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Final Drainage Report Addendum
Peaceful Ridge at Fountain Valley Subdivision
El Paso County, Colorado

June 2023

HR Green Project No: 2302308

Prepared For:

Peaceful Ridge Development Company

Contact: J. Ryan Watson

3 Widefield Boulevard

Colorado Springs, CO 80911

Prepared By:

HR Green Development, LLC

Contact: Colleen Monahan, PE

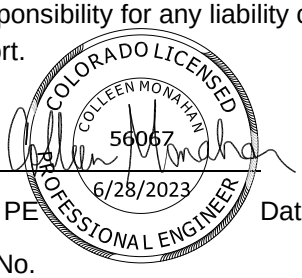
cmonahan@hrgreen.com

(719) 394-2433

PCD File No. CDR-22-015

Engineer's Statement:

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



Colleen Monahan, PE Date

State of Colorado No.

For and on behalf of HR Green Development, LLC

Owner/Developer's Statement:

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

By: _____ June 29th, 2023

Authorized Signature Date

Address: Peaceful Ridge Development Company
3 Widefield Boulevard
Colorado Springs, CO 80911

El Paso County Statement

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

Approved
By: Gilbert LaForce, P.E.
Engineering Manager
Date: 11/01/2023 8:09:34 AM
El Paso County Department of Public Works

Joshua Palmer, P.E. ate

County Engineer/ECM Administrator

Conditions:

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APPENDICES

I. General Purpose, Location and Description

a. Purpose

The purpose of this Final Drainage Report (FDR) for Peaceful Ridge at Fountain Valley is to describe the onsite and offsite drainage patterns, size drainage infrastructure to safely capture and convey developed runoff to water quality and detention facilities, and to safely route detained stormwater to adequate outfalls.

b. Location

Peaceful Ridge at Fountain Valley, referred to as 'the site' herein, is to be developed as a single-family residential subdivision. The site lies within the Southeast ¼ Section 15, Township 15 South, Range 65 West of the 6th Principal Meridian, in El Paso County, Colorado. The property is approximately 60.14 acres of which 2.34 acres was dedicated as additional right-of-way along Marksheffel Road. The site is bound to the north by unplatted land which will be future Bradley Ridge subdivision, to the east by Marksheffel Road, to the south by Cottonwood Meadows Filing No. 3 and to the west by unplatted land. A vicinity map is presented in Appendix A.

c. Description of Property

The property is currently undeveloped and platted as Peaceful Ridge at Fountain Valley subdivision with 255 single-family lots, a detention basin tract and roadway rights-of-way. The construction plans for the overall site were previously approved by the County and are being refreshed to current County and District standards. With the update, three lots will be incorporated into the detention basin tract. Access to the development will be provided at Marksheffel Road at the northeast corner of the site with the construction of Peaceful Ridge Drive. Secondary access will be provided with the extension of Sleepy Meadows Drive at the southwest corner of the site.

The site generally slopes to the southeast at approximately 6%. There are no major drainageways or irrigation facilities that traverse the site. The vegetation consists primarily of native grasses and weeds. Per a NRCS web soil survey, the site's soil is comprised of Kim Loam (#43) which is classified within Hydrologic Soil Group B. A small portion of the site consists of Nelson-Tassel Fine Sandy Loams, Razor-Midway Complex and Stoneham Sandy Loam. These soils are classified as Hydrologic Soil Groups C and D.

There are no existing utilities on the site, however there are existing utilities in Marksheffel right-of-way adjacent to the east side of the site, including watermain, sanitary sewer, storm sewer, fiber optic, electric lines.

d. Floodplain Statement

Based on FEMA FIRM 08041C0957G December 7, 2018, the site is Zone X, which are areas determined to be outside the 0.2% annual chance flood. The map has been presented in Appendix A.

II. Drainage Design Criteria

a. Drainage Criteria

Hydrologic data and calculations were performed using Drainage Criteria Manual Volume 1 of El Paso County (EPCDCM), with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs Drainage Criteria Manual (CCSDCM), May 2014 revised January 2021.

Onsite drainage improvements are designed for the 5-year storm (minor event) and 100-year storm (major event) using rainfall values from CCSDCM Table 6-2 below. Runoff was calculated per CCSDCM Section 6.3.0 - Rational Method. 5-year and 100-year runoff coefficients were determined from Table 6-6 of the CCSDCM Vol. 1. Private, full spectrum pond design was completed using the latest version of Mile High Flood District's (MHFD) UD-Detention per CCSDCM Section 13.3.2.1 – Private, full spectrum Detention. The detention pond allowable release rate will be limited to less than historic rates.

Table 6-2: Rainfall Depths for El Paso County		
Return Period (yr)	5	100
1-hr Rainfall Depth (in)	1.50	2.52

Inlets were sized per the methods described in EPCDCM Section III Chapter 7 – Street Drainage and Storm Water Inlets. Storm sewer was sized per the methods described in EPCDCM Section III Chapter 8 – Storm Drains and Appurtenances.

III. Drainage Basins and Subbasins

a. Previous Drainage Studies

The site is located within the Jimmy Camp Creek Drainage Basin. The site's drainage characteristics were previously studied in the following reports:

1. "Final Drainage Report for Cottonwood Meadows, Filing No. 1," prepared by HMS Group, LLC, approved November 4, 1999.
2. "Final Drainage Report for Cottonwood Meadows, Filings No. 2 and 3," prepared by HMS Group, LLC, approved May 31, 2000.
3. "Preliminary and Final Drainage Report, Peaceful Ridge at Fountain Valley Subdivision," prepared by Kiowa Engineering Corporation, approved October 17, 2006.
4. "Early Grading Drainage Report, Peaceful Ridge at Fountain Valley Subdivision," prepared by Kiowa Engineering Corporation, approved July 14, 2022. EGP-21-003.

According to the Cottonwood Meadows drainage reports, historic offsite Basin H-3 which consists of the western and southern portion of the site and a portion to the west of the site drained in a southeasterly direction onto the Cottonwood Meadows site prior to the development of Cottonwood Meadows. A trapezoidal channel in the back of the lots along the northern boundary line was constructed with the development of the Cottonwood Meadows property that now directs this offsite runoff to the east to Marksheffel Road. In the current condition, a total of Q_5 = 21 cfs Q_{100} = 62 cfs from Basin H-3 drains to the trapezoidal channel and discharges to the northeast corner of the Cottonwood Meadows development. According to the Cottonwood Meadows drainage reports, only historic runoff will be allowed to discharge to the trapezoidal channel. See Basin D-1 description for proposed runoff conditions to the existing trapezoidal channel.

b. Existing Subbasin Description

Basin E-1 contains approximately 27.76 acres of the northern portion of the site. Approximately Q_5 = 16.4 cfs Q_{100} = 41.5 cfs generated from this basin sheet flows to the east to a roadside ditch along Marksheffel Road. Runoff collected in this ditch travels to an existing 7' x' 4' concrete box culvert. Runoff intercepted by this culvert is directed under Marksheffel Road to the east and ultimately discharges to Jimmy Camp Creek.

Basin E-2 contains approximately 33.34 acres of the southern portion of the site. Approximately Q_5 = 18.6 cfs Q_{100} = 46.3 cfs generated from this basin sheet flows in a southeasterly direction along the south boundary line. Runoff collected in the channel travels to the east to Marksheffel Road and discharges into the roadway corridor west side ditch. A portion of these flows (Q_{100} = 31cfs per the Cottonwood Meadows F2 and F3 FDR) to the existing trapezoidal channel along the northern property boundary of the Cottonwood Meadows subdivision prior to entering into the roadside ditch along Marksheffel. This is the historic drainage condition for the basin per the Early Grading Drainage Report, Peaceful Ridge at Fountain Valley Subdivision (EGP FDR) and per the Cottonwood Meadows F2 and F3 FDR to route the site's flows around the Cottonwood Meadows Subdivision. However, the existing channel has been encroached upon by the Cottonwood Meadows homeowners and is potentially unstable.

Basin OS-1 contains approximately 32.60 acres north of the site. Approximately Q_5 = 23.0 cfs Q_{100} = 16.4 cfs generated from this basin sheet flows in an easterly and southeasterly direction to the roadside ditch along Marksheffel. Runoff from this basin does not enter the site until it nearly reaches Marksheffel Road. Runoff channel flows to the south to an existing 7' x 4' concrete box culvert.

Basin OS-2 contains approximately 3.05 acres west of the site. Approximately Q_5 = 2.3 cfs Q_{100} = 6.0 cfs generated from this basin sheet flows in a southeasterly direction to Sleep Meadows Drive. Runoff gutter flows to the south towards Fontaine Boulevard.

Basin OS-3 contains approximately 13.50 acres north of the site along Marksheffel Road. Approximately Q_5 = 11.1 cfs Q_{100} = 28.6 cfs generated from this basin sheet flows in a southeasterly direction to the roadside ditch along Marksheffel. Runoff gutter flows to the south towards Fontaine Boulevard. Runoff channel flows to the south to an existing 7' x 4' concrete box culvert that is under capacity due to shallow slopes. The existing 24" culvert located in Basin OS-3 north of the Peaceful Ridge Drive and Marksheffel intersection will be removed. A proposed 24" FES will replace the culvert and tie into existing 48" storm sewer within Marksheffel Road that has the capacity necessary to handle proposed flows.

Basin OS-4 contains approximately 9.38 acres west and south of the site. Approximately Q_5 = 6.9 cfs Q_{100} = 18.4 cfs from this basin accumulate in a broad natural channel which convey runoff to the south and away from the site. Some flows enter the west side borrow ditch for Sleepy Meadows Drive at a point several hundred feet south of the site. Some of these flows enter the Fontaine Boulevard Roadway Corridor, and some of these flows enter the FMIC Ditch. Basin OS-4 is raw land and is heavily vegetated with native grasses and weeds.

c. Proposed Subbasin Description

Basin OS-1 will remain as described in the existing condition of Basin OS2, with 3.05 acres. Stormwater (Q_5 = 1.4 cfs Q_{100} = 9.5 cfs) will drain into Basin C1 and is captured by onsite storm sewer.

Basin A0 is 1.73 acres of proposed single family residential rear lots. Stormwater (Q_5 = 4.4 cfs Q_{100} = 8.7 cfs) sheets flows across the rear of lots to DP1 within Bradley Ridge. Flows are captured within Bradley Ridge and conveyed to Pond 3. The Bradley Ridge drainage map is presented in Appendix E. Basin A0 is synonymous with Bradley Ridge Basin OS-3. Coordination is ongoing with Bradley Ridge to ensure the limits of Basin A0 are consistent. Per the approved EGP, Water Quality treatment for this basin is achieved by Infiltration Reduction Factoring within the rear yard areas. Calculations supporting treatment are presented in the IRF spreadsheet in Appendix B. As of the date of this report, Pond 3 is being constructed as a temporary sediment basin and will function as intended in the interim condition until final construction.

Basin A0.1 is 0.91 acres of proposed single family residential rear lots. Stormwater (Q_5 = 2.2 cfs Q_{100} = 4.4 cfs) sheets flows across the rear of lots to DP21. Flows are captured in a 24" FES at DP21 and piped to an existing 48" RCP storm sewer that already exists under Marksheffel Road. Flows from there continue to Jimmy Camp creek in existing storm sewer. Per the approved EGP, Water Quality treatment for this basin is achieved by Infiltration Reduction Factoring within the rear yard areas. Calculations supporting treatment are presented in the IRF spreadsheet in Appendix B.

Basin A1 is 2.62 acres of proposed single family residential and roadway. Stormwater (Q_5 = 5.0 cfs Q_{100} = 10.0 cfs) is conveyed in curb and gutter to DP3. Flows at DP3 are captured in a 20' Type R inlet (Public) and piped to Pond A.

Basin A2 is 3.61 acres of proposed single family residential and roadway. Stormwater (Q_5 = 6.9 cfs Q_{100} = 13.9 cfs) is conveyed in curb and gutter to DP4. Flows at DP4 are captured in a 15' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 2.5 cfs bypass DP4 and continue south to DP5.

Basin B1 is 4.88 acres of proposed single family residential and roadway. Stormwater (Q_5 = 11.0 cfs Q_{100} = 22.0 cfs) is conveyed in curb and gutter to DP5. Flows at DP5 are captured in a 20' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 5.8 cfs bypass DP5 and continue south to DP15.

Basin B2 is 4.68 acres of proposed single family residential and roadway. Stormwater (Q_5 = 9.6 cfs Q_{100} = 19.3 cfs) is conveyed in curb and gutter to DP15. Flows at DP15 are captured in a 15' Type R inlet (Public) and piped to Pond A. A total of Q_5 = 0.7 cfs, Q_{100} = 8.5 cfs bypass DP15 and continue south to DP16.

Basin B2.1 is 1.29 acres of proposed single family residential and roadway. Stormwater (Q_5 = 2.8 cfs Q_{100} = 5.7 cfs) is conveyed in curb and gutter to DP16. Flows at DP16 are captured in a 15' Type R sump inlet (Public) and piped to Pond A.

Basin B3 is 4.88 acres of proposed single family residential and roadway. Stormwater (Q_5 = 9.4 cfs Q_{100} = 19.0 cfs) is conveyed in curb and gutter to DP14. Flows at DP14 are captured in a 20' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 3.7 cfs bypass DP14 and continue east to DP16.

Basin B4 is 4.66 acres of proposed single family residential and roadway. Stormwater (Q_5 = 9.8 cfs Q_{100} = 19.6 cfs) is conveyed in curb and gutter to DP13. Flows at DP13 are captured in a 20' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 4.3 cfs bypass DP13 and continue east to DP14.

Basin B5 is 5.93 acres of proposed single family residential and roadway. Stormwater (Q_5 = 11.9 cfs Q_{100} = 23.9 cfs) is conveyed in curb and gutter to DP12. Flows at DP12 are captured in a 20' Type R inlet (Public) and piped to Pond A. A total of Q_5 = 0.1 cfs, Q_{100} = 6.2 cfs bypass DP12 and continue east to DP13.

Basin B6 is 2.38 acres of proposed single family residential and roadway. Stormwater (Q_5 = 4.6 cfs Q_{100} = 9.7 cfs) is conveyed in curb and gutter to DP10. Flows at DP10 are captured in a 10' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 0.7 cfs bypass DP10 and continue southeast to DP11.

Basin B7 is 4.19 acres of proposed single family residential and roadway. Stormwater (Q_5 = 8.2 cfs Q_{100} = 16.4 cfs) is conveyed in curb and gutter to DP11. Flows at DP11 are captured in a 20' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 3.8 cfs bypass DP11 and continue southeast to DP12.

Basin B8 is 1.14 acres of proposed single family residential and roadway. Stormwater (Q_5 = 2.5 cfs Q_{100} = 5.0 cfs) is conveyed in curb and gutter to DP9. Flows at DP9 continue in curb and gutter to DP11 and are captured in a 20' Type R inlet (Public) and piped to Pond A.

Basin B9 is 2.44 acres of proposed single family residential and roadway. Stormwater (Q_5 = 4.8 cfs Q_{100} = 9.6 cfs) is conveyed in curb and gutter to D18. Flows at DP18 are captured in a 15' Type R sump inlet (Public) and piped to Pond A.

Basin B10 is 1.47 acres of proposed single family residential and roadway. Stormwater (Q_5 = 2.6 cfs Q_{100} = 5.3 cfs) is conveyed in curb and gutter to D18. Flows at DP18 are captured in a 15' Type R sump inlet (Public) and piped to Pond A.

Basin B11 is 1.39 acres of drainage tract and full spectrum detention area. Stormwater (Q_5 = 3.7 cfs Q_{100} = 7.4 cfs) sheet flows directly to the pond at DP19.

Basin C1 is 3.85 acres of proposed single family residential and roadway. Stormwater (Q_5 = 7.9 cfs Q_{100} = 15.9 cfs) is conveyed in curb and gutter to DP8. Flows at DP8 are captured in a 20' Type R inlet (Public) and piped to Pond A. A total of Q_{100} = 4.5 cfs bypass DP8 and continue south in Sleepy Meadows Drive curb and gutter.

Basins D1 and OS-D1 are a combined 3.42 acres, of which 2.73 acres is proposed single family residential from the on-site, and 0.69 acres is off-site from the Cottonwood Meadows Subdivision swale area along the Cottonwood Meadows northerly boundary. Due to encroachment causing instability of the existing swale, a proposed swale (Swale D1) will be built along the southerly boundary of the Peaceful Ridge site within a proposed 20' drainage and no build easement. Stormwater from the 3.42 acres (Q_5 = 5.1 cfs Q_{100} = 11.2 cfs) will flow easterly in the proposed swale to DP20, where Type L riprap rundown will be provided. The flow then enters the roadside ditch along Marksheffel and continues southerly to its ultimate discharge at Jimmy Camp Creek. Water Quality Treatment for Basin D1 is achieved in the rear yard areas. Calculations are presented in Appendix B. Hydraulic analysis for the proposed Swale D1 is presented in Appendix C.

Basin D2 is 1.33 acres of proposed single family residential. Stormwater (Q_5 = 2.4 cfs Q_{100} = 4.9 cfs) sheet flows to the proposed swale along Marksheffel. Runoff intercepted by this swale will continue south to an existing 7' x 4' box culvert (DP22). Runoff intercepted by this culvert is directed under Marksheffel Road to the east and ultimately discharges to Jimmy Camp Creek. Water Quality Treatment for Basin D2 is achieved in the rear yard areas. Water quality calculations are presented in Appendix B. Hydraulic analysis for the roadside ditch is presented in Appendix C.

Basin D3 is 1.27 acres of proposed single family residential. Stormwater (Q_5 = 2.3 cfs Q_{100} = 4.6 cfs) sheet flows to the proposed swale along Marksheffel. Runoff intercepted by this swale will continue south ditch along Marksheffel to DP23 and offsite. Water Quality Treatment for Basin D3 is achieved in the rear yard areas. Water quality calculations are presented in Appendix B. Hydraulic analysis for the roadside ditch is presented in Appendix C.

Basin D4 is 0.92 acres of undeveloped area and a portion of Marksheffel Road. Stormwater (Q_5 = 1.5 cfs Q_{100} = 3.6 cfs) sheet flows to the proposed swale ditch along Marksheffel. Runoff intercepted by this swale will continue south to an existing 7' x 4' box culvert (DP22). Runoff intercepted by this culvert is directed under Marksheffel Road to the east and ultimately discharges to Jimmy Camp Creek. Per Section I.7.1.B.7 of the EPCECM Appendix I, Basin D4 can be excluded from the water quality and detention standard.

Basin D5 is 2.40 acres of undeveloped area and a portion of Marksheffel Road. Stormwater (Q_5 = 3.3 cfs Q_{100} = 7.3 cfs) sheet flows to the existing roadside ditch along Marksheffel. Runoff intercepted by this swale will continue south ditch along Marksheffel to DP23 and offsite. Per Section I.7.1.B.7 of the EPCECM Appendix I, Basin D5 can be excluded from the water quality and detention standard.

Basin D6 is 0.17 acres of Peaceful Ridge Drive. Stormwater (Q_5 = 0.8 cfs Q_{100} = 1.4 cfs) flows in curb & gutter to a riprap rundown to DP21. Flows are captured in a proposed 24" FES at DP21 and piped to existing 48" storm sewer under Marksheffel Road and ultimately to Jimmy Camp Creek. Per Section I.7.1.C.1 of the EPCECM Appendix I, Basin D6 can be excluded from the water quality and detention standard. The total paved area excluded from water quality and detention is 0.65 acres from Basins D6-D8.

Basin D7 is 0.16 acres of Peaceful Ridge Drive. Stormwater (Q_5 = 0.7 cfs Q_{100} = 1.3 cfs) flows in curb & gutter to a riprap rundown to the swale along Marksheffel. Runoff intercepted by this swale will continue south to an existing 7' x 4' box culvert (DP22). Runoff intercepted by this culvert is directed under Marksheffel Road to the east and ultimately discharges to Jimmy Camp Creek. Per Section I.7.1.C.1 of the EPCECM Appendix I, Basin D7 can be excluded from the water quality and detention standard. The total paved area excluded from water quality and detention is 0.65 acres from Basins D6-D8.

Basin D8 is 0.32 acres of Sleep Meadows Drive. Stormwater (Q_5 = 1.1 cfs Q_{100} = 2.1 cfs) flows in curb & gutter southerly offsite, per the approved EGP FDR. Per Section I.7.1.C.1 of the EPCECM Appendix I, Basin D7 can be excluded from the water quality and detention standard. The total paved area excluded from water quality and detention is 0.65 acres from Basins D6-D8.

Basin JC5 is a MDDP basin shown for reference only. The existing 24" RCP culvert that is located within this basin at the intersection of Peaceful Ridge Drive and Marksheffel Road will be removed and replaced with a 24" FES that will be rerouted into the existing 48" RCP sewer under Marksheffel Road that routes the storm flow to the same location as the 7'x4' box culvert. The 7'x4' box culvert will be continued to be used for the stormwater from the outlet of the pond and south of Peaceful Ridge Drive.

IV. Drainage Facility Design

a. General Concept

Peaceful Ridge at Fountain Valley storm water will be collected by a series on inlets and piped to an onsite, full spectrum water quality and detention pond. Basins that cannot be reasonably captured and conveyed to the detention pond have been addressed with water quality exclusions from EPCECM Appendix I. The full spectrum water quality and detention pond will discharge at less than historic rates.

b. Water Quality & Detention

Pond A

Water quality and detention for proposed Basins OS1, C1 and B1 – B11 is provided in a full spectrum water quality and detention pond: Pond A. A total of 52.46 acres at 41.6% imperviousness will be detained in the pond. The WQCV is 0.805 ac-ft, the EURV is 1.494 ac-ft, and the 100-year volume is 4.310 ac-ft. The WQCV, EURV and 100-year storms are released in 40, 72 and 72 hours, respectively. A forebay is located at the outfall into the pond and a 2.0' trickle channel conveys flow towards the outlet structure. A 10' access and maintenance road is provided to the bottom of the pond to facilitate future maintenance. A 100' emergency overflow spillway is provided that conveys the developed, peak 100-yr flow rate with 1.0' of freeboard towards Marksheffel Road. The spillway will be lined with Type L riprap. Pond design calculations are presented in Appendix D.

The pond's outfall will be constructed within the right-of-way for Marksheffel Road. A Work-in-the-ROW permit will be required before construction can commence.

Water quality for Basins A0, A0.1, D1, D2 & D3 will be provided by Runoff Reduction methods. Mile High Flood District's Stormwater Management Practice Design Workbook (Version 3.07, November 2016) workbook was used to calculate the reduction and is presented in Appendix B.

Water quality for Basins D6-D8 has been excluded per Section I.7.1.C.1 of the EPCECM Appendix I.

c. Inspection and Maintenance

The private detention pond is to be owned and maintained by the Peaceful Ridge at Fountain Valley HOA. Maintenance access for the full spectrum detention facilities will be provided from public Right-of-Way.

d. Four Step Method to Minimize Adverse Impacts of Urbanization

Step 1 – Reducing Runoff Volumes: Low impact development (LID) practices are utilized to reduce runoff at the source. In general, stormwater discharges are routed across pervious areas prior to capture in storm sewer. This practice promotes infiltration and reduces peak runoff rates. The Runoff Reduction Factor method was used and is presented in Appendix B.

Step 2 – Treat and slowly release the WQCV: This step utilizes full spectrum water quality and detention to capture the WQCV and slowly release runoff from the site. Onsite full spectrum detention pond provides water quality treatment for the site. The WQCV is released over a period of 40 hours while the EURV releases over a period of 72 hours. Areas that couldn't be routed to the pond will employ runoff reduction measures to achieve water quality treatment.

Step 3 – Stabilize stream channels: This step establishes practices to stabilize drainageways and provide scour protection at stormwater outfalls. Erosion protection is provided at all concentrated stormwater discharge points in the form of riprap pads.

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

e. Drainage and Bridge Fees

Drainage basin and bridge fees for Peaceful Ridge at Fountain Valley Subdivision were paid at time of platting.

f. Opinion of Probable Cost

An engineer's opinion of probable is presented in Appendix E.

g. Hydraulic Grade Line Analysis

A hydraulic grade line analysis of the proposed storm sewer is presented in Appendix C.

V. Summary

Peaceful Ridge at Fountain Valley Subdivision lies within the Jimmy Camp Creek Drainage Basin. Water quality and detention for the site is provided in a full spectrum water quality and detention ponds. The water quality and detention pond will be maintained by the Peaceful Ridge at Fountain Valley HOA. All drainage facilities were sized per the El Paso County Drainage Criteria Manuals.

VI. Drawings

Please refer to the appendices for vicinity and drainage basin maps.

VII. References

1. City of Colorado Springs – Drainage Criteria Manual, May 2014, Revised January 2021.
2. Drainage Criteria Manual of El Paso, Colorado, October 2018.
3. El Paso County Engineering Criteria Manual, October 2020.
4. Urban Storm Drainage Criteria Manual, Urban Drainage Flood Control District, January 2018.
5. “Final Drainage Report for Cottonwood Meadows, Filing No. 1,” prepared by HMS Group, LLC, approved November 4, 1999.
6. “Final Drainage Report for Cottonwood Meadows, Filings No. 2 and 3,” prepared by HMS Group, LLC, approved May 31, 2000.
7. “Preliminary and Final Drainage Report, Peaceful Ridge at Fountain Valley Subdivision,” prepared by Kiowa Engineering Corporation, approved October 17, 2006.
8. “Early Grading Drainage Report, Peaceful Ridge at Fountain Valley Subdivision,” prepared by Kiowa Engineering Corporation, approved July 14, 2022.

APPENDIX A – VICINITY MAP, SOIL MAP, FEMA MAP

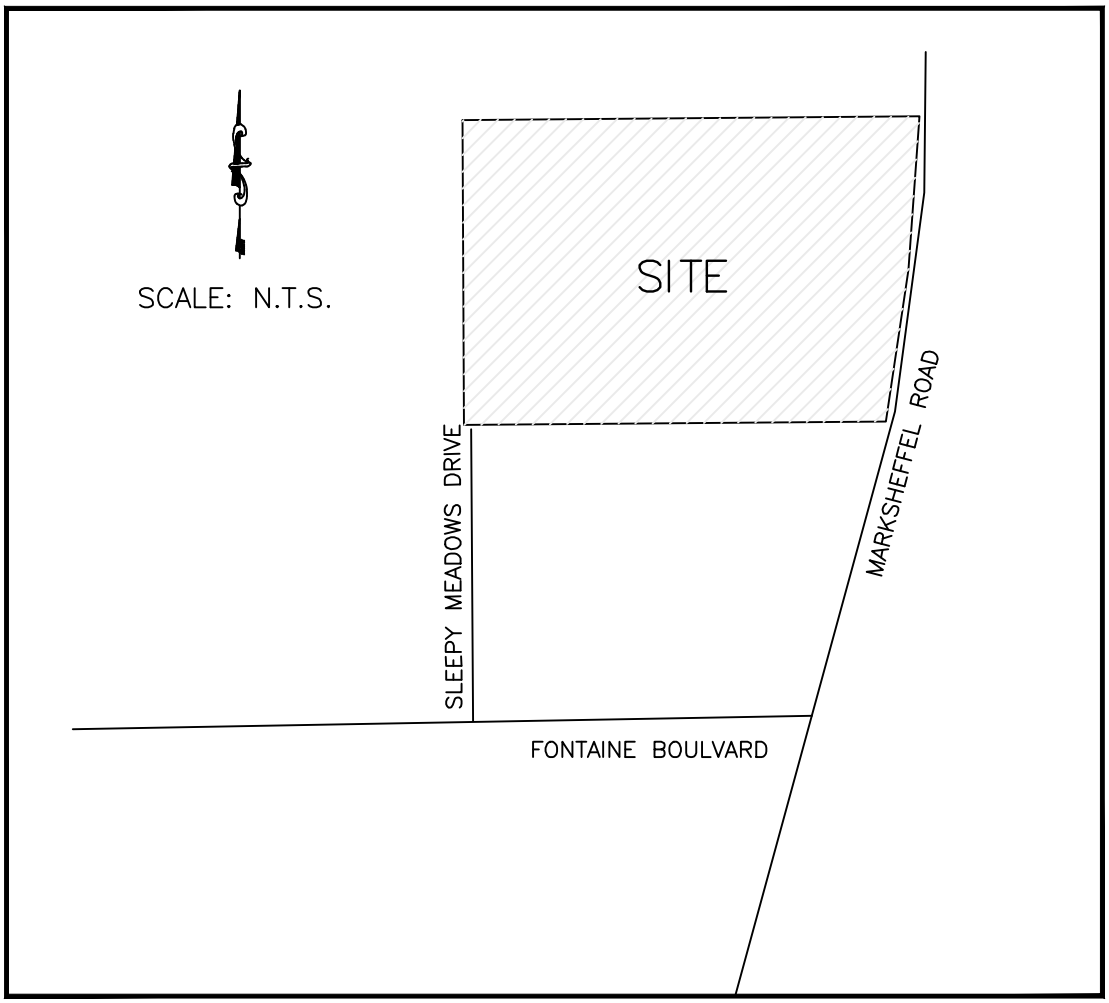
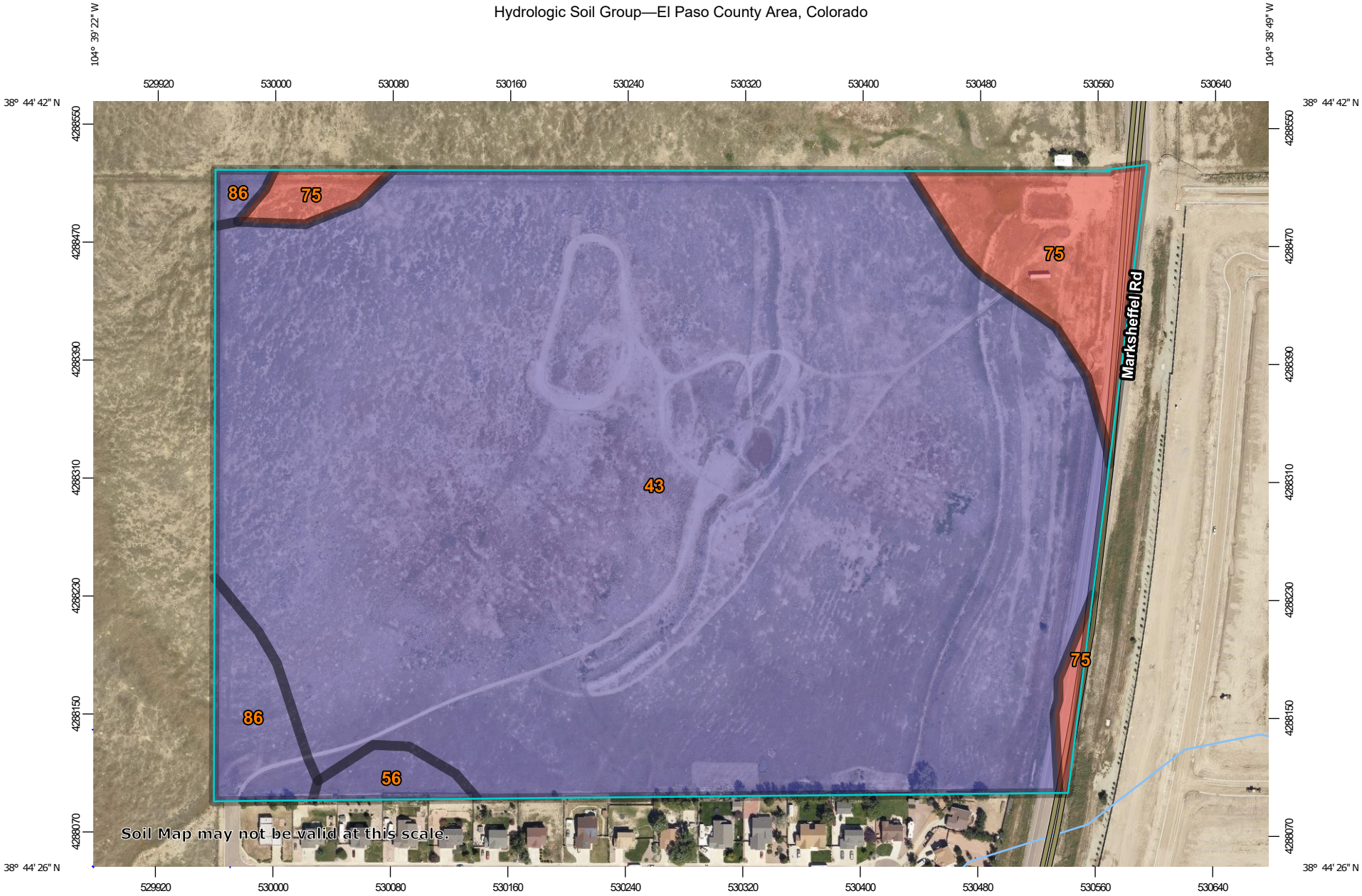


FIGURE 1
VICINITY MAP
PEACEFUL RIDGE at
FOUNTAIN VALLEY SUBDIVISION



Map Scale: 1:3,660 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

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

Date(s) aerial images were photographed: Aug 14, 2018—Sep 23, 2018

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
43	Kim loam, 1 to 8 percent slopes	B	57.0	88.9%
56	Nelson-Tassel fine sandy loams, 3 to 18 percent slopes	B	0.7	1.1%
75	Razor-Midway complex	D	4.5	7.0%
86	Stoneham sandy loam, 3 to 8 percent slopes	B	1.9	3.0%
Totals for Area of Interest			**64.1**	**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.

NOTES TO USERS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

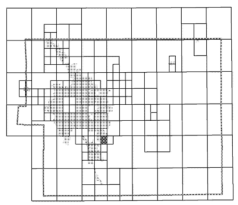
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

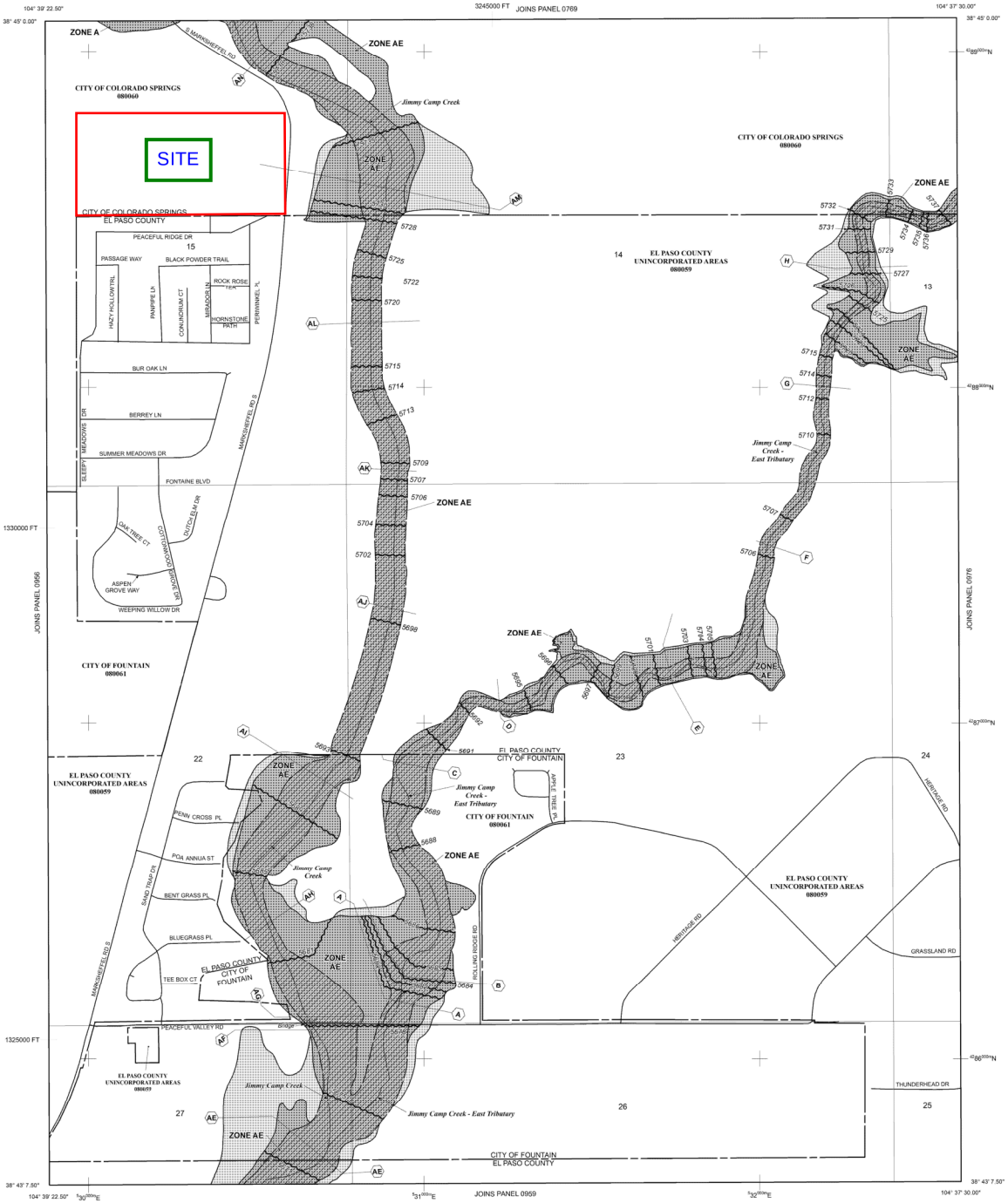
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



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

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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 15 SOUTH, RANGE 65 WEST.

LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

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

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

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

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

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0957G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 957 OF 1300
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0957	G
EL PASO COUNTY	080059	0957	G
FOUNTAIN, CITY OF	080061	0957	G

Notice: This map was released on 05/15/2020 to make a correction.This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

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

MAP NUMBER
08041C0957G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX B – HYDROLOGIC CALCULATIONS

HRGreen	**PEACEFUL RIDGE**	**Calc'd by:**	**NQJ**
	PROPOSED CONDITIONS	**Checked by:**	**CM**
	EL PASO COUNTY, COLORADO	**Date:**	**6/28/2023**

SUMMARY RUNOFF TABLE

BASIN	AREA (ac)	% IMP.	Q_5 (cfs)	Q_{100} (cfs)
A0	1.73	44	4.4	8.7
A0.1	0.91	44	2.2	4.4
A1	2.62	44	5.0	10.0
A2	3.61	44	6.9	13.9
B1	4.88	44	11.0	22.0
B2	4.68	44	9.6	19.3
B2.1	1.29	44	2.8	5.7
B3	4.88	44	9.4	19.0
B4	4.66	44	9.8	19.6
B5	5.93	44	11.9	23.9
B6	2.38	44	4.9	9.7
B7	4.19	44	8.2	16.4
B8	1.14	44	2.5	5.0
B9	2.44	44	4.8	9.6
B10	1.47	44	2.6	5.3
B11	1.39	44	3.7	7.4
C1	3.85	44	7.9	15.9
OSD1	0.69	2	0.2	1.5
D1	2.73	44	5.4	10.9
D2	1.33	44	2.4	4.9
D3	1.27	44	2.3	4.6
D4	0.92	41	1.5	3.6
D5	2.40	51	3.3	7.3
D6	0.17	100	0.8	1.4
D7	0.16	100	0.7	1.3
D8	0.32	69	1.1	2.1
OS1	3.05	2	1.4	9.5
JC5	7.48	61	10.8	23.5

DESIGN POINT SUMMARY TABLE

DESIGN POINT	CONTRIBUTING BASINS	ΣQ_5 (cfs)	ΣQ_{100} (cfs)
1	A0	4.4	8.7
3	A1	5.0	10.0
4	A2	6.9	13.9
4.1	DP3 & DP4	11.5	20.7
5	B1	4.4	22.0
5.1	DP3-DP5	20.1	35.8
7	OS1	1.4	9.5
8	C1 & DP7	7.9	15.9
9	B8	2.5	5.0
10	B6	4.9	9.7
10.1	DP8 & DP10	13.5	27.4
11	B7	10.4	21.5
11.1	DP10.1 & DP11	23.5	44.3
12	B5	11.9	23.9
12.1	DP11.1 & DP12	34.4	62.5
13	B4	9.8	19.6
13.1	DP12.1 & DP13	42.7	77.2
14	B3	9.4	19.0
14.1	DP13.1 & DP14	51.8	92.2
15	B2	9.6	19.3
15.1	DP5.1 & DP15	27.5	47.9
16	B2.1	2.8	5.7
16.1	DP15.1 & DP16	30.2	66.2
17.1	DP14.1 & DP16.1	78.9	156.8
18	B9 & B10	2.6	5.3
18.1	DP17.1 & DP18	85.8	170.4
19	DP18.1 & B11	3.7	7.4
20	D1 & OSD1	5.1	11.2
21	D6 & JC5	10.8	23.5
21.1	DP21 & POND 3 OUT	21.8	87.0
22	DP21, D2, D4 & D7	13.5	125.4
22.1	DP21.1 & DP22	35.3	212.3
23	D3 & D5	5.0	10.9
24	D8	1.1	2.1

HRGreen	**PEACEFUL RIDGE**					**Calc'd by:**	**NQJ**	
	PROPOSED CONDITIONS					**Checked by:**	**CM**	
	EL PASO COUNTY, COLORADO					**Date:**	**6/28/2023**	

COMPOSITE 'C' FACTORS

BASIN	UNDEVELOPED	PAVED	RESIDENTIAL (4.5 DU/AC)	TOTAL	SOIL TYPE	UNDEVELOPED			PAVED			RESIDENTIAL (4.5 DU/AC)			COMPOSITE IMPERVIOUSNESS & C		
	ACRES					%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}	%I	C_5	C_{100}
A0	0.00	0.00	1.73	1.73	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
A0.1	0.00	0.00	0.91	0.91	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
A1	0.00	0.00	2.62	2.62	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
A2	0.00	0.00	3.61	3.61	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B1	0.00	0.00	4.88	4.88	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B2	0.00	0.00	4.68	4.68	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B2.1	0.00	0.00	1.29	1.29	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B3	0.00	0.00	4.88	4.88	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B4	0.00	0.00	4.66	4.66	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B5	0.00	0.00	5.93	5.93	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B6	0.00	0.00	2.38	2.38	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B7	0.00	0.00	4.19	4.19	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B8	0.00	0.00	1.14	1.14	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B9	0.00	0.00	2.44	2.44	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B10	0.00	0.00	1.47	1.47	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
B11	0.00	0.01	1.38	1.39	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
C1	0.00	0.00	3.85	3.85	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
OSD1	0.69	0.00	0.00	0.69	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	2	0.09	0.36
D1	0.00	0.00	2.73	2.73	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
D2	0.00	0.00	1.33	1.33	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
D3	0.00	0.00	1.27	1.27	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	44	0.51	0.61
D4	0.55	0.37	0.00	0.92	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	41	0.42	0.60
D5	1.20	1.20	0.00	2.40	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	51	0.50	0.66
D6	0.00	0.17	0.00	0.17	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	100	0.90	0.96
D7	0.00	0.16	0.00	0.16	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	100	0.90	0.96
D8	0.10	0.22	0.00	0.32	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	69	0.65	0.77
D9	0.45	0.36	0.47	1.28	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	45	0.47	0.62
OS1	3.05	0.00	0.00	3.05	B	2	0.09	0.36	100	0.90	0.96	44	0.51	0.61	2	0.09	0.36
JC5	BASIN JC5 PER BHMD MDDP BY MATRIX			7.48											61	0.58	0.75
POND				**52.46**											**41.6**		

HRGreen	**PEACEFUL RIDGE**	**Calc'd by:**	**NQJ**
	PROPOSED CONDITIONS	**Checked by:**	**CM**
	EL PASO COUNTY, COLORADO	**Date:**	**6/28/2023**

TIME OF CONCENTRATION

BASIN DATA			OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					TOTAL
DESIGNATION	C_5	AREA (ac)	LENGTH (ft)	SLOPE %	t_i (min)	C_V	LENGTH (ft)	SLOPE %	V (ft/s)	t_t (min)	t_c (min)
A0	0.51	1.73	25	25.0	1.8	20	1125	5.50	4.7	4.0	5.8
A0.1	0.51	0.91	85	10.0	4.6	20	530	5.40	4.6	1.9	6.5
A1	0.51	2.62	100	2.5	8.0	20	1450	5.50	4.7	5.2	13.1
A2	0.51	3.61	90	2.5	7.6	20	1450	5.50	4.7	5.2	12.7
B1	0.51	4.88	100	11.4	4.8	20	950	5.00	4.5	3.5	8.3
B2	0.51	4.68	100	3.3	7.3	20	665	2.65	3.3	3.4	10.7
B2.1	0.51	1.29	100	3.3	7.3	20	390	3.50	3.7	1.7	9.0
B3	0.51	4.88	55	2.5	5.9	20	1350	2.90	3.4	6.6	12.5
B4	0.51	4.66	100	3.4	7.2	20	500	2.00	2.8	2.9	10.1
B5	0.51	5.93	100	12.0	4.7	20	1280	2.60	3.2	6.6	11.3
B6	0.51	2.38	55	2.0	6.4	20	990	3.30	3.6	4.5	10.9
B7	0.51	4.19	100	2.5	8.0	20	950	3.30	3.6	4.4	12.3
B8	0.51	1.14	55	2.5	5.9	20	720	3.30	3.6	3.3	9.2
B9	0.51	2.44	55	2.5	5.9	20	1500	4.00	4.0	6.3	12.2
B10	0.51	1.47	55	2.5	5.9	20	1100	1.00	2.0	9.2	15.1
B11	0.51	1.39	25	25.0	1.8	20	300	1.00	2.0	2.5	5.0
C1	0.51	3.85	145	10.0	6.0	20	1000	3.30	3.6	4.6	10.6
OSD1	0.09	0.69	73	13.6	6.6	15	1680	4.60	3.2	8.7	15.3
D1	0.51	2.73	75	6.5	5.0	20	1500	3.60	3.8	6.6	11.6
D2	0.51	1.33	100	10.0	5.0	10	405	0.50	0.7	9.5	14.6
D3	0.51	1.27	100	10.0	5.0	10	405	0.50	0.7	9.5	14.6
D4	0.42	0.92	50	15.0	3.6	10	360	0.50	0.7	8.5	12.1
D5	0.50	2.40	50	15.0	3.2	10	930	0.50	0.7	21.9	25.1
D6	0.90	0.17	17	2.0	1.2	20	350	1.00	2.0	2.9	5.0
D7	0.90	0.16	17	2.0	1.2	20	350	1.00	2.0	2.9	5.0
D8	0.65	0.32	17	2.0	2.7	20	200	4.50	4.2	0.8	5.0
D9	0.47	1.28	50	2.0	6.5	10	350	1.00	1.0	5.8	12.3
OS1	0.09	3.05	5	600.0	0.5	10	400	6.00	2.4	2.7	5.0
JC5	0.58	7.48	BASIN OS2 PER BRADLEY RIDGE SUB. FIL NO. 1 FDR								

FORMULAS:

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \qquad V = C_v S_w^{0.5}$$

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

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

HRGreen

PEACEFUL RIDGE
PROPOSED CONDITIONS
DESIGN STORM: 5-YEAR

Calc'd by: NQJ
Checked by:
Date: 6/28/2023

4.93404729

			DIRECT RUNOFF						TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
STREET	DESIGN POINT	BASIN ID	AREA (ac)	C_5	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_5*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_5*A (ac)	SLOPE %	PIPE SIZE (FT)	LENGTH (FT)	VEL. (FPS)	TRAVEL TIME (min	
	1	A0	1.73	0.51	5.8	0.88	4.93	4.4					4.4	0.88	10.0								BASIN A0 FLOW OFFSITE TO NORTH, CAPTURED BY BRADLEY RIDGE STORM SEWER SYSTEM
		A0.1	0.91	0.51	6.5	0.46	4.77	2.2					2.2	0.46	10.0					295	6.3	0.78	BASIN A0.1 FLOW OFFSITE TO DP21
	3	A1	2.62	0.51	13.1	1.34	3.72	5.0								5.0	1.34	2.0	1.5	460	8.4	0.91	DP3 CAPTURED BY 20' TYPE R INLET, PIPE TO DP4.1
	4	A2	3.61	0.51	12.7	1.84	3.77	6.9								6.9	1.83	2.0	1.5	35	8.4	0.07	DP4 CAPTURED BY 15' TYPE R INLET, PIPE TO DP4.1
	4.1								14.0	3.17	3.62	11.5				11.5	3.17	2.0	2.0	400	10.2	0.65	DP4.1 FLOW, PIPE TO DP5.1
	5	B1	4.88	0.51	8.3	2.49	4.40	11.0	8.3	2.49	4.40	11.0				11.0	2.50	2.0	1.5				DP5 CAPTURED BY 20' TYPE R INLET, PIPE TO DP5.1
	5.1								14.7	5.67	3.55	20.1				20.1	5.67	2.5	2.5	520	13.2	0.66	DP5.1 FLOW, PIPE TO DP15.1
	7	OS1	3.05	0.09	5.0	0.27	5.17	1.4															BASIN OS1 FLOW INTO BASIN C1
	8	C1	3.85	0.51	10.6	1.96	4.04	7.9	10.6	2.24	4.04	9.0				9.0	2.24	2.0	1.5	455	8.4	0.90	DP8 CAPTURED BY 20' TYPE R INLET, PIPE TO DP11.1
	9	B8	1.14	0.51	9.2	0.58	4.25	2.5															BASIN B8 FLOW @ DP9, C&G FLOW TO DP11
		B7	4.19	0.51	12.3	2.14	3.82	8.2															BASIN B7 FLOW @ DP11
	10	B6	2.38	0.51	10.9	1.21	4.00	4.9								5.0	1.25	2.0	1.5	95	8.4	0.19	DP10 FLOW CAPTURED BY 10' TYPE R INLET, PIPE TO DP10.1
	10.1								11.5	3.45	3.91	13.5				13.5	3.45	2.0	1.5	90	8.4	0.18	DP10.1 FLOW, PIPE TO DP11.1
	11								12.3	2.72	3.82	10.4				10.4	2.72	2.0	1.5	28	8.4	0.06	DP11 FLOW CAPTURED BY 20' TYPE R INLET, PIPE TO DP11.1
	11.1								12.4	6.17	3.81	23.5				23.5	6.17	2.0	2.5	330	11.8	0.47	DP11.1 FLOW, PIPE TO DP12.1
	12	B5	5.93	0.51	11.3	3.02	3.94	11.9	11.3	3.02	3.94	11.9	0.1	0.03	4.0	11.8	2.99	2.0	1.5	480 28	4.0 8.4	2.00 0.06	DP12 BYPASS FLOW, C&G TO DP13 DP12 FLOW CAPTURED BY 20' TYPE R INLET, PIPE TO DP12.1
	12.1								12.8	9.16	3.75	34.4				34.4	9.16	4.0	2.5	530	16.7	0.53	COMBINED DP11.1 & DP12, PIPE TO DP13.1
	13	B4	4.66	0.51	10.1	2.38	4.11	9.8	10.1	2.41	4.11	9.9				9.9	2.41	2.0	1.5	30	8.4	0.06	DP13 FLOW CAPTURED BY 20' TYPE R INLET, PIPE TO DP13.1
	13.1								13.4	11.57	3.69	42.7				42.7	11.57	4.0	4.0	110	22.9	0.08	DP13.1 FLOW, PIPE TO DP14.1
	14	B3	4.88	0.51	12.5	2.49	3.79	9.4	12.5	2.49	3.79	9.4				9.4	2.49	2.0	1.5	30	8.4	0.06	B14 CAPTURED BY 20' TYPE R INLET, PIPE TO DP14.1
	14.1								13.5	14.06	3.68	51.8				51.8	14.06	4.0	5.0	290	26.5	0.18	DP14.1 FLOW, PIPE TO DP17.1
	15	B2	4.68	0.51	10.7	2.39	4.03	9.6	10.7	2.39	4.03	9.6	0.7	0.18	2.0	8.9	2.21	2.0	1.5	295 30	2.8 8.4	1.74 0.06	DP15 BYPASS, C&G FLOW TO DP16 DP15 CAPTURED BY 15' TYPE R INLET, PIPE TO DP15.1
	15.1								15.3	7.87	3.49	27.5				27.5	7.87	2.0	4.5	180	17.5	0.17	DP15.1 FLOW, PIPE TO DP16.1
	16	B2.1	1.29	0.51	9.0	0.66	4.29	2.8	12.5	0.84	3.79	3.2				3.2	0.84	2.0	1.5	5	8.4	0.01	DP16 CAPTURED BY 15' TYPE R SUMP INLET, PIPE TO DP16.1
	16.1								15.5	8.71	3.47	30.2				30.2	8.71	2.0	5.5	46	20.0	0.04	DP16.1 FLOW, PIPE TO DP17.1
	17.1								15.6	22.77	3.47	78.9				78.9	22.77	2.0	6.0	31	21.2	0.02	DP17.1 FLOW, PIPE TO DP18.1

HRGreen

PEACEFUL RIDGE
PROPOSED CONDITIONS
DESIGN STORM: 5-YEAR

Calc'd by: NQJ
Checked by:
Date: 6/28/2023

4.93404729

			DIRECT RUNOFF						TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
STREET	DESIGN POINT	BASIN ID	AREA (ac)	C_5	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_5*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_5*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_5*A (ac)	SLOPE %	PIPE SIZE (FT)	LENGTH (FT)	VEL. (FPS)	TRAVEL TIME (min	
		B9	2.44	0.51	12.2	1.24	3.84	4.8															BASIN B9 FLOW @ DP18
	18	B10	1.47	0.51	15.1	0.75	3.51	2.6	15.1	1.99	3.51	7.0				7.0	1.99						DP18 CAPTURED BY 15' TYPE R SUMP INLET, PIPE TO DP18.1
	18.1								15.6	24.77	3.46	85.8											DP18.1 FLOW, PIPE TO DP19
	19	B11	1.39	0.51	5.0	0.71	5.17	3.7	15.6	25.48	3.46	88.3											TOTAL FLOW ENTERING ON-SITE WQ & DETENTION POND
		OSD1	0.69	0.09	15.3	0.06	3.49	0.2															BASIN 0SD1 FLOW INTO SWALE D1 TO DP20
		D1	2.73	0.51	11.6	1.39	3.91	5.4															BASIN D1 FLOW INTO SWALE D1 TO DP20
	20								15.3	1.45	3.49	5.1											DP20, FOLLOW HISTORIC DRAINAGE PATTERNS IN REAR LOT SWALE D-1
		D2	1.33	0.51	14.6	0.68	3.56	2.4															BASIN D2 FLOW @ DP22
		D3	1.27	0.51	14.6	0.65	3.56	2.3															BASIN D3 FLOW @ DP23
		D4	0.92	0.42	12.1	0.38	3.85	1.5															BASIN D4 FLOW @ DP22
		D5	2.40	0.50	25.1	1.19	2.75	3.3															BASIN D5 FLOW @ DP23
		D6	0.17	0.90	5.0	0.15	5.17	0.8															BASIN D6 FLOW @ DP21
		D7	0.16	0.90	5.0	0.14	5.17	0.7															BASIN D7 FLOW @ DP22
	21	JC5	7.48	0.58	-	-	-	10.8				13.8											DP21 FLOW (BASIN A0.1, D6 & JC5) CAPTURED BY TYPE C INLET, PIPE TO DP21.1
	21.1											21.8											COMBINED DP21 & POND 3 DISCHARGE, PIPE TO DP22.1 (EX STORM SEWER)
	22								14.6	1.20	3.56	13.5											DP22 FLOW, CAPTURED BY EX 7' X 4' RCBC, PIPE TO EX STORM SEWER
	22.1											35.3											DP22.2 FLOW, EX STORM SEWER FLOW EAST TO JIMMY CAMP CREEK
	23								25.1	1.84	2.75	5.0											DP23 FLOW, FOLLOW HISTORIC DRAINAGE PATTERNS IN ROADSIDE DITCH ALONG MARKSHEFFEL
	24	D8	0.32	0.65	5.0	0.21	5.17	1.1	5.0	0.21	5.17	1.1											DP24 FLOW, FLOW SOUTH OFFSITE TO SLEEPY MEADOWS DRIVE C&G

HRGreen

PEACEFUL RIDGE

PROPOSED CONDITIONS

DESIGN STORM: 100-YEAR

Calc'd by: NQJ

Checked by:

Date: 6/28/2023

			DIRECT RUNOFF						TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
STREET		BASIN ID	AREA (ac)	C_{100}	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_{100}*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_{100}*A (ac)	SLOPE %	PIPE SIZE (ft)	LENGTH (ft)	VEL. (ft/s)	TRAVEL TIME (min)	
	1	A0	1.73	0.61	5.8	1.06	8.28	8.7					8.7	1.06	10.0								BASIN A0 FLOW OFFSITE TO NORTH, CAPTURED BY BRADLEY RIDGE STORM SEWER SYSTEM
		A0.1	0.91	0.61	6.5	0.56	8.01	4.4					4.4	0.56	10.0					295	6.3	0.78	BASIN A0.1 FLOW OFFSITE TO DP21
	3	A1	2.62	0.61	13.1	1.60	6.25	10.0								10.0	1.60	2.0	1.5	460	8.4	0.91	DP3 CAPTURED BY 20' TYPE R INLET, PIPE TO DP4.1
	4	A2	3.61	0.61	12.7	2.20	6.33	13.9					2.5	0.40	2.0	11.4	1.80	2.0	1.5	350	2.8	2.06	DP4 BYPASS FLOW, C&G FLOW TO DP5
																				35	8.4	0.07	DP4 CAPTURED BY 15' TYPE R INLET, PIPE TO DP4.1
	4.1								14.0	3.40	6.08	20.7				20.7	3.40	2.0	2.0	400	10.2	0.65	DP4.1 FLOW, PIPE TO DP5.1
	5	B1	4.88	0.61	8.3	2.98	7.39	22.0	8.3	3.38	7.39	25.0	5.8	0.78	2.0	19.2	2.60	2.0	1.5	670	2.8	3.95	DP5 BYPASS FLOW, C&G FLOW TO DP15
																							DP5 CAPTURED BY 20' TYPE R INLET, PIPE TO DP5.1
	5.1								14.7	6.00	5.96	35.8				35.8	6.00	2.5	2.5	520	13.2	0.66	DP5.1 FLOW, PIPE TO DP15.1
	7	OS1	3.05	0.36	5.0	1.10	8.68	9.5															BASIN OS1 FLOW INTO BASIN C1
													5.0	0.73	2.0								DP8 BYPASS FLOW, C&G FLOW TO DP24
	8	C1	3.85	0.61	10.6	2.35	6.78	15.9	10.6	3.45	6.78	23.4				18.4	2.71	2.0	1.5	455	8.4	0.90	DP8 CAPTURED BY 20' TYPE R INLET, PIPE TO DP11.1
	9	B8	1.14	0.61	9.2	0.70	7.14	5.0															BASIN B8 FLOW @ DP9, C&G FLOW TO DP11
		B7	4.19	0.61	12.3	2.56	6.41	16.4															BASIN B7 FLOW @ DP11
													0.7	0.11	2.0					50	2.8	0.29	DP10 BYPASS FLOW, C&G FLOW TO DP11
	10	B6	2.38	0.61	10.9	1.45	6.71	9.7								9.0	1.34	2.0	1.5	95	8.4	0.19	DP10 FLOW CAPTURED BY 10' TYPE R INLET, PIPE TO DP10.1
	10.1								11.5	4.17	6.57	27.4				27.4	4.17	2.0	1.5	90	8.4	0.18	DP10.1 FLOW, PIPE TO DP11.1
													3.8	0.60	4.0					280	4.0	1.17	DP10 BYPASS FLOW, C&G TO DP12
	11								12.3	3.36	6.41	21.5				17.7	2.76	2.0	1.5	28	8.4	0.06	DP11 FLOW CAPTURED BY 20' TYPE R INLET, PIPE TO DP11.1
	11.1								12.4	6.93	6.39	44.3				44.3	6.93	2.0	2.5	330	11.8	0.47	DP11.1 FLOW, PIPE TO DP12.1
													6.2	1.01	4.0					480	4.0	2.00	DP12 BYPASS FLOW, C&G TO DP13
	12	B5	5.93	0.61	11.3	3.62	6.62	23.9	13.5	4.22	6.18	26.0				19.8	3.21	2.0	1.5	28	8.4	0.06	DP12 FLOW CAPTURED BY 20' TYPE R INLET, PIPE TO DP12.1
	12.1								13.6	10.14	6.17	62.5				62.5	10.14	4.0	2.5	530	16.7	0.53	COMBINED DP11.1 & DP12, PIPE TO DP13.1
													4.3	0.73	4.0					110	4.0	0.46	DP13 BYPASS, C&G TO DP14
	13	B4	4.66	0.61	10.1	2.84	6.90	19.6	15.5	3.85	5.83	22.5				18.2	3.12	2.0	1.5	30	8.4	0.06	DP13 FLOW CAPTURED BY 20' TYPE R INLET, PIPE TO DP13.1
	13.1								15.6	13.26	5.82	77.2				77.2	13.26	4.0	4.0	110	22.9	0.08	DP13.1 FLOW, PIPE TO DP14.1
													3.7	0.94	2.0					295	2.8	1.74	B14 BYPASS, C&G TO DP16
	14	B3	4.88	0.61	12.5	2.98	6.37	19.0	16.0	3.71	5.76	21.3				17.6	2.76	2.0	1.5	30	8.4	0.06	B14 CAPTURED BY 20' TYPE R INLET, PIPE TO DP14.1
	14.1								16.0	16.02	5.76	92.2				92.2	16.02	4.0	5.0	290	26.5	0.18	DP14.1 FLOW, PIPE TO DP17.1
													8.5	1.45	2.0					295	2.8	1.74	DP15 BYPASS, C&G FLOW TO DP16
	15	B2	4.68	0.61	10.7	2.85	6.77	19.3	12.3	3.63	6.41	23.3				14.8	2.19	2.0	1.5	30	8.4	0.06	DP15 CAPTURED BY 15' TYPE R INLET, PIPE TO DP15.1
	15.1								15.3	8.19	5.85	47.9				47.9	8.19	2.0	4.5	180	17.5	0.17	DP15.1 FLOW, PIPE TO DP16.1
	16	B2.1	1.29	0.61	9.0	0.79	7.20	5.7	17.7	3.18	5.49	17.5				17.5	3.18	2.0	1.5	5	8.4	0.01	DP16 CAPTURED BY 15' TYPE R SUMP INLET, PIPE TO DP16.1
	16.1								15.5	11.36	5.83	66.2				66.2	11.36	2.0	5.5	46	20.0	0.04	DP16.1 FLOW, PIPE TO DP17.1
	17.1								16.1	27.38	5.73	156.8				156.8	27.38	2.0	6.0	31	21.2	0.02	DP17.1 FLOW, PIPE TO DP18.1

HRGreen

PEACEFUL RIDGE

PROPOSED CONDITIONS

DESIGN STORM: 100-YEAR

Calc'd by: NQJ

Checked by:

Date: 6/28/2023

			DIRECT RUNOFF						TOTAL RUNOFF				OVERLAND			PIPE				TRAVEL TIME			REMARKS
STREET		BASIN ID	AREA (ac)	C_{100}	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	t_c (min)	C_{100}*A (ac)	I (in./ hr.)	Q (cfs)	Q_{street} (cfs)	C_{100}*A (ac)	SLOPE %	Q_{PIPE} (cfs)	C_{100}*A (ac)	SLOPE %	PIPE SIZE (ft)	LENGTH (ft)	VEL. (ft/s)	TRAVEL TIME (min)	
		B9	2.44	0.61	12.2	1.49	6.44	9.6															BASIN B9 FLOW @ DP18
	18	B10	1.47	0.61	15.1	0.90	5.90	5.3	15.1	2.39	5.90	14.1				14.1	2.39						DP18 CAPTURED BY 15' TYPE R SUMP INLET, PIPE TO DP18.1
	18.1								16.2	29.77	5.72	170.4											DP18.1 FLOW, PIPE TO DP19
	19	B11	1.39	0.61	5.0	0.85	8.68	7.4	16.2	30.62	5.72	175.2											TOTAL FLOW ENTERING ON-SITE WQ & DETENTION POND
		OSD1	0.69	0.36	15.3	0.25	5.86	1.5															BASIN 0SD1 FLOW INTO SWALE D1 TO DP20
		D1	2.73	0.61	11.6	1.67	6.56	10.9															BASIN D1 FLOW INTO SWALE D1 TO DP20
	20								15.3	1.91	5.86	11.2											DP20 FLOW (SWALE D-1)
		D2	1.33	0.61	14.6	0.81	5.98	4.9															BASIN D2 FLOW @ DP22
		D3	1.27	0.61	14.6	0.77	5.98	4.6															BASIN D3 FLOW @ DP23
		D4	0.92	0.60	12.1	0.55	6.46	3.6															BASIN D4 FLOW @ DP22
		D5	2.40	0.66	25.1	1.58	4.61	7.3															BASIN D5 FLOW @ DP23
		D6	0.17	0.96	5.0	0.16	8.68	1.4															BASIN D6 FLOW @ DP21
		D7	0.16	0.96	5.0	0.15	8.68	1.3															BASIN D7 FLOW @ DP22
	21	JC5	7.48	0.75	-	-	-	23.5				29.4											DP21 FLOW (D6 & JC5) CAPTURED BY TYPE C INLET, PIPE TO DP21.1
	21.1											87.0											COMBINED DP21 & POND 3 DISCHARGE, PIPE TO DP22.1 (EX STORM SEWER)
	22								14.6	1.52	5.98	125.4											DP22 FLOW, CAPTURED BY EX 7' X 4' RCBC, PIPE TO EX STORM SEWER
	22.1											212.3											DP22.2 FLOW, EX STORM SEWER FLOW EAST TO JIMMY CAMP CREEK
	23								25.1	2.36	4.61	10.9											DP23 FLOW, FOLLOW HISTORIC DRAINAGE PATTERNS IN ROADSIDE DITCH ALONG MARKSHEFFEL
	24	D8	0.32	0.77	5.0	0.25	8.68	2.1	10.6	0.98	6.78	6.6											DP24 FLOW, FLOW SOUTH OFFSITE TO SLEEPY MEADOWS DRIVE C&G

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer: N. JOKERST
Company: HR GREEN
Date: May 2, 2023
Project: Peaceful Ridge IRF BASINS: A-0, A0.1, D-1, D-2 & D-3)
Location: Widefield, CO

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	SPA	SPA	UIA:RPA	UIA:RPA	SPA	SPA	UIA:RPA	UIA:RPA	SPA	SPA
Area ID	A-0-a	A-0-b	0-a	0-b	D-1-a	D-1-b	1-a	1-b	D-2-a	D-3-a	2-a	3-a
Downstream Design Point ID	1	21	1	21	20	20	20	20	22	23	22	23
Downstream BMP Type	None	None	None	None	None	None	None	None	None	None	None	None
DCIA (ft^2)	--	--	--	--	--	--	--	--	--	--	--	--
UIA (ft^2)	27,291	10,338	--	--	14,200	11,697	--	--	17,748	14,616	--	--
RPA (ft^2)	27,504	23,001	--	--	14,416	14,415	--	--	27,934	24,986	--	--
SPA (ft^2)	--	--	27,504	6,564	--	--	13,314	12,415	--	--	11,116	15,399
HSG A (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HSG B (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HSG C/D (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Average Slope of RPA (ft/ft)	0.020	0.080	--	--	0.250	0.200	--	--	0.200	0.200	--	--
UIA:RPA Interface Width (ft)	930.00	470.00	--	--	615.00	625.00	--	--	384.00	430.00	--	--

CALCULATED RUNOFF RESULTS

Area ID	A-0-a	A-0-b	0-a	0-b	D-1-a	D-1-b	1-a	1-b	D-2-a	D-3-a	2-a	3-a
UIA:RPA Area (ft^2)	54,795	33,339	--	--	28,616	26,112	--	--	45,682	39,602	--	--
L / W Ratio	0.06	0.15	--	--	0.08	0.07	--	--	0.31	0.21	--	--
UIA / Area	0.4981	0.3101	--	--	0.4962	0.4480	--	--	0.3885	0.3691	--	--
Runoff (in)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Runoff (ft^3)	0	0	0	0	0	0	0	0	0	0	0	0
Runoff Reduction (ft^3)	1137	431	1375	328	592	487	666	621	740	609	556	770

CALCULATED WQCV RESULTS

Area ID	A-0-a	A-0-b	0-a	0-b	D-1-a	D-1-b	1-a	1-b	D-2-a	D-3-a	2-a	3-a
WQCV (ft^3)	1137	431	0	0	592	487	0	0	740	609	0	0
WQCV Reduction (ft^3)	1137	431	0	0	592	487	0	0	740	609	0	0
WQCV Reduction (%)	100%	100%	0%	0%	100%	100%	0%	0%	100%	100%	0%	0%
Untreated WQCV (ft^3)	0	0	0	0	0	0	0	0	0	0	0	0

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

Downstream Design Point ID	1	21	1	21	20	20	20	20	22	23	22	23
DCIA (ft^2)	0	0	0	0	0	0	0	0	0	0	0	0
UIA (ft^2)	27,291	10,338	27,291	10,338	25,897	25,897	25,897	25,897	17,748	14,616	17,748	14,616
RPA (ft^2)	27,504	23,001	27,504	23,001	28,831	28,831	28,831	28,831	27,934	24,986	27,934	24,986
SPA (ft^2)	27,504	6,564	27,504	6,564	25,729	25,729	25,729	25,729	11,116	15,399	11,116	15,399
Total Area (ft^2)	82,299	39,903	82,299	39,903	80,457	80,457	80,457	80,457	56,798	55,001	56,798	55,001
Total Impervious Area (ft^2)	27,291	10,338	27,291	10,338	25,897	25,897	25,897	25,897	17,748	14,616	17,748	14,616
WQCV (ft^3)	1,137	431	1,137	431	1,079	1,079	1,079	1,079	740	609	740	609
WQCV Reduction (ft^3)	1,137	431	1,137	431	1,079	1,079	1,079	1,079	740	609	740	609
WQCV Reduction (%)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Untreated WQCV (ft^3)	0	0	0	0	0	0	0	0	0	0	0	0

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

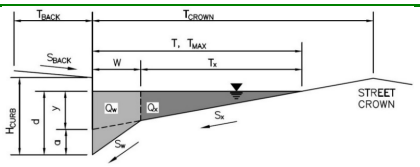
Total Area (ft^2)	789,829
Total Impervious Area (ft^2)	243,573
WQCV (ft^3)	3,995
WQCV Reduction (ft^3)	3,995
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0

APPENDIX C – HYDRAULIC CALCULATIONS

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

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

Project: **PEACEFUL RIDGE**
Inlet ID: **DP3**



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

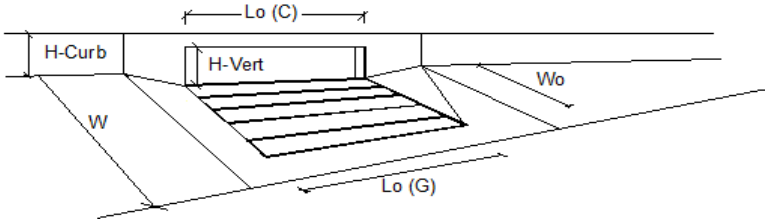
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.3**	**23.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 5.00 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 10.00 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



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')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**5.0**	**10.0**	**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**	**%**

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP3	DP4	DP5
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	5.0	6.9	11.0
Major Q_{Known} (cfs)	10.0	13.9	25.0

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

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**5.0**	**6.9**	**11.0**
Major Total Design Peak Flow, Q (cfs)	**10.0**	**13.9**	**25.0**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	0.0	2.5	5.8

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP8	DP10	DP11
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	9.0	4.9	10.4
Major Q_{Known} (cfs)	22.9	9.7	21.5

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**9.0**	**4.9**	**10.4**
Major Total Design Peak Flow, Q (cfs)	**22.9**	**9.7**	**21.5**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.0	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	4.5	0.7	3.8

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP12	DP13	DP14
Site Type (Urban or Rural)	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	11.9	9.9	9.4
Major Q_{Known} (cfs)	26.0	22.5	21.3

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0	0.0	0.0

Watershed Characteristics

Subcatchment Area (acres)			
Percent Impervious			
NRCS Soil Type			

Watershed Profile

Overland Slope (ft/ft)			
Overland Length (ft)			
Channel Slope (ft/ft)			
Channel Length (ft)			

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)			
One-Hour Precipitation, P_1 (inches)			

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**11.9**	**9.9**	**9.4**
Major Total Design Peak Flow, Q (cfs)	**26.0**	**22.5**	**21.3**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.1	0.0	0.0
Major Flow Bypassed Downstream, Q_b (cfs)	6.2	4.3	3.7

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INLET MANAGEMENT

Worksheet Protected

INLET NAME	DP15
Site Type (Urban or Rural)	URBAN
Inlet Application (Street or Area)	STREET
Hydraulic Condition	On Grade
Inlet Type	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	9.6
Major Q_{Known} (cfs)	23.3

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.0
Major Bypass Flow Received, Q_b (cfs)	0.0

Watershed Characteristics

Subcatchment Area (acres)	
Percent Impervious	
NRCS Soil Type	

Watershed Profile

Overland Slope (ft/ft)	
Overland Length (ft)	
Channel Slope (ft/ft)	
Channel Length (ft)	

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

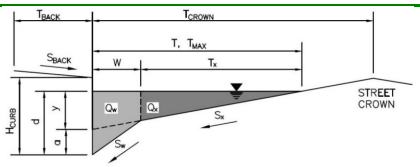
CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**9.6**
Major Total Design Peak Flow, Q (cfs)	**23.3**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.7
Major Flow Bypassed Downstream, Q_b (cfs)	8.5

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

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

Project: **PEACEFUL RIDGE**
Inlet ID: **DP4**



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	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} =	5.6	7.2	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} =**	**16.3**	**23.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 6.90 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 13.90 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

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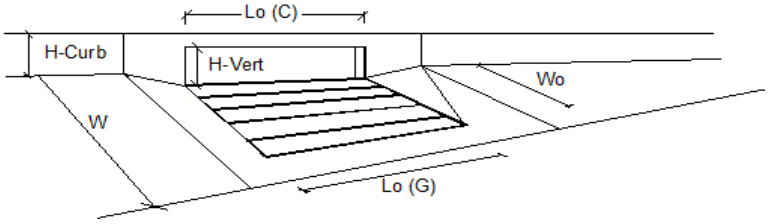


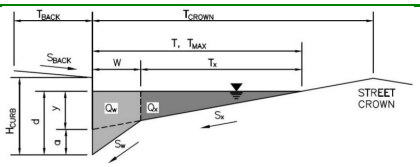
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**6.9**	**11.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.5**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**82**	**%**

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

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

Project: **PEACEFUL RIDGE**
Inlet ID: **DP5**



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.022	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

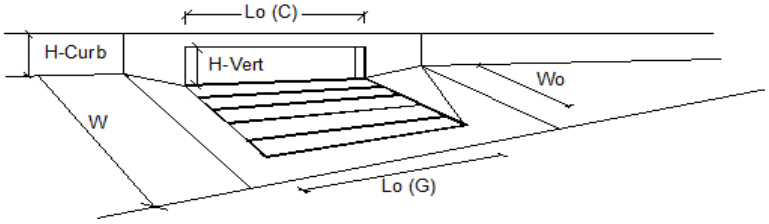
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.1**	**28.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 11.00 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 25.00 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



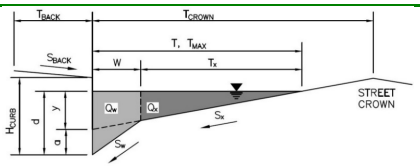
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**11.0**	**19.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**5.8**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**77**	**%**

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

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

Project: **PEACEFUL RIDGE**
Inlet ID: **DP8**



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.033	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

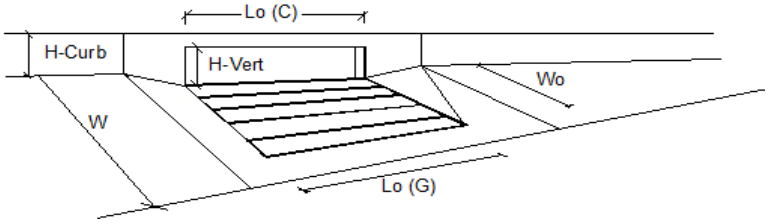
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**17.2**	**25.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 9.00 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 22.90 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



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')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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	

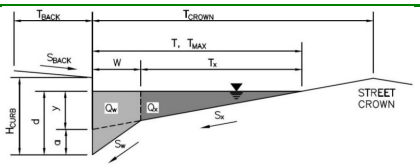
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**9.0**	**18.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.5**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**80**	**%**

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **PEACEFUL RIDGE**
Inlet ID: **DP10**



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.022	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

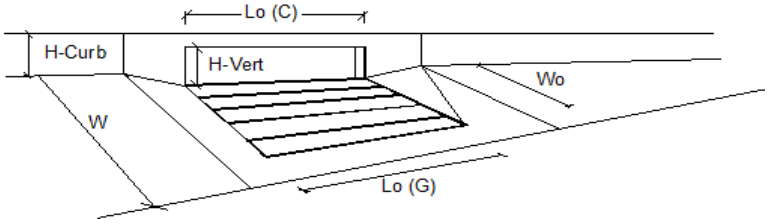
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.1**	**28.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.90 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 9.70 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



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')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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	

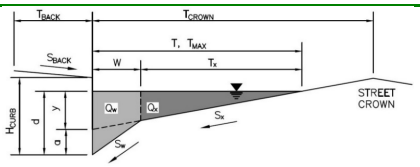
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.9**	**9.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.7**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**93**	**%**

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **PEACEFUL RIDGE**
Inlet ID: **DP11**



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

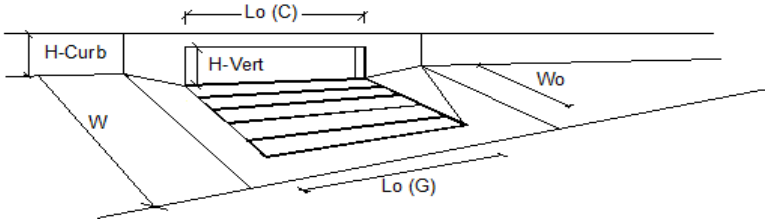
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.3**	**23.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 10.40 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 21.50 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



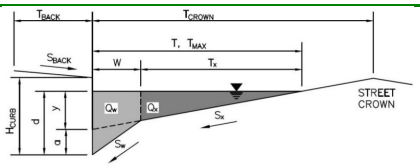
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**10.4**	**17.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**3.8**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**82**	**%**

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

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

Project: PEACEFUL RIDGE
Inlet ID: DP12



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

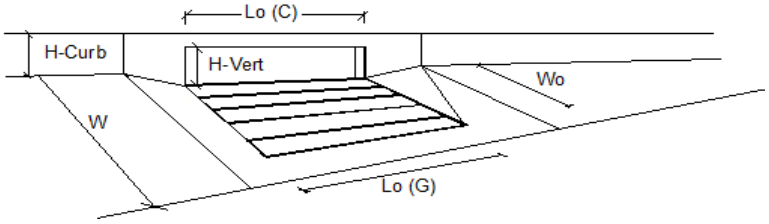
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.6	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.3**	**27.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 11.90 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 26.00 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



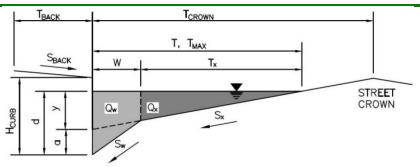
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**11.8**	**19.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**6.2**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**99**	**76**	**%**

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

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

Project: PEACEFUL RIDGE
Inlet ID: DP13



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

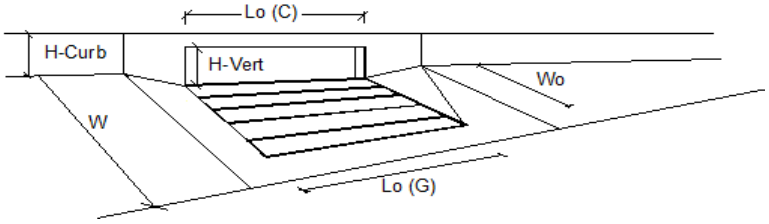
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.6	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.3**	**27.9**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 9.90 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 22.50 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



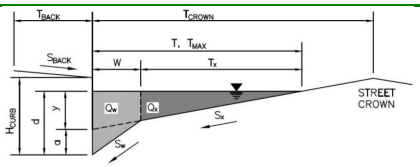
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**9.9**	**18.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.3**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**81**	**%**

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

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

Project: PEACEFUL RIDGE
Inlet ID: DP14



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

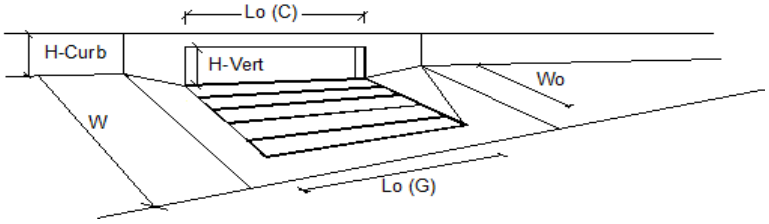
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.3**	**23.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 9.40 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 21.30 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



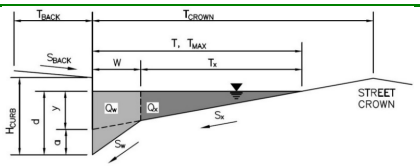
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	4	4	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**9.4**	**17.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**3.7**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**83**	**%**

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

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

Project: PEACEFUL RIDGE
Inlet ID: DP15



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 =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.011	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

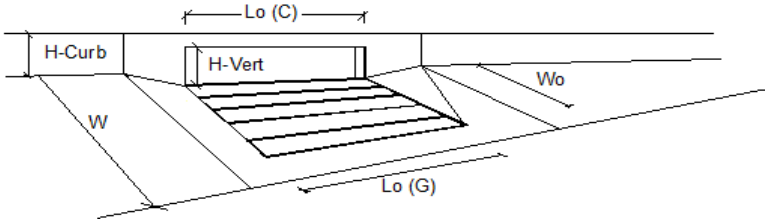
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	7.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☑	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**11.4**	**25.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 9.60 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 23.30 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

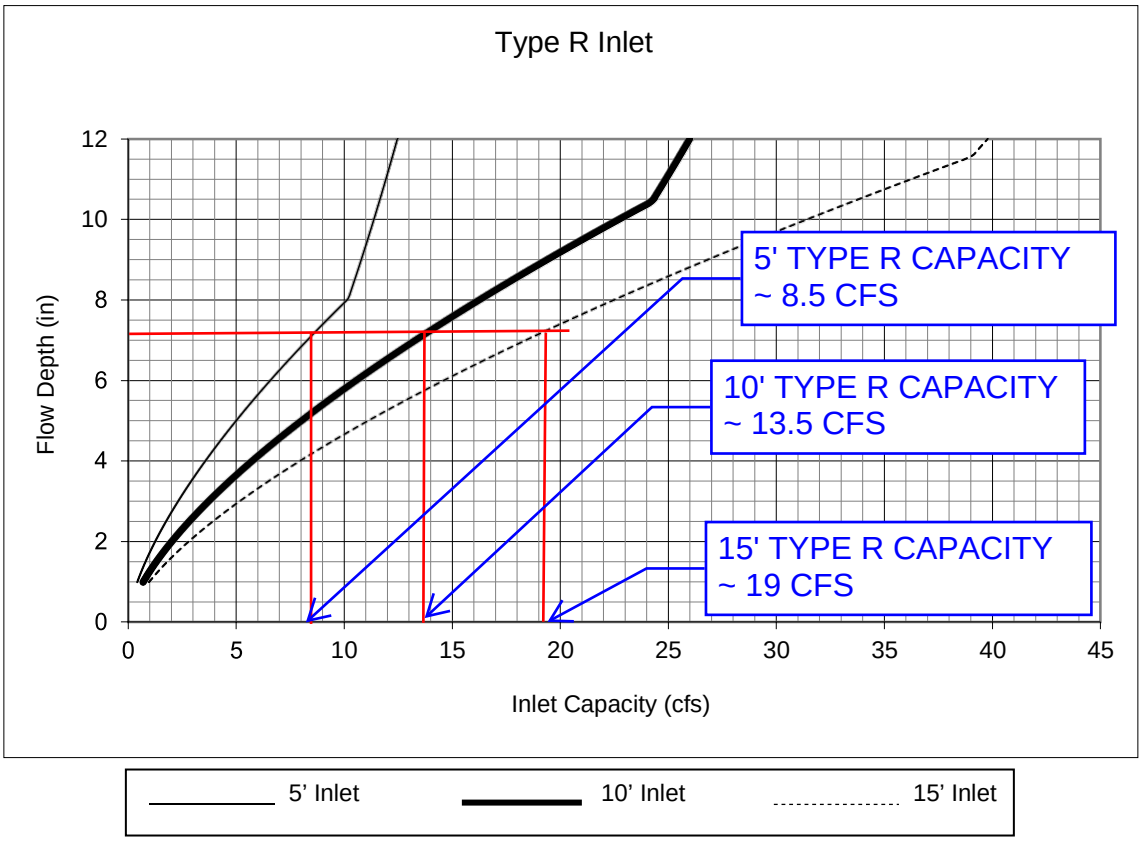
MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	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 =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	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 =**	**8.9**	**14.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.7**	**8.5**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**93**	**64**	**%**

Figure 8-11. Inlet Capacity Chart Sump Conditions , Curb Opening (Type R) Inlet



PEACEFUL RIDGE SUMP INLETS:

DP16 Q100 = 17.5 CFS -> 15' TYPE R SUMP INLET

DP18 Q100 = 14.1 CFS -> 15' TYPE R SUMP INLET

Notes:

1. The standard inlet parameters must apply to use this chart.

5-YEAR SCENARIO

Conduit FlexTable: Combined Pipe/Node Report

Label	Upstream Structure	Diameter (in)	Length (Unified) (ft)	Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
CO-1	DP22		125.9	13.30	6.60	5,727.50	5,725.04	0.020	5,727.98	5,725.33	5,732.81	5,731.30
CO-2	EX-INLET		24.1	13.30	7.23	5,724.95	5,724.32	0.026	5,725.43	5,724.60	5,731.30	5,731.87
CO-3	EX-BOX	48.0	390.0	13.30	5.23	5,723.69	5,722.07	0.004	5,724.76	5,723.75	5,731.87	5,735.51
CO-4	DP22.2	60.0	380.6	34.70	8.44	5,721.32	5,718.35	0.008	5,722.96	5,719.66	5,735.51	5,729.35
CO-5	EX-MH-3	48.0	21.0	21.40	9.84	5,722.24	5,721.89	0.017	5,723.60	5,723.75	5,735.60	5,735.51
CO-7	MH-8	42.0	105.3	9.60	13.06	5,738.91	5,731.59	0.070	5,739.85	5,732.04	5,744.61	5,741.60
CO-8	MH-9	42.0	153.6	9.60	6.60	5,731.39	5,729.85	0.010	5,732.33	5,731.22	5,741.60	5,738.51
CO-9	DP21.1	48.0	117.5	21.40	10.50	5,729.35	5,727.00	0.020	5,730.71	5,727.88	5,738.51	5,735.60
CO-10	DP21	24.0	20.7	10.80	11.88	5,732.19	5,731.35	0.041	5,733.37	5,732.13	5,738.90	5,738.51
CO-12	EX-MH-1	60.0	335.7	34.70	6.83	5,718.18	5,716.73	0.004	5,719.82	5,718.26	5,729.35	5,722.00
P-1	DP18.1		15.8	85.70	10.58	5,732.29	5,732.17	0.008	5,734.58	5,734.23	5,739.17	5,737.00
P-2	DP17.1		31.0	78.90	9.39	5,732.57	5,732.39	0.006	5,734.76	5,734.68	5,739.10	5,739.17
P-3	DP14.1	42.0	279.1	51.70	13.71	5,739.34	5,733.65	0.020	5,741.59	5,735.10	5,746.39	5,739.10
P-4	DP13.1	36.0	95.4	42.70	16.59	5,743.53	5,739.84	0.039	5,745.66	5,742.58	5,750.10	5,746.39
P-5	DP12.1	36.0	485.1	34.30	16.20	5,764.29	5,743.53	0.043	5,766.19	5,746.66	5,770.81	5,750.10
P-6	DP11.1	30.0	280.3	23.40	14.27	5,775.71	5,764.79	0.039	5,777.36	5,767.03	5,782.64	5,770.81
P-7	DP10.1	24.0	59.7	13.50	11.32	5,778.00	5,776.21	0.030	5,779.32	5,778.09	5,785.02	5,782.64
P-8	MH-7	18.0	191.6	9.00	12.93	5,789.24	5,778.50	0.056	5,790.40	5,779.92	5,793.66	5,785.02
P-9	MH-8	18.0	156.1	9.00	10.57	5,794.49	5,789.44	0.032	5,795.65	5,790.17	5,799.68	5,793.66
P-10	DP8	18.0	43.0	9.00	8.81	5,795.45	5,794.59	0.020	5,796.61	5,795.47	5,800.15	5,799.68
P-11	DP14	18.0	29.0	9.40	8.96	5,741.93	5,741.34	0.020	5,743.11	5,742.58	5,746.66	5,746.39
P-12	DP13	18.0	29.5	9.90	9.00	5,745.62	5,745.03	0.020	5,746.83	5,746.66	5,750.37	5,750.10
P-13	DP12	18.0	29.5	11.80	9.33	5,766.38	5,765.79	0.020	5,767.69	5,766.86	5,771.08	5,770.81
P-14	DP11	18.0	29.5	10.40	14.43	5,778.21	5,776.21	0.068	5,779.45	5,778.09	5,782.91	5,782.64
P-15	MH9	18.0	59.0	5.00	7.58	5,779.68	5,778.50	0.020	5,780.54	5,779.92	5,785.63	5,785.02
P-16	DP10	18.0	29.0	5.00	7.58	5,780.56	5,779.98	0.020	5,781.42	5,780.61	5,784.83	5,785.63
P-17	DP16.1	42.0	39.7	30.20	7.11	5,732.85	5,732.65	0.005	5,735.71	5,735.70	5,739.25	5,739.10
P-18	MH-11	36.0	108.6	27.50	6.91	5,733.89	5,733.35	0.005	5,735.99	5,735.91	5,740.17	5,739.25
P-19	DP15.1	36.0	78.9	27.50	6.90	5,734.38	5,733.99	0.005	5,736.08	5,736.01	5,740.88	5,740.17
P-20	MH-13	36.0	259.7	20.10	7.72	5,736.54	5,734.38	0.008	5,737.98	5,736.78	5,743.22	5,740.88
P-21	DP5.1	30.0	264.2	20.10	8.59	5,739.93	5,737.04	0.011	5,741.45	5,738.24	5,745.60	5,743.22
P-22	MH-15	24.0	208.1	13.40	7.69	5,742.65	5,740.43	0.011	5,743.97	5,742.11	5,749.45	5,745.60

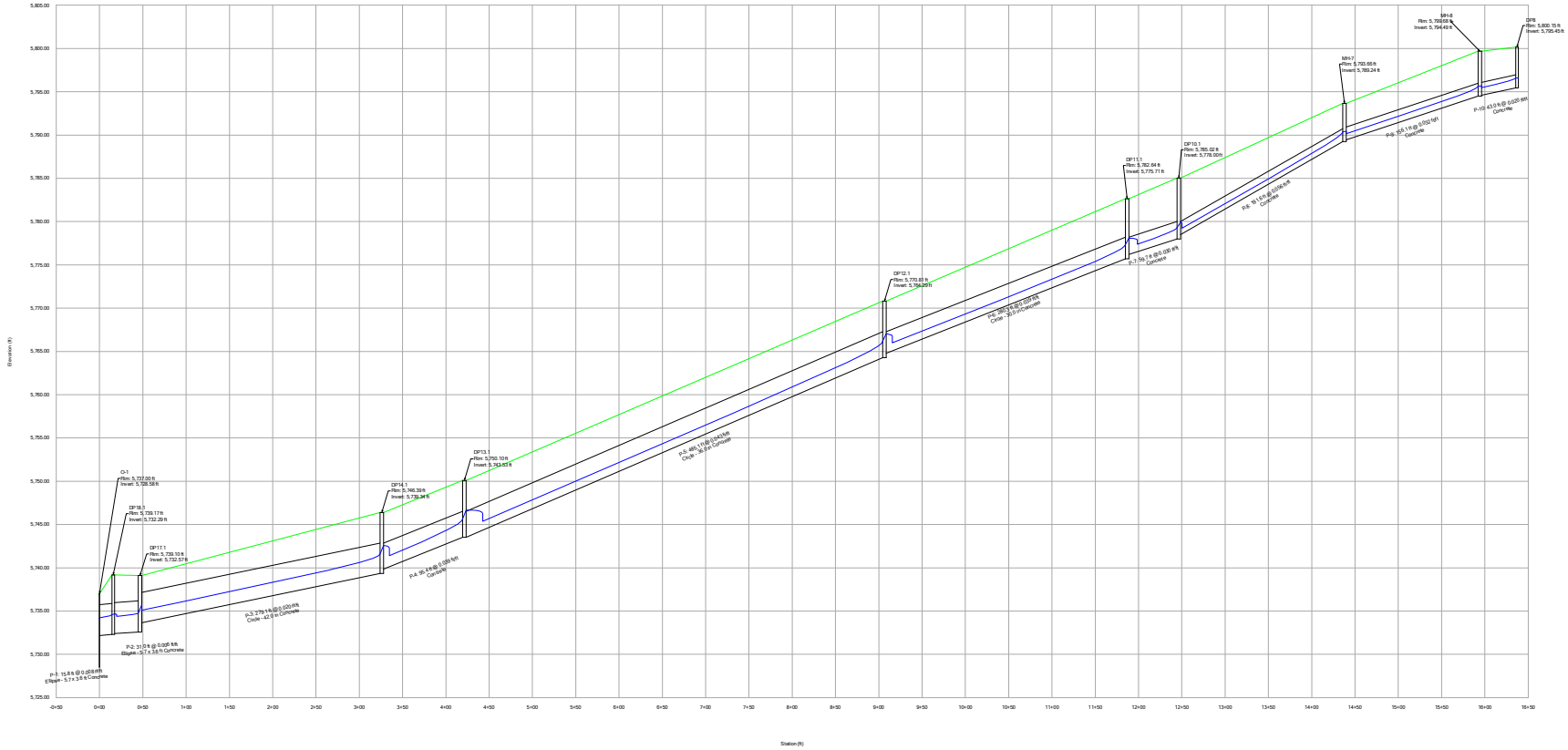
Conduit FlexTable: Combined Pipe/Node Report

Label	Upstream Structure	Diameter (in)	Length (Unified) (ft)	Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
P-23	MH-16	24.0	143.5	13.40	8.74	5,744.90	5,742.75	0.015	5,746.22	5,743.73	5,751.53	5,749.45
P-24	DP4.1	24.0	45.2	13.40	9.71	5,745.90	5,745.00	0.020	5,747.22	5,745.96	5,751.32	5,751.53
P-25	DP3	18.0	36.2	5.00	7.57	5,747.12	5,746.40	0.020	5,747.98	5,747.81	5,751.82	5,751.32
P-26	DP16	18.0	13.9	3.20	4.63	5,734.95	5,734.85	0.007	5,735.91	5,735.91	5,739.50	5,739.25
P-27	DP15	18.0	5.0	8.90	6.67	5,735.93	5,735.88	0.010	5,737.08	5,736.98	5,741.11	5,740.88
P-28	DP5	18.0	5.0	11.00	9.20	5,741.03	5,740.93	0.020	5,742.30	5,742.06	5,745.87	5,745.60
P-29	DP4	18.0	35.0	6.90	13.11	5,748.88	5,746.40	0.071	5,749.90	5,747.81	5,753.09	5,751.32
P-32 (Pr-Storm)	OUT. STRUCT.		56.3	8.00	3.99	5,730.25	5,730.04	0.004	5,730.92	5,730.76	5,738.00	5,738.00
P-33 (Pr-Storm)	MH-19	48.0	600.4	8.00	4.02	5,729.74	5,727.94	0.003	5,730.60	5,728.76	5,738.00	5,733.33
P-34 (Pr-Storm)	MH-18	48.0	24.2	8.00	4.34	5,727.74	5,727.65	0.004	5,728.56	5,728.47	5,733.33	5,733.00

5-YEAR SCENARIO

Profile Report

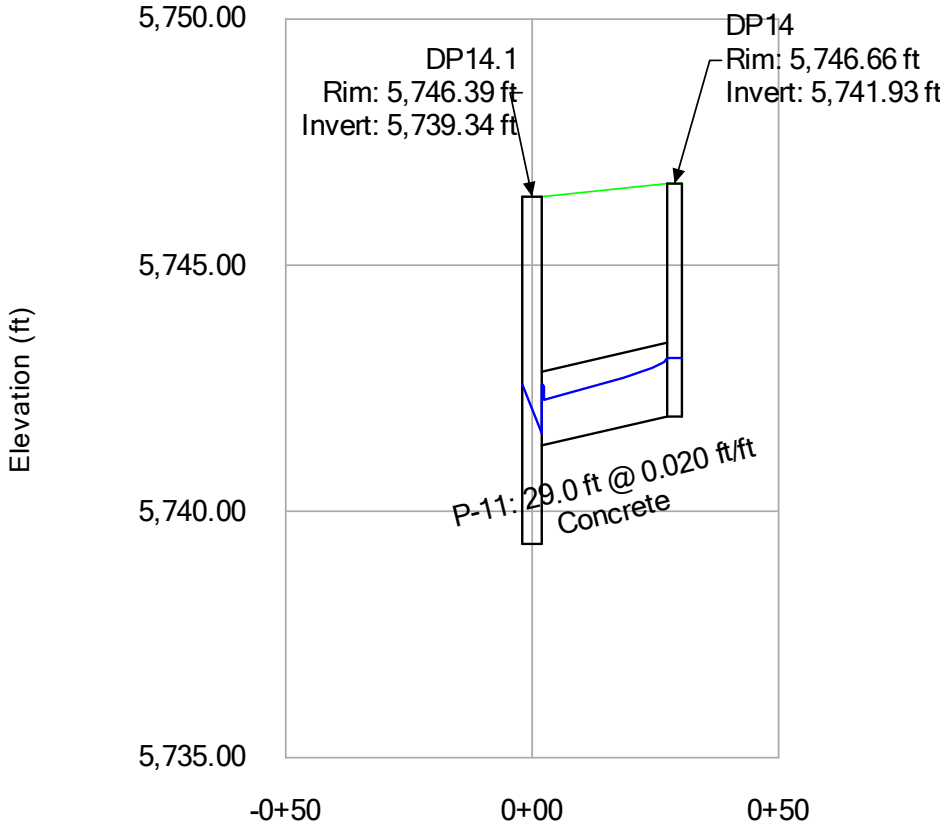
Engineering Profile - Storm-1 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

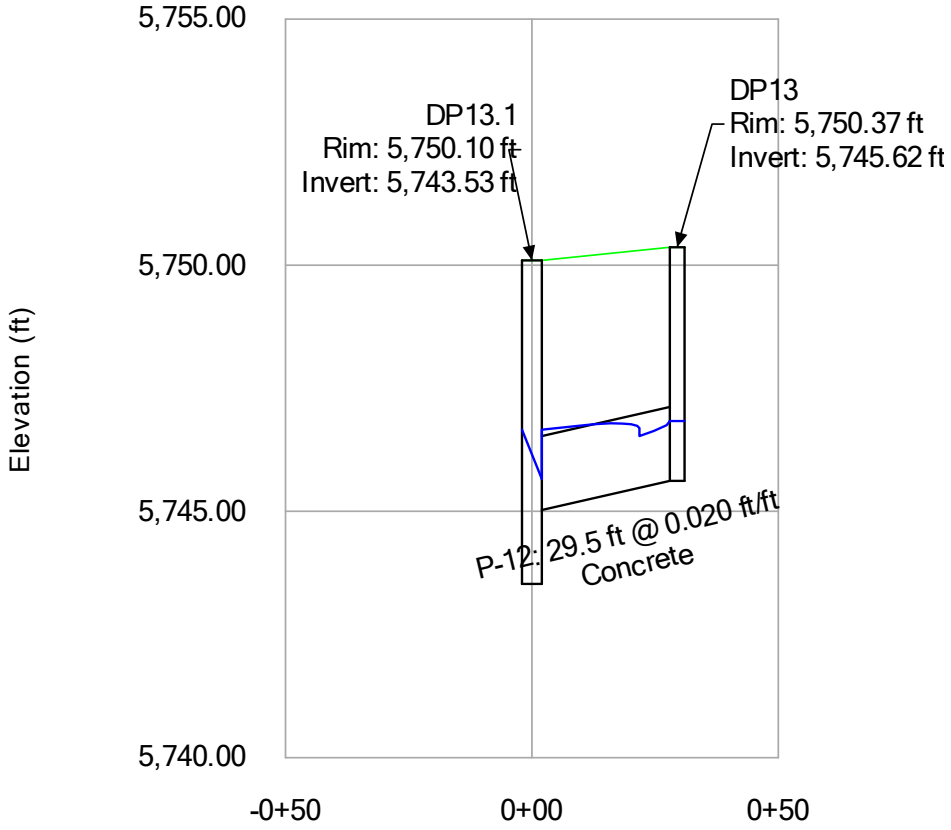
Engineering Profile - Storm-2 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

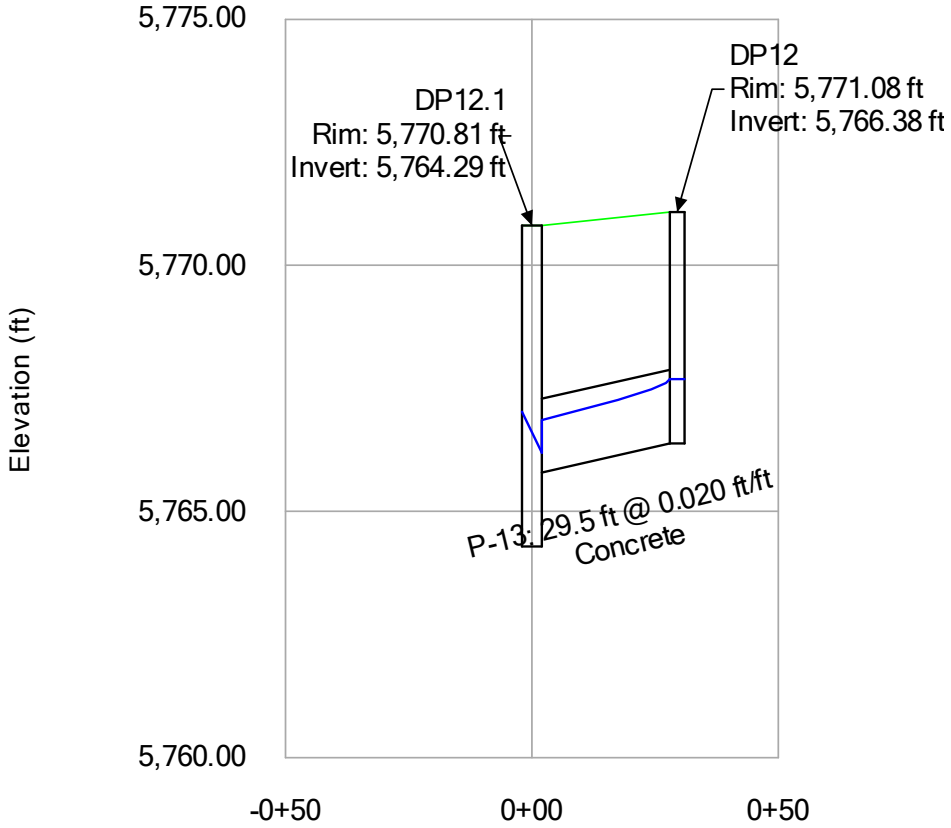
Engineering Profile - Storm-3 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

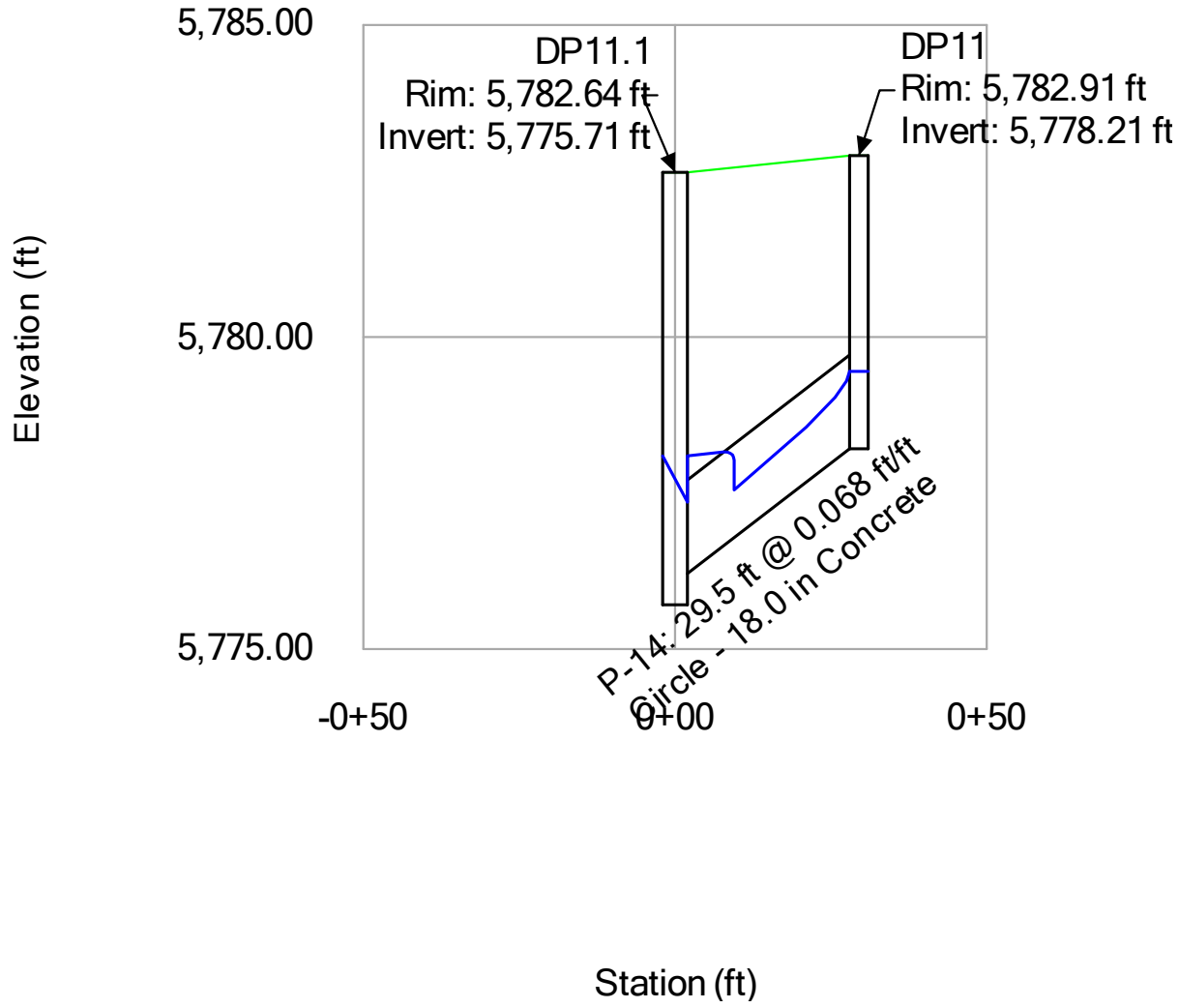
Engineering Profile - Storm-4 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

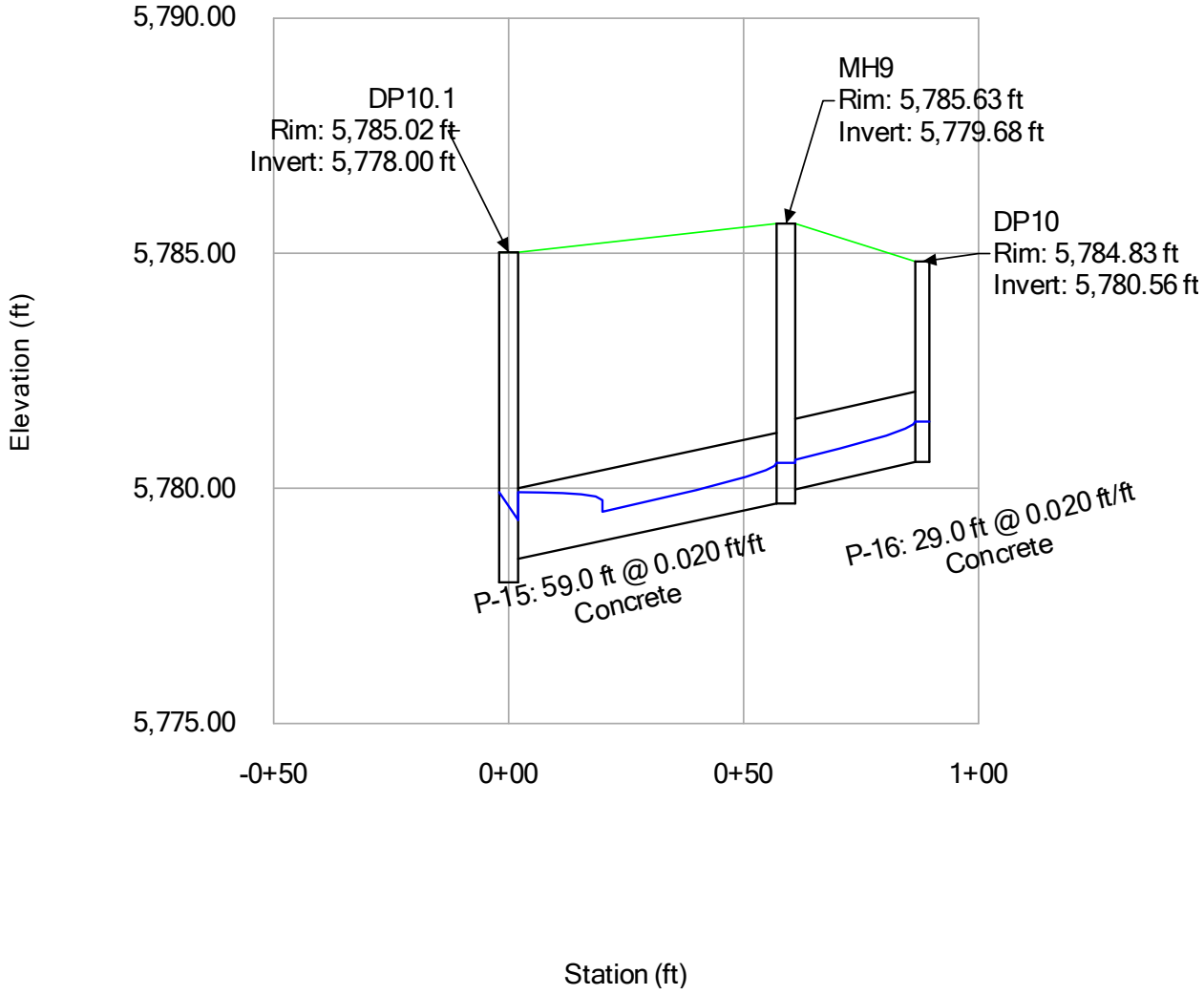
Engineering Profile - Storm-5 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

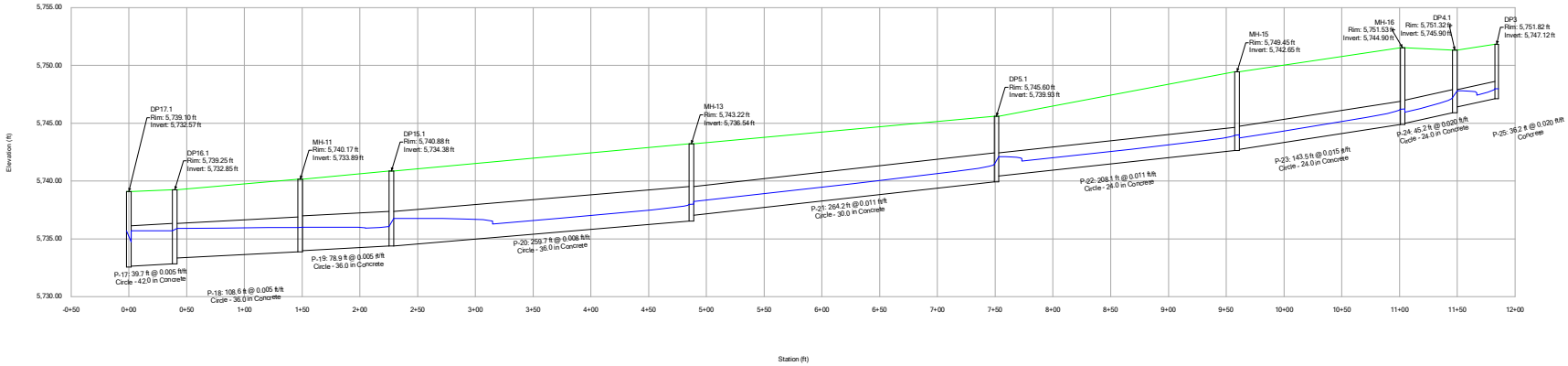
Profile Report

Engineering Profile - Storm-6 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

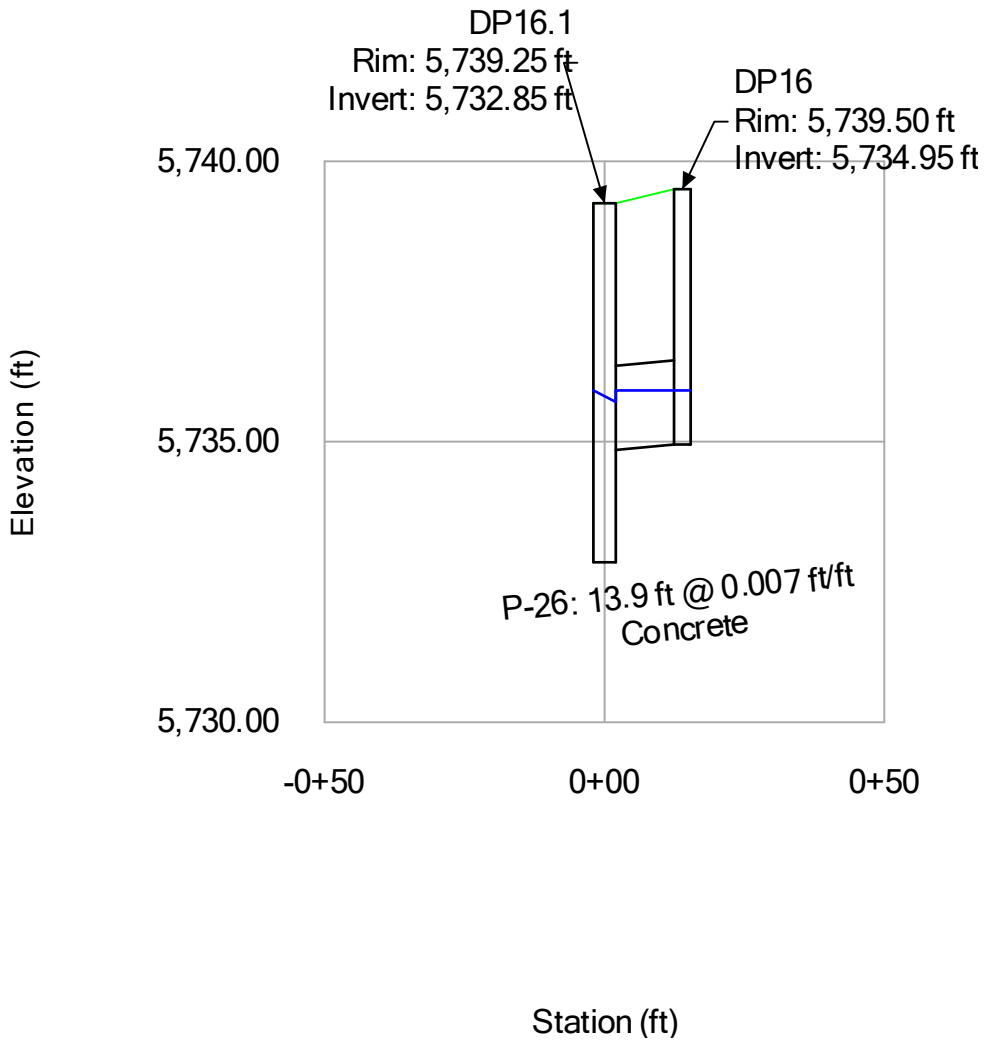
Profile Report
Engineering Profile - Storm-7 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

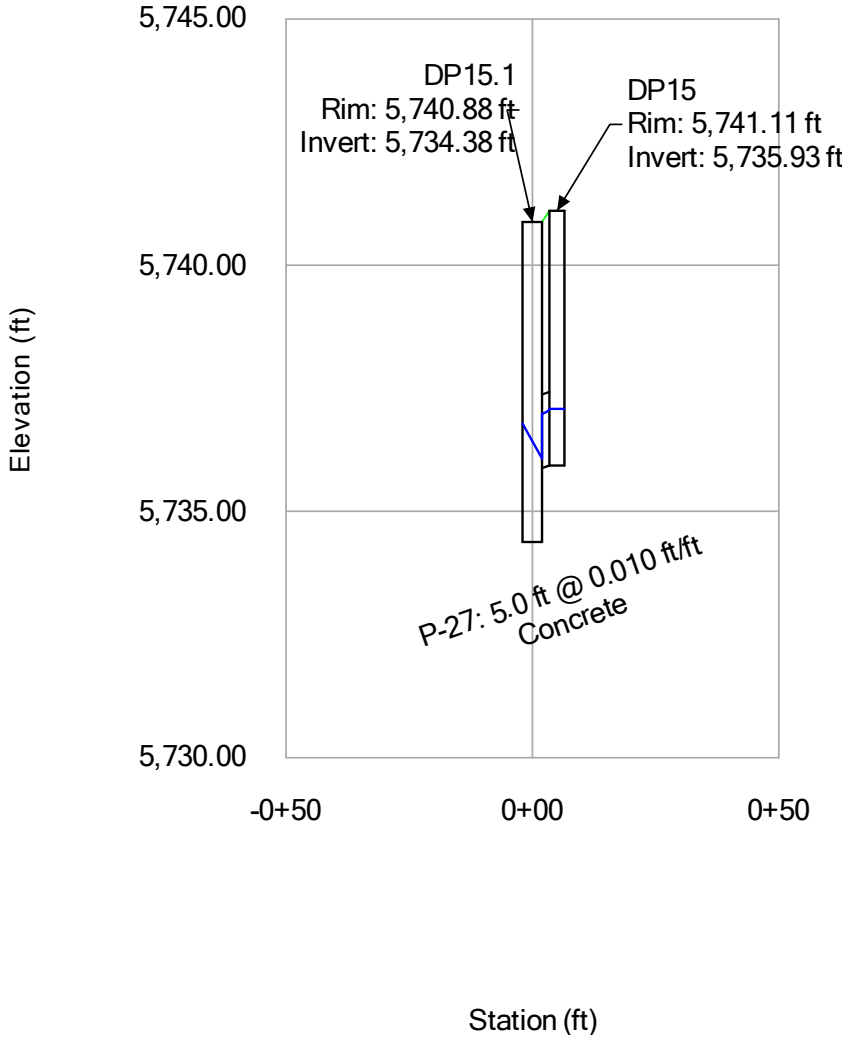
Engineering Profile - Storm-8 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

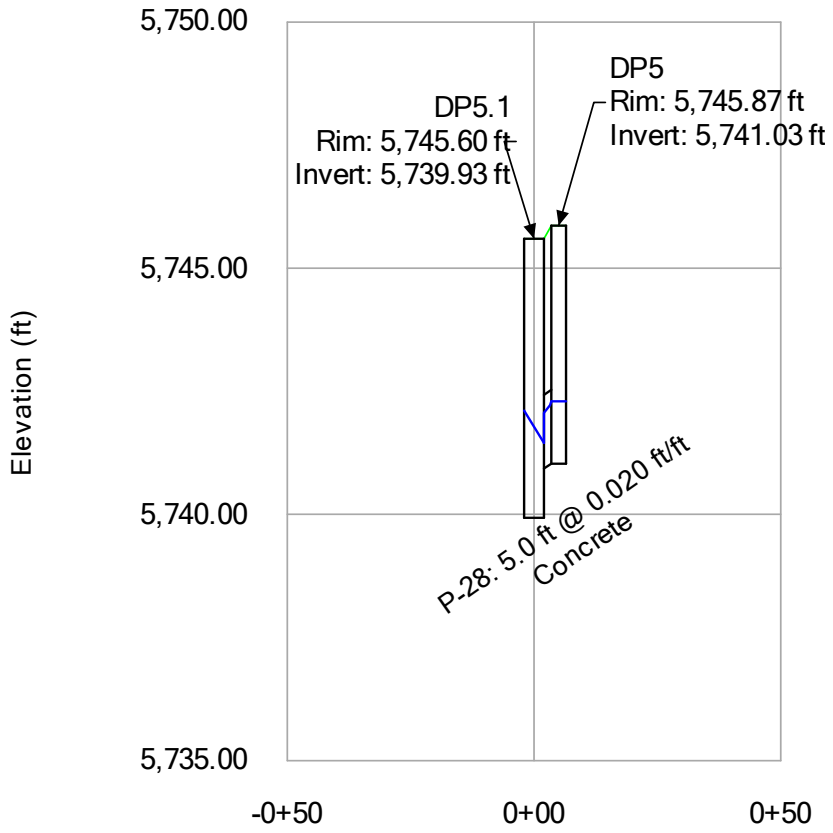
Engineering Profile - Storm-9 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

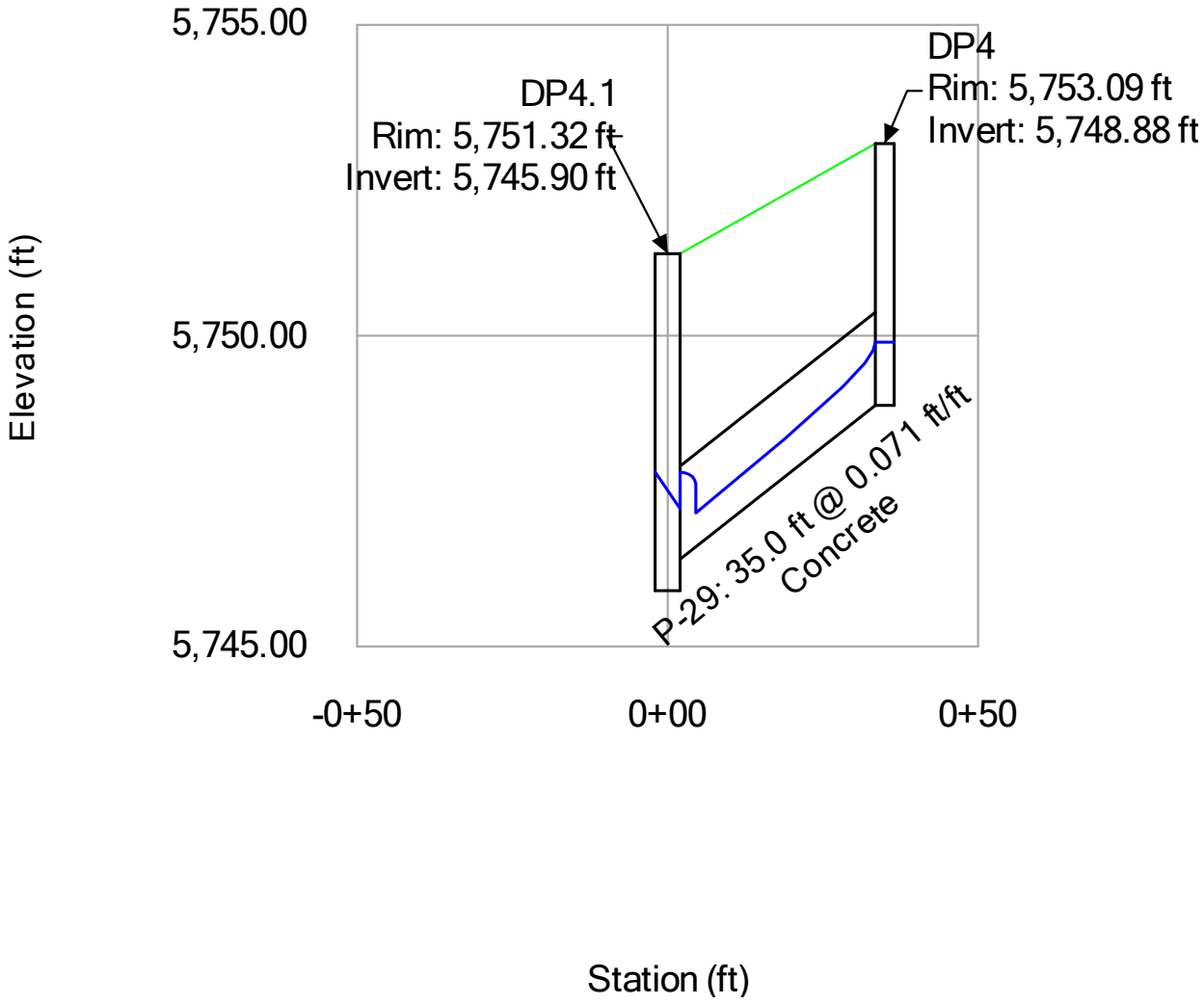
Engineering Profile - Storm-10 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

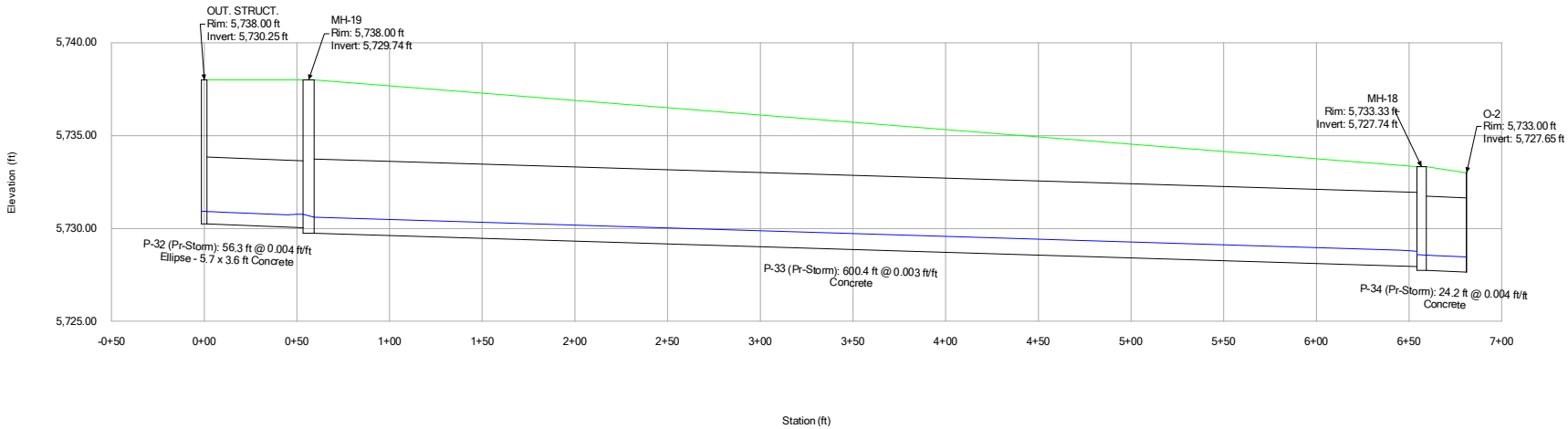
Engineering Profile - Storm-11 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

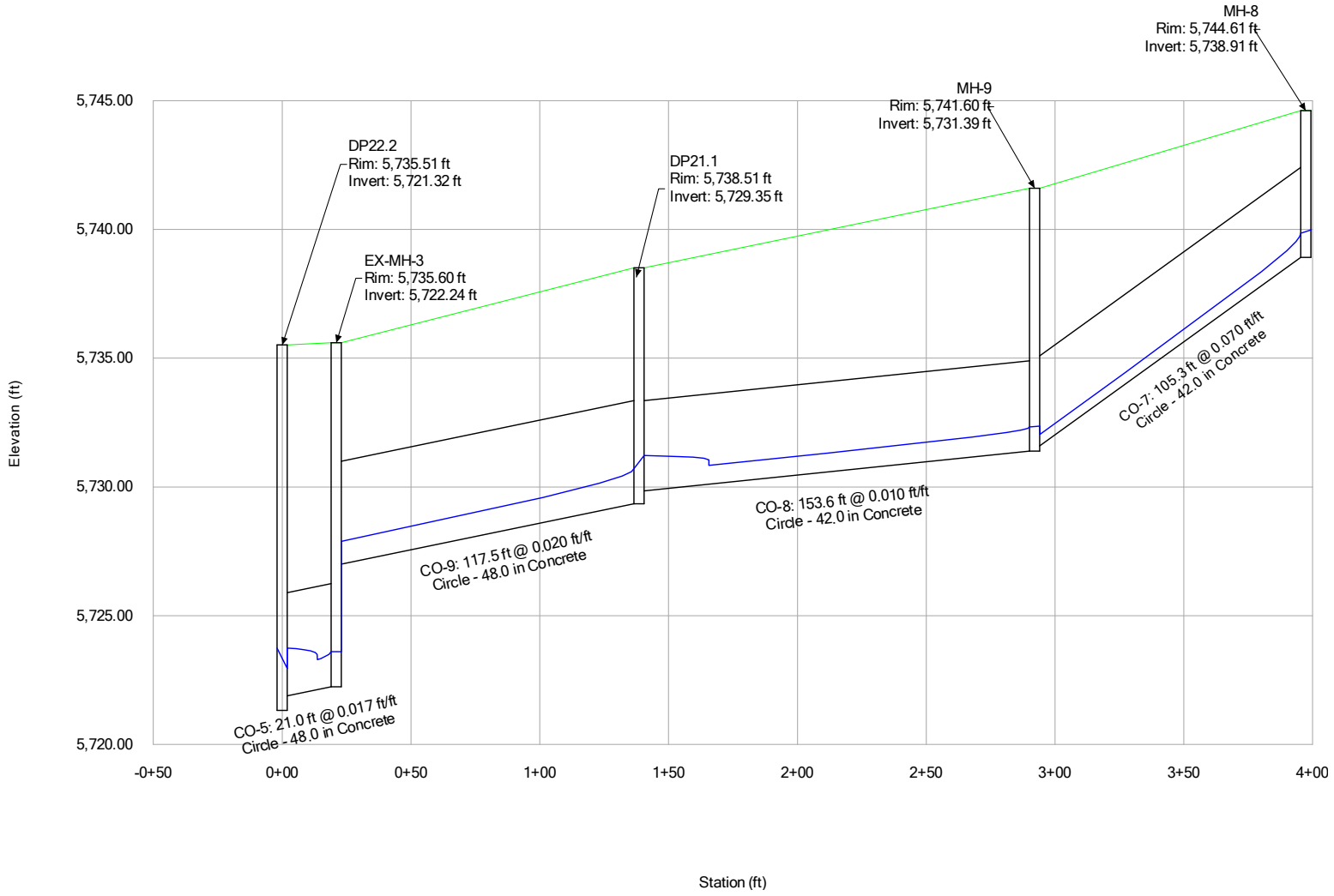
Engineering Profile - Storm-12 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report

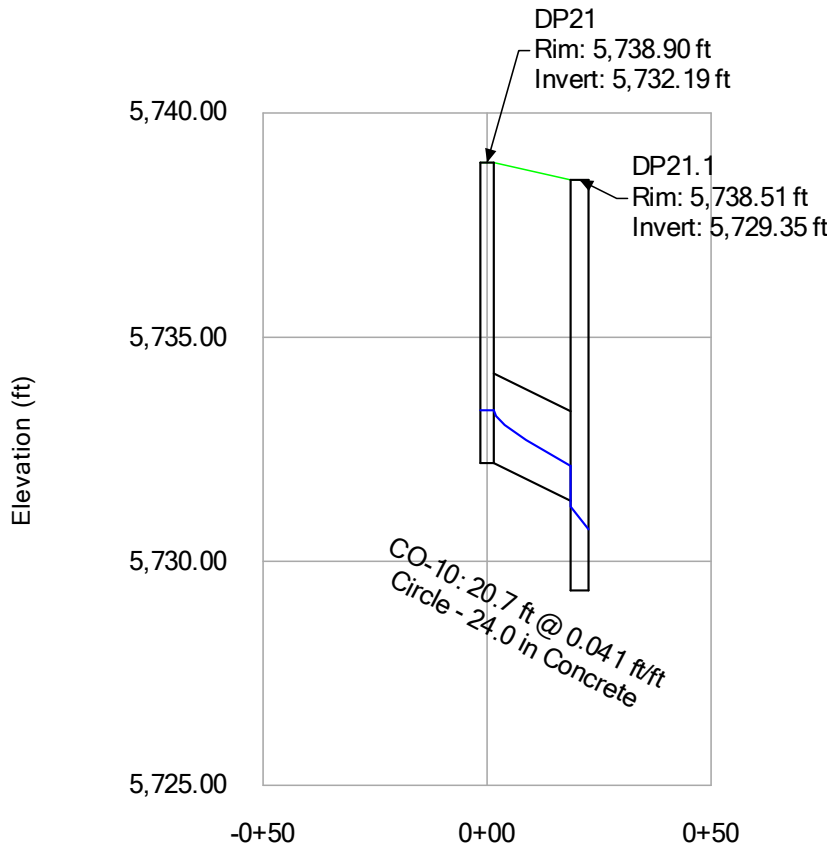
Engineering Profile - Storm-13 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

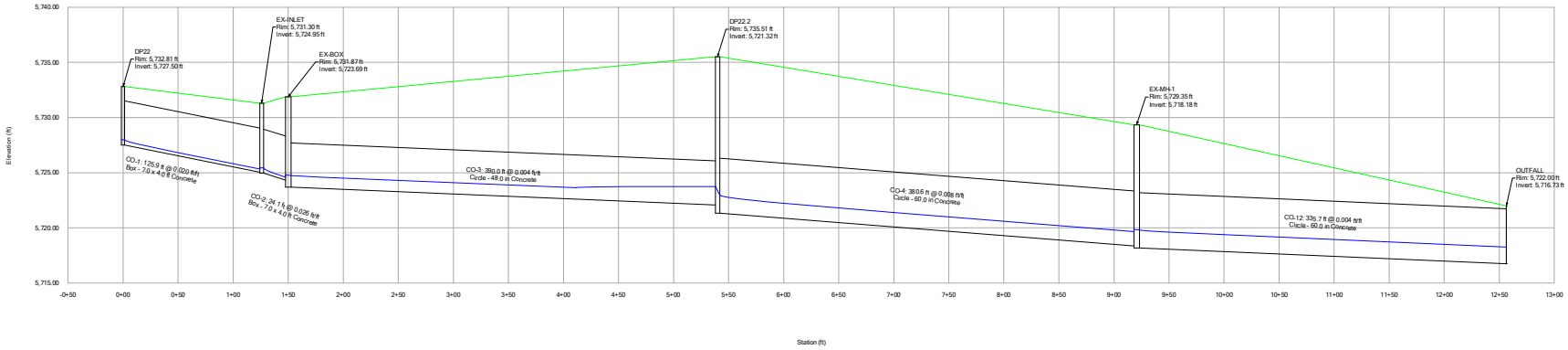
Profile Report

Engineering Profile - Storm-14 (Peaceful_Ridge.stsw)



5-YEAR SCENARIO

Profile Report
Engineering Profile - Ex-Storm-01 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Conduit FlexTable: Combined Pipe/Node Report

Label	Upstream Structure	Diameter (in)	Length (Unified) (ft)	Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
CO-1	DP22		125.9	124.60	14.83	5,727.50	5,725.04	0.020	5,731.43	5,731.30	5,732.81	5,731.30
CO-2	EX-INLET		24.1	124.60	4.45	5,724.95	5,724.32	0.026	5,731.59	5,731.57	5,731.30	5,731.87
CO-3	EX-BOX	48.0	390.0	124.60	9.92	5,723.69	5,722.07	0.004	5,731.41	5,728.48	5,731.87	5,735.51
CO-4	DP22.2	60.0	380.6	210.80	13.29	5,721.32	5,718.35	0.008	5,725.45	5,723.50	5,735.51	5,729.35
CO-5	EX-MH-3	48.0	21.0	86.20	6.86	5,722.24	5,721.89	0.017	5,728.55	5,728.48	5,735.60	5,735.51
CO-7	MH-8	42.0	105.3	57.60	22.04	5,738.91	5,731.59	0.070	5,741.29	5,732.79	5,744.61	5,741.60
CO-8	MH-9	42.0	153.6	57.60	10.82	5,731.39	5,729.85	0.010	5,733.77	5,733.48	5,741.60	5,738.51
CO-9	DP21.1	48.0	117.5	86.20	15.50	5,729.35	5,727.00	0.020	5,732.16	5,728.95	5,738.51	5,735.60
CO-10	DP21	24.0	20.7	23.50	14.63	5,732.19	5,731.35	0.041	5,733.91	5,733.48	5,738.90	5,738.51
CO-12	EX-MH-1	60.0	335.7	210.80	10.74	5,718.18	5,716.73	0.004	5,723.41	5,720.86	5,729.35	5,722.00
P-1	DP18.1		15.8	170.40	12.36	5,732.29	5,732.17	0.008	5,735.45	5,735.22	5,739.17	5,737.00
P-2	DP17.1		31.0	156.80	10.77	5,732.57	5,732.39	0.006	5,735.80	5,735.65	5,739.10	5,739.17
P-3	DP14.1	42.0	279.1	92.20	15.85	5,739.34	5,733.65	0.020	5,742.31	5,737.48	5,746.39	5,739.10
P-4	DP13.1	36.0	95.4	77.20	19.31	5,743.53	5,739.84	0.039	5,746.27	5,744.09	5,750.10	5,746.39
P-5	DP12.1	36.0	485.1	62.50	19.04	5,764.29	5,743.53	0.043	5,766.83	5,748.33	5,770.81	5,750.10
P-6	DP11.1	30.0	280.3	44.30	16.87	5,775.71	5,764.79	0.039	5,777.92	5,768.35	5,782.64	5,770.81
P-7	DP10.1	24.0	59.7	27.40	8.72	5,778.00	5,776.21	0.030	5,780.27	5,779.40	5,785.02	5,782.64
P-8	MH-7	18.0	191.6	18.40	15.41	5,789.24	5,778.50	0.056	5,790.70	5,781.48	5,793.66	5,785.02
P-9	MH-8	18.0	156.1	18.40	12.18	5,794.49	5,789.44	0.032	5,795.95	5,790.64	5,799.68	5,793.66
P-10	DP8	18.0	43.0	18.40	10.41	5,795.45	5,794.59	0.020	5,797.39	5,796.04	5,800.15	5,799.68
P-11	DP14	18.0	29.0	17.60	9.96	5,741.93	5,741.34	0.020	5,744.90	5,744.09	5,746.66	5,746.39
P-12	DP13	18.0	29.5	18.20	10.30	5,745.62	5,745.03	0.020	5,749.22	5,748.33	5,750.37	5,750.10
P-13	DP12	18.0	29.5	19.80	11.20	5,766.38	5,765.79	0.020	5,769.40	5,768.35	5,771.08	5,770.81
P-14	DP11	18.0	29.5	17.70	10.02	5,778.21	5,776.21	0.068	5,780.23	5,779.40	5,782.91	5,782.64
P-15	MH9	18.0	59.0	9.00	5.09	5,779.68	5,778.50	0.020	5,781.91	5,781.48	5,785.63	5,785.02
P-16	DP10	18.0	29.0	9.00	5.09	5,780.56	5,779.98	0.020	5,782.12	5,781.91	5,784.83	5,785.63
P-17	DP16.1	42.0	39.7	66.20	6.88	5,732.85	5,732.65	0.005	5,737.65	5,737.48	5,739.25	5,739.10
P-18	MH-11	36.0	108.6	47.90	6.78	5,733.89	5,733.35	0.005	5,738.96	5,738.40	5,740.17	5,739.25
P-19	DP15.1	36.0	78.9	47.90	6.78	5,734.38	5,733.99	0.005	5,739.40	5,739.00	5,740.88	5,740.17
P-20	MH-13	36.0	259.7	35.80	5.06	5,736.54	5,734.38	0.008	5,740.88	5,740.13	5,743.22	5,740.88
P-21	DP5.1	30.0	264.2	35.80	7.29	5,739.93	5,737.04	0.011	5,742.91	5,740.90	5,745.60	5,743.22
P-22	MH-15	24.0	208.1	20.70	6.59	5,742.65	5,740.43	0.011	5,745.50	5,743.75	5,749.45	5,745.60

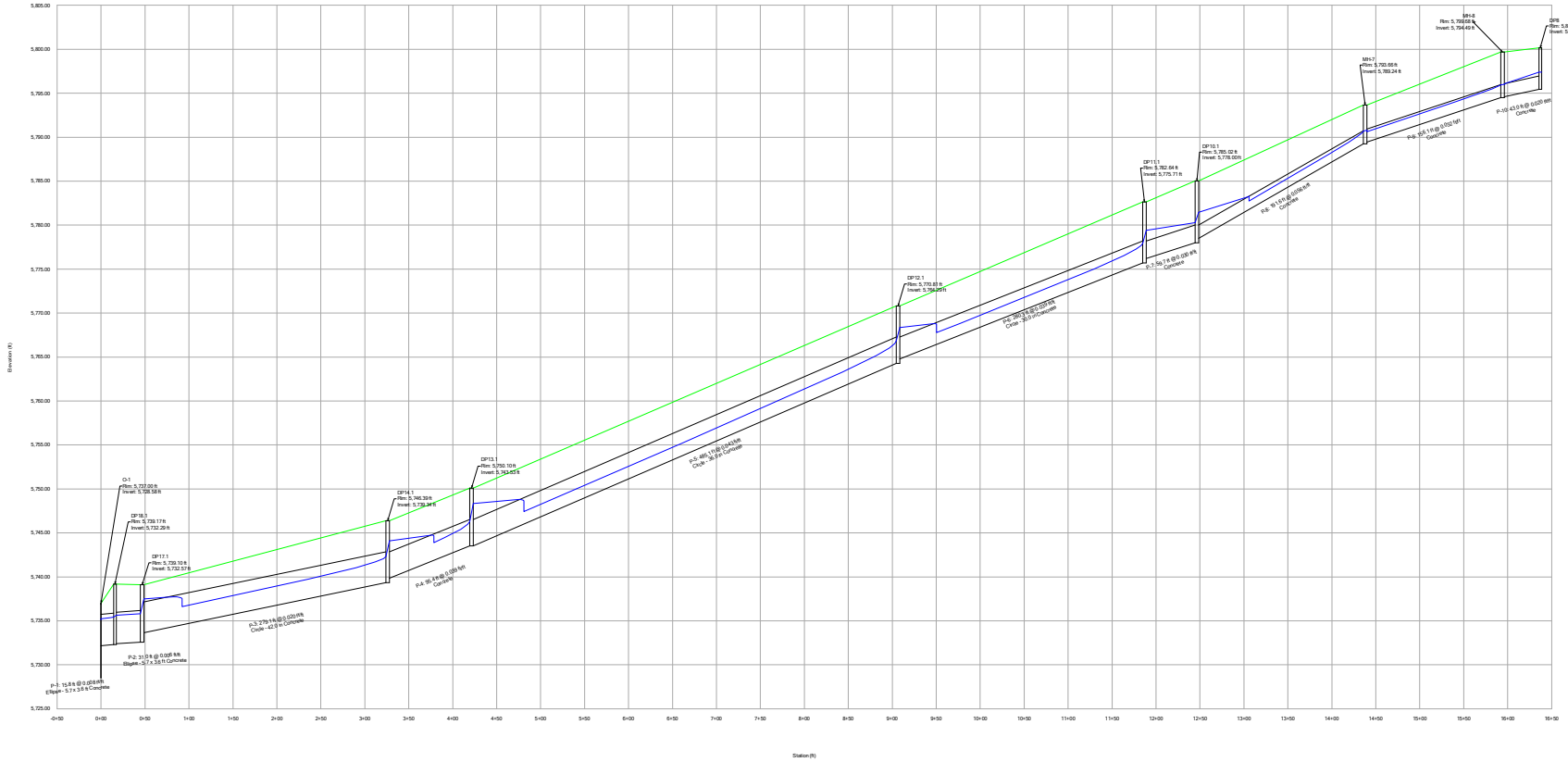
Conduit FlexTable: Combined Pipe/Node Report

Label	Upstream Structure	Diameter (in)	Length (Unified) (ft)	Flow (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
P-23	MH-16	24.0	143.5	20.70	9.67	5,744.90	5,742.75	0.015	5,746.53	5,745.53	5,751.53	5,749.45
P-24	DP4.1	24.0	45.2	20.70	10.81	5,745.90	5,745.00	0.020	5,747.53	5,746.25	5,751.32	5,751.53
P-25	DP3	18.0	36.2	10.00	5.66	5,747.12	5,746.40	0.020	5,748.76	5,748.43	5,751.82	5,751.32
P-26	DP16	18.0	13.9	17.50	9.90	5,734.95	5,734.85	0.007	5,738.79	5,738.40	5,739.50	5,739.25
P-27	DP15	18.0	5.0	14.80	8.38	5,735.93	5,735.88	0.010	5,740.23	5,740.13	5,741.11	5,740.88
P-28	DP5	18.0	5.0	19.20	10.86	5,741.03	5,740.93	0.020	5,743.92	5,743.75	5,745.87	5,745.60
P-29	DP4	18.0	35.0	11.40	15.02	5,748.88	5,746.40	0.071	5,750.17	5,748.43	5,753.09	5,751.32
P-32 (Pr-Storm)	OUT. STRUCT.		56.3	115.80	7.19	5,730.25	5,730.04	0.004	5,736.53	5,736.33	5,738.00	5,738.00
P-33 (Pr-Storm)	MH-19	48.0	600.4	115.80	9.22	5,729.74	5,727.94	0.003	5,735.48	5,731.44	5,738.00	5,733.33
P-34 (Pr-Storm)	MH-18	48.0	24.2	115.80	9.22	5,727.74	5,727.65	0.004	5,731.29	5,730.90	5,733.33	5,733.00

100-YR SCENARIO

Profile Report

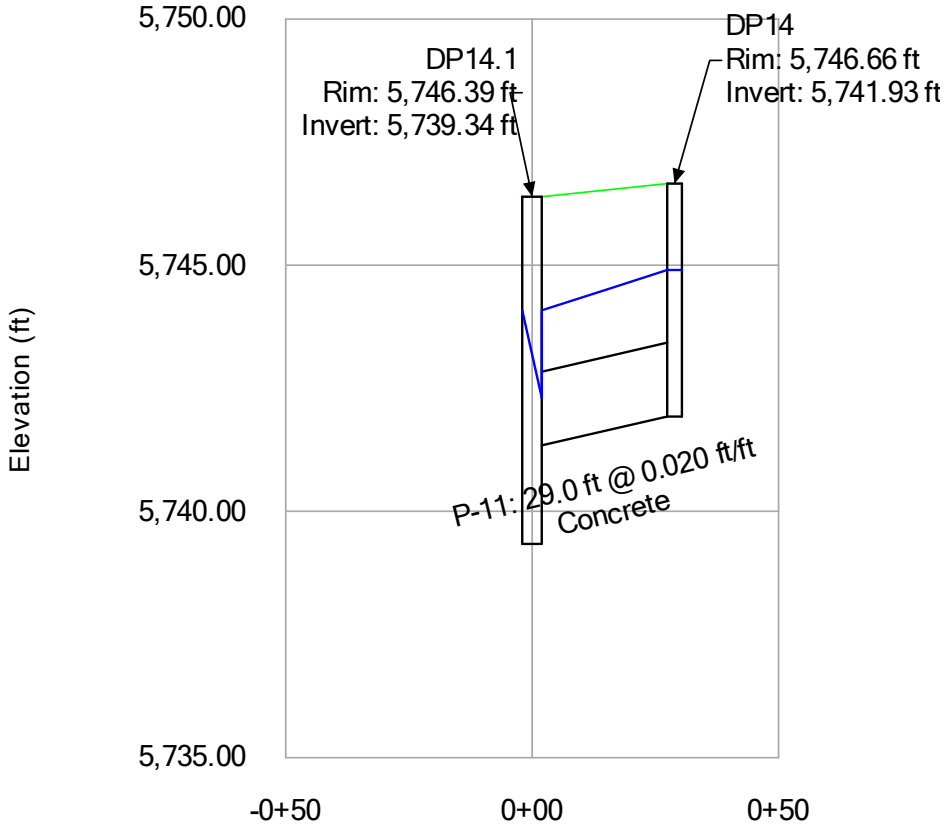
Engineering Profile - Storm-1 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

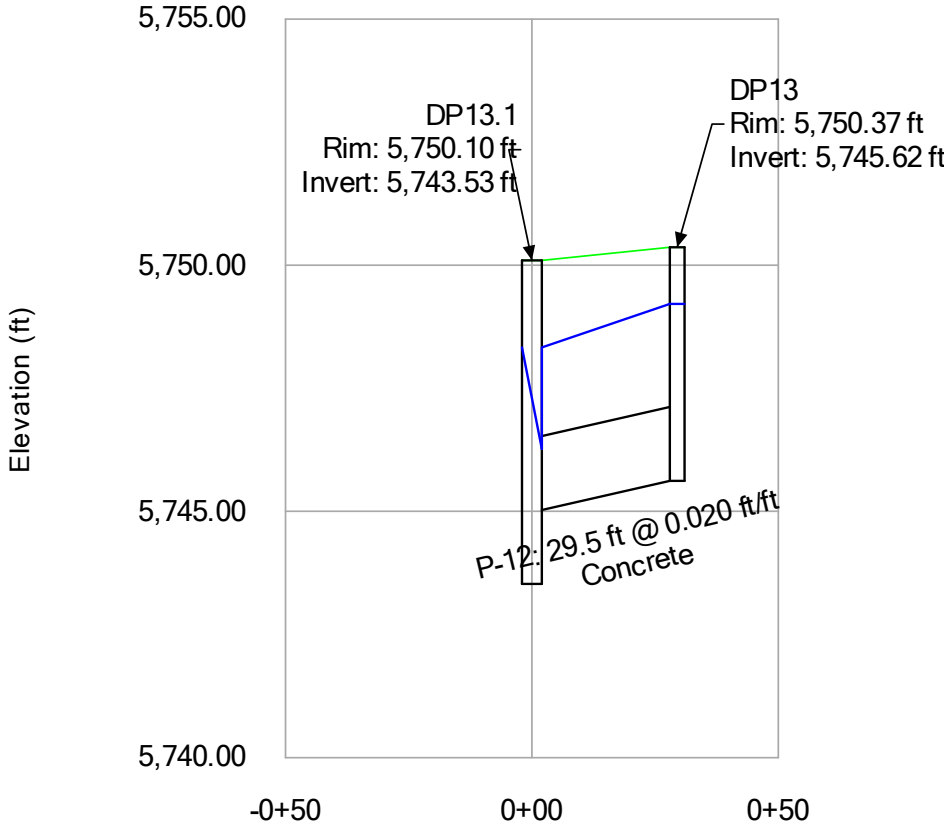
Engineering Profile - Storm-2 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

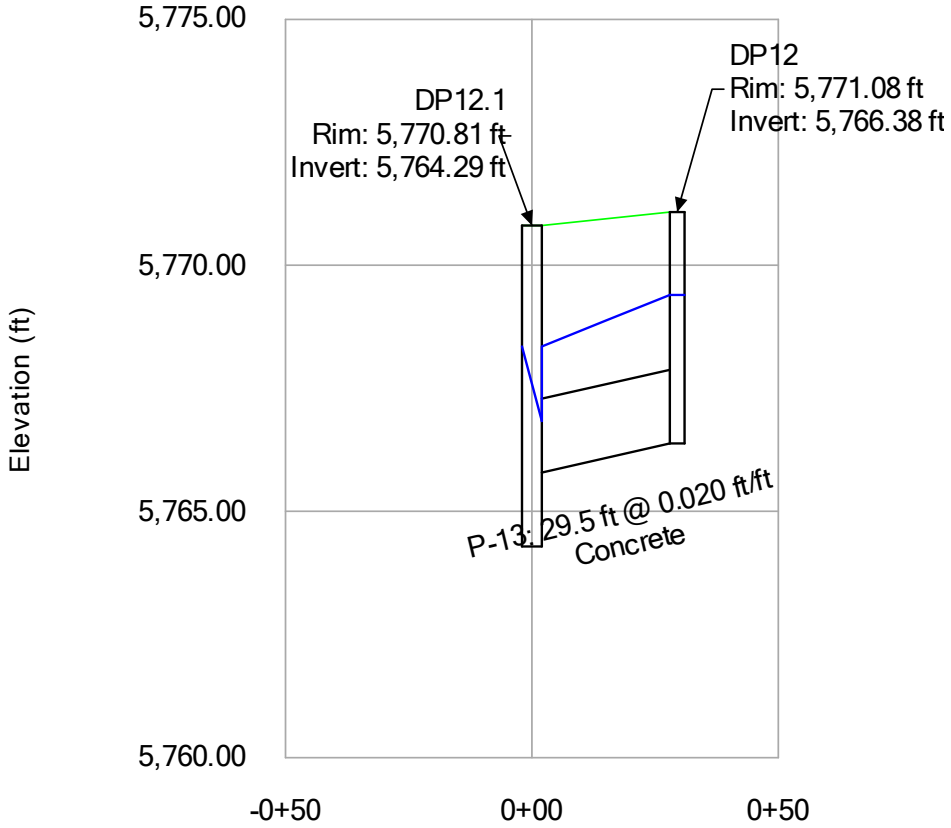
Engineering Profile - Storm-3 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

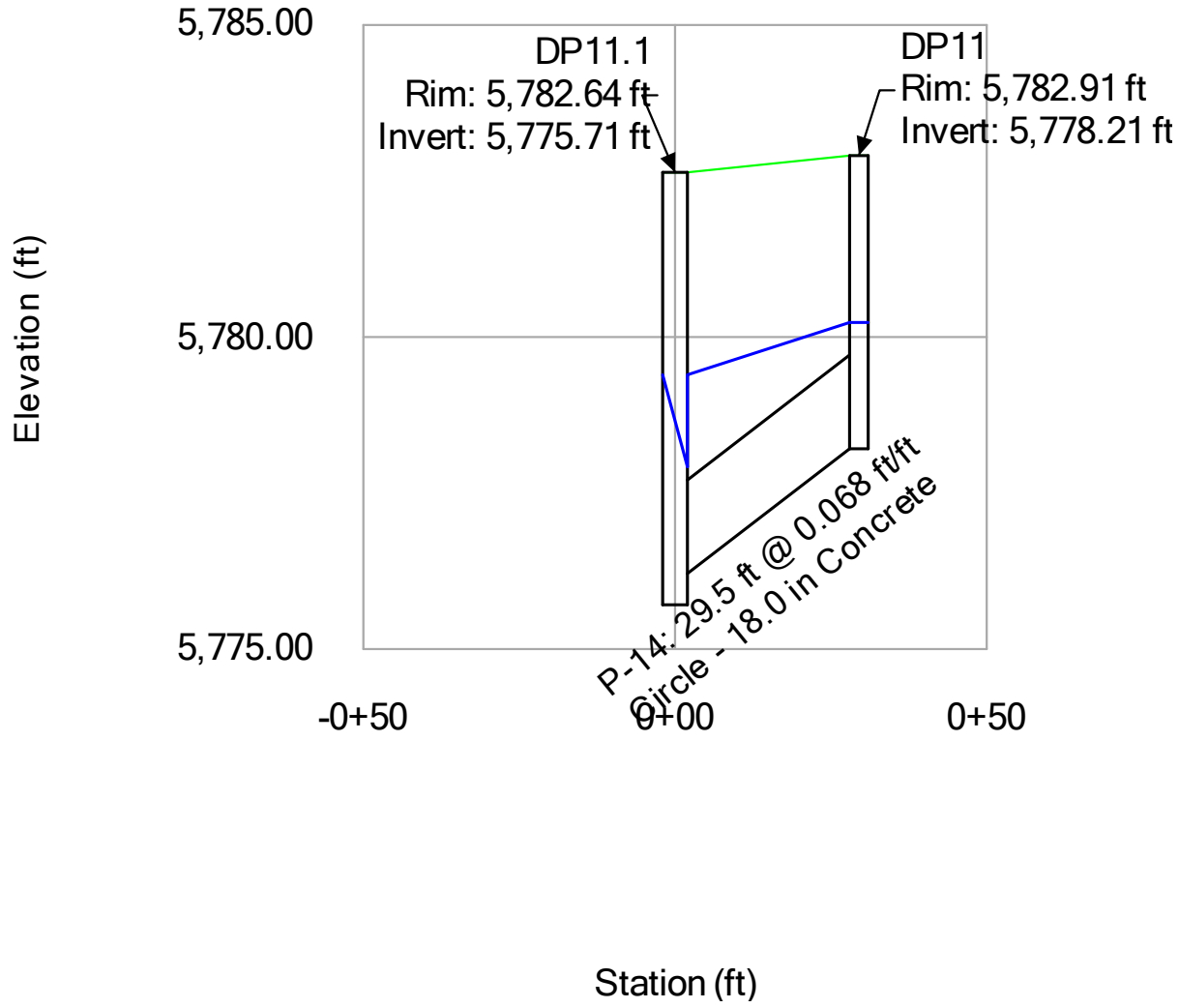
Engineering Profile - Storm-4 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

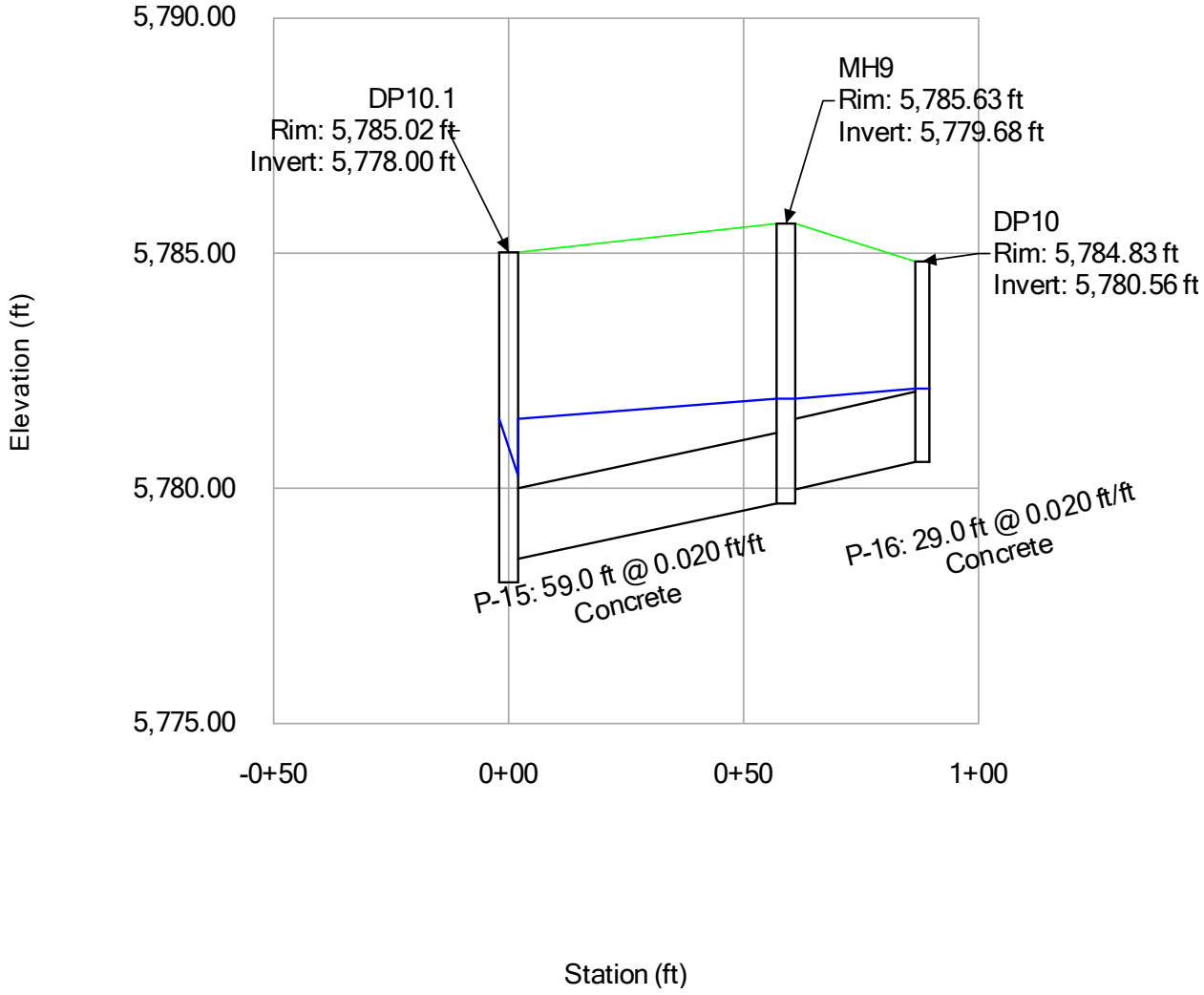
Engineering Profile - Storm-5 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

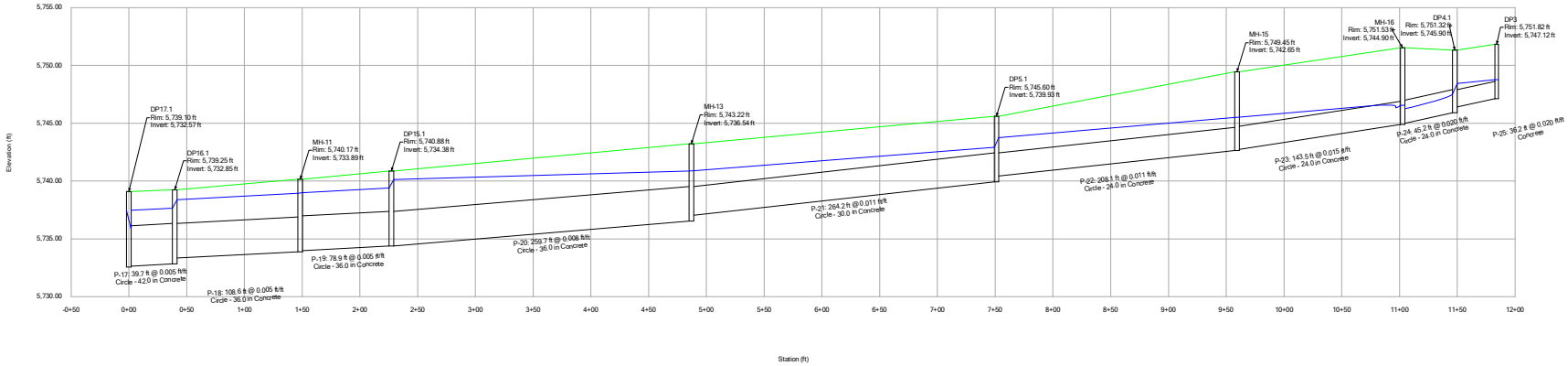
Engineering Profile - Storm-6 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

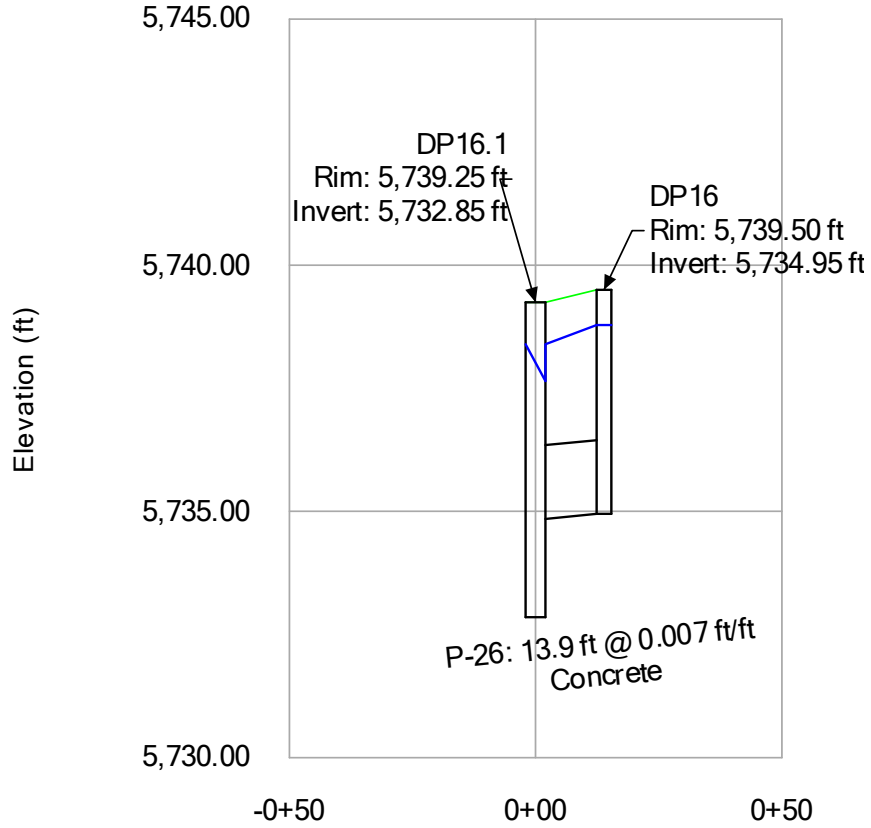
Engineering Profile - Storm-7 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

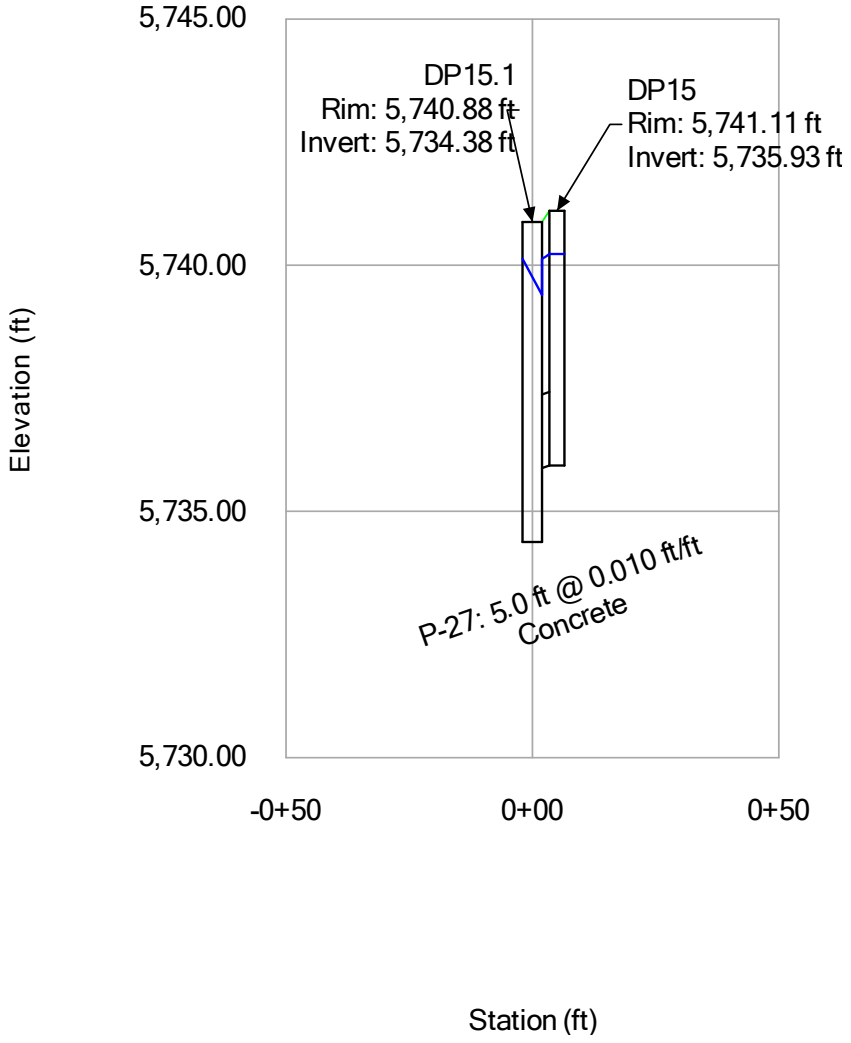
Engineering Profile - Storm-8 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

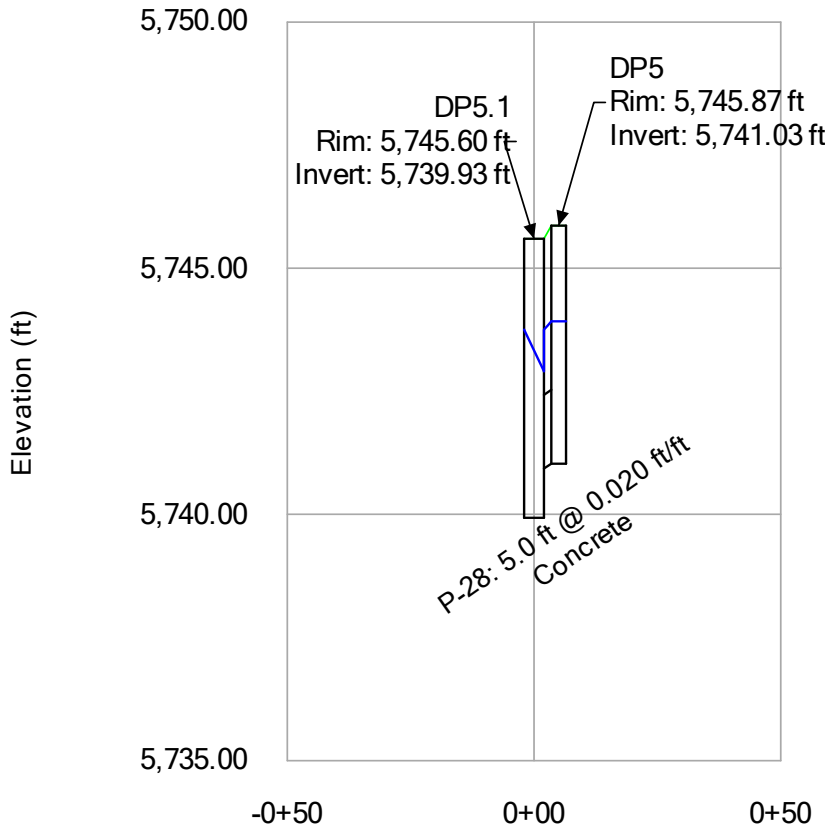
Engineering Profile - Storm-9 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

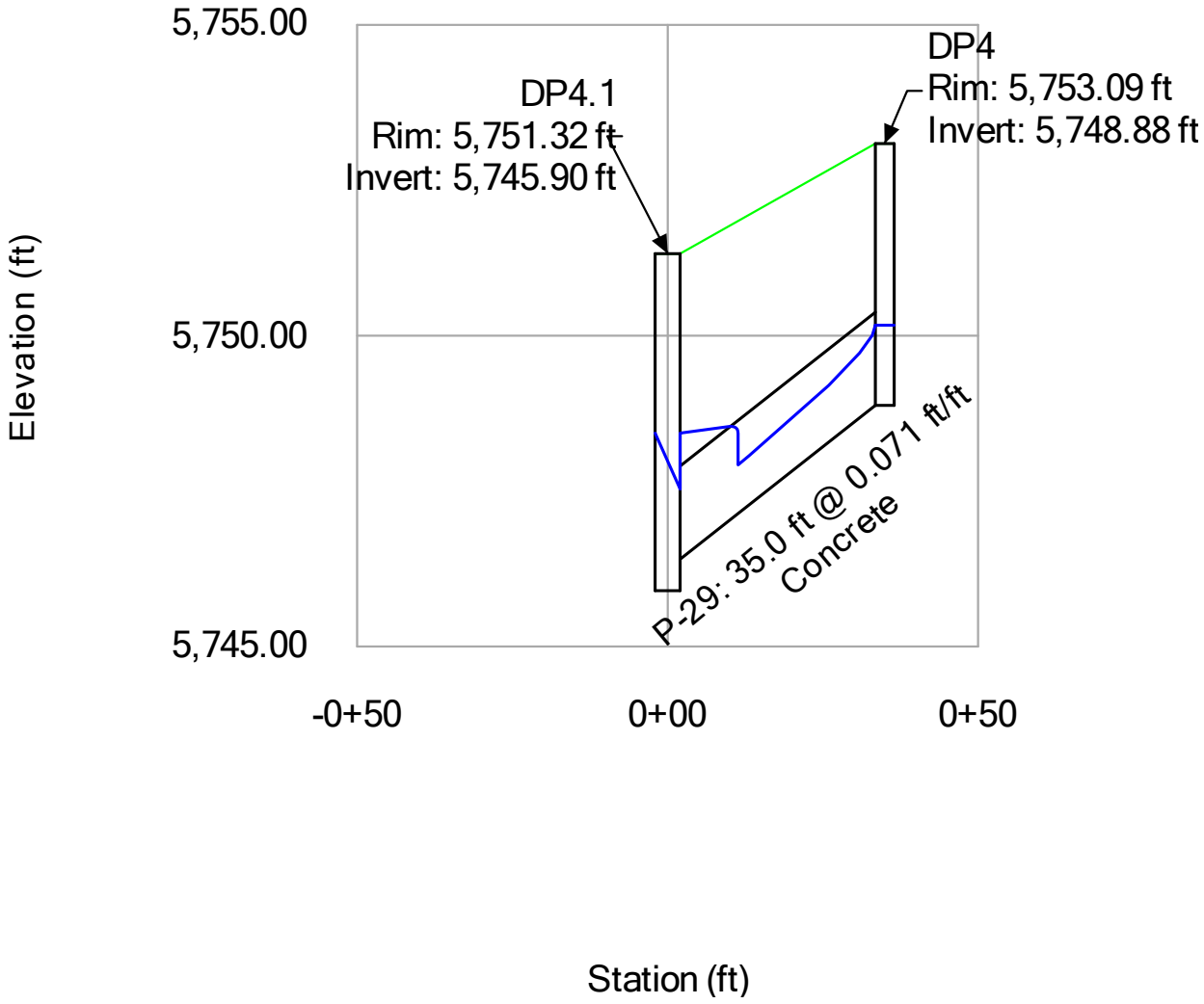
Engineering Profile - Storm-10 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

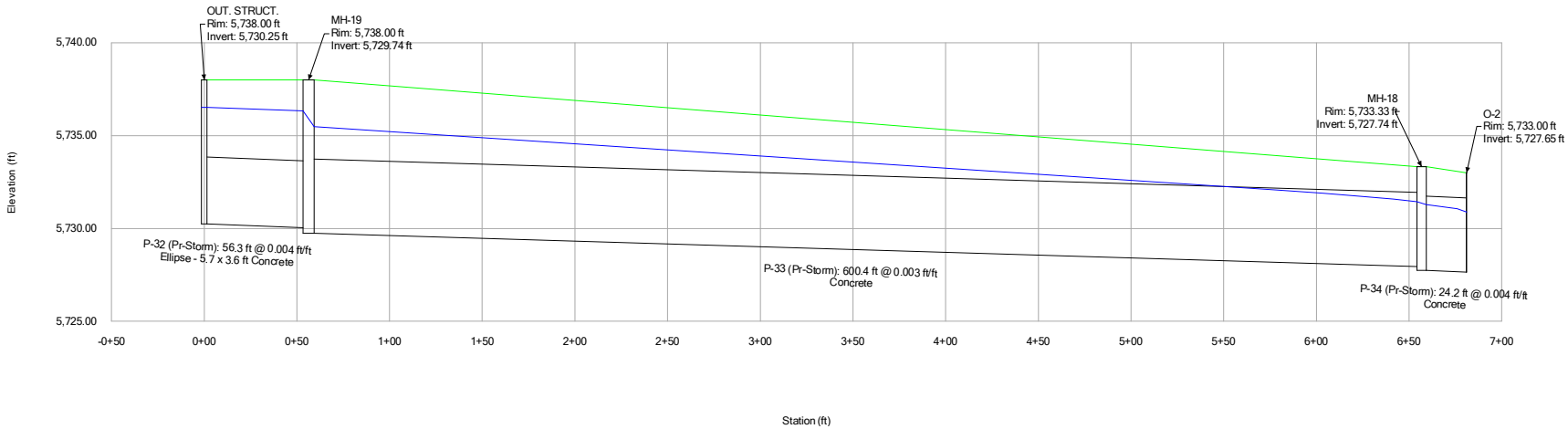
Engineering Profile - Storm-11 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

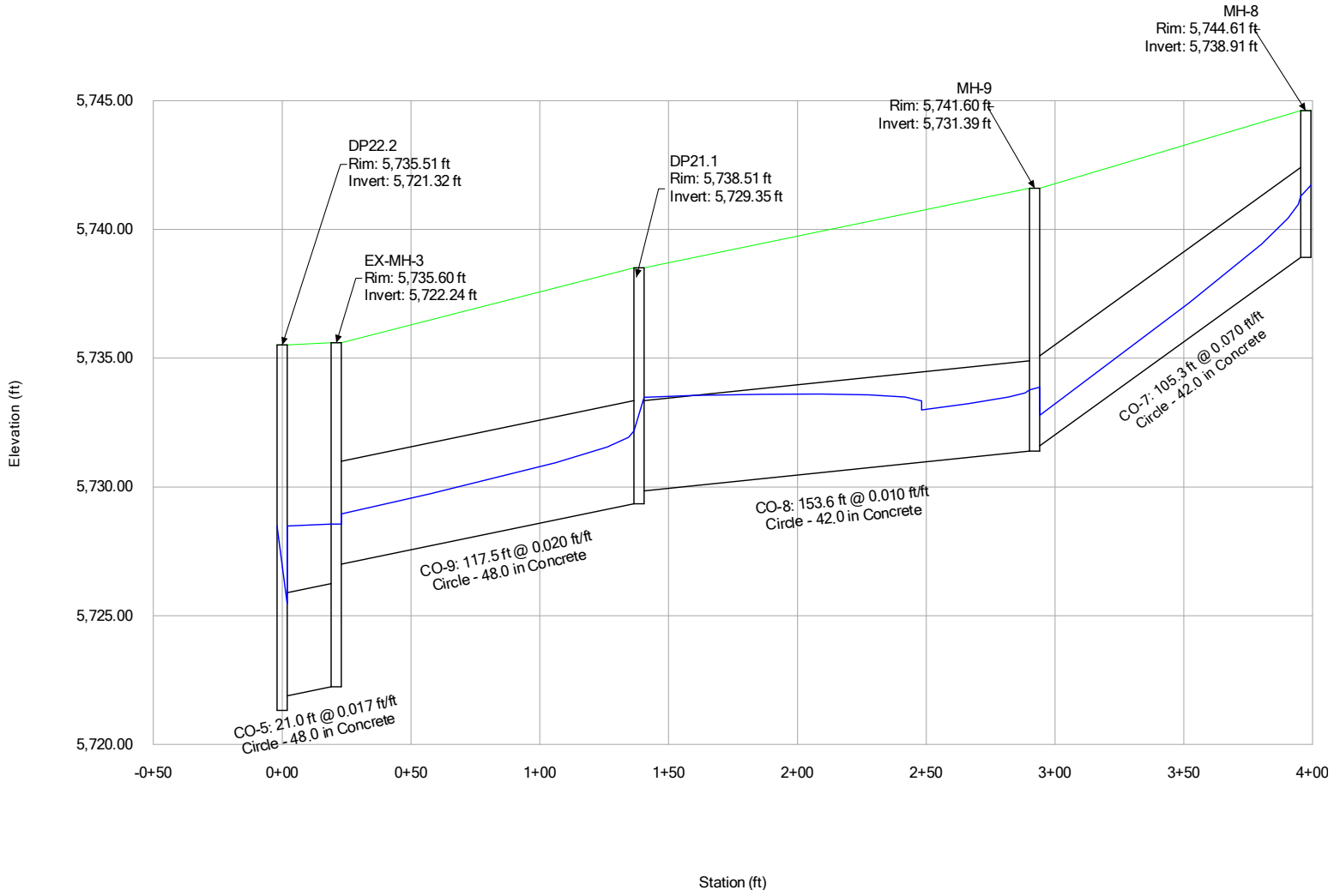
Engineering Profile - Storm-12 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

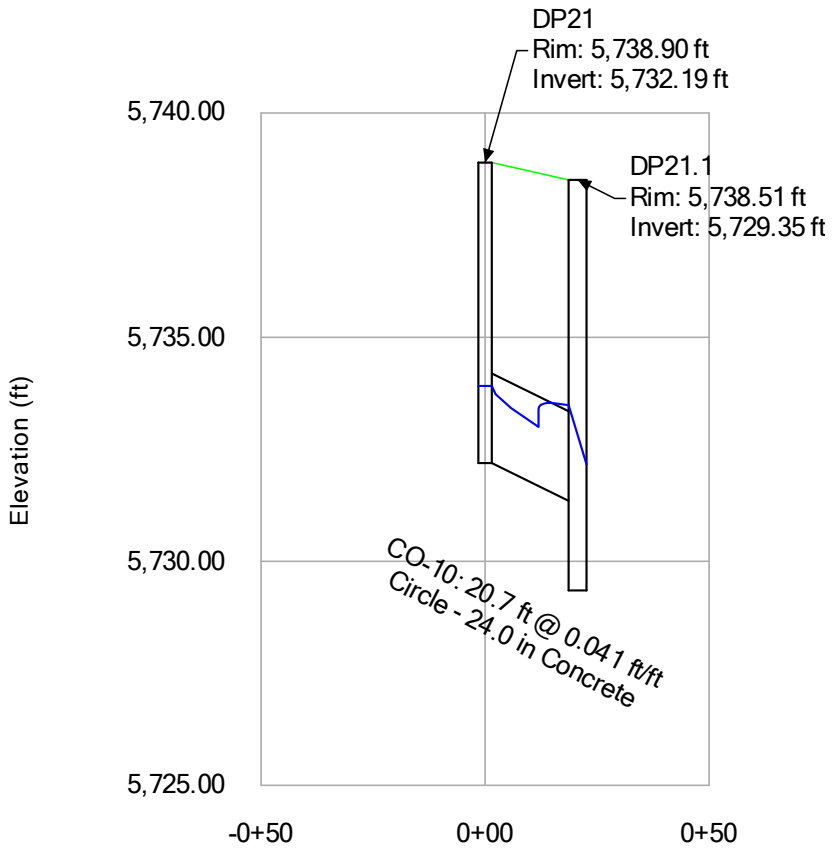
Engineering Profile - Storm-13 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

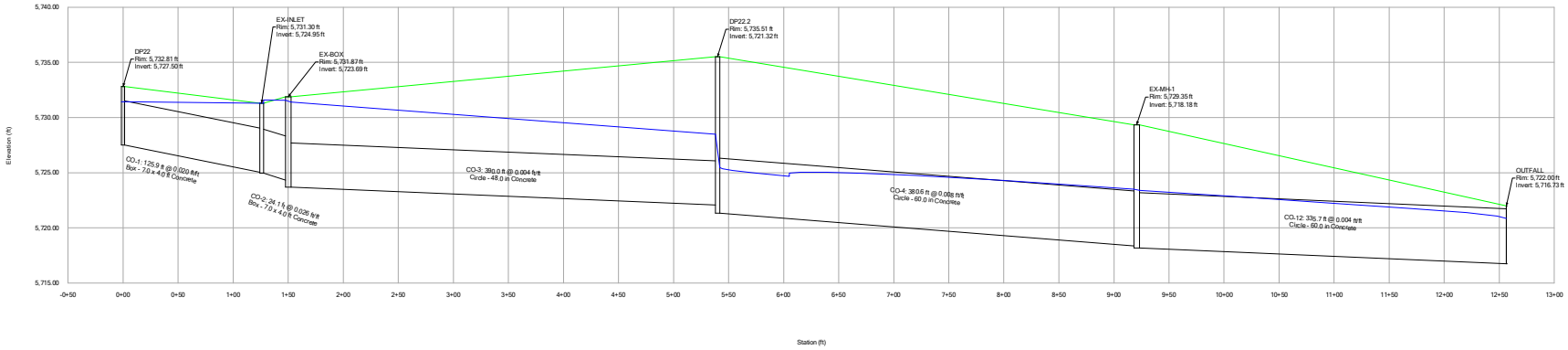
Engineering Profile - Storm-14 (Peaceful_Ridge.stsw)



100-YR SCENARIO

Profile Report

Engineering Profile - Ex-Storm-01 (Peaceful_Ridge.stsw)



Riprap Sizing - Spillway				
q (cfs/ft)	S (ft/ft)	C_f	n	D_{50} min. (in)
1.94	0.33	2	0	8.20

Type L Riprap (D_{50} = 9") will be utilized for the spillway protection

Riprap Sizing - DP18 Overflow				
q (cfs/ft)	S (ft/ft)	C_f	n	D_{50} min. (in)
1.35	0.25	2	0	5.94

Type VL Riprap (D_{50} = 6") will be utilized for the overflow protection

Riprap Sizing - Peaceful Ridge Rundown (Basin D6)				
q (cfs/ft)	S (ft/ft)	C_f	n	D_{50} min. (in)
0.10	0.25	2	0	1.38

Type VL Riprap (D_{50} = 6") will be utilized for the rundown protection

Riprap Sizing - Peaceful Ridge Rundown (Basin 7)				
	S (ft/ft)	C_f	n	D_{50} min. (in)
0.22	0.25	2	0	2.13

Type VL Riprap (D_{50} = 6") will be utilized for the rundown protection

Riprap Sizing - Pond Outfall (DP22)							
Pipe Dia (ft)	q (cfs/ft)	S (ft/ft)	C_f	n	D_{50} min. (in)	Length (ft, = 3x Pipe Dia)	Width (ft, = 3x Pipe Dia)
4	29.00	0.02	2	0	11.18	12	12

Type M Riprap (D_{50} = 12") will be utilized for the outfall protection

$$D_{50} = 5.23\, S^{0.43}\, (1.35 C_f q)^{0.56}$$ Equation 13-9

Where:

- D_{50} = median rock size (in)
- S = longitudinal slope (ft/ft)
- C_f = concentration factor (1.0 to 3.0)
- q = unit discharge (cfs/ft)

When:

- η (porosity) = 0.0 (i.e., for buried soil riprap)

Forebay #1 Sizing	
Tributary Area (ac) =	53.55
Site % Impervious=	41.70
Total Impervious Acres =	22.33
WQCV (ac-ft) =	0.82
WQCV (ft^3)=	35,849.88
3% of WQCV =	**1,075.50**

Weir Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Apr 6 2023

Forebay Weir Sizing (Q = 2% Undetained Peak 100-Yr = 2% DP18.1 = 3.50 cfs)

Rectangular Weir

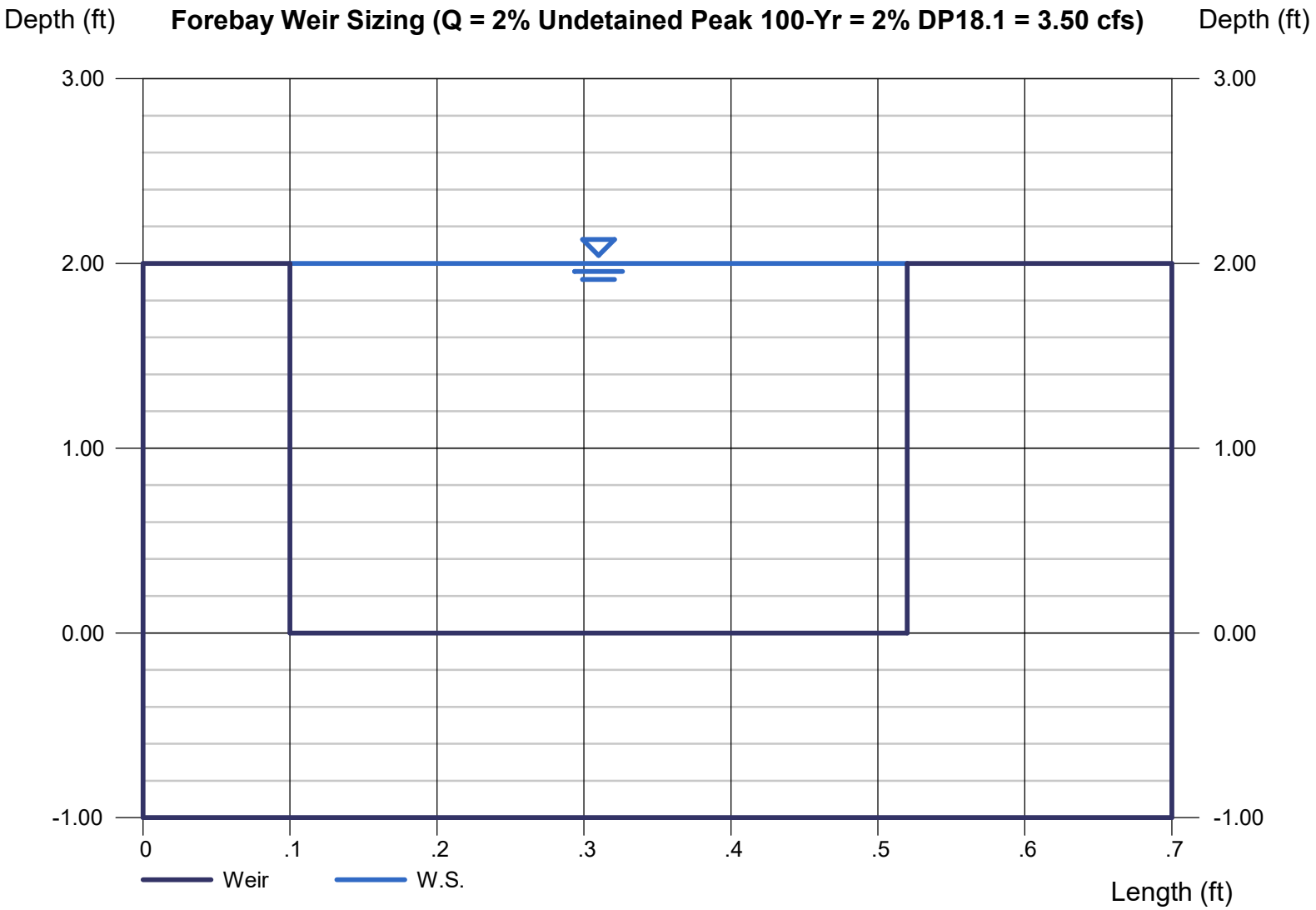
Crest	= Sharp
Bottom Length (ft)	= 0.42
Total Depth (ft)	= 2.00

Calculations

Weir Coeff. Cw	= 3.33
Compute by:	Q vs Depth
No. Increments	= 5

Highlighted

Depth (ft)	= 2.00
Q (cfs)	= 3.956
Area (sqft)	= 0.84
Velocity (ft/s)	= 4.71
Top Width (ft)	= 0.42



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Apr 6 2023

Trickle Channel Capacity (Q = FB Release = 3.5 cfs)

Rectangular

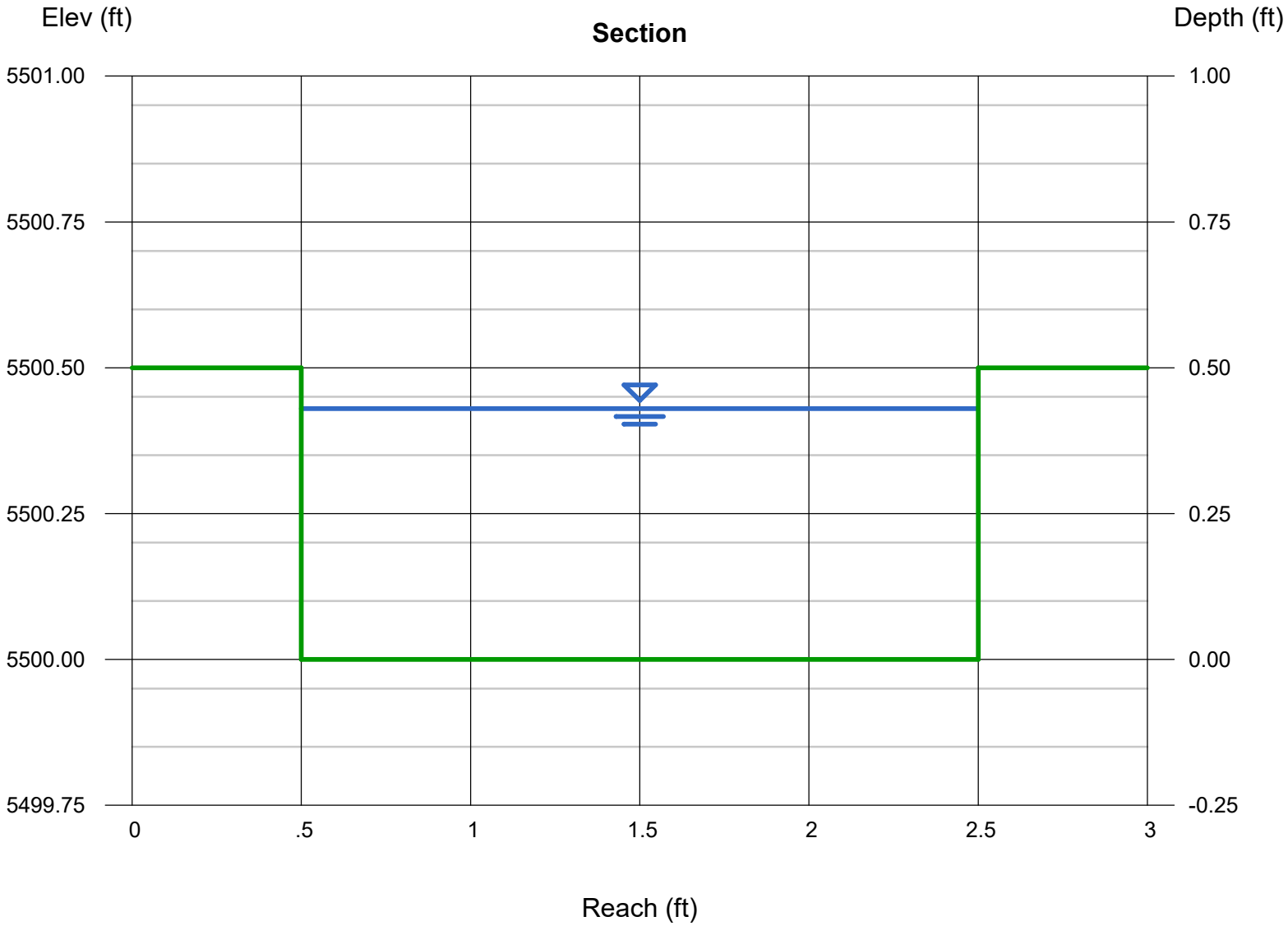
Bottom Width (ft)	= 2.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 5500.00
Slope (%)	= 1.00
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.50

Highlighted

Depth (ft)	= 0.43
Q (cfs)	= 3.500
Area (sqft)	= 0.86
Velocity (ft/s)	= 4.07
Wetted Perim (ft)	= 2.86
Crit Depth, Yc (ft)	= 0.46
Top Width (ft)	= 2.00
EGL (ft)	= 0.69



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jun 26 2023

SWALE D1 - Q100 = DP20 = 11.2 CFS

Trapezoidal

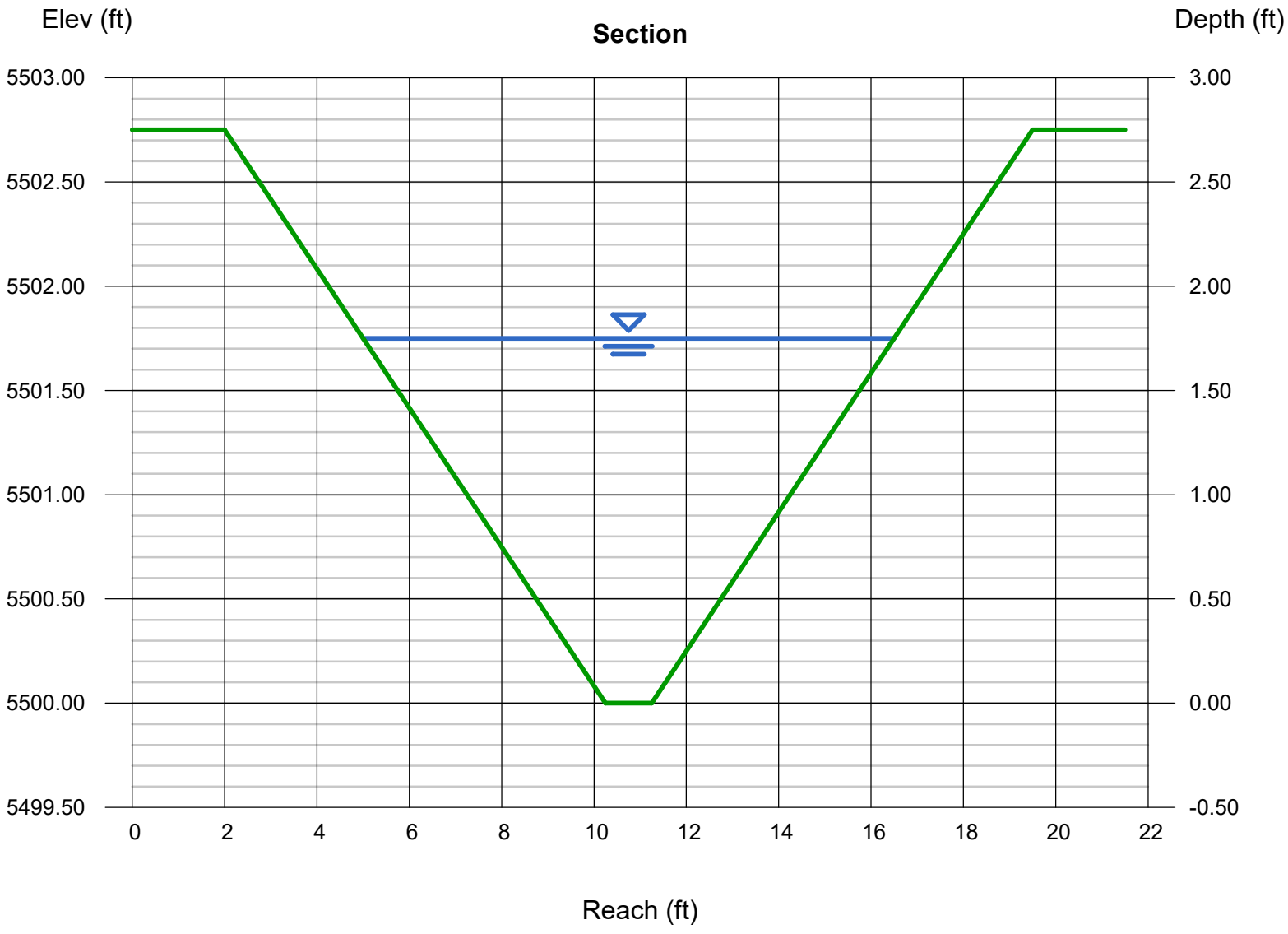
Bottom Width (ft)	= 1.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.75
Invert Elev (ft)	= 5500.00
Slope (%)	= 0.05
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 11.20

Highlighted

Depth (ft)	= 1.75
Q (cfs)	= 11.20
Area (sqft)	= 10.94
Velocity (ft/s)	= 1.02
Wetted Perim (ft)	= 12.07
Crit Depth, Yc (ft)	= 0.83
Top Width (ft)	= 11.50
EGL (ft)	= 1.77



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Apr 28 2023

BASIN D4 SWALE - Q100 = D2 + D4 = 8.5 CFS

Triangular

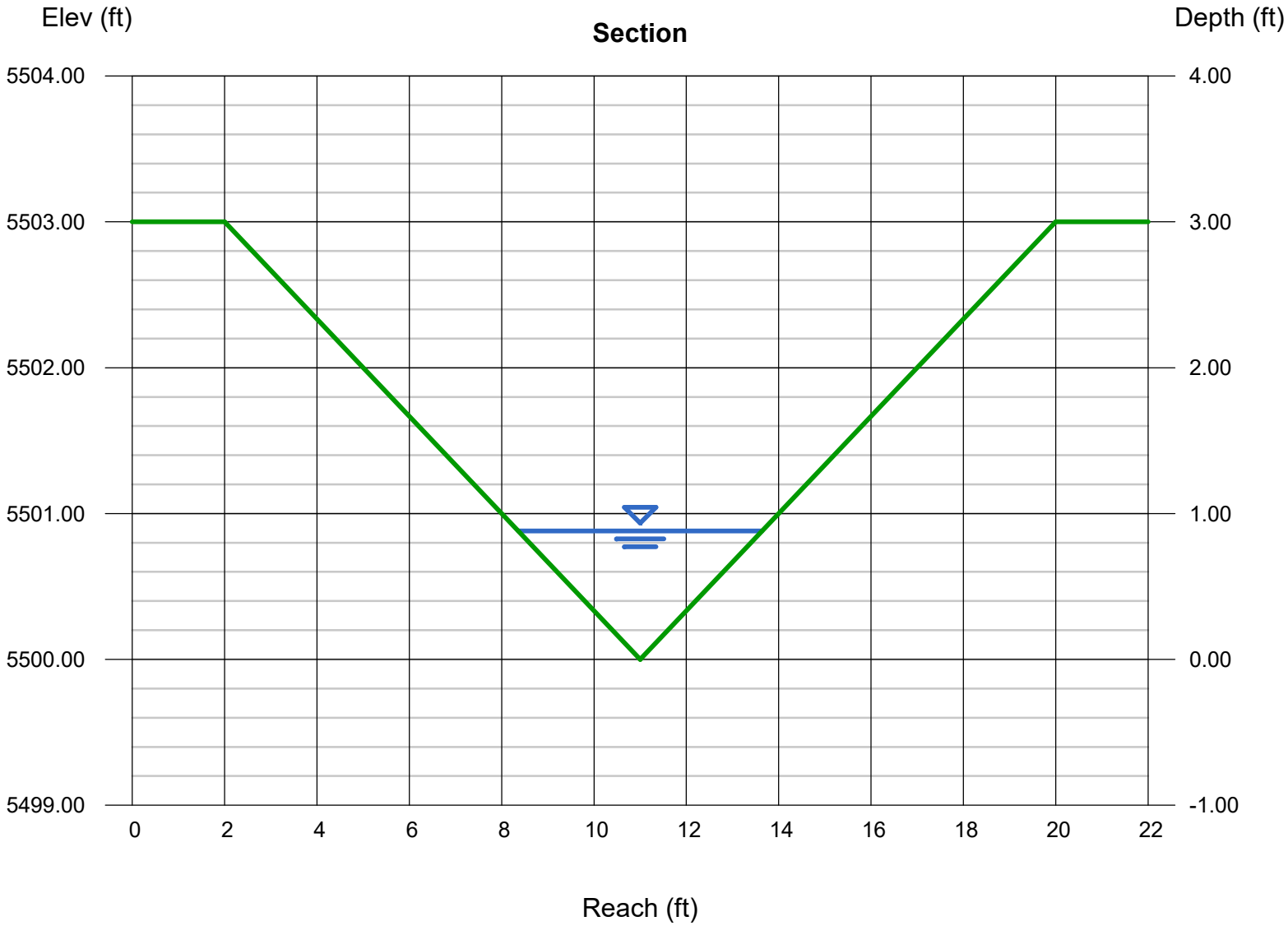
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 5500.00
Slope (%)	= 1.80
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.50

Highlighted

Depth (ft)	= 0.88
Q (cfs)	= 8.500
Area (sqft)	= 2.32
Velocity (ft/s)	= 3.66
Wetted Perim (ft)	= 5.57
Crit Depth, Yc (ft)	= 0.88
Top Width (ft)	= 5.28
EGL (ft)	= 1.09



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, May 1 2023

BASIN D5 SWALE: Q100 = DP23 FLOW = 10.9 cfs

Triangular

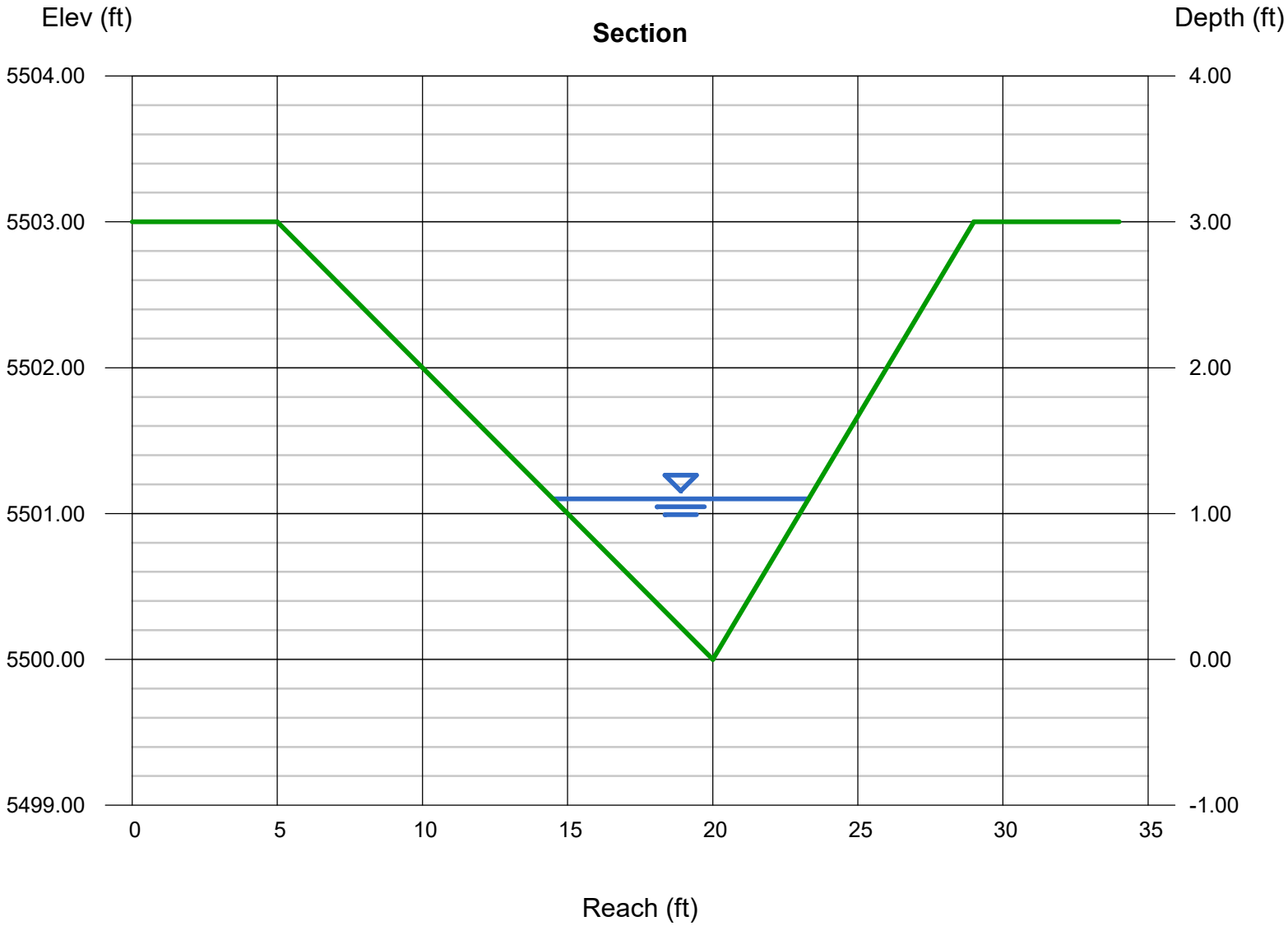
Side Slopes (z:1)	= 5.00, 3.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 5500.00
Slope (%)	= 0.50
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 10.90

Highlighted

Depth (ft)	= 1.10
Q (cfs)	= 10.90
Area (sqft)	= 4.84
Velocity (ft/s)	= 2.25
Wetted Perim (ft)	= 9.09
Crit Depth, Yc (ft)	= 0.86
Top Width (ft)	= 8.80
EGL (ft)	= 1.18



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, May 1 2023

BASIN JC5 SWALE: Q100 = BASIN JC5 FLOW = 23.5 cfs

Triangular

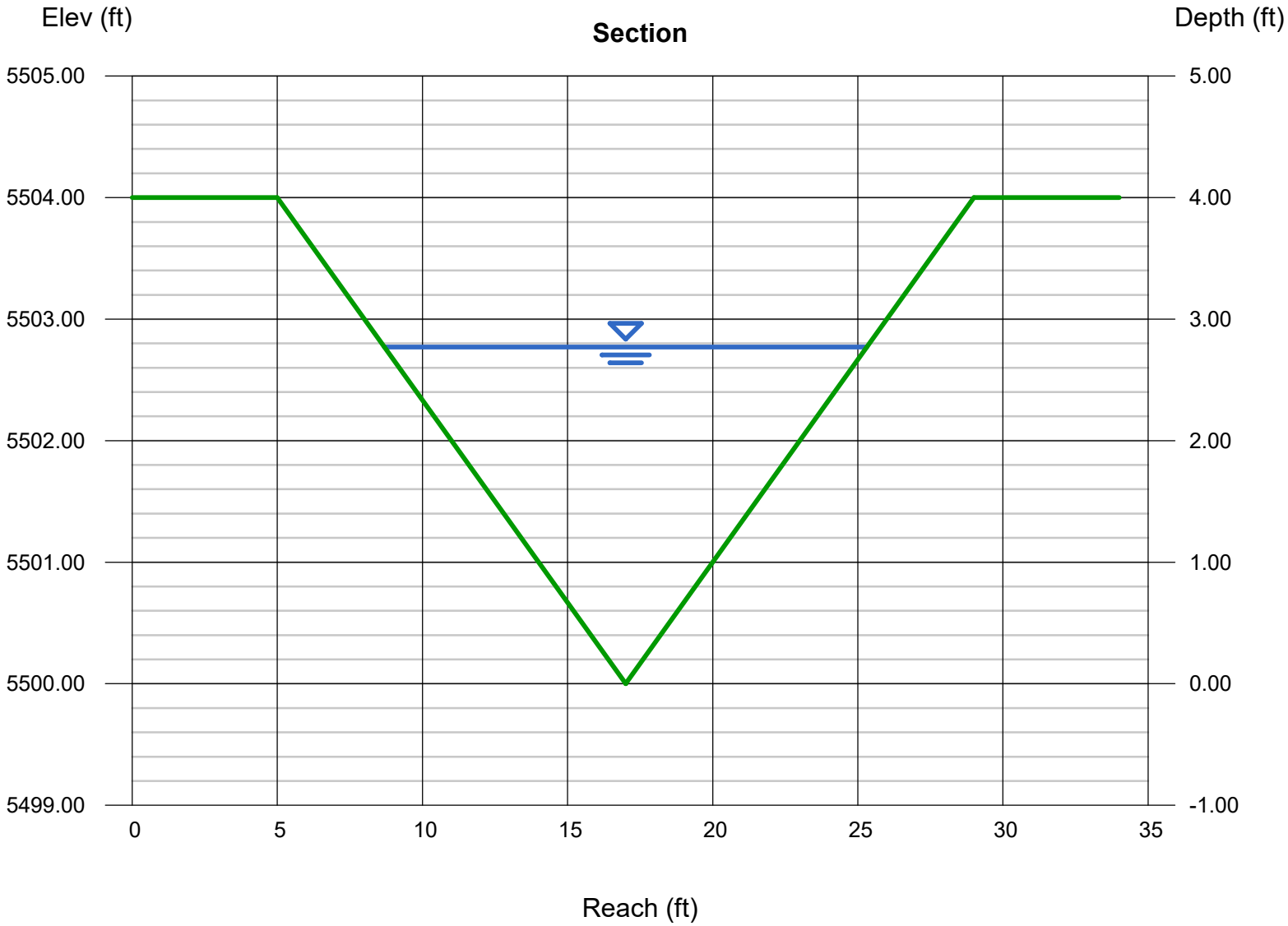
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 4.00
Invert Elev (ft)	= 5500.00
Slope (%)	= 0.03
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.50

Highlighted

Depth (ft)	= 2.77
Q (cfs)	= 23.50
Area (sqft)	= 23.02
Velocity (ft/s)	= 1.02
Wetted Perim (ft)	= 17.52
Crit Depth, Yc (ft)	= 1.31
Top Width (ft)	= 16.62
EGL (ft)	= 2.79



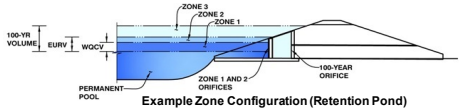
APPENDIX D – WATER QUALITY & DETENTION

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: PEACEFUL RIDGE FINAL DRAINAGE REPORT

Basin ID: BASINS OS1, A1, A2 & B1-B11



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	52.46	acres
Watershed Length =	2,200	ft
Watershed Length to Centroid =	250	ft
Watershed Slope =	0.035	ft/ft
Watershed Imperviousness =	41.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

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

			Optional User Overrides
Water Quality Capture Volume (WQCV) =	0.805	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	2.299	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	2.161	acre-feet	1.19 inches
5-yr Runoff Volume (P1 = 1.5 in.) =	3.204	acre-feet	1.50 inches
10-yr Runoff Volume (P1 = 1.75 in.) =	4.139	acre-feet	1.75 inches
25-yr Runoff Volume (P1 = 2 in.) =	5.466	acre-feet	2.00 inches
50-yr Runoff Volume (P1 = 2.25 in.) =	6.505	acre-feet	2.25 inches
100-yr Runoff Volume (P1 = 2.52 in.) =	7.855	acre-feet	2.52 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	10.544	acre-feet	inches
Approximate 2-yr Detention Volume =	1.702	acre-feet	
Approximate 5-yr Detention Volume =	2.369	acre-feet	
Approximate 10-yr Detention Volume =	3.237	acre-feet	
Approximate 25-yr Detention Volume =	3.604	acre-feet	
Approximate 50-yr Detention Volume =	3.779	acre-feet	
Approximate 100-yr Detention Volume =	4.310	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.805	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.494	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.011	acre-feet
Total Detention Basin Volume =	4.310	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

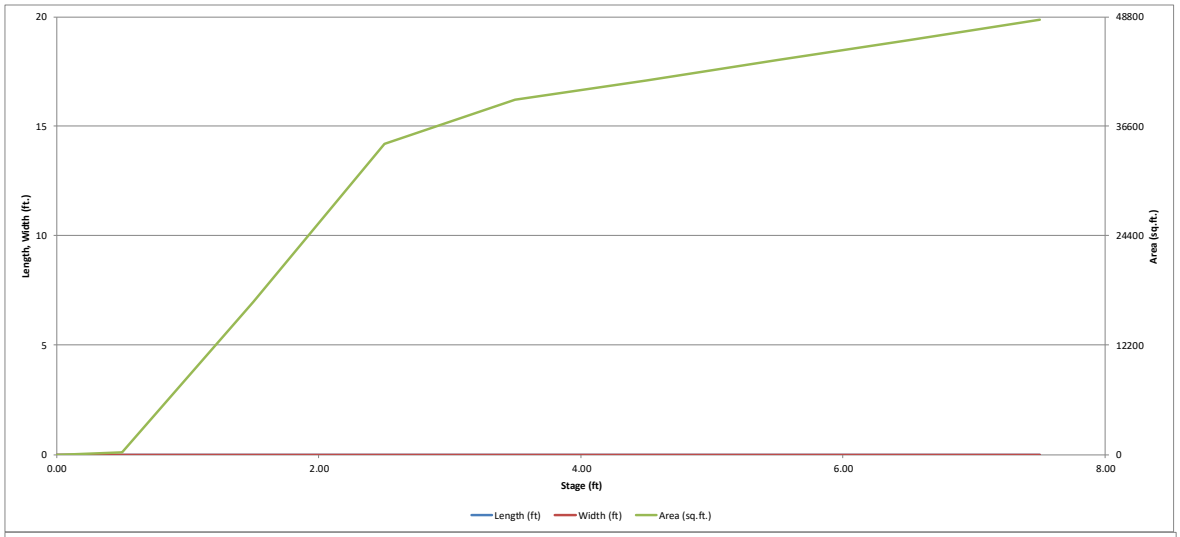
5730.25

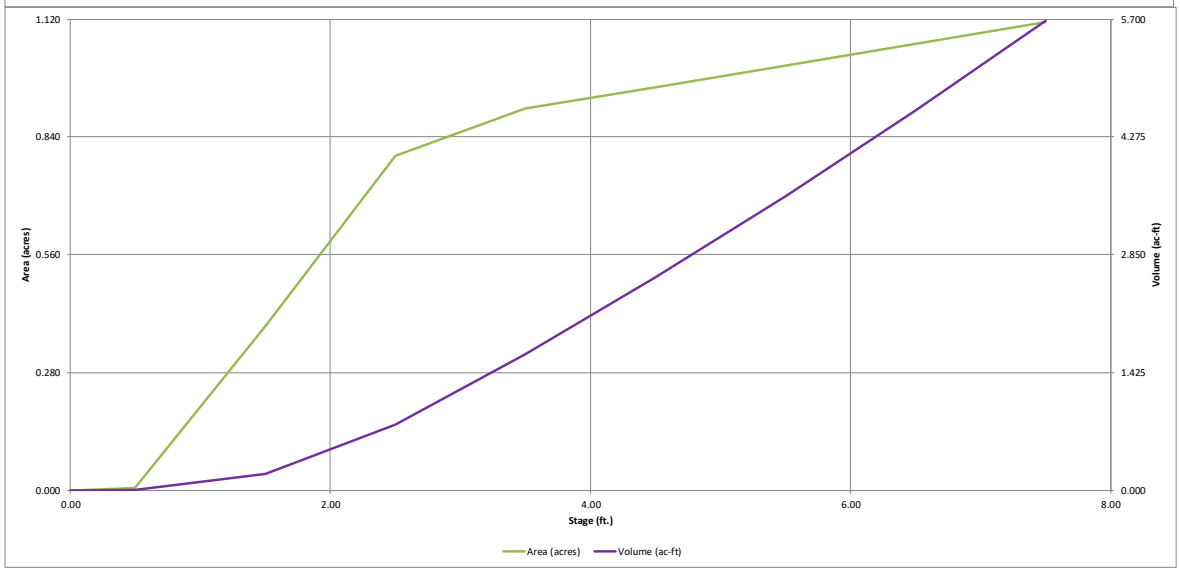
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
5731	--	0.50	--	--	--	258	0.006	64	0.001
5732	--	1.50	--	--	--	17,009	0.390	8,698	0.200
5733	--	2.50	--	--	--	34,626	0.795	34,515	0.792
5734	--	3.50	--	--	--	39,531	0.908	71,594	1.644
5735	--	4.50	--	--	--	41,729	0.958	112,224	2.576
5736	--	5.50	--	--	--	43,957	1.009	155,067	3.560
5737	--	6.50	--	--	--	46,200	1.061	200,145	4.595
5738	--	7.50	--	--	--	48,476	1.113	247,483	5.681

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



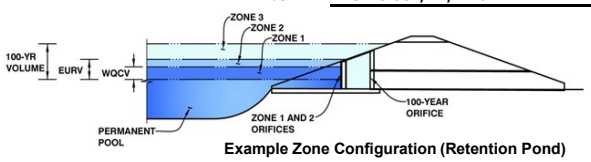


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: PEACEFUL RIDGE FINAL DRAINAGE REPORT

Basin ID: BASINS OS1, A1, A2 & B1-B11



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.52	0.805	Orifice Plate
Zone 2 (EURV)	4.21	1.494	Circular Orifice
Zone 3 (100-year)	6.24	2.011	Weir&Pipe (Restrict)
Total (all zones)		4.310	

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

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

Calculated Parameters for Underdrain

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

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.063E-02	ft^2
Depth at top of Zone using Orifice Plate =	2.52	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	10.10	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	2.97	sq. inches (diameter = 1-15/16 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	0.84	1.68					
Orifice Area (sq. inches)	2.97	2.97	2.97					

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

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected			Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.52	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.02	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	4.21	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.08	N/A	feet
Vertical Orifice Diameter =	1.82	N/A	inches				

Calculated Parameters for Vertical Orifice

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

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.21	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.04	N/A	feet
Overflow Weir Front Edge Length =	34.00	N/A	feet	Overflow Weir Slope Length =	10.03	N/A	feet
Overflow Weir Grate Slope =	12.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	20.00	N/A	
Horiz. Length of Weir Sides =	10.00	N/A	feet	Overflow Grate Open Area w/o Debris =	237.46	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	118.73	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	11.87	N/A	ft^2
Outlet Pipe Diameter =	48.00	N/A	inches	Outlet Orifice Centroid =	1.90	N/A	feet
Restrictor Plate Height Above Pipe Invert =	43.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	2.48	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	5.75	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.72	feet
Spillway Crest Length =	100.00	feet	Stage at Top of Freeboard =	7.47	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.11	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	5.65	acre-ft

Calculated Parameters for Spillway

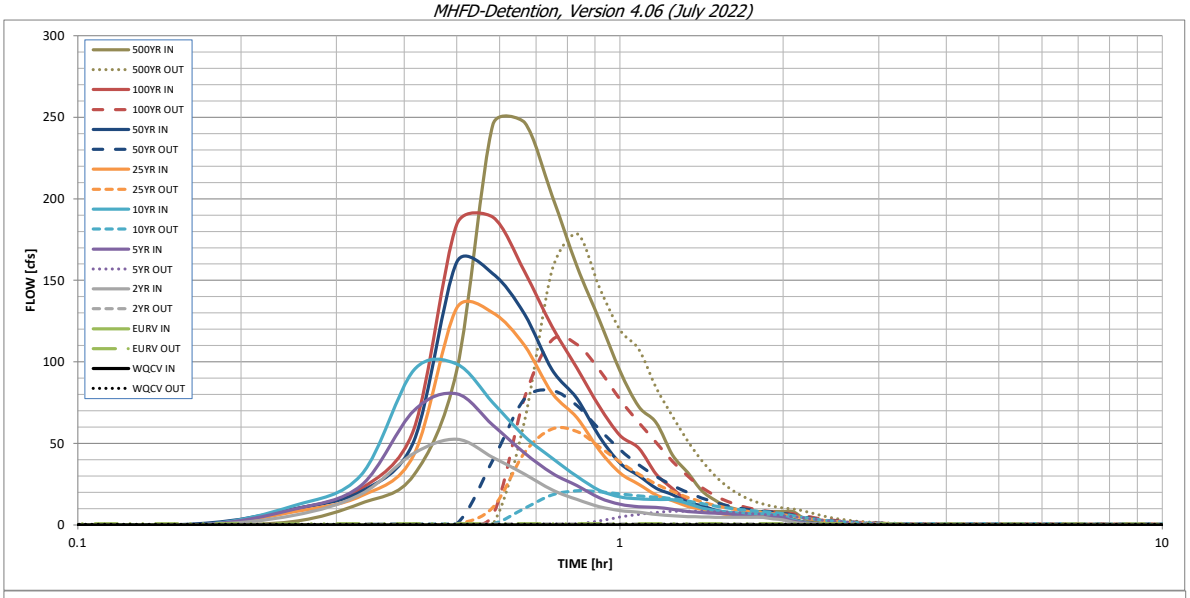
Routed Hydrograph Results

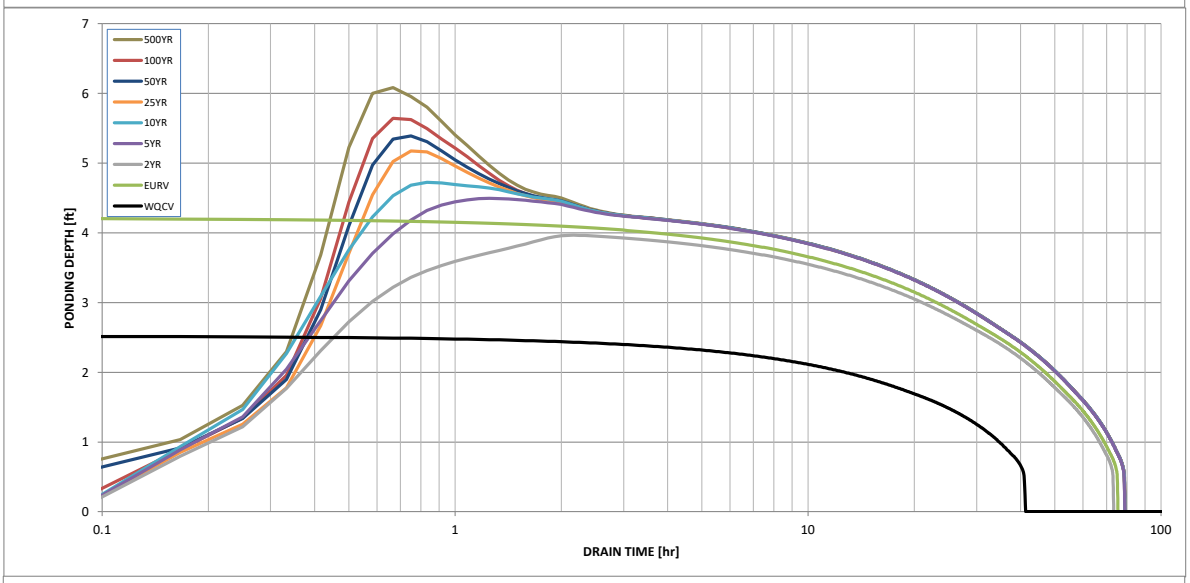
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

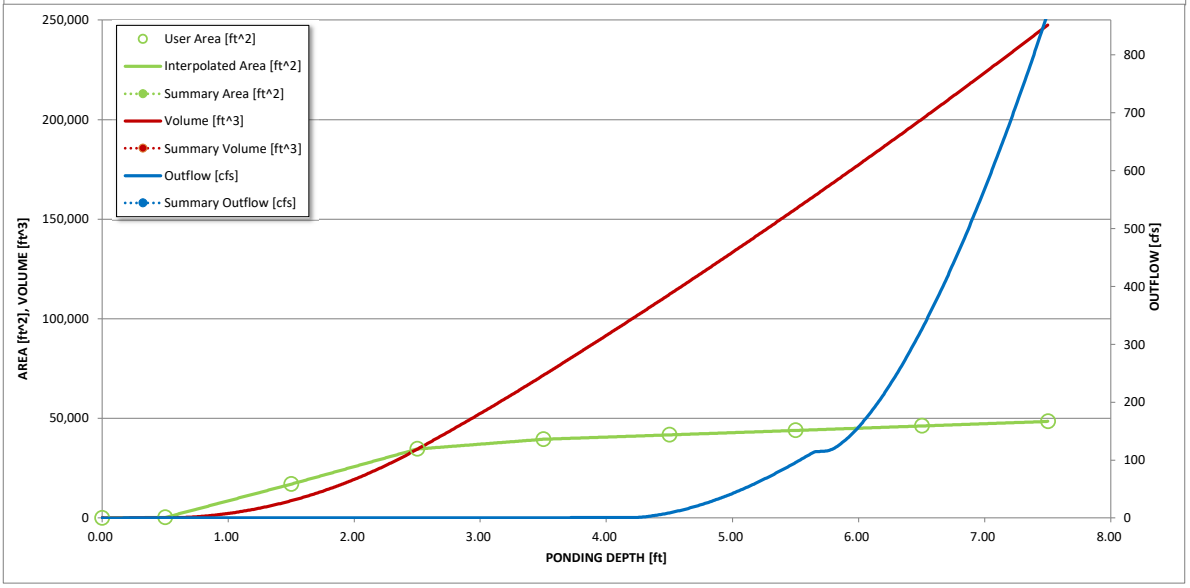
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.805	2.299	2.161	3.204	4.139	5.466	6.505	7.855	10.544
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.161	3.204	4.139	5.466	6.505	7.855	10.544
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	11.0	30.1	45.7	75.4	95.5	120.5	167.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.21	0.57	0.87	1.44	1.82	2.30	3.19
Peak Inflow Q (cfs) =	N/A	N/A	52.6	80.3	98.7	133.1	161.0	188.7	246.9
Peak Outflow Q (cfs) =	0.4	0.7	0.6	8.5	21.0	58.9	82.4	113.5	178.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.5	0.8	0.9	0.9	1.1
Structure Controlling Flow =	Plate	Overflow Weir 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.0	0.1	0.2	0.3	0.5	0.5
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) =	38	68	66	69	67	65	63	60	56
Time to Drain 99% of Inflow Volume (hours) =	**40**	72	70	75	74	72	72	71	69
Maximum Ponding Depth (ft) =	2.52	4.21	3.96	4.49	4.72	5.17	5.39	5.64	6.08
Area at Maximum Ponding Depth (acres) =	0.80	0.94	0.93	0.96	0.97	0.99	1.00	1.02	1.04
Maximum Volume Stored (acre-ft) =	0.808	2.301	2.066	2.567	2.788	3.230	3.439	3.702	4.154

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.07	2.13
	0:15:00	0.00	0.00	5.79	9.49	11.78	7.92	9.69	9.65	13.26
	0:20:00	0.00	0.00	18.89	24.37	30.80	17.83	20.56	22.34	30.48
	0:25:00	0.00	0.00	43.82	70.10	94.84	42.91	51.31	58.63	94.70
	0:30:00	0.00	0.00	52.61	80.35	98.73	133.10	161.04	184.33	245.46
	0:35:00	0.00	0.00	41.35	61.09	74.93	130.06	154.06	188.73	246.90
	0:40:00	0.00	0.00	31.09	44.12	54.29	109.97	129.36	155.32	201.96
	0:45:00	0.00	0.00	21.47	31.64	40.96	80.87	95.13	121.55	158.61
	0:50:00	0.00	0.00	15.57	24.05	29.69	65.75	77.46	96.18	125.60
	0:55:00	0.00	0.00	11.21	16.61	21.21	45.73	54.19	72.47	94.60
	1:00:00	0.00	0.00	8.76	12.65	17.19	31.85	37.97	54.98	72.56
	1:05:00	0.00	0.00	7.83	11.20	15.98	24.95	30.24	46.98	62.77
	1:10:00	0.00	0.00	6.33	10.72	15.58	18.35	22.52	31.09	42.99
	1:15:00	0.00	0.00	5.57	9.54	15.47	14.90	18.50	22.31	32.06
	1:20:00	0.00	0.00	5.13	8.28	13.16	11.34	13.92	14.55	20.90
	1:25:00	0.00	0.00	4.89	7.55	10.43	9.62	11.67	10.50	14.98
	1:30:00	0.00	0.00	4.73	7.14	8.78	7.62	9.07	7.87	11.16
	1:35:00	0.00	0.00	4.64	6.90	7.82	6.51	7.62	6.48	9.17
	1:40:00	0.00	0.00	4.62	5.77	7.25	5.93	6.86	6.06	8.48
	1:45:00	0.00	0.00	4.62	5.14	6.90	5.64	6.48	5.88	8.16
	1:50:00	0.00	0.00	4.62	4.77	6.78	5.50	6.31	5.86	8.14
	1:55:00	0.00	0.00	3.65	4.58	6.34	5.44	6.22	5.86	8.14
	2:00:00	0.00	0.00	3.08	4.20	5.52	5.43	6.22	5.86	8.14
	2:05:00	0.00	0.00	1.75	2.39	3.16	3.12	3.56	3.36	4.65
	2:10:00	0.00	0.00	0.99	1.35	1.77	1.77	2.02	1.90	2.62
	2:15:00	0.00	0.00	0.50	0.71	0.92	0.93	1.06	0.99	1.36
	2:20:00	0.00	0.00	0.23	0.37	0.45	0.48	0.55	0.51	0.69
	2:25:00	0.00	0.00	0.09	0.14	0.16	0.18	0.20	0.18	0.24
	2:30:00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.01	0.01
	2:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	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
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	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	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).

APPENDIX E – REFERENCE MATERIAL

SHEET No. 1

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

LEGEND

- BASIN BOUNDARY
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED STORM DRAIN PIPE
- EXISTING STORM DRAIN PIPE
- FLOW DIRECTION
- EXISTING EDGE OF ROAD
- PROPERTY LINE

BASIN (Q5 / Q100 / AREA)
- SUB BASIN DESIGNATION
- 5-YEAR STORM EVENT PEAK FLOW (CFS)
- 100-YEAR STORM EVENT PEAK FLOW (CFS)
- SUB BASIN AREA (AC. OR SQ. MI.)

2 — DESIGN POINT

N

GRAPHIC SCALE
250' 0' 250' 500'
(IN FEET)
1 inch = 250 ft.

Existing Design Point Summary - Rational Method

BRADLEY HEIGHTS MDDP

Design Point	Sub-Basins	Total Area (ac.)	Q(5) (cfs)	Q(100) (cfs)
WF1	W1, TAR-EP	258.80	35.56	298.86
WF2	W2,W3	88.88	29.39	157.39
JC	J1	46.62	15.00	80.34

BRADLEY HEIGHTS MDDP
EXISTING CONDITIONS
HEC-HMS - SCS METHOD

Sub-basin	Area Acres	Area Sq. Mi.	Q5 CFS	Q100 CFS
M1	*92.4*	*0.1443*	17.7	158.6
M2	*144.3*	*0.2255*	25.2	220.8
M3	*146.3*	*0.2286*	9.5	151.3
M4	*149.4*	*0.2334*	10.6	162.9
M5	*105.9*	*0.1654*	3.3	48.5
M6	*144.4*	*0.2256*	4.5	75.3
M7	*108.3*	*0.1692*	3.8	115.3
M8	*158.4*	*0.2475*	22.8	183.2
M9	*150.8*	*0.2357*	2.9	60
M10	*88.8*	*0.1388*	1.8	17.5
M11	*69.1*	*0.1079*	2	31
M12	*106.2*	*0.1660*	3.1	12.8
M13	*144.4*	*0.2257*	3.7	25.6
M14	*72.7*	*0.1136*	2	10.6
M15	*59.1*	*0.0924*	2.2	5.3
M16	*148.5*	*0.2321*	3.7	18.3
M17	*182.0*	*0.2844*	4.9	121.9
M18	*163.5*	*0.2554*	4.2	107.7
M19	*192.0*	*0.3000*	4.7	32.5
M20	*89.5*	*0.1399*	2.1	5.1
M21	*146.6*	*0.2290*	4.6	11.6
M22	*66.1*	*0.1033*	2.1	5.3
M23	*132.8*	*0.2075*	2.8	6.9
M24	*99.6*	*0.1556*	3.1	22.3
M25	*101.8*	*0.1591*	3.2	37.1
M26	*114.3*	*0.1786*	2	4.7
M27	*124.9*	*0.1951*	2.1	5
Design Points				
DP-M0	*3302.1*	*5.1595*	81.4	1024.4
DP-M1	*3302.1*	*5.1595*	81.4	1024.4
DP-M2	*3209.7*	*5.0152*	78.8	987.8
DP-M3	*3065.4*	*4.7897*	69	897.8
DP-M4	*2919.1*	*4.5611*	62	804.4
DP-M5	*250.2*	*0.3910*	7.6	122.8
DP-M6	*2102.0*	*3.2844*	27	371.6
DP-M7	*451.6*	*0.7056*	8	70.4
DP-M8	*1561.6*	*2.4400*	17.7	284.3
DP-M9	*875.6*	*1.3681*	12.9	67.8
DP-M10	*368.9*	*0.5764*	9.1	23.2
DP-M11	*239.2*	*0.3737*	4	9.7

CITY OF COLORADO SPRINGS

BRADLEY HEIGHTS METRO DISTRICT
MASTER DEVELOPMENT DRAINAGE REPORT

PREDEVELOPMENT DRAINAGE CONDITIONS

DESIGNED BY: MO
DRAWN BY: JTS
CHECKED BY: JTS

DATE-SIGNED: JANUARY 2022
SHEET: 1 OF 5
SCALE: HORIZ 1" = 250'
VERT. NA

DRAWING No. DR-01

SEAL

PRELIMINARY
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.
PROJECT No: 21.1213.004

PREPARED BY: Matrix

No.	DATE	DESCRIPTION	BY
		REVISIONS	

COMPUTER FILE MANAGEMENT
FILE NAME: S:\21.1213.001 Bradley Heights Metro District\200 Drainage\201 Drainage Reports\MDDP\DWG\BRADLEY HEIGHTS DR.dwg
CTB FILE:
PLOT DATE: January 11, 2022 4:45:55 PM
THIS DRAWING IS CURRENTLY AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.

REFERENCE DRAWINGS

Rational Method - Proposed Conditions

Project Name: BRADLEY HEIGHTS MDDP
Project Location: COLORADO SPRINGS, EL PASO COUNTY, CO
Designer JTS
Notes: Proposed Condition

Average Channel Velocity 4.00 ft/s (If specific channel vel is used, this will be ignored)
Average Slope for Initial Flow 0.04 ft/ft (If Elevations are used, this will be ignored)
SOIL TYPE CHOSEN BASED ON WORST CASE FOR TRIBUTARY AREA

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

PCT Impervious: 95% | 65% | 100% | 70% | 30% | 2%

Sub-basin	Comments	Area sf	Area acres	Area Sq. Mi.	Soil Group	Commercial Areas (95% Impervious) C5	C100	Area	Residential (1/8 or less) (65% Impervious) C5	C100	Area (SF)	Pavement (100% Impervious) C5	C100	Area (SF)	Neighborhoods/Multi-Family (70% Impervious) C5	C100	Area	Residential (1/3 Acre) (30% Impervious) C5	C100	Area	Undeveloped/Pervious Areas (2% Impervious) C5	C100	Area
BR1	NORTH OF TRAILS AT ASPEN RIDGE	121992	2.80	0.0044	B	0.81	0.88	42600	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	79392
BH1	NE CORNER OF TRAILS, NW CORNER OF BRADLEY HEIGHTS	69052	1.59	0.0025	B	0.81	0.88		0.45	0.59		0.90	0.96	11729	0.49	0.62		0.25	0.47		0.09	0.36	57323
BH2	DITCH BETWEEN BRADLEY ROAD & BRADLEY HEIGHTS EAST	130927	3.01	0.0047	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	130927
BHE	BRADLEY HEIGHTS EAST F 1&2 UNDEVELOPED/DISCHARGE FROM FSD	1755694	40.31	0.0630	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	1755694
BHE2	BRADLEY HEIGHTS EAST F 3&4 UNDEVELOPED/DISCHARGE FROM MKJCC POND #11	382000	8.77	0.0137	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	382000
BHE3	BRADLEY HEIGHTS EAST F 5&6 - DEVELOPED FLOWS	941040	21.60	0.0338	D	0.82	0.89		0.49	0.65	941040	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
BHC	BRADLEY HEIGHTS COMMERCIAL UNDEVELOPED/DISCHARGE FROM MKJCC POND #10	612207	14.05	0.0220	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	612207
TAR-NE	NORTHEAST TRAILS AT ASPEN RIDGE (PART OF TAR F4) UNDEVELOPED/DISCHARGE FROM FSD	398439	9.15	0.0143	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	398439
BL1	WEST HALF OF BRADLEY LANDING DRAINING TO NORTH. PORTION OF BRADLEY ROAD DRAINING EAST	130000	2.98	0.0047	B	0.81	0.88	130000	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
BL2	EAST HALF OF BRADLEY LANDING	60354	1.39	0.0022	B	0.81	0.88	60354	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
RHC1	SOUTH HALF OF BRADLEY ROAD BETWEEN BLISS AND BRADLEY LANDING	107935	2.48	0.0039	B	0.81	0.88	107935	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
RHC2	EAST HALF OF BLISS ROAD ADJACENT TO REDEMPTION HILL CHURCH	25483	0.59	0.0009	B	0.81	0.88	25483	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
RHC3	REDEMPTION HILL CHURCH	431154	9.90	0.0155	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68	431154	0.30	0.57		0.16	0.51	
RHC4	RHC ADJACENT PROPERTY OWNED BY THE CHURCH	1055503	24.23	0.0379	D	0.82	0.89		0.49	0.65	1055503	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
BS1	BLISS ROAD	137852	3.16	0.0049	B	0.81	0.88	60390	0.45	0.59	77462	0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
BS2	BLISS ROAD	35937	0.83	0.0013	B	0.81	0.88	35937	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
BS3	BLISS ROAD	33528	0.77	0.0012	D	0.82	0.89	33528	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
BS4	BLISS ROAD	30562	0.70	0.0011	D	0.82	0.89	30562	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
BS5	BLISS ROAD	52249	1.20	0.0019	D	0.82	0.89	52249	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
BS6	BLISS ROAD	21806	0.50	0.0008	D	0.82	0.89	21806	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK1	SCHOOL & PUD	912529	20.95	0.1388	D	0.82	0.89	912529	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK2	PUD-MARKSHEFFEL-WOODMEN INVESTMENTS, LLC	491552	11.28	0.1079	D	0.82	0.89		0.49	0.65	491552	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK3	BRADLEY LANDING BOULEVARD	71539	1.64	0.1660	D	0.82	0.89	71539	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK4	BRADLEY LANDING BOULEVARD	71100	1.63	0.2257	D	0.82	0.89	71100	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK5	BRADLEY RIDGE ROAD	26108	0.60	0.1136	D	0.82	0.89	26108	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK6	PUD-MARKSHEFFEL-WOODMEN INVESTMENTS, LLC	2270661	52.13	0.0924	D	0.82	0.89		0.49	0.65	2270661	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK7	PUD-MARKSHEFFEL-WOODMEN INVESTMENTS, LLC	1085533	24.92	0.2321	D	0.82	0.89		0.49	0.65	1085533	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK8	MARKSHEFFEL ROAD/MARKSHEFFEL TRIB. DOWNSTREAM OF CC POND.	351015	8.06	0.2844	D	0.82	0.89	98617	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	252398
MK9	PUD-PIKES PEAK COUNCIL BOYS MULTI-FAMILY IN MDDP-2015	1796376	41.24	0.2554	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68	1796376	0.30	0.57		0.16	0.51	
MK10	BRADLEY RIDGE ROAD	85832	1.97	0.3000	D	0.82	0.89	85832	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
CC	COLORADO CENTRE POND/MARKSHEFFEL TRIBUTARY FUTURE FLOW PATH	2259954	51.88	0.1399	D	0.82	0.89	207592	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	2052362
MK11	BRADLEY RIDGE ROAD	195555	4.49	0.2290	D	0.82	0.89	77886	0.49	0.65		0.90	0.96		0.53	0.68	72375	0.30	0.57		0.16	0.51	45294
MK12	1ST COLLECTOR WEST OF MARKSHEFFEL	16546	0.38	0.1033	D	0.82	0.89	16546	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK13	BRADLEY RIDGE DEVELOPMENT	685860	15.75	0.2075	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68	685860	0.30	0.57		0.16	0.51	
MK14	BRADLEY RIDGE DEVELOPMENT	131504	3.02	0.0047	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68	131504	0.30	0.57		0.16	0.51	
MK15	BRADLEY RIDGE ROAD	29148	0.67	0.0010	D	0.82	0.89	29148	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
MK16	MARKSHEFFEL ROAD & UNDEVELOPED CITY PROPERTY	293102	6.73	0.0105	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	293102
JC1	1ST COLLECTOR WEST OF MARKSHEFFEL-WEST SIDE	80679	1.85	0.1556	D	0.82	0.89	35729	0.49	0.65		0.90	0.96		0.53	0.68	30402	0.30	0.57		0.16	0.51	14548
JC2	1ST COLLECTOR WEST OF MARKSHEFFEL-EAST SIDE	32553	0.75	0.1591	D	0.82	0.89	32553	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
JC3	BRADLEY RIDGE DEVELOPMENT 70% impervious used to provide more conservative flow	788205	18.09	0.1786	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68	788205	0.30	0.57		0.16	0.51	
JC4	BRADLEY RIDGE DEVELOPMENT	729417	16.75	0.1951	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68	729417	0.30	0.57		0.16	0.51	
JC5	MARKSHEFFEL ROAD & UNDEVELOPED CITY PROPERTY	326813	7.50	0.0117	D	0.82	0.89	207805	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	119008
WF1	BRADLEY HEIGHTS EAST FILINGS 3&4	696679	15.99	0.0250	B	0.81	0.88		0.45	0.59	696679	0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
WF2	BRADLEY LANDING (WEST SIDE) & LEGACY HILL DR (NORTH SIDE)	201537	4.63	0.0072	B	0.81	0.88	17670	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	183867
WF3	SOUTH HALF OF LEGACY HILL DRIVE	32652	0.75	0.0012	B	0.81	0.88	32652	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
LH1	LEGACY HILL NORTHSIDE DRAINING WEST	7884	0.18	0.0003	B	0.81	0.88	7884	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
LH2	LEGACY HILL NORTHSIDE DRAINING EAST	7884	0.18	0.0003	B	0.81	0.88	7884	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
WF4	BRADLEY HEIGHTS MULTI-FAMILY	883225	20.28	0.0317	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62	697669	0.25	0.47		0.09	0.36	185556
WF5	BRADLEY HEIGHTS EAST FILINGS 3&4	280402	6.44	0.0101	D	0.82	0.89		0.49	0.65	280402	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF6	BRADLEY LANDING (WEST SIDE)	46250	1.06	0.0017	D	0.82	0.89	46250	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF7	BRADLEY RIDGE DEVELOPMENT SOUTHWEST OF BRADLEY RIDGE ROAD	584103	13.41	0.0210	D	0.82	0.89		0.49	0.65	584103	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF8	WFJCC POND #1	579521	13.30	0.0208	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	579521
WF9	OFFSITE AREAS: CSU FUTURE SUBSTATION	550374	12.63	0.0197	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	550374
WF10	NORTH SIDE OF BRADLEY RIDGE ROAD	67865	1.56	0.0024	B	0.81	0.88	67865	0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	
WF11	SOUTH SIDE OF BRADLEY RIDGE ROAD	47120	1.08	0.0017	D	0.82	0.89	47120	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF12	BRADLEY RIDGE DEVELOPMENT SOUTWEST OF BRADLEY RIDGE AND COLLECTOR 2	2478934	56.91	0.0889	D	0.82	0.89	2152296	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	326638
WF13	WEST HALF OF COLLECTOR 2	44672	1.03	0.0016	D	0.82	0.89	44672	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF14	EAST HALF OF COLLECTOR 2	137679	3.16	0.0049	D	0.82	0.89	48793	0.49	0.65		0.90	0.96		0.53	0.68	88886	0.30	0.57		0.16	0.51	
WF15	BRADLEY RIDGE DEVELOPMENT SOUTH OF BRADLEY RIDGE AND EAST OF COLLECTOR 2	1255752	28.83	0.0450	D	0.82	0.89		0.49	0.65	1255752	0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF16	WEST HALF OF COLLECTOR 2 NEAR SOUTH BOUND OF BRADLEY HEIGHTS	3901	0.09	0.0001	D	0.82	0.89	3901	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	
WF17	EAST HALF OF COLLECTOR 2 NEAR SOUTH BOUND OF BRADLEY HEIGHTS	11725	0.27	0.0004	D	0.82	0.89	4177	0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51	7548
OS-ES	Trails at Aspen Ridge Sub-basin OS-East Side. Undeveloped electric easement.	184090	4.23	0.0066	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	184090

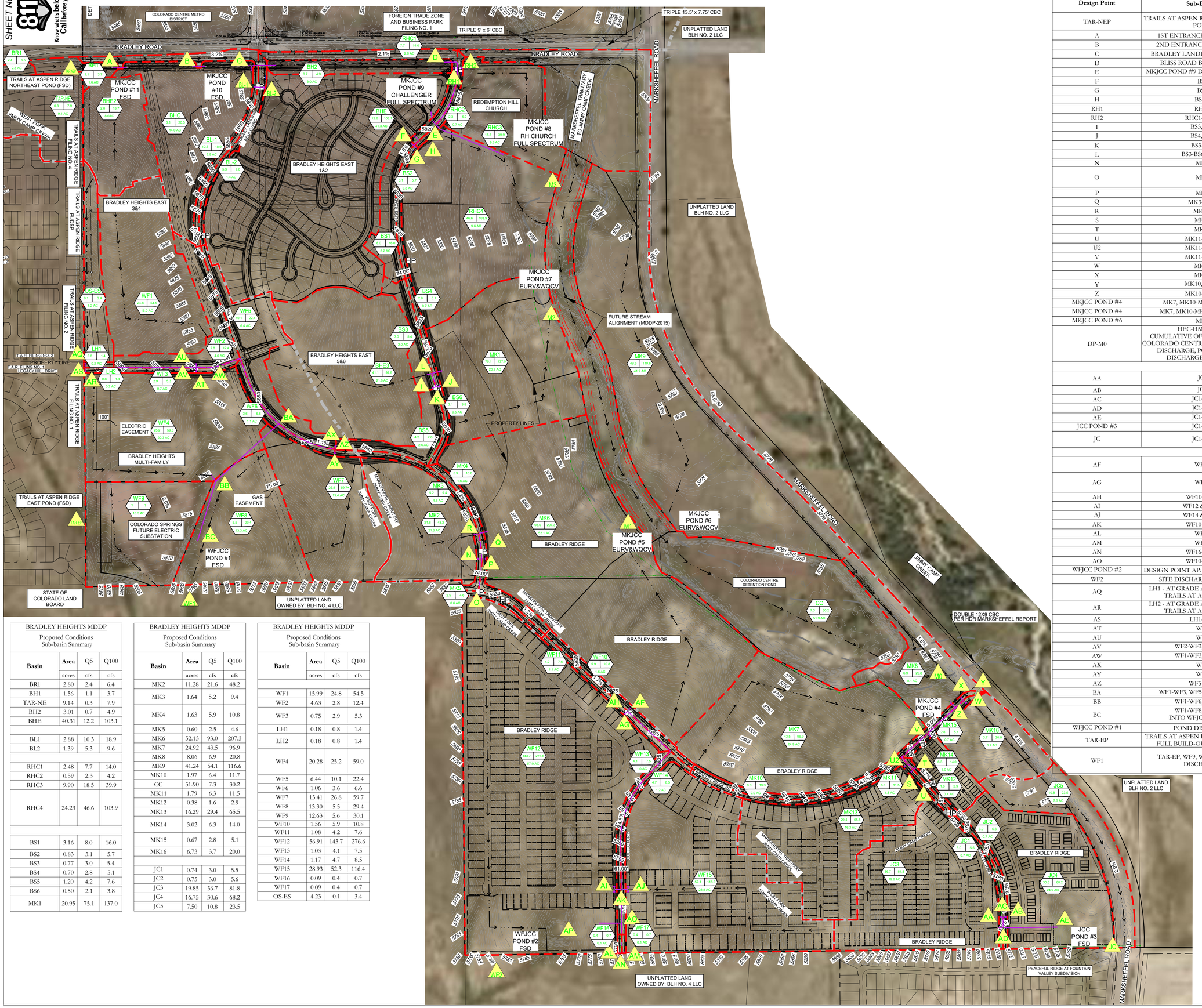
Sub-basin	Composite C5	Composite C100	Percent Impervious	Flow Lengths: Initial ft	True Initial Length ft	Channel ft	True Channel Length ft	Average (decimal) Slope	Initial Tc (min)	Average (%) Slope	Channel Flow Type (See Key above) Ground Type	Velocity (ft/s)	Channel Tc (min)	Tc Total (min)	i5 in/hr	Q5 cfs	i100 in/hr	Q100 cfs	Sub-basin
BR1	0.34	0.54	34.48	100	100	1268	1268	0.02	10.84	3.0	4	1.21	17.43	28.26	2.51	**2.4**	4.21	**6.4**	BR1
BH1	0.23	0.46	18.65	100	100	549	549	0.02	12.46	3.0	4	1.21	7.55	20.01	3.01	**1.1**	5.06	**3.7**	BH1
BH2	0.09	0.36	2.00	20	20	1233	1233	0.05	4.75	2.0	4	0.99	20.76	25.51	2.65	**0.7**	4.45	**4.9**	BH2
BHE	0.16	0.51	2.00	100	100	2332	2332	0.05	9.89	2.0	7	2.83	13.74	23.63	2.76	**12.2**	4.64	**103.1**	BHE
BHE2	0.09	0.36	2.00	100	100	898	898	0.05	10.63	3.0	4	1.21	12.34	22.97	2.81	**2.2**	4.71	**15.0**	BHE2
BHE3	0.49	0.65	65.00	100	100	1100	1100	0.05	6.42	3.0	7	3.46	5.29	11.71	3.85	**41.1**	6.47	**91.6**	BHE3
BHC	0.09	0.36	2.00	100	100	1166	1166	0.05	10.63	2.0	4	0.99	19.63	30.26	2.41	**3.1**	4.05	**20.7**	BHC
TAR-NE	0.09	0.36	2.00	100	100	1750	1750	0.05	10.63	2.0	7	2.83	10.31	20.94	2.94	**0.3**	4.95	**7.9**	TAR-NE
BL1	0.81	0.88	95.00	20	20	1372	1372	0.03	1.62	3.0	7	3.46	6.60	8.21	4.41	**10.7**	7.40	**19.6**	BL1
BL2	0.81	0.88	95.00	20	20	1212	1212	0.05	1.37	3.3	7	3.63	5.56	6.92	4.66	**5.3**	7.83	**9.6**	BL2
RHC1	0.81	0.88	95.00	92	92	1343	1343	0.02	3.97	1.9	7	2.76	8.12	12.09	3.80	**7.7**	6.39	**14.0**	RHC1
RHC2	0.81	0.88	95.00	20	20	546	546	0.02	1.85	1.0	7	2.00	4.55	6.40	4.77	**2.3**	8.01	**4.2**	RHC2
RHC3	0.53	0.68	70.00	100	100	1110	1110	0.02	8.14	2.0	7	2.83	6.54	14.68	3.50	**18.5**	5.87	**39.9**	RHC3
RHC4	0.49	0.65	65.00	100	100	1035	1035	0.05	6.42	3.0	7	3.46	4.98	11.40	3.90	**46.6**	6.55	**103.9**	RHC4
BS1	0.61	0.72	78.14	100	100	980	980	0.05	5.18	1.8	7	2.68	6.09	11.26	3.92	**7.6**	6.58	**15.0**	BS1
BS2	0.81	0.88	95.00	20	20	980	980	0.05	1.37	1.8	7	2.68	6.09	7.45	4.55	**3.1**	7.64	**5.6**	BS2
BS3	0.82	0.89	95.00	100	100	737	737	0.05	2.95	2.3	7	3.03	4.05	6.99	4.64	**3.0**	7.80	**5.4**	BS3
BS4	0.82	0.89	95.00	50	50	737	737	0.05	2.08	2.3	7	3.03	4.05	6.13	4.83	**2.8**	8.12	**5.1**	BS4
BS5	0.82	0.89	95.00	50	50	1147	1147	0.05	2.08	1.8	7	2.68	7.12	9.20	4.23	**4.2**	7.11	**7.6**	BS5
BS6	0.82	0.89	95.00	50	50	555	555	0.05	2.08	1.8	7	2.68	3.45	5.53	4.97	**2.1**	8.35	**3.8**	BS6
MK1	0.82	0.89	95.00	100	100	1170	1170	0.05	2.95	3.0	7	3.46	5.63	8.57	4.34	**75.1**	7.29	**137.0**	MK1
MK2	0.49	0.65	65.00	100	100	1056	1056	0.05	6.42	3.0	7	3.46	5.08	11.50	3.88	**21.6**	6.52	**48.2**	MK2
MK3	0.82	0.89	95.00	50	50	1303	1303	0.05	2.08	1.2	7	2.19	9.91	11.99	3.82	**5.2**	6.41	**9.4**	MK3
MK4	0.82	0.89	95.00	50	50	830	830	0.05	2.08	1.2	7	2.19	6.31	8.39	4.37	**5.9**	7.35	**10.8**	MK4
MK5	0.82	0.89	95.00	50	50	157	157	0.05	2.08	1.0	7	2.00	1.31	5.00	5.10	**2.5**	8.58	**4.6**	MK5
MK6	0.49	0.65	65.00	100	100	1500	1500	0.05	6.42	3.0	7	3.46	7.22	13.63	3.61	**93.0**	6.07	**207.3**	MK6
MK7	0.49	0.65	65.00	100	100	1650	1650	0.05	6.42	3.0	7	3.46	7.94	14.35	3.53	**43.5**	5.93	**96.9**	MK7
MK8	0.35	0.62	28.13	50	50	1200	1200	0.02	7.62	1.8	4	0.94	21.30	28.91	2.47	**6.9**	4.16	**20.8**	MK8
MK9	0.53	0.68	70.00	100	100	2500	2500	0.05	6.00	0.8	7	1.79	23.29	29.29	2.46	**54.1**	4.13	**116.6**	MK9
MK10	0.82	0.89	95.00	50	50	2150	2150	0.05	2.08	4.0	7	4.00	8.96	11.04	3.95	**6.4**	6.63	**11.7**	MK10
CC	0.22	0.54	10.54	300	100	6000	6200	0.05	16.03	0.5	4	0.49	208.76	224.79	0.63	**7.3**	1.06	**30.2**	CC
MK11	0.56	0.72	64.21	50	50	1673	1673	0.05	4.02	4.0	7	4.00	6.97	10.99	3.95	**10.0**	6.64	**21.8**	MK11
MK12	0.82	0.89	95.00	50	50	400	400	0.05	2.08	3.7	7	3.85	1.73	5.00	5.10	**1.6**	8.58	**2.9**	MK12
MK13	0.53	0.68	70.00	100	100	1425	1425	0.05	6.00	3.0	7	3.46	6.86	12.85	3.71	**31.2**	6.23	**67.2**	MK13
MK14	0.53	0.68	70.00	100	100	610	610	0.05	6.00	3.0	7	3.46	2.93	8.93	4.28	**6.9**	7.19	**14.9**	MK14
MK15	0.82	0.89	95.00	50	50	550	550	0.05	2.08	4.0	7	4.00	2.29	5.00	5.10	**2.8**	8.58	**5.1**	MK15
MK16	0.16	0.51	2.00	50	50	760	760	0.05	7.00	4.8	4	1.53	8.26	15.25	3.44	**3.7**	5.77	**20.0**	MK16
JC1	0.59	0.74	68.81	20	20	795	795	0.05	2.39	2.3	7	3.03	4.37	6.76	4.69	**5.2**	7.88	**10.9**	JC1
JC2	0.82	0.89	95.00	20	20	795	795	0.05	1.32	2.3	7	3.03	4.37	5.68	4.94	**3.0**	8.29	**5.6**	JC2
JC3	0.53	0.68	70.00	100	100	1150	1150	0.05	6.00	4.0	7	4.00	4.79	10.79	3.98	**38.5**	6.69	**83.0**	JC3
JC4	0.53	0.68	70.00	100	100	1181	1181	0.05	6.00	2.3	7	3.03	6.49	12.48	3.75	**33.6**	6.31	**72.4**	JC4
JC5	0.58	0.75	61.13	100	100	1692	1692	0.05	5.48	2.9	4	1.19	23.66	29.13	2.46	**10.8**	4.14	**23.5**	JC5
WF1	0.45	0.59	65.00	100	100	1466	1466	0.05	6.84	2.0	7	2.83	8.64	15.48	3.41	**24.8**	5.73	**54.5**	WF1
WF2	0.15	0.41	10.15	50	50	1070	1070	0.05	7.05	4.1	7	4.05	4.40	11.45	3.89	**2.8**	6.53	**12.4**	WF2
WF3	0.81	0.88	95.00	30	30	589	589	0.05	1.67	1.0	7	2.00	4.91	6.58	4.73	**2.9**	7.95	**5.3**	WF3
LH1	0.81	0.88	95.00	20	20	180	180	0.05	1.37	2.0	7	2.83	1.06	5.00	5.10	**0.8**	8.58	**1.4**	LH1
LH2	0.81	0.88	95.00	20	20	180	180	0.05	1.37	2.0	7	2.83	1.06	5.00	5.10	**0.8**	8.58	**1.4**	LH2
WF4	0.41	0.57	55.71	100	100	1484	1484	0.05	7.31	1.0	7	2.00	12.37	19.67	3.04	**25.2**	5.11	**59.0**	WF4
WF5	0.49	0.65	65.00	100	100	1471	1471	0.05	6.42	1.1	7	2.10	11.69	18.10	3.17	**10.1**	5.32	**22.4**	WF5
WF6	0.82	0.89	95.00	50	50	961	961	0.05	2.08	1.1	7	2.10	7.64	9.71	4.15	**3.6**	6.97	**6.6**	WF6
WF7	0.49	0.65	65.00	100	100	823	823	0.05	6.42	3.0	7	3.46	3.96	10.38	4.04	**26.8**	6.79	**59.7**	WF7
WF8	0.16	0.51	2.00	100	100	1025	1025	0.05	9.89	2.0	4	0.99	17.26	27.15	2.56	**5.5**	4.30	**29.4**	WF8
WF9	0.16	0.51	2.00	100	100	819	819	0.05	9.89	2.0	4	0.99	13.79	23.68	2.76	**5.6**	4.64	**30.1**	WF9
WF10	0.81	0.88	95.00	50	50	765	765	0.05	2.16	1.7	7	2.61	4.89	7.04	4.63	**5.9**	7.78	**10.8**	WF10
WF11	0.82	0.89	95.00	50	50	765	765	0.05	2.08	1.7	7	2.61	4.89	6.97	4.65	**4.2**	7.81	**7.6**	WF11
WF12	0.73	0.84	82.75	100	100	2777	2777	0.05	3.86	4.0	7	4.00	11.57	15.43	3.42	**143.7**	5.74	**276.6**	WF12
WF13	0.82	0.89	95.00	50	50	1050	1050	0.05	2.08	4.6	7	4.29	4.08	6.16	4.82	**4.1**	8.10	**7.5**	WF13
WF14	0.63	0.75	78.86	50	50	1050	1050	0.05	3.48	4.6	7	4.29	4.08	7.55	4.53	**9.1**	7.61	**18.3**	WF14
WF15	0.49	0.65	65.00	100	100	1645	1645	0.05	6.42	4.0	7	4.00	6.85	13.27	3.66	**52.1**	6.14	**116.0**	WF15
WF16	0.82	0.89	95.00	20	20	118	118	0.05	1.32	1.0	7	2.00	0.98	5.00	5.10	**0.4**	8.58	**0.7**	WF16
WF17	0.40	0.65	35.13	20	20	118	118	0.05	3.32	1.0	7	2.00	0.98	5.00	5.10	**0.5**	8.58	**1.5**	WF17
OS-ES	0.09	0.36	2.00	50	50	1274	1274	0.05	7.52	3.0	4	1.21	17.51	25.03	2.68	**0.1**	4.50	**3.4**	OS-ES

Rational Method - Proposed Conditions

DESIGN POINTS	Sub-basins/Comments	Area sf	Area acres	Area Sq. Mi.	Soil Group	Commercial Areas (95% Impervious) C5	Commercial C100	Commercial Area	Residential (1/8 or less) (65% Impervious) C5	Residential 1/8 C100	Residential 1/8 Area (SF)	Pavement (100% Impervious) C5	Pavement C100	Pavement Area (SF)	Neighborhoods/Multi-Family (70% Impervious) C5	Neighborhoods C100	Neighborhoods Area	Residential (1/3 Acre) (30% Impervious) C5	Residential 1/3 C100	Residential 1/3 Area	Undeveloped/Pervious Areas (2% Impervious) C5	Undeveloped C100	Undeveloped Area	Composite C5	Composite C100	Percent Impervious	Initial ft	True Initial Length ft	Channel ft	True Channel Length ft	Average (decimal) Slope	Initial Tc (min)	Average (%) Slope	Channel Flow Type (See Key above) Ground Type	Velocity (ft/s)	Channel Tc (min)	Tc Total (min)	i5 in/hr	Q5 cfs	i100 in/hr	Q100 cfs		DESIGN POINTS
TAR-NEP	TRAILS AT ASPEN RIDGE NORTHEAST POND	398439	9.15	0.0143	B	0.81	0.88		0.45	0.59	0	0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36	398439	0.09	0.36	2.00	100	100	1150	1150	0.05	10.63	2.9	4	1.19	16.08	26.71		0.2		7.9		TAR-NEP
A	1ST ENTRANCE EAST OF TAR	589483	13.53	0.0211	B	0.81	0.88	42600	0.45	0.59	0	0.90	0.96	11729	0.49	0.62	0	0.25	0.47	0	0.09	0.36	535154	0.16	0.41	10.67	100	100	1882	1882	0.05	9.91	3.0	4	1.21	25.87	35.78	2.19	1.3	3.67	11.6		A
B	2ND ENTRANCE EAST OF TAR	1583690	36.36	0.0568	B	0.81	0.88	42600	0.45	0.59	0	0.90	0.96	11729	0.49	0.62	0	0.25	0.47	0	0.09	0.36	917154	0.08	0.24	4.45	100	100	2432	2432	0.05	10.73	3.0	4	1.21	33.43	44.16	1.92	3.5	3.23	26.6		B
C	BRADLEY LANDING BOULEVARD CROSSING	1583690	36.36	0.0568	B	0.81	0.88	42600	0.45	0.59	0	0.90	0.96	11729	0.49	0.62	0	0.25	0.47	0	0.09	0.36	1529361	0.12	0.38	5.23	100	100	2830	2830	0.05	10.36	3.0	4	1.21	38.90	49.26	1.80	3.5	3.02	26.6		C
D	BLISS ROAD BYPASS STORM	1714617	39.36	0.0615	B	0.81	0.88	42600	0.45	0.59	0	0.90	0.96	11729	0.49	0.62	0	0.25	0.47	0	0.09	0.36	1660288	0.11	0.38	4.98	100	100	4063	4063	0.05	10.39	3.0	4	1.21	55.85	66.23	1.48	6.7	2.49	37.3		D
E	MKJCC POND #9 DISCHARGE & DP D	3470311	79.67	0.1245	B	0.81	0.88	42600	0.45	0.59	0	0.90	0.96	11729	0.49	0.62	0	0.25	0.47	0	0.09	0.36	3415982	0.10	0.37	3.47	100	100	4063	4063	0.05	10.51	3.0	4	1.21	55.85	66.36	1.48	18.9	2.49	140.4		E
RH1	RHC1	107935	2.48	0.0039	B	0.81	0.88	107935	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	92	92	1343	1343	0.02	3.97	1.9	7	2.76	8.12	12.09	3.80	7.7	6.39	14.0		RH1
RH2	RHC1-RHC2	133418	3.06	0.0048	B	0.81	0.88	133418	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	92	92	1343	1343	0.02	3.97	1.9	7	2.76	8.12	12.09	3.80	9.5	6.39	17.4		RH2
MKJCC POND #8	RHC1-RHC3 (SEE PDR/FDR FOR MORE DETAILED ANALYSIS OF THE REDEMPTION HILL CHURCH SITE	564572	12.96	0.0203	D	0.82	0.89	133418	0.49	0.65	0	0.90	0.96	0	0.53	0.68	431154	0.30	0.57	0	0.16	0.51	0	0.60	0.73	75.91	100	100	2443	2443	0.02	7.16	1.9	7	2.76	14.77	21.93	2.87	22.5	4.83	46.0		MKJCC POND #8
MKJCC POND #8	OUTFLOW	564572	12.96	0.0203	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51		0.00	0.00	0.00		0		0		#DIV/0!							3.6		11.3		MKJCC POND #8
DP-M3	HEC-HMS CALCS CUMULATIVE OF OFFSITE FLOWS, MKJCC POND #8-MKJCC POND#11	133507044	3064.90	4.7889	B	0.81	0.88		0.45	0.59		0.90	0.96		0.49	0.62		0.25	0.47		0.09	0.36		0.00	0.00	0.00														284.6		1209.3	HEC-HMS	DP-M3
BL-1	INLET BL-1	130000	2.98	0.0047	B	0.81	0.88	130000	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	20	20	1372	1372	0.03	1.62	3.0	7	3.46	6.60	8.21	4.41	10.7	7.40	19.6		BL-1
BL-2	INLET BL-2 OUTFLOW	190354	4.37	0.0068	B	0.81	0.88	190354	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	20	20	1372	1372	0.03	1.62	3.0	7	3.46	6.60	8.21	4.41	15.7	7.40	28.7		BL-2
F	BS1	137852	3.16	0.0049	B	0.81	0.88	60390	0.45	0.59	77462	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.61	0.72	78.14	100	100	980	980	0.05	5.18	1.8	7	2.68	6.09	11.26	3.92	7.6	6.58	15.0		F
G	BS2	35937	0.83	0.0013	B	0.81	0.88	35937	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	20	20	980	980	0.05	1.37	1.8	7	2.68	6.09	7.45	4.55	3.1	7.64	5.6		G
H	BS1-2	173789	3.99	0.0062	B	0.81	0.88	96327	0.45	0.59	77462	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.65	0.75	81.63	100	100	980	980	0.05	4.74	1.8	7	2.68	6.09	10.82	3.98	10.4	6.68	20.2		H
I	BS3, BS5	85777	1.97	0.0031	D	0.82	0.89	85777	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	100	100	737	737	0.05	2.95	2.3	7	3.03	4.05	6.99	4.64	7.6	7.80	13.8		I
J	BS4, BS6	52368	1.20	0.0019	D	0.82	0.89	52368	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	20	20	737	737	0.05	1.32	2.3	7	3.03	4.05	5.36	5.01	5.0	8.42	9.1		J
K	BS3-BS6	138145	3.17	0.0050	D	0.82	0.89	138145	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	100	100	737	737	0.05	2.95	2.3	7	3.03	4.05	6.99	4.64	12.2	7.80	22.2		K
L	BS3-BS6, BHE3	1079185	24.77	0.0387	D	0.82	0.89	138145	0.49	0.65	941040	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.53	0.68	68.84	100	100	1400	1400	0.05	5.98	2.5	7	3.16	7.38	13.35	3.65	48.5	6.13	104.1		L
MKJCC POND #7	BS3-BS6, BHE3, MK1, RHC4	3047217	69.95	0.1093	D	0.82	0.89	1050674	0.49	0.65	1996543	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.60	0.73	75.34	100	100	2435	2435	0.05	5.22	2.5	7	3.16	12.83	18.05	3.17	135.1	5.33	275.4		MKJCC POND #7
MKJCC POND #7	OUTFLOW	3047217	69.95	0.1093	D	0.82	0.89	1050674	0.49	0.65	1996543	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.60	0.73	75.34	100	100	2435	2435	0.05	5.22	2.5	7					23.5		177.2		MKJCC POND #7
DP-M2	HEC-HMS CALCS CUMULATIVE OF OFFSITE FLOWS, MKJCC PONDS #6, #7, & #8	139962636	3213.10	5.0205	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51		0.00	0.00	0.00														305.9		1220.2	HEC-HMS	DP-M2
N	MK3	71539	1.64	0.0026	D	0.82	0.89	71539	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	1384	1384	0.05	2.08	1.2	7	2.19	10.53	12.61	3.74	5.1	6.28	9.2		N
O	MK5	26108	0.60	0.0009	D	0.82	0.89	26108	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	541	541	0.05	2.08	1.2	7	2.19	4.12	6.19	4.82	2.4	8.09	4.4		O
P	MK4	71100	1.63	0.0026	D	0.82	0.89	71100	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	830	830	0.05	2.08	1.2	7	2.19	6.31	8.39	4.37	5.9	7.35	10.8		P
Q	MK3-MK5	168747	3.87	0.0061	D	0.82	0.89	168747	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	1384	1384	0.05	2.08	1.2	7	2.19	10.53	12.61	3.74	12.0	6.28	21.8		Q
R	MK2-5	660299	15.16	0.0237	D	0.82	0.89	168747	0.49	0.65	491552	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.57	0.71	72.67	100	100	1100	1100	0.05	5.53	3.0	7	3.46	5.29	10.82	3.98	34.9	6.68	72.7		R
MKJCC POND #5	MK2-MK6	2930960	67.29	0.1051	D	0.82	0.89	168747	0.49	0.65	2762213	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.51	0.66	66.73	100	100	2050	2050	0.05	6.22	4.0	7	4.00	8.54	14.76	3.49	120.4	5.86	263.8		MKJCC POND #5
MKJCC POND #5	OUTFLOW	2930960	67.29	0.1051	D	0.82	0.89	168747	0.49	0.65	2762213	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.51	0.66	66.73	100	100	2050	2050	0.05	6.22	4.0	7					24.2		203.5		MKJCC POND #5
DP-M1	HEC-HMS CALCS CUMULATIVE OF OFFSITE FLOWS AND MKJCC PONDS #5-#8	141505972	3248.53	5.0758				168747			2762213			0			0			0			0	0.00	0.00	1.38														330.7		1217.9	HEC-HMS	DP-M1
COLORADO CENTRE DETENTION POND	HEC-HMS CALCS CUMULATIVE OF OFFSITE FLOWS AND MKJCC PONDS #5-#8, AND MARKSHEFFEL TRIBUTARY TO JIMMY CAMP CREEK CHANNEL FLOWS SOUTH OF BRADLEY ROAD	141505972	3248.53	5.0758				376339			2762213			0			0			0			2052362	0.00	0.00	1.55														327.1		1001.2	HEC-HMS	COLORADO CENTRE DETENTION POND
S	MK11	195555	4.49	0.0070	D	0.82	0.89	77886	0.49	0.65	0	0.90	0.96	0	0.53	0.68	72375	0.30	0.57	0	0.16	0.51	45294	0.56	0.72	64.21	50	50	1673	1673	0.05	4.02	4.0	7	4.00	6.97	10.99	3.95	10.0	6.64	21.8		S
T	MK12	16546	0.38	0.0006	D	0.82	0.89	16546	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	400	400	0.05	2.08	3.7	7	3.85	1.73	5.00	5.10	1.6	8.58	2.9		T
U	MK11-MK12	212101	4.87	0.0076	D	0.82	0.89	94432	0.49	0.65	0	0.90	0.96	0	0.53	0.68	72375	0.30	0.57	0	0.16	0.51	45294	0.58	0.74	66.61	50	50	1673	1673	0.05	3.87	3.7	7	3.85	7.25	11.11	3.94	11.2	6.61	23.9		U
U2	MK11-MK13	897961	20.61	0.0322	D	0.82	0.89	94432	0.49	0.65	0	0.90	0.96	0	0.53	0.68	758235	0.30	0.57	0	0.16	0.51	45294	0.54	0.69	69.20	50	50	1673	1673	0.05	4.15	3.7	7	3.85	7.25	11.40	3.90	43.9	6.55	94.3		U2
V	MK11-MK14	1029465	23.63	0.0369	D	0.82	0.89	94432	0.49	0.65	0	0.90	0.96	0	0.53	0.68	889739	0.30	0.57	0	0.16	0.51	45294	0.54	0.69	69.30	50	50	1873	1873	0.05	4.17	3.7	7	3.85	8.11	12.28	3.78	48.6	6.35	104.6		V
W	MK15	29148	0.67	0.0010	D	0.82	0.89	29148	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	550	550	0.05	2.08	4.0	7	4.00	2.29	5.00	5.10	2.8	8.58	5.1		W
X	MK10	85832	1.97	0.0031	D	0.82	0.89	85832	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	2150	2150	0.05	2.08	4.0	7	4.00	8.96	11.04	3.95	6.4	6.63	11.7		X
Y	MK10, MK15	114980	2.64	0.0041	D	0.82	0.89	114980	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	2150	2150	0.05	2.08	4.0	7	4.00	8.96	11.04	3.95	8.6	6.63	15.7		Y
Z	MK10-MK15	1144445	26.27	0.0411	D	0.82	0.89	209412	0.49	0.65	0	0.90	0.96	0	0.53	0.68	889739	0.30	0.57	0	0.16	0.51	45294	0.57	0.71	71.88	50	50	2150	2150	0.05	3.96	4.0	7	4.00	8.96	12.91	3.70	55.7	6.22	117.1		Z
MKJCC POND #4	MK7, MK10-MK16-INFLOW	2229978	51.19	0.0800	D	0.82	0.89	209412	0.49	0.65	1085533	0.90	0.96	0	0.53	0.68	889739	0.30	0.57	0	0.16	0.51	45294	0.53	0.68	68.53	100	100	2050	2050	0.05	6.00	4.0	7	4.00	8.54	14.53	3.51	96.1	5.90	207.6		MKJCC POND #4
MKJCC POND #4	MK7, MK10-MK16-OUTFLOW	2229978	51.19	0.0800	D	0.82	0.89	209412	0.49	0.65	1085533	0.90	0.96	0	0.53	0.68	889739	0.30	0.57	0	0.16	0.51	45294	0.53	0.68	68.53													10.0		70.3		MKJCC POND #4
MKJCC POND #6	MK8	1796276	41.24	0.0644	D	0.82	0.89	0	0.49	0.65	0	0.90	0.96	0	0.53	0.68	1796276	0.30	0.57	0	0.16	0.51	0	0.53	0.68	70.00	100		2500		0.05		0.8	7					[illegible]		[illegible]		MKJCC POND #6
DP-M0	HEC-HMS CALCS CUMULATIVE OF OFFSITE FLOWS, COLORADO CENTRE REGIONAL POND DISCHARGE, POND MKJCC #4 DISCHARGE, AND MK-8	143993179	3305.63	5.1650	D	0.82	0.89	684368	0.49	0.65	3847746	0.90	0.96	0	0.53	0.68	889739	0.30	0.57	0	0.16	0.51	2350054	0.02	0.03	2.65														338.4		1003.8	HEC-HMS	DP-M0
AA	JC1	80679	1.85	0.0029	D	0.82	0.89	35729	0.49	0.65	0	0.90	0.96	0	0.53	0.68	30402	0.30	0.57	0	0.16	0.51	14548	0.59	0.74	68.81	20	20	795	795	0.05	2.39	2.3	7	3.03	4.37	6.76	4.69	5.2	7.88	10.9		AA
AB	JC2	32553	0.75	0.0012	D	0.82	0.89	32553	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	20	20	795	795	0.05	1.32	2.3	7	3.03	4.37	5.68	4.94	3.0	8.29	5.6		AB
AC	JC1-JC2	113232	2.60	0.0041	D	0.82	0.89	68282	0.49	0.65	0	0.90	0.96	0	0.53	0.68	30402	0.30	0.57	0	0.16	0.51	14548	0.66	0.78	76.34	20	20	795	795	0.05	2.08	2.3	7	3.03	4.37	6.45	4.76	8.2	7.99	16.4		AC
AD	JC1-JC3	901437	20.69	0.0323	D	0.82	0.89	68282	0.49	0.65	0	0.90	0.96	0	0.53	0.68	818607	0.30	0.57	0	0.16	0.51	14548	0.55	0.69	70.80	100	100	1150	1150	0.05	5.83	4.0	7	4.00	4.79	10.62	4.01	45.6	6.73	97.4		AD
AE	JC1-JC4	1630854	37.44	0.0585	D	0.82	0.89	68282	0.49	0.65	0	0.90	0.96	0	0.53	0.68	1548024	0.30	0.57	0	0.16	0.51	14548	0.54	0.69	70.44	100	100	1450	1450	0.05	5.91	4.0	7	4.00	6.04	11.94	3.82	77.7	6.42	166.6		AE
JCC POND #3	JC1-JC4	1630854	37.44	0.0585	D	0.82	0.89	68282	0.49	0.65	0	0.90	0.96	0	0.53	0.68	1548024	0.30	0.57	0	0.16	0.51	14548	0.54	0.69	70.44	100	100	1450	1450	0.05	5.91	4.0	7	4.00	6.04	11.94	3.82	7.4	6.42	59.8		JCC POND #3
JC	JC1-JC5	[illegible]	[illegible]	[illegible]	D	0.82	0.89	[illegible]	0.49	0.65	0	0.90	0.96	0	0.53	0.68	1548024	0.30	0.57	0	0.16	0.51	[illegible]	[illegible]	[illegible]	[illegible]	100	100	1450	1450	0.05	[illegible]	4.0	7	4.00	6.04	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		JC
AF	WF10	67865	1.56	0.0024	D	0.82	0.89	67865	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	765	765	0.05	2.08	1.7	7	2.61	4.89	6.97	4.65	6.0	7.81	10.9		AF
AG	WF11	47120	1.08	0.0017	D	0.82	0.89	47120	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	765	765	0.05	2.08	1.7	7	2.61	4.89	6.97	4.65	4.2	7.81	7.6		AG
AH	WF10-WF11	114985	2.64	0.0041	D	0.82	0.89	114985	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	765	765	0.05	2.08	1.7	7	2.61	4.89	6.97	4.65	10.1	7.81	18.5		AH
AI	WF12 & WF13	2523606	57.93	0.0905	D	0.82	0.89	2196968	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	326638	0.73	0.84	82.96	100	100	2777	2777	0.05	3.85	4.0	7	4.00	11.57	15.41	3.42	146.7	5.75	282.1		AI
AJ	WF14 & WF15	1393431	31.99	0.0500	D	0.82	0.89	48793	0.49	0.65	1255752	0.90	0.96	0	0.53	0.68	88886	0.30	0.57	0	0.16	0.51	0	0.50	0.66	66.37	100	100	1645	1645	0.05	6.27	4.0	7	4.00	6.85	13.12	3.67	59.7	6.17	131.4		AJ
AK	WF10-WF15	4032022	92.56	0.1446	D	0.82	0.89	2360746	0.49	0.65	1255752	0.90	0.96	0	0.53	0.68	88886	0.30	0.57	0	0.16	0.51	326638	0.66	0.78	77.57	100	100	3777	3777	0.05	4.66	4.0	7	4.00	15.74	20.39	2.98	183.1	5.01	364.9		AK
AL	WF16	3901	0.09	0.0001	D	0.82	0.89	3901	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	20	20	118	118	0.05	1.32	1.0	7	2.00	0.98	5.00	5.10	0.4	8.58	0.7		AL
AM	WF17	11725	0.27	0.0004	D	0.82	0.89	4177	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	7548	0.40	0.65	35.13	20	20	118	118	0.05	3.32	1.0	7	2.00	0.98	5.00	5.10	0.5	8.58	1.5		AM
AN	WF16-WF17	15626	0.36	0.0006	D	0.82	0.89	8078	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	7548	0.50	0.71	50.08	20	20	118	118	0.05	2.82	1.0	7	2.00	0.98	5.00	5.10	0.9	8.58	2.2		AN
AO	WF10-WF17	4047648	92.92	0.1452	D	0.82	0.89	2368824	0.49	0.65	1255752	0.90	0.96	0	0.53	0.68	88886	0.30	0.57	0	0.16	0.51	334186	0.66	0.78	77.47	100	100	3777	3777	0.05	4.67	4.0	7	4.00	15.74	20.40	2.98	183.6	5.01	366.0		AO
WFJCC POND #2	DESIGN POINT AP: POND DISCHARGE	4047648	92.92	0.1452	D	0.82	0.89	2368824	0.49	0.65	1255752	0.90	0.96	0	0.53	0.68	88886	0.30	0.57	0	0.16	0.51	334186	0.66	0.78	77.47	100	100	3777	3777	0.05	4.67	4.0	7	4.00	15.74	20.40	2.98	22.6	5.01	153.5		WFJCC POND #2
WF2	SITE DISCHARGE TO SOUTH	4047648	92.92	0.1452	D	0.82	0.89	2368824	0.49	0.65	1255752	0.90	0.96	0	0.53	0.68	88886	0.30	0.57	0	0.16	0.51	334186	0.66	0.78	77.47	100	100	3777	3777	0	4.67	4	7	4.00	15.74	20.40	2.98	22.6	5.01	153.5		WF2
AQ	LH1 - AT GRADE AT BORDER WITH TRAILS AT ASPEN RIDGE	7884	0.18	0.0003	B	0.81	0.88	7884	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	20	20	180	180	0	1.37	2	7	2.83	1.06	5.00	5.10	0.8	8.58	1.4		AQ
AR	LH2 - AT GRADE AT BORDER WITH TRAILS AT ASPEN RIDGE	7884	0.18	0.0003	B	0.81	0.88	7884	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	20	20	180	180	0	1.37	2	7	2.83	1.06	5.00	5.10	0.8	8.58	1.4		AR
AS	LH1-LH2	15768	0.36	0.0006	B	0.81	0.88	15768	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	20	20	180	180	0.05	1.37	2.0	7	2.83	1.06	5.00	5.10	1.5	8.58	2.8		AS
AT	WF3	32652	0.75	0.0012	B	0.81	0.88	32652	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	0	0.81	0.88	95.00	30	30	589	589	0.05	1.67	1	7	2.00	4.91	6.58	4.73	2.9	7.95	5.3		AT
AU	WF2	201537	4.63	0.0072	B	0.81	0.88	17670	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	183867	0.15	0.41	10.15	50	50	1070	1070	0	7.05	4	7	4.05	4.40	11.45	3.89	2.8	6.53	12.4		AU
AV	WF2-WF3, LH1-LH2	249957	5.74	0.0090	B	0.81	0.88	66090	0.45	0.59	0	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	183867	0.28	0.50	26.59	50	50	1070	1070	0.05	6.10	4.1	7	4.05	4.40	10.50	4.03	6.5	6.76	19.5		AV
AW	WF1-WF3, LH1-LH2	946636	21.73	0.0340	B	0.81	0.88	66090	0.45	0.59	696679	0.90	0.96	0	0.49	0.62	0	0.25	0.47	0	0.09	0.36	183867	0.41	0.57	54.86	50	50	1070	1070	0.05	5.17	4.1	7	4.05	4.40	9.57	4.17	37.0	7.01	86.8		AW
AX	WF5	280402	6.44	0.0101	D	0.82	0.89	0	0.49	0.65	280402	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.49	0.65	65.00	100	100	1471	1471	0	6.42	1	7	2.10	11.69	18.10	3.17	10.1	5.32	22.4		AX
AY	WF6	46250	1.06	0.0017	D	0.82	0.89	46250	0.49	0.65	0	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.82	0.89	95.00	50	50	961	961	0	2.08	1	7	2.10	7.64	9.71	4.15	3.6	6.97	6.6		AY
AZ	WF5-WF6	326652	7.50	0.0117	D	0.82	0.89	46250	0.49	0.65	280402	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	0	0.54	0.68	69.25	100	100	1471	1471	0.05	5.93	1.1	7	2.10	11.69	17.61	3.21	13.0	5.39	27.9		AZ
BA	WF1-WF3, WF5-WF6, LH1, LH2	1273288	29.23	0.0457	D	0.82	0.89	112340	0.49	0.65	977081	0.90	0.96	0	0.53	0.68	0	0.30	0.57	0	0.16	0.51	183867	0.47	0.65	58.55	100	100	1471	1471	0.05	6.62	1.1	7	2.10	11.69	18.30	3.15	43.8	5.29	101.5		BA
BB	WF1-WF6, LH1-LH2	2156513	49.51	0.0774	D	0.82	0.89	112340	0.49	0.65	977081	0.90	0.96	0	0.53	0.68	697669	0.30	0.57	0	0.16	0.51	369423	0.46	0.65	57.39	100	100	1471	1471	0.05	6.70	1.1	7	2.10	11.69	18.38	3.14	72.7	5.28	170.9		BB
BC	WF1-WF8, LH1-LH2 INTO WFJCC POND #1	3320137	76.22	0.1191	D	0.82	0.89	112340	0.49	0.65	1561184	0.90	0.96	0	0.53	0.68	697669	0.30	0.57	0	0.16	0.51	948944	0.42	0.62	49.06	100	100	1971	1971	0.05	7.21	1.1	7	2.10	15.66	22.86	2.81	89.7	4.73	226.7		BC
WFJCC POND #1	POND DISCHARGE	3320137	76.22	0.1191	D	0.82	0.89	112340	0.49	0.65	1561184	0.90	0.96	0	0.53	0.68	697669	0.30	0.57	0	0.16	0.51	948944	0.42	0.62	49.06													10.7		106.7		WFJCC POND #1
TAR-EP	TRAILS AT ASPEN RIDGE-EAST POND FULL BUILD-OUT DISCHARGE	7007497	160.87	0.2514	B																					44.95														5.8		139.5		TAR-EP
WF1	TAR-EP, WF9, WFJCC POND #1 DISCHARGE	10878008	249.72	0.3902	D	0.82	0.89		0.49	0.65		0.90	0.96		0.53	0.68		0.30	0.57		0.16	0.51		0.00	0.00	44.03														22.1		276.3		WF1

SHEET No. 4

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



BRADLEY HEIGHTS MDDP
Proposed Conditions
Sub-basin Summary

Basin	Area	Q5	Q100
	acres	cfs	cfs
BR1	2.80	2.4	6.4
BH1	1.56	1.1	3.7
TAR-NE	9.14	0.3	7.9
BH2	3.01	0.7	4.9
BHE	40.31	12.2	103.1
BL1	2.88	10.3	18.9
BL2	1.39	5.3	9.6
RHC1	2.48	7.7	14.0
RHC2	0.59	2.3	4.2
RHC3	9.90	18.5	39.9
RHC4	24.23	46.6	103.9
BS1	3.16	8.0	16.0
BS2	0.83	3.1	5.7
BS3	0.77	3.0	5.4
BS4	0.70	2.8	5.1
BS5	1.20	4.2	7.6
BS6	0.50	2.1	3.8
MK1	20.95	75.1	137.0

BRADLEY HEIGHTS MDDP
Proposed Conditions
Sub-basin Summary

Basin	Area	Q5	Q100
	acres	cfs	cfs
MK2	11.28	21.6	48.2
MK3	1.64	5.2	9.4
MK4	1.63	5.9	10.8
MK5	0.60	2.5	4.6
MK6	52.13	93.0	207.5
MK7	24.92	43.5	96.9
MK8	8.06	6.9	20.8
MK9	41.24	54.1	116.6
MK10	1.97	6.4	11.7
CC	51.90	7.3	30.2
MK11	1.79	6.3	11.5
MK12	0.38	1.6	2.9
MK13	16.29	29.4	65.5
MK14	3.02	6.3	14.0
MK15	0.67	2.8	5.1
MK16	6.73	3.7	20.0
JC1	0.74	3.0	5.5
JC2	0.75	3.0	5.6
JC3	19.85	36.7	81.8
JC4	16.75	30.6	68.2
JC5	7.50	10.8	23.5

BRADLEY HEIGHTS MDDP
Proposed Conditions
Sub-basin Summary

Basin	Area	Q5	Q100
	acres	cfs	cfs
WF1	15.99	24.8	54.5
WF2	4.63	2.8	12.4
WF3	0.75	2.9	5.3
LH1	0.18	0.8	1.4
LH2	0.18	0.8	1.4
WF4	20.28	25.2	59.0
WF5	6.44	10.1	22.4
WF6	1.06	3.6	6.6
WF7	13.41	26.8	59.7
WF8	13.30	5.5	29.4
WF9	12.63	5.6	30.1
WF10	1.56	5.9	10.8
WF11	1.08	4.2	7.6
WF12	56.91	143.7	276.6
WF13	1.03	4.1	7.5
WF14	1.17	4.7	8.5
WF15	28.93	52.3	116.4
WF16	0.09	0.4	0.7
WF17	0.09	0.4	0.7
OS-ES	4.23	0.1	3.4

Proposed Design Point Summary
BRADLEY HEIGHTS MDDP

Design Point	Sub-Basins	Total Area (ac.)	Q(5) (cfs)	Q(100) (cfs)
TAR-NEP	TRAILS AT ASPEN RIDGE NORTHEAST POND	9.09	0.20	7.90
A	1ST ENTRANCE EAST OF TAR	13.46	1.29	11.60
B	2ND ENTRANCE EAST OF TAR	35.44	3.33	25.29
C	BRADLEY LANDING BOULEVARD	35.44	3.33	25.29
D	BLISS ROAD BYPASS STORM	38.44	6.55	36.46
E	MKJCC POND #9 DISCHARGE & DP D	78.75	18.75	139.56
F	BS1	3.16	7.59	15.05
G	BS2	0.83	3.06	5.59
H	BS1-2	3.99	10.39	20.18
RH1	RHC1	2.48	7.70	14.05
RH2	RHC1-RHC2	3.06	9.51	17.36
I	BS3, BS5	1.97	7.56	13.78
J	BS4, BS6	1.20	4.98	9.08
K	BS3-BS6	3.17	12.17	22.19
L	BS3-BS6, BHE3	24.77	48.47	104.14
N	MK3	1.64	5.07	9.25
O	MK5	0.60	2.39	4.35
P	MK4	1.63	5.90	10.76
Q	MK3-MK5	3.87	11.97	21.82
R	MK2-5	15.16	34.92	72.65
S	MK11	1.79	6.29	11.47
T	MK12	0.38	1.60	2.92
U	MK11-MK12	2.17	7.54	13.75
U2	MK11-MK13	18.46	38.21	82.33
V	MK11-MK14	21.47	42.63	92.28
W	MK15	0.67	2.82	5.15
X	MK10	1.97	6.43	11.72
Y	MK10, MK15	2.64	8.61	15.70
Z	MK10-MK15	24.11	49.83	105.12
MKJCC POND #4	MK7, MK10-MK16-INFLOW	49.03	90.43	195.90
MKJCC POND #4	MK7, MK10-MK16-OUTFLOW	49.03	10.00	70.30
MKJCC POND #6	MK9	41.24	17.00	89.00
DP-M0	HEC-HMS CALCS CUMULATIVE OF OFFSITE FLOWS, COLORADO CENTRE REGIONAL POND DISCHARGE, POND MKJCC #4 DISCHARGE, AND MK-8	3264.34	338.40	1003.80
AA	JC1	0.74	3.00	5.47
AB	JC2	0.75	3.05	5.56
AC	JC1-JC2	1.48	6.05	11.03
AD	JC1-JC3	21.33	41.64	90.93
AE	JC1-JC4	38.07	69.67	153.48
JCC POND #3	JC1-JC4	38.07	7.40	59.80
JC	JC1-JC5	45.58	18.20	83.32
AF	WF10	1.56	5.98	10.91
AG	WF11	1.08	4.16	7.58
AH	WF10-WF11	2.64	10.14	18.49
AI	WF12 & WF13	57.93	146.69	282.09
AJ	WF14 & WF15	30.00	55.86	123.04
AK	WF10-WF15	90.57	180.08	358.35
AL	WF16	0.09	0.38	0.69
AM	WF17	0.09	0.38	0.69
AN	WF16-WF17	0.18	0.76	1.38
AO	WF10-WF17	90.75	180.52	359.15
WFJCC POND #2	DESIGN POINT AP: POND DISCHARGE	90.75	22.60	153.50
WF2	SITE DISCHARGE TO SOUTH	90.75	22.60	153.50
AQ	LH1 - AT GRADE AT BORDER WITH TRAILS AT ASPEN RIDGE	0.18	0.75	1.38
AR	LH2 - AT GRADE AT BORDER WITH TRAILS AT ASPEN RIDGE	0.18	0.75	1.38
AS	LH1-LH2	0.36	1.51	2.75
AT	WF3	0.75	2.90	5.28
AU	WF2	4.63	2.78	12.36
AV	WF2-WF3, LH1-LH2	5.74	6.53	19.46
AW	WF1-WF3, LH1-LH2	21.73	37.02	86.80
AX	WF5	6.44	10.07	22.45
AY	WF6	1.06	3.64	6.64
AZ	WF5-WF6	7.50	13.03	27.89
BA	WF1-WF3, WF5-WF6, LH1, LH2	29.23	43.77	101.53
BB	WF1-WF6, LH1-LH2	49.51	72.74	170.87
BC	WF1-WF8, LH1-LH2 INTO WFJCC POND #1	76.22	89.73	226.69
WFJCC POND #1	POND DISCHARGE	76.22	10.70	106.70
TAR-EP	TRAILS AT ASPEN RIDGE-EAST POND FULL BUILD-OUT DISCHARGE	160.87	5.80	139.50
WF1	TAR-EP, WF9, WFJCC POND #1 DISCHARGE	249.72	22.13	276.32

CITY OF COLORADO SPRINGS

BRADLEY HEIGHTS METRO DISTRICT
MASTER DEVELOPMENT DRAINAGE REPORT

POST DEVELOPMENT DRAINAGE CONDITIONS

DESIGNED BY: MO
DRAWN BY: JTS
CHECKED BY: JTS

SCALE: HORIZ 1" = 250', VERT. NA

DATE ISSUED: JANUARY 2022

SHEET 4 OF 5

DRAWING No. DR-04

SEAL

PRELIMINARY
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

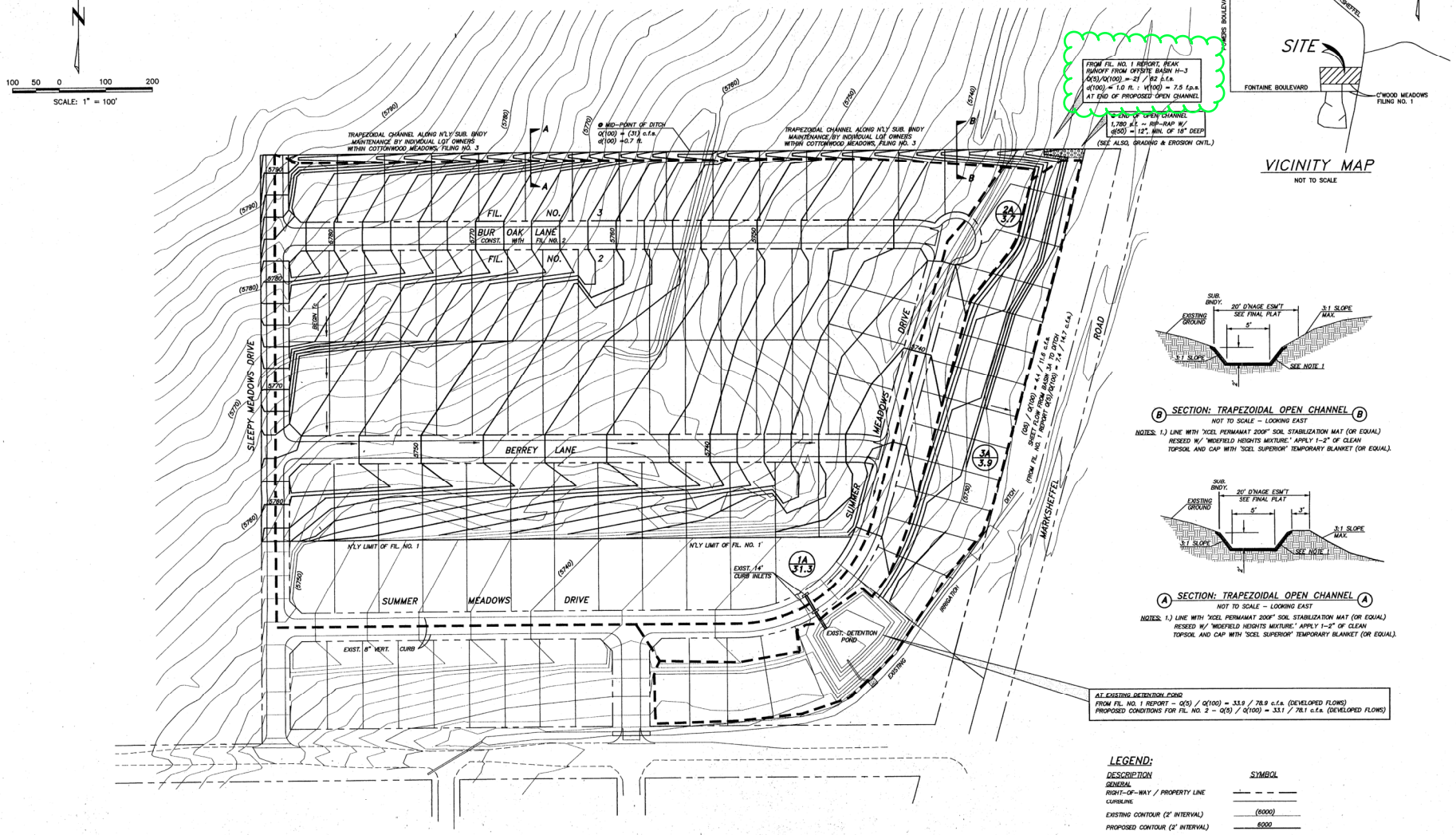
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.
PROJECT No. 21.1213.004

PREPARED BY: Matrix

No.	DATE	DESCRIPTION	BY
		REVISIONS	

COMPUTER FILE MANAGEMENT
FILE NAME: S:\21.1213.001 Bradley Heights Metro District\200 Drainage\201 Drainage Reports\MDDP\DWG\BRADLEY HEIGHTS DR.dwg
CTB FILE:
PLOT DATE: January 11, 2022 5:49:58 PM
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE

REFERENCE DRAWINGS



REVISION	DATE
ADD SECTION TO N'LY DITCH AND TEXT FOR DESIGNATION AS PRIVATELY	04/17/00
BY OWNERS OF LOTS WITHIN FILING NO. 3.	
REVISE TYP. CROSS SECTIONS TO REFLECT DRAINAGE EASEMENT.	05/22/00

JOB NUMBER:	0320212
DWG. NAME:	DNAGE
DWG. SCALE:	1"=100'(H)
DATE:	02/11/2000
PREPARED BY:	
CHECKED BY:	

HMS Group, LLC
Civil Engineering & Design
5555 Erindale Dr., Ste. 201, Co. Spgs., CO 80918
(719) 528-8554 (office) (719) 598-4547 (fax)

DEVELOPED DRAINAGE MAP
COTTONWOOD MEADOWS, FIL. NO.S 2 & 3
EL PASO COUNTY, COLORADO

PREPARED FOR:
RBL ENTERPRISES, LLC
940 CARLSON DRIVE, COLORADO SPRINGS, CO 80918

SHEET 1 OF 1

PEACEFUL RIDGE AT FOUNTAIN VALLEY SUBDIVISION

ENGINEER'S OPINION OF PROBABLE COST - STORM SEWER & WATER QUALITY POND

SUMMARY TABLE

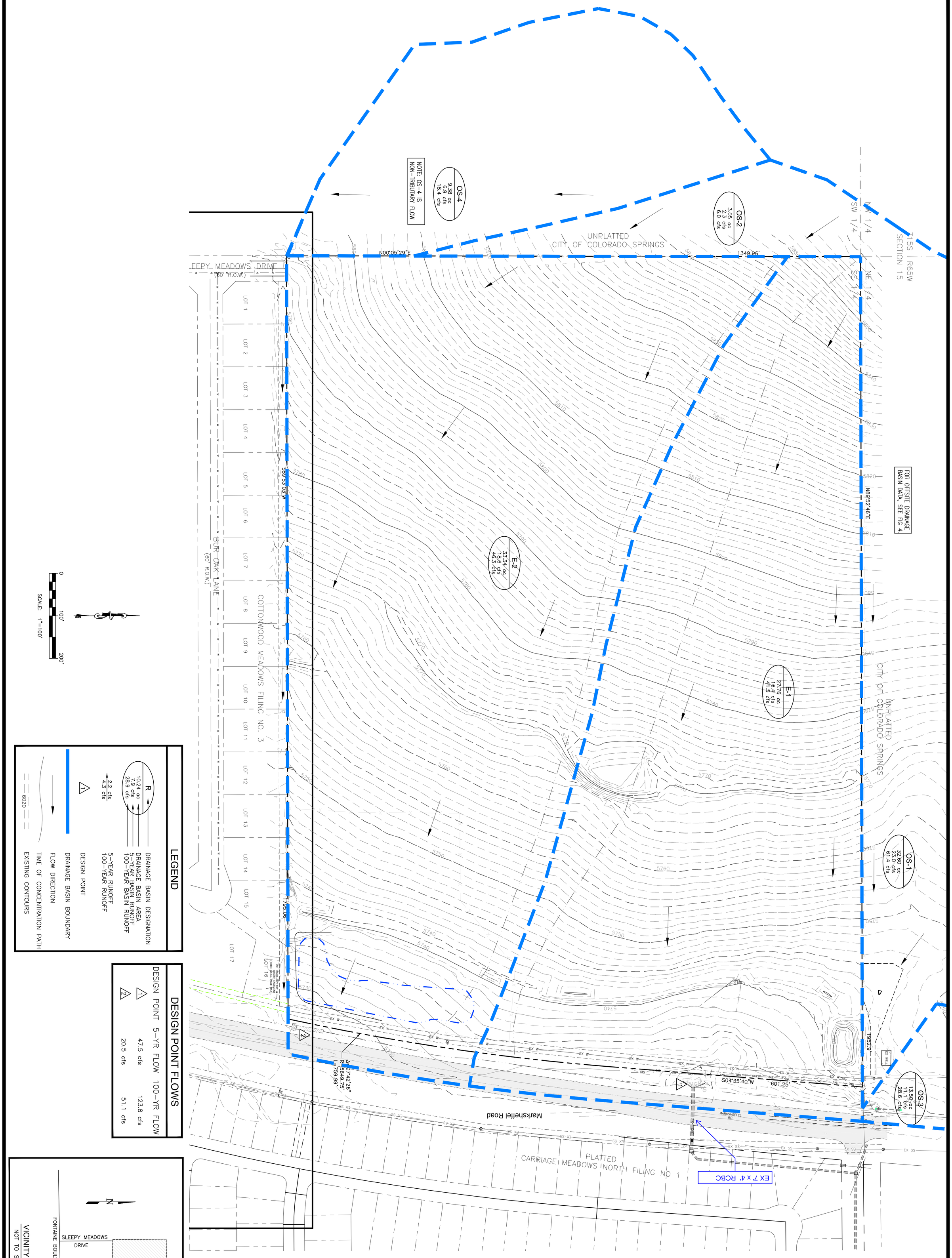
PUBLIC STORM SEWER	$	750,333
TOTAL:	**$**	**750,333**
PRIVATE STORM SEWER	$	118,821
PRIVATE DETENTION/WATER QUALITY POND	$	70,928
TOTAL:	**$**	**189,749**

PUBLIC STORM SEWER	QUAN.	UNIT	UNIT PRICE	PRICE
4' DIA. TYPE II MH	10	EA	$ 7,734.00	$ 77,340.00
5' DIA. TYPE I MH	6	EA	$ 7,734.00	$ 46,404.00
6' DIA. TYPE I MH	1	EA	$ 7,734.00	$ 7,734.00
8' DIA. TYPE I MH (BOX BASE)	1	EA	$ 14,061.00	$ 14,061.00
18" RCP CL-III	361	LF	$ 76.00	$ 27,436.00
24" RCP CL-III	253	LF	$ 91.00	$ 23,023.00
30" RCP CL-III	624	LF	$ 114.00	$ 71,136.00
36" RCP CL-III	1028	LF	$ 140.00	$ 143,920.00
42" RCP CL-III	318	LF	$ 187.00	$ 59,466.00
68" x 43" HERCP	32	LF	$ 402.00	$ 12,864.00
10' TYPE R INLET	1	EA	$ 9,507.00	$ 9,507.00
15' TYPE R INLET	4	EA	$ 12,858.00	$ 51,432.00
20' TYPE R INLET	7	EA	$ 14,109.00	$ 98,763.00
			SUBTOTAL:	**$ 682,121**
			10% ENGINEERING CONTINGENCY:	**$ 68,212**
			TOTAL:	**$ 750,333**

PRIVATE STORM SEWER	QUAN.	UNIT	UNIT PRICE	PRICE
6' DIA. TYPE I MH	3	EA	$ 7,734.00	$ 23,202.00
24" RCP CL-III	21	LF	$ 91.00	$ 1,911.00
42" RCP CL-III	260	LF	$ 187.00	$ 48,620.00
48" RCP CL-III	118	LF	$ 228.00	$ 26,904.00
68" x 43" HERCP	16	LF	$ 402.00	$ 6,432.00
24" RCP FES	1	EA	$ 950.00	$ 950.00
			SUBTOTAL:	**$ 108,019**
			10% ENGINEERING CONTINGENCY:	**$ 10,802**
			TOTAL:	**$ 118,821**

PRIVATE DETENTION/WATER QUALITY POND	QUAN.	UNIT	UNIT PRICE	PRICE
POND EXCAVATION	5000	CY	$ 7.00	$ 35,000.00
MAINTENANCE ACCESS ROAD	5754	SY	$ 24.00	$ 138,096.00
OUTLET STRUCTURE	1	LS	$ 30,000.00	$ 30,000.00
CONCRETE TRICKLE CHANNEL	22	CY	$ 150.00	$ 3,300.00
FOREBAY	1	EA	$ 15,000.00	$ 15,000.00
TYPE L SOIL RIP RAP	874	TON	$ 97.00	$ 84,778.00
TYPE M SOIL RIP RAP	78	TON	$ 97.00	$ 7,566.00
POND WALL	3800	SF	$ 55.00	$ 209,000.00
8' DIA. TYPE I MH	1	EA	$ 7,734.00	$ 7,734.00
8' DIA. TYPE I MH (BOX BASE)	1	EA	$ 14,061.00	$ 14,061.00
60" x 38" HERCP	57	LF	$ 348.00	$ 19,836.00
48" FES	1	EA	$ 2,406.00	$ 2,406.00
48" RCP CL-III	625	LF	$ 228.00	$ 142,500.00
			SUBTOTAL:	**$ 709,277**
			10% ENGINEERING CONTINGENCY:	**$ 70,928**
			TOTAL:	**$ 780,205**

APPENDIX F – DRAINAGE MAPS



LEGEND

- R — DRAINAGE BASIN DESIGNATION
  - 10.24 ac — DRAINAGE BASIN AREA
  - 7.9 cfs — 5-YEAR BASIN RUNOFF
  - 28.9 cfs — 100-YEAR BASIN RUNOFF
- 2.2 cfs / 4.3 cfs — 5-YEAR RUNOFF / 100-YEAR RUNOFF
- 1 — DESIGN POINT
- DRAINAGE BASIN BOUNDARY
- FLOW DIRECTION
- TIME OF CONCENTRATION PATH
- 6020 — EXISTING CONTOURS

DESIGN POINT FLOWS

DESIGN POINT	5-YR FLOW	100-YR FLOW
1	47.5 cfs	123.8 cfs
2	20.5 cfs	51.1 cfs

SHEET
E-1
1 OF 3 SHEETS

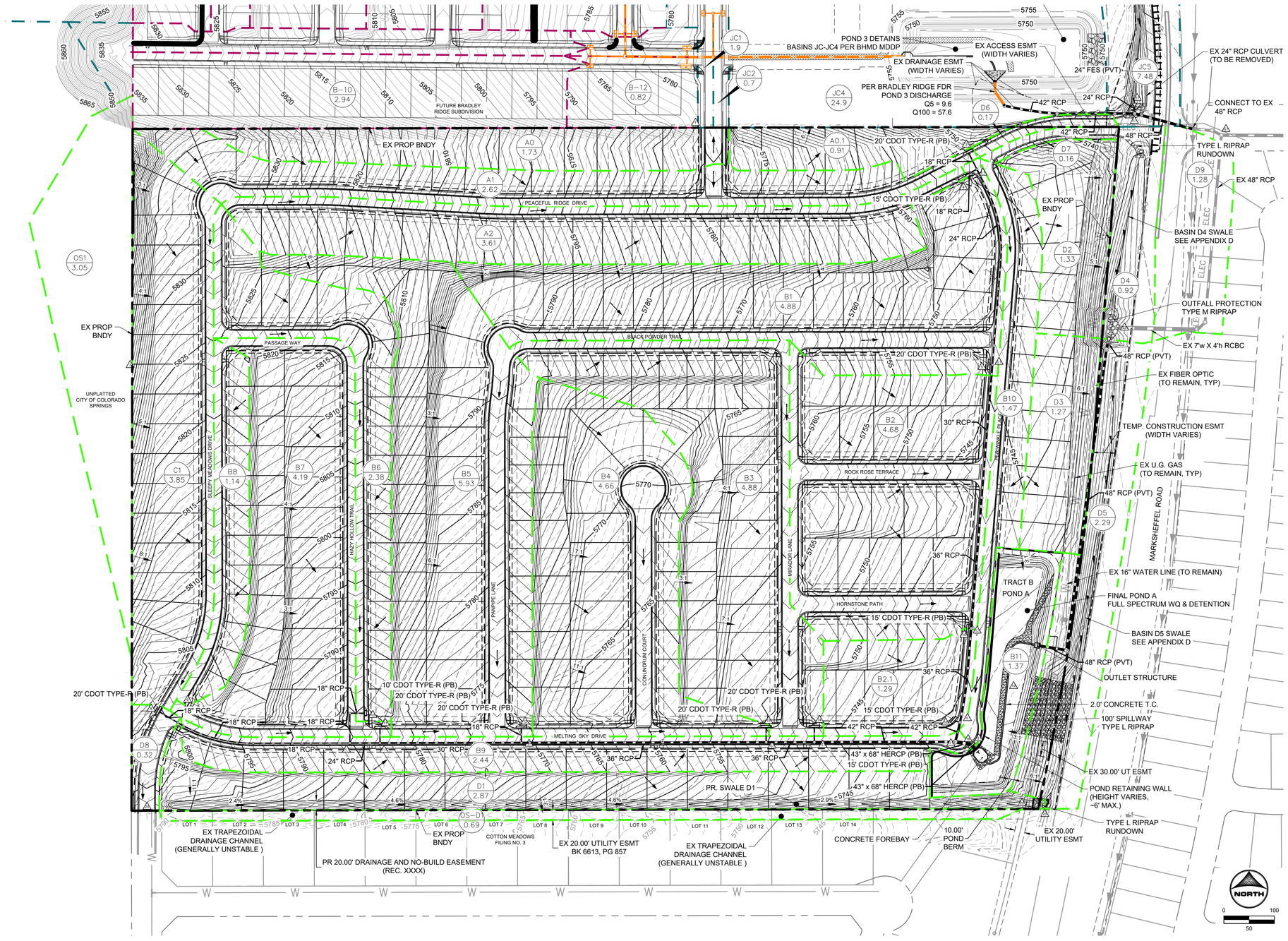
Project No.:	21031
Date:	Nov 23 2021
Design:	JGD/MJK
Drawn:	JGD/MJK
Check:	AWMc
Revisions:	
1.	11/21 Storm Revs

PEACEFUL RIDGE at FOUNTAIN VALLEY SUBDIVISION
FINAL DRAINAGE REPORT ADDENDUM
EXISTING CONDITIONS
EL PASO COUNTY, COLORADO

WIDEFIELD Investment Group

Kiowa Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

21031-pdrain.dwg/Nov 22, 2021/3:00pm



SUMMARY RUNOFF TABLE

BASIN	AREA (ac)	% IMP.	Q_5 (cfs)	Q_{100} (cfs)
A0	1.73	44	4.4	8.7
A0.1	0.91	44	2.2	4.4
A1	2.62	44	5.0	10.0
A2	3.61	44	6.9	13.9
B1	4.88	44	11.0	22.0
B2	4.68	44	9.6	19.3
B2.1	1.29	44	2.8	5.7
B3	4.88	44	9.4	19.0
B4	4.66	44	9.8	19.6
B5	5.93	44	11.9	23.9
B6	2.38	44	4.9	9.7
B7	4.19	44	8.2	16.4
B8	1.14	44	2.5	5.0
B9	2.44	44	4.8	9.6
B10	1.47	44	2.6	5.3
B11	1.39	44	3.7	7.4
C1	3.85	44	7.9	15.9
OSD1	0.69	2	0.2	1.5
D1	2.73	44	5.4	10.9
D2	1.33	44	2.4	4.9
D3	1.27	44	2.3	4.6
D4	0.92	41	1.5	3.6
D5	2.40	51	3.3	7.3
D6	0.17	100	0.8	1.4
D7	0.16	100	0.7	1.3
D8	0.32	69	1.1	2.1
OS1	3.05	2	1.4	9.5
JC5	7.48	61	10.8	23.5

DESIGN POINT SUMMARY TABLE

DESIGN POINT	CONTRIBUTING BASINS	ΣQ_5 (cfs)	ΣQ_{100} (cfs)
1	A0	4.4	8.7
3	A1	5.0	10.0
4	A2	6.9	13.9
4.1	DP3 & DP4	11.5	20.7
5	B1	4.4	22.0
5.1	DP3-DP5	20.1	35.8
7	OS1	1.4	9.5
8	C1 & DP7	7.9	15.9
9	B8	2.5	5.0
10	B6	4.9	9.7
10.1	DP8 & DP10	13.5	27.4
11	B7	10.4	21.5
11.1	DP10.1 & DP11	23.5	44.3
12	B5	11.9	23.9
12.1	DP11.1 & DP12	34.4	62.5
13	B4	9.8	19.6
13.1	DP12.1 & DP13	42.7	77.2
14	B3	9.4	19.0
14.1	DP13.1 & DP14	51.8	92.2
15	B2	9.6	19.3
15.1	DP5.1 & DP15	27.5	47.9
16	B2.1	2.8	5.7
16.1	DP15.1 & DP16	30.2	66.2
17.1	DP14.1 & DP16.1	78.9	156.8
18	B9 & B10	2.6	5.3
18.1	DP17.1 & DP18	85.8	170.4
19	DP18.1 & B11	3.7	7.4
20	D1 & OSD1	5.1	11.2
21	D6 & JC5	10.8	23.5
21.1	DP21 & POND 3 OUT	21.8	87.0
22	DP21, D2, D4 & D7	13.5	125.4
22.1	DP21.1 & DP22	35.3	212.3
23	D3 & D5	5.0	10.9
24	D8	1.1	2.1

LEGEND:

- PROPOSED MAJOR CONTOUR — 5250
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR — 5250
- EXISTING MINOR CONTOUR
- PROPOSED STORM SEWER
- PROPOSED STORM SEWER
- STORM SEWER (BY OTHERS)
- EXISTING DRAINAGE SWALE
- PROPOSED DRAINAGE SWALE
- PROPERTY BOUNDARY
- PROPOSED FLOW DIRECTION
- EXISTING FLOW DIRECTION
- PROPOSED DRAINAGE BASIN
- PROPOSED DRAINAGE BASIN (BRADLEY HEIGHTS MDDP)
- PROPOSED DRAINAGE BASIN (BRADLEY RIDGE FDR)
- DESIGN POINT
- PROPOSED BASIN LABEL
- BASIN DESIGNATION
- AREA (AC.)

PCD FILE NO. CDR-22-015

DRAWN BY: NQJ JOB DATE: 6/26/2023
APPROVED: CM JOB NUMBER: ####
CAD DATE: 6/28/2023
CAD FILE: J:\2023\2302308\CAD\Dwgs\C\Drainage\Pr_Drainage_Map

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1"
IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

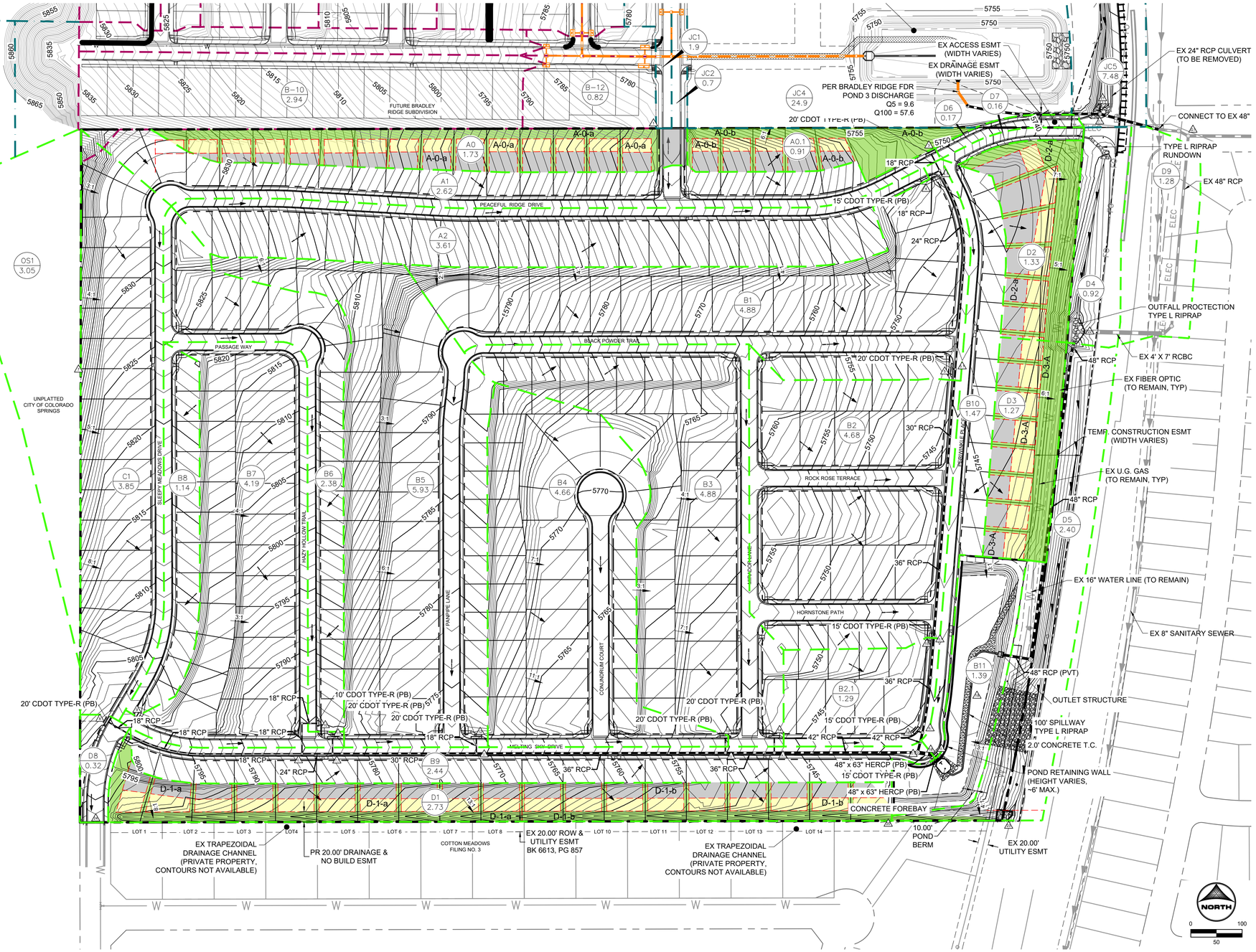
NO.	DATE	BY	REVISION DESCRIPTION

HR GREEN - COLORADO SPRINGS
1975 RESEARCH PARKWAY SUITE 230
COLORADO SPRINGS, CO 80920
PHONE: 719.394.2440
FAX: 713.965.0044

PEACEFUL RIDGE AT FOUNTAIN VALLEY
PEACEFUL RIDGE DEVELOPMENT COMPANY
EL PASO COUNTY, CO

PROPOSED CONDITIONS - DRAINAGE MAP

SHEET DRN 01



LEGEND:

- PROPOSED MAJOR CONTOUR — 5250
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR — 5250
- EXISTING MINOR CONTOUR
- PROPOSED STORM SEWER
- PROPOSED STORM SEWER
- STORM SEWER (BY OTHERS)
- EXISTING DRAINAGE SWALE
- PROPOSED DRAINAGE SWALE
- PROPERTY BOUNDARY
- PROPOSED FLOW DIRECTION
- EXISTING FLOW DIRECTION
- PROPOSED DRAINAGE BASIN
- PROPOSED DRAINAGE BASIN (BRADLEY HEIGHTS MDDP)
- PROPOSED DRAINAGE BASIN (BRADLEY RIDGE FDR)
- DESIGN POINT
- PROPOSED BASIN LABEL — A — BASIN DESIGNATION; 11 / 1.25 — AREA (AC.)
- IRF BOUNDARIES
- UNCONNECTED IMPERVIOUS AREA (UIA)
- RECEIVING PERVIOUS AREA (RPA)
- SEPARATE PERVIOUS AREA (SPA)
- DIRECTLY CONNECTED IMPERVIOUS AREA (DCIA)

PCD FILE NO. CDR-22-015

DRAWN BY: NQJ	JOB DATE: 5/2/2023	BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.	
APPROVED: CM	JOB NUMBER: ####		
CAD DATE: 6/28/2023			
CAD FILE: J:\2023\2302308\CAD\Dwgs\C\Drainage\Pr_Runoff_Reduction_Map			

NO.	DATE	BY	REVISION DESCRIPTION

HRGreen
HR GREEN - COLORADO SPRINGS
1975 RESEARCH PARKWAY SUITE 230
COLORADO SPRINGS, CO 80920
PHONE: 719.394.2440
FAX: 713.965.0044

PEACEFUL RIDGE AT FOUNTAIN VALLEY
PEACEFUL RIDGE DEVELOPMENT COMPANY
EL PASO COUNTY, CO

RUNOFF REDUCTION MAP

SHEET DRN 2