.241	acre-feet	1.32	inches
10-yr Runoff Volume (P1 = 1.59 in.) =	5.518	acre-feet	1.59	inches
25-yr Runoff Volume (P1 = 2.01 in.) =	8.012	acre-feet	2.01	inches
50-yr Runoff Volume (P1 = 2.38 in.) =	9.997	acre-feet	2.38	inches
100-yr Runoff Volume (P1 = 2.77 in.) =	12.312	acre-feet	2.77	inches
500-yr Runoff Volume (P1 = 3.84 in.) =	18.279	acre-feet	3.84	inches
Approximate 2-yr Detention Volume =	2.612	acre-feet		
Approximate 5-yr Detention Volume =	3.596	acre-feet		
Approximate 10-yr Detention Volume =	4.811	acre-feet		
Approximate 25-yr Detention Volume =	5.767	acre-feet		
Approximate 50-yr Detention Volume =	6.330	acre-feet		
Approximate 100-yr Detention Volume =	7.215	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.203	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.737	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.275	acre-feet
Total Detention Basin Volume =	7.215	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = 2.00 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	--	--	--	800	0.018		
6801.25	--	0.50	--	--	--	800	0.018	400	0.009
6802	--	1.25	--	--	--	2,229	0.051	1,536	0.035
6804	--	3.25	--	--	--	28,643	0.658	32,408	0.744
6806	--	5.25	--	--	--	71,204	1.635	132,255	3.036
6808	--	7.25	--	--	--	92,735	2.129	296,194	6.800
6810	--	9.25	--	--	--	103,022	2.365	491,951	11.294
6812	--	11.25	--	--	--	123,213	2.829	718,186	16.487

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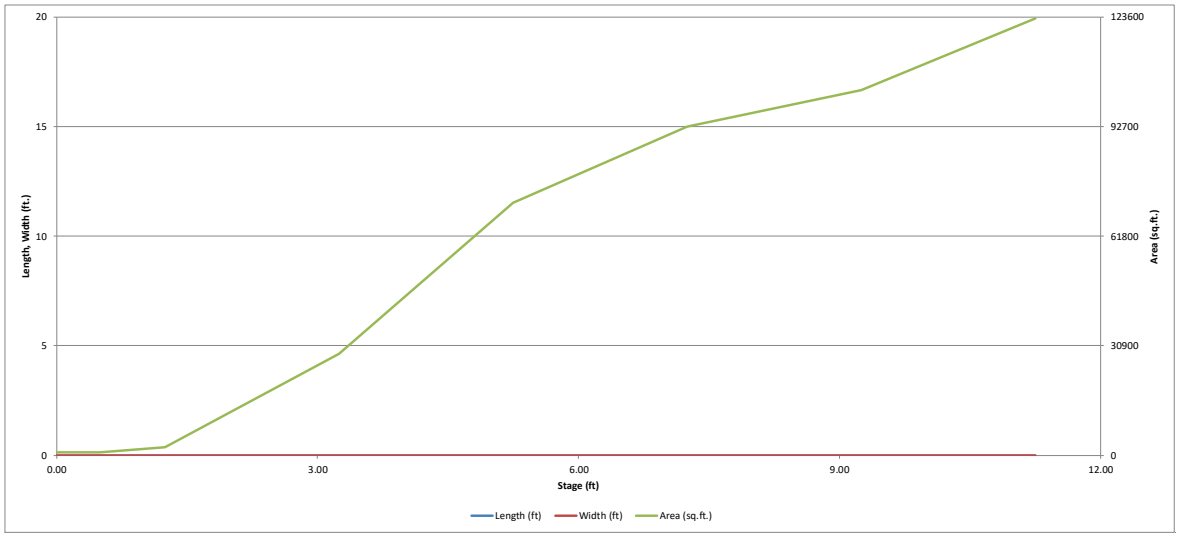

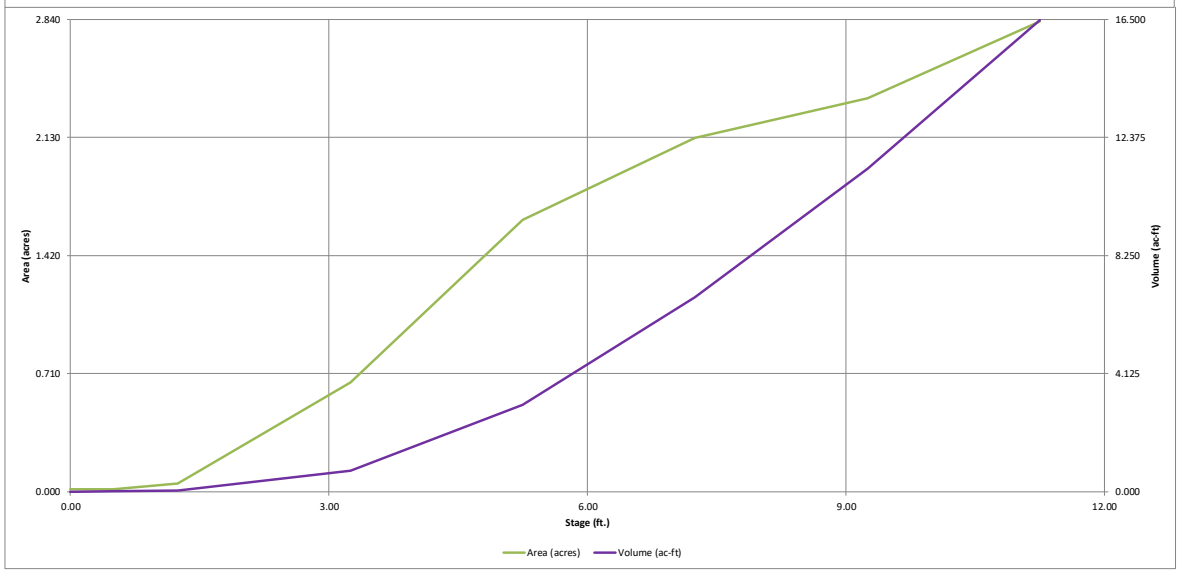

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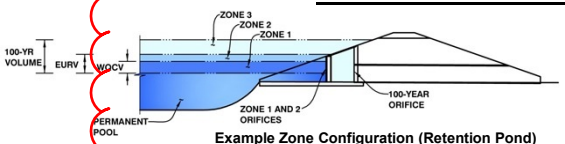
DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **DOWNTOWN FLYING HORSE FILING NO. 1 AMENDMENT # 1**

Basin ID: **POND 1**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.83	1.203	Orifice Plate
Zone 2 (EURV)	5.79	2.737	Orifice Plate
Zone 3 (100-year)	7.45	3.275	Weir&Pipe (Restrict)
Total (all zones)		7.215	

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

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

Calculated Parameters for Underdrain

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

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	7.00	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	21.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.80	3.60	5.40				
Orifice Area (sq. inches)	4.00	4.50	14.00	14.00				

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	7.00	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	8.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	7.00	N/A	feet
Overflow Weir Slope Length =	4.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	8.81	N/A	
Overflow Grate Open Area w/o Debris =	22.27	N/A	ft^2
Overflow Grate Open Area w/ Debris =	22.27	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	18.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	2.53	N/A	ft^2
Outlet Orifice Centroid =	0.83	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.09	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.25	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.91	feet
Spillway Crest Length =	75.00	feet	Stage at Top of Freeboard =	11.16	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.81	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	16.23	acre-ft

Calculated Parameters for Spillway

Routed Hydrograph Results

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

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.03	1.32	1.59	2.01	2.38	2.77	3.84
CUHP Runoff Volume (acre-ft) =	1.203	3.939	2.978	4.241	5.518	8.012	9.997	12.312	18.279
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.978	4.241	5.518	8.012	9.997	12.312	18.279
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.9	10.4	20.7	50.9	69.8	93.1	149.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.17	0.33	0.81	1.11	1.48	2.37
Peak Inflow Q (cfs) =	N/A	N/A	47.4	68.7	89.3	133.9	167.2	205.4	301.3
Peak Outflow Q (cfs) =	0.7	1.6	1.1	1.6	1.9	15.2	32.4	34.2	114.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.1	0.3	0.5	0.4	0.8
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.6	1.3	1.4	1.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	64	58	66	73	77	75	73	68
Time to Drain 99% of Inflow Volume (hours) =	**41**	69	62	72	80	85	84	83	81
Maximum Ponding Depth (ft) =	3.83	5.79	5.10	5.82	6.47	7.30	7.69	8.48	9.73
Area at Maximum Ponding Depth (acres) =	0.94	1.77	1.56	1.77	1.94	2.13	2.18	2.27	2.48
Maximum Volume Stored (acre-ft) =	1.208	3.955	2.781	3.990	5.214	6.906	7.726	9.508	12.456

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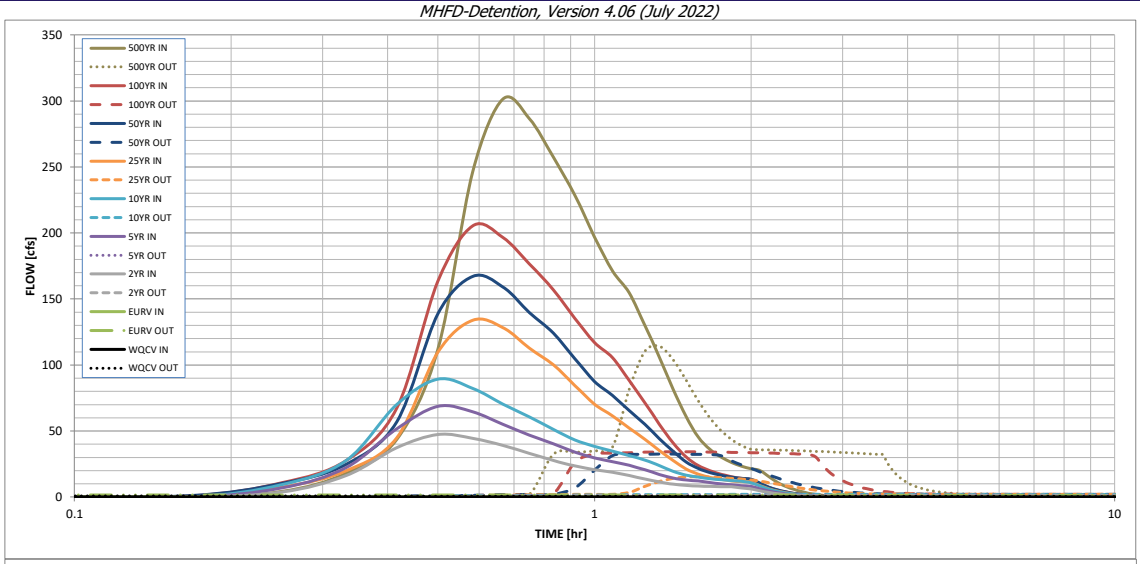
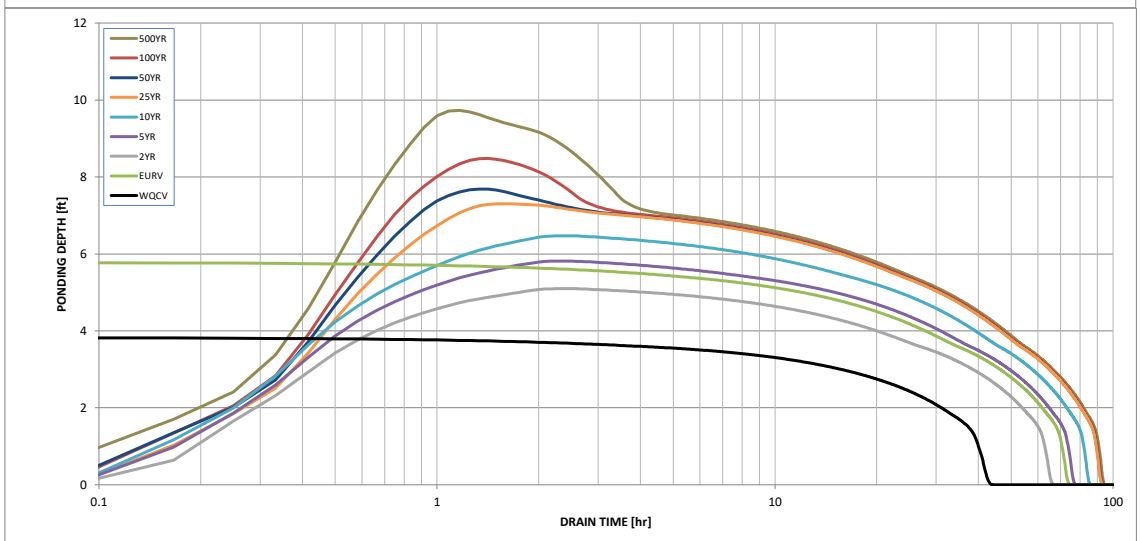
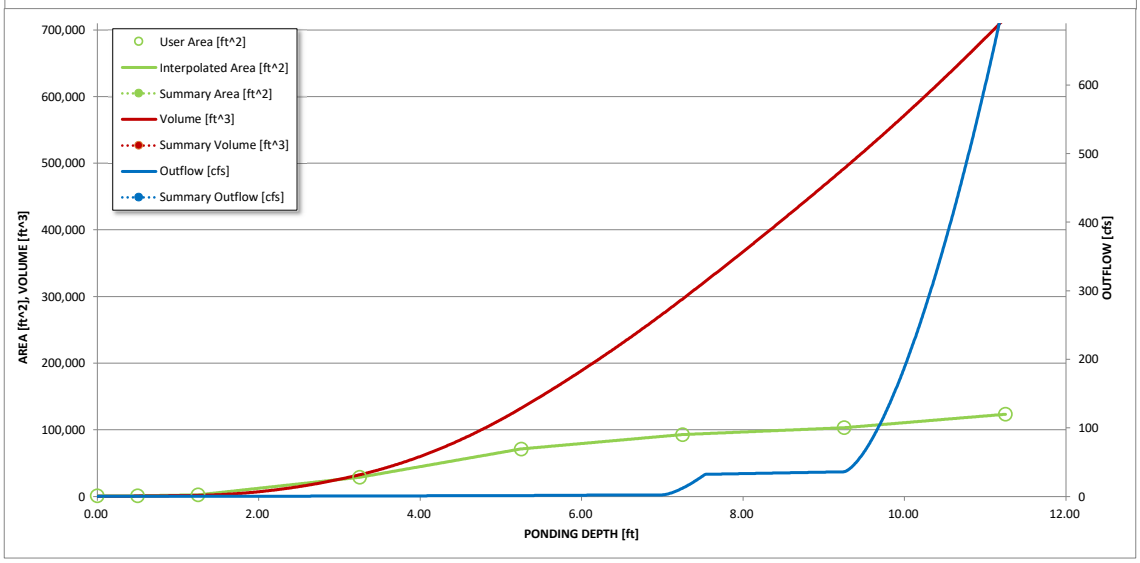
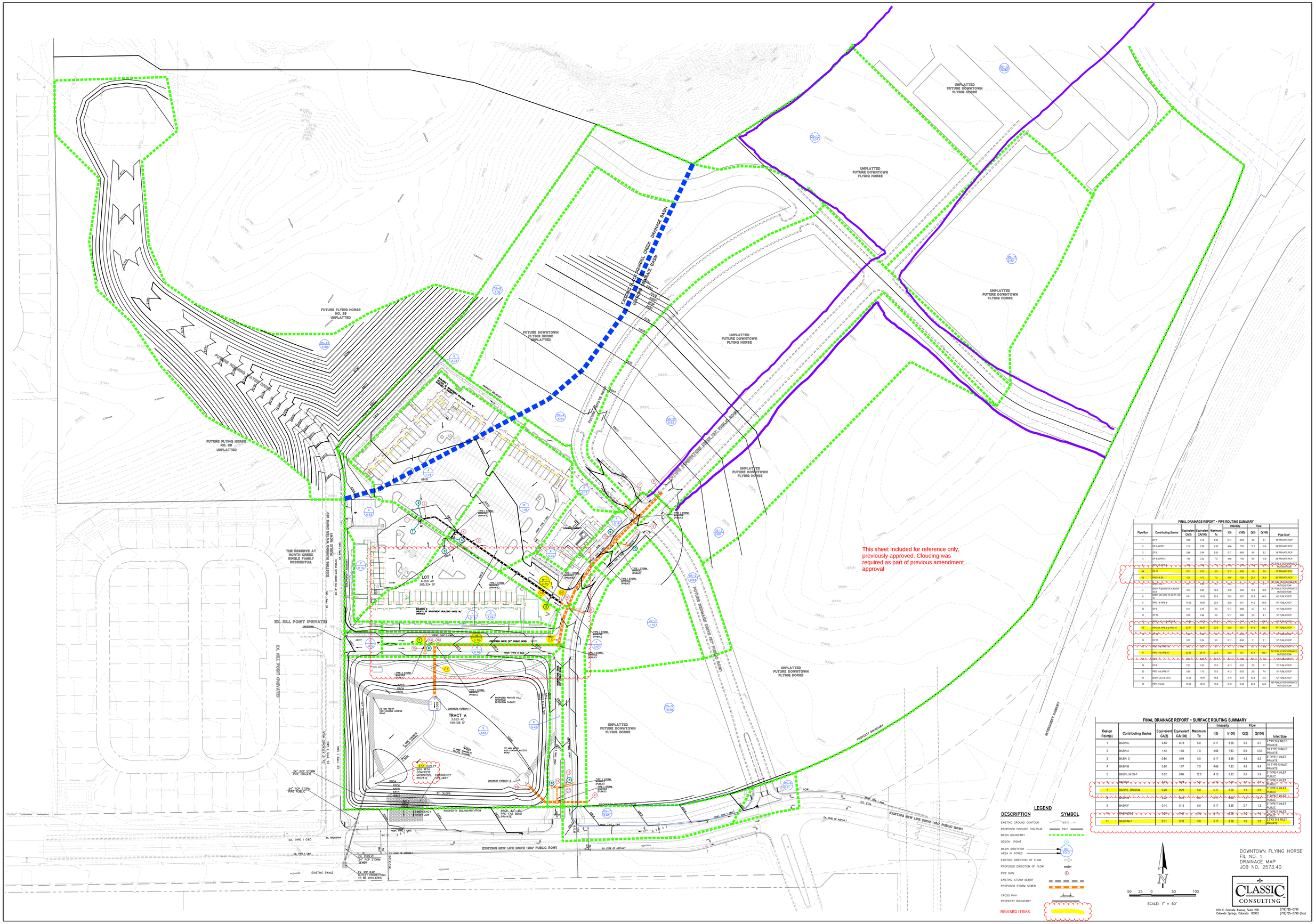






S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			



FINAL DRAINAGE REPORT – PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Pipe Size*
1	DP 1	0.66	0.78	5.0	5.17	8.68	3.5	6.7	18" PRIVATE RCP
2	DP 2 & PIPE 1	2.16	2.38	7.00	4.66	7.83	10.1	18.6	24" PRIVATE RCP
3	DP 3	0.86	0.94	5.00	5.17	8.68	4.5	8.2	18" PRIVATE RCP
4	DP 4 & PIPE 3	1.94	2.02	7.0	4.66	7.83	9.0	15.8	24" PRIVATE RCP
5	DP 5 & PIPE 4	4.6	4.6	7.0	4.66	7.83	21.4	36.0	30" PUBLIC RCP (PRIVATE OUTSIDE ROW)
5A	DP 11	0.31	0.33	5.0	5.17	8.68	1.6	2.8	12" PRIVATE PVC
5B	PIPE 5 & 5A	4.90	4.72	7.0	4.66	7.83	22.1	36.9	30" PRIVATE RCP
6	PIPE 5B	5.11	5.05	7.0	4.66	7.83	23.8	39.7	30" PUBLIC RCP (PRIVATE OUTSIDE ROW)
7	BASIN A,BASIN GS-4, BASIN GS-3	4.71	4.71	6.65	16.4	3.35	5.68	16.0	36.0	36" PUBLIC RCP (PRIVATE OUTSIDE ROW)
8	BASIN GS-3,GS-10,GS-11,GS-12	9.91	10.00	20.9	3.02	5.07	29.9	50.0	48" PUBLIC RCP
9	PIPE 7 & PIPE 8	14.63	19.69	20.9	3.02	5.07	44.2	99.9	48" PUBLIC RCP
10	DP 9	0.14	0.15	5.0	5.17	8.68	0.7	1.3	18" PUBLIC RCP
11	DP 10	0.39	0.48	5.0	5.17	8.68	2.0	4.1	18" PUBLIC RCP
12	PIPE 9, 10 & PIPE 11	15.2	21.2	20.9	3.02	5.07	45.9	107.4	48" PUBLIC RCP
13	PIPE 5B, PIPE 6 & PIPE 12	20.61	26.21	20.9	3.02	5.07	62.3	132.9	54" PUBLIC RCP
14	BASIN B,BASIN GS-1,GS-2	1.48	1.60	7.0	4.66	7.83	6.9	12.5	18" PUBLIC RCP (PRIVATE OUTSIDE ROW)
15	DP 11	0.22	0.24	5.0	5.17	8.68	1.1	2.1	18" PUBLIC RCP
16	PIPE 14 & PIPE 15	1.67	1.83	7.0	4.66	7.83	7.8	14.2	18" PUBLIC RCP (PRIVATE OUTSIDE ROW)
17	PIPE 14 & PIPE 17	20.89	28.74	20.9	3.02	5.07	63.1	145.7	54" PUBLIC RCP (PRIVATE OUTSIDE ROW)
18	BASIN C,BASIN D	1.52	1.73	5.0	5.17	8.68	7.9	15.0	24" PUBLIC RCP (PRIVATE OUTSIDE ROW)
19	DP 9	0.23	0.24	10.0	4.13	6.93	0.9	1.7	18" PUBLIC RCP
20	PIPE 18 & PIPE 17	0.85	1.15	10.0	4.13	6.93	3.5	7.9	18" PUBLIC RCP
21	BASIN GS-5 & GS-6	12.68	14.61	18.6	3.18	5.34	40.3	78.1	42" PUBLIC RCP
22	PIPE 19 & 20	13.53	15.91	18.6	3.18	5.34	43.0	84.9	48" PUBLIC RCP (PRIVATE OUTSIDE ROW)

FINAL DRAINAGE REPORT – SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Inlet Size
1	BASIN C	0.68	0.78	5.0	5.17	8.68	3.5	6.7	2 5'X5' D-9 INLET PRIVATE
2	BASIN A	1.48	1.60	7.0	4.66	7.83	6.9	12.5	10' TYPE R INLET PRIVATE
3	BASIN D	0.86	0.94	5.0	5.17	8.68	4.5	8.2	5' TYPE R INLET PRIVATE
4	BASIN B	0.98	1.07	7.0	4.66	7.83	4.6	8.4	10' TYPE R INLET PRIVATE
5	BASIN J & OS-7	0.62	0.86	10.0	4.13	6.93	2.6	5.9	5' TYPE R INLET PUBLIC
6	BASIN L	0.25	0.27	5.0	5.17	8.68	1.3	2.3	5' TYPE R INLET PUBLIC
7	BASIN L, BASIN M	0.20	0.29	5.0	5.17	8.68	1.1	2.5	5' TYPE R INLET PUBLIC
8	BASIN M	0.25	0.34	5.0	5.17	8.68	1.3	2.9	5' TYPE R INLET PUBLIC
9	BASIN F	0.14	0.15	5.0	5.17	8.68	0.7	1.3	5' TYPE R INLET PUBLIC
10	BASIN H	0.29	0.40	5.0	5.17	8.68	1.5	3.4	5' TYPE R INLET PUBLIC
11	BASIN M-1	0.31	0.33	5.0	5.17	8.68	1.6	2.8	2 5'X5' D-9 INLET PRIVATE

LEGEND

DESCRIPTION	SYMBOL
EXISTING GROUND CONTOUR	6910
PROPOSED FINISHED CONTOUR	6910
BASIN BOUNDARY	
DESIGN POINT	5
BASIN IDENTIFIER / AREA IN ACRES	BB 10.0
EXISTING DIRECTION OF FLOW	
PROPOSED DIRECTION OF FLOW	
PIPE RUN	5
EXISTING STORM SEWER	
PROPOSED STORM SEWER	
CROSS PAN	
PROPERTY BOUNDARY	
REVISED ITEMS	

N

SCALE: 1" = 50'

DOWNTOWN FLYING HORSE
FIL NO. 1
DRAINAGE MAP
JOB NO. 2573.40

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799 (Fax)

PROPOSED CONDITIONS DRAINAGE MAP

BASIN RUNOFF SUMMARY

Intensity calculated using 5/100 yr in 1 Degree-Hours-per-Day

BASIN	DESIGNATED CA(5)	DESIGNATED CA(100)	DESIGNATED C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc	STREET / CHANNEL FLOW Length (ft)	STREET / CHANNEL FLOW Slope (ft/ft)	STREET / CHANNEL FLOW Velocity (fps)	STREET / CHANNEL FLOW Tc	INTENSITY I(5)	INTENSITY I(100)	TOTAL FLOWS Q(5)	TOTAL FLOWS Q(100)
A	0.46	0.87	0.23	0.98	100	21	900	0.0%	1.0	14	3.15	5.58	0.7	4.9
B	0.75	1.55	0.34	1.01	100	21	900	0.0%	1.0	14	3.15	5.58	2.4	8.7
C	0.46	0.92	0.26	0.98	100	21	900	0.0%	1.0	14	3.15	5.58	1.4	5.6
D	0.93	1.82	1.15	0.97	100	21	900	0.0%	1.0	14	3.15	5.58	3.6	10.2
E	0.46	0.92	1.27	0.98	100	21	900	0.0%	1.0	14	3.15	5.58	4.0	10.7
F	0.46	0.92	0.27	0.98	100	21	900	0.0%	1.0	14	3.15	5.58	0.8	5.1
G	0.25	0.49	0.27	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	0.8	5.0
H	0.07	0.08	0.07	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	0.2	0.4
I	0.24	0.59	0.75	0.98	30	5	50	0.0%	0.0	15	3.15	5.17	2.4	9.2
J	0.55	1.09	0.85	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	2.6	10.2
K	0.18	0.36	0.55	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	1.7	6.7
L	0.20	0.37	0.55	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	1.7	6.8
M	0.28	0.57	1.05	0.98	20	10	100	0.0%	0.0	15	3.15	5.17	3.3	9.6
N	0.55	1.09	0.85	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	2.6	10.2
O	0.22	0.43	0.55	0.98	5	5	50	0.0%	0.0	15	3.15	5.17	1.7	6.4
P	0.46	0.92	0.55	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	1.7	6.8
Q	0.5	0.9	0.6	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	1.9	6.1
OS-1	0.07	0.14	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	2.1
OS-2	1.15	2.30	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	11.9
OS-3	0.97	1.94	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	10.0
OS-4	1.20	2.40	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	12.4
OS-5	0.13	0.26	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	1.3
OS-6	1.21	2.42	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	12.5
OS-7	0.03	0.07	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	0.3
OS-8	0.21	0.42	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	2.2
OS-9	2.05	4.10	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	21.2
OS-10	0.16	0.32	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	1.7
OS-11	0.05	0.11	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	0.6
OS-12	6.39	12.78	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	66.0
OS-13	1.51	3.02	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	15.6
OS-14	12.32	24.64	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	127.2
OS-1	0.75	1.50	0.25	0.98	10	5	50	0.0%	0.0	15	3.15	5.17	0.8	7.7

SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Facility Inlet Size*
1	BASIN A	1.37	1.75	16.2	3.46	5.71	4.7	9.9	30" PYRES / 30" PUBLIC
2	BASIN B	1.94	1.01	16.2	3.46	5.71	7.6	5.8	30" PYRES / 30" PUBLIC
3	BASIN C	0.92	0.66	16.2	3.46	5.71	3.2	3.8	30" PYRES / 30" PUBLIC
4	BASIN D	2.80	1.75	15.4	3.48	5.84	9.8	10.2	30" PYRES / 30" PUBLIC
5	BASIN E & FLOW OP 1	1.87	2.41	16.2	3.46	5.71	6.7	13.8	30" PYRES / 30" PUBLIC
6	BASIN F & BASIN OS-3	1.13	1.32	16.1	3.42	5.73	3.9	7.6	30" PYRES / 30" PUBLIC
7	BASIN G	0.25	0.27	5.0	5.17	8.68	1.3	2.3	30" PYRES / 30" PUBLIC
8	BASIN H, BASIN C, OS-1, OS-5, FLOW OP 2	1.91	2.46	16.2	3.46	5.71	6.7	14.1	30" PYRES / 30" PUBLIC
9	BASIN I, K, OS-8,FLOW OP 3	2.46	3.25	16.2	3.46	5.71	8.4	18.5	30" PYRES / 30" PUBLIC
10	BASIN K,FLOW OP 3	0.55	1.21	16.2	3.46	5.71	1.9	6.9	30" PYRES / 30" PUBLIC
11	BASIN L & OS-4	0.39	0.45	10.0	4.13	6.93	1.6	3.8	30" PYRES / 30" PUBLIC

PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins / Design Point(s)Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Pipe Size*
1	OP 1 INTERCEPTED	1.25	1.17	16.2	3.46	5.71	4.3	6.7	18" PUBLIC/RCP
2	OP 2 INTERCEPTED	0.94	0.90	16.2	3.46	5.71	3.3	5.1	18" PUBLIC/RCP
3	PIPE 1 & 2	2.10	2.07	16.2	3.46	5.71	7.1	11.8	24" PUBLIC/RCP
4	BASIN G & OS 10 + 11 + 12 + 13	1.07	1.06	16.4	3.39	5.58	3.6	10.3	18" PUBLIC/RCP
5	PIPE 3 & 4	3.17	3.02	16.5	3.13	5.26	9.9	25.5	24" PUBLIC/RCP
6	OP 4 INTERCEPTED	0.95	1.14	15.4	3.48	5.84	2.4	6.7	18" PUBLIC/RCP
7	PIPE 5 & 6	4.16	3.95	16.5	3.12	5.24	13.0	25.3	24" PUBLIC/RCP
8	OP 5	1.87	2.41	16.2	3.46	5.71	6.7	13.8	18" PUBLIC/RCP
9	PIPE 7 & 8	5.82	7.47	23.5	2.91	4.85	16.9	36.3	30" PUBLIC/RCP
10	OP 6	1.13	1.32	16.1	3.42	5.73	3.9	7.6	18" PUBLIC/RCP
11	OP 7	0.25	0.27	5.0	5.17	8.68	1.3	2.3	18" PUBLIC/RCP
12	PIPE 10 & 11	1.35	1.08	16.1	3.42	5.73	4.7	6.1	24" PUBLIC/RCP
13	BASIN P & OS-2	1.88	2.28	16.4	3.39	5.58	6.7	12.3	24" PUBLIC/RCP
14	PIPE 12 & 13	3.26	3.07	16.4	3.39	5.58	11.4	23.9	24" PUBLIC/RCP
14A	OP 3	0.52	0.68	16.2	3.46	5.71	1.8	3.9	18" PUBLIC/RCP
15	PIPE 14 & 14A	6.70	11.44	26.3	2.66	4.42	24.0	51.4	30" PUBLIC/RCP
16	OP 8 INTERCEPTED	1.95	1.94	16.2	3.46	5.71	6.8	11.1	24" PUBLIC/RCP
17	PIPE 15 & 16	11.14	13.38	26.3	2.66	4.42	29.6	60.2	30" PUBLIC/RCP
18	BASIN Q, FLOW OP 5 + 6 + 7 & OS-1	1.16	2.22	16.4	3.39	5.58	3.9	12.2	24" PUBLIC/RCP
19	PIPE 17 & 18	12.30	15.75	26.3	2.66	4.42	32.6	70.0	30" PUBLIC/RCP
20	OP 9 INTERCEPTED	2.31	2.24	16.2	3.46	5.71	7.9	12.8	24" PUBLIC/RCP
21	PIPE 19 & 20	14.61	17.94	26.1	2.68	4.43	37.7	77.6	42" PUBLIC/RCP
22	OP 10 INTERCEPTED	0.22	1.31	16.2	3.46	5.71	1.1	6.9	24" PUBLIC/RCP
23	OP 11 INTERCEPTED	0.25	0.40	16.0	4.13	6.93	1.2	2.8	18" PUBLIC/RCP
24	PIPE 21,22,23	15.23	19.65	26.1	2.68	4.43	39.2	84.6	2-48" PUBLIC/RCP
25	BASIN OS-9 & OS-10	2.62	3.17	13.5	3.75	6.21	9.7	19.7	2-24" PUBLIC/RCP
26	PIPE 24 & 25	17.85	22.72	27.8	2.60	4.30	46.3	98.0	2-48" PUBLIC/RCP
27	BASIN OS-12	10.46	11.37	16.1	3.42	5.73	35.8	65.2	2-42" PUBLIC/RCP
28	BASIN OS-14	1.67	6.62	26.7	2.71	4.48	5.5	29.7	18" PUBLIC/RCP

DRAINAGE MAP
CREEKRIDGE AT FLYING HORSE FIL 1
1171.78
MAY 2026

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