Phase III Drainage Report

Bella Mesa Filing No. 1
CD26-0032

Prepared for:

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September 08, 2026
Project No. 17026.007

ENGINEER'S CERTIFICATION

"I affirm that this report and plan for the Phase III drainage design of Bella Mesa South, was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others."

_____
Travis Frazier, P.E.
Registered Professional Engineer
State of Colorado No. 45342

Owner Approval:
Cardel Homes hereby certifies that the drainage facilities for Bella Mesa South will be constructed according to the design presented in this report. I understand that the Town of Castle Rock does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the Town of Castle Rock reviews drainage plans pursuant to the Municipal Code; but cannot, on behalf of Bella Mesa Filing No. 1 guarantee that final drainage design review will absolve Cardel Homes and/or their successors and/or assigns of future liability for improper design."

_____.
Name of Developer

_____.
Authorized Signature

Town of Castle Rock Approvals:

_____.
Castle Rock Water Department Date

_____.
Development Services Date

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Introduction – General Location and Description

INTRODUCTION

This Phase III Drainage Report presents an analysis for the proposed drainage patterns and requirements for the proposed Bella Mesa South, hereafter referred to as the Site.

Site Location

The Site consists of approximately 8.9 acres. Native grasses and weeds currently cover the Site. There is an existing floodplain to the north and to the west of the Site. The southern portion of the Site generally drains to the south and west towards Mitchell Gulch at slopes between 1% and 33%. The northern portion of the Site generally drains to the north and to the west towards Mitchell Gulch and Tract B of Founders Village Filing No. 24.

Site Description

Bella Mesa South is located in the Town of Castle Rock. More specifically, the project is located in the southeast quarter of section 8, Township 8 South, Range 66 West of the Sixth Principal Meridian, Douglas County, Colorado. The project is bound by Mitchell Gulch to the west, Mitchell Street to the East, Mikelson Boulevard to the south, and Tract B of Founders Village Filing No. 24 to the north. Please see the vicinity map in Appendix A for further reference.

There is an existing sub-regional detention pond to the north of the Site that was designed and constructed as a part of the Public Improvement Construction Plans for Founders Village Filing 24 – Phase 1A by Core Consultants dated December 28, 2018. A majority of the runoff from the Site will flow north to the existing sub-regional detention pond. The remaining runoff will flow west to Mitchell Gulch and south to Mickelson Boulevard. There are no active irrigation facilities on or across the limits of the Site.

Proposed Project Description

The proposed development will include 93 single family attached units as well as landscaping, associated roadways, and site infrastructure.

Flood Hazard and Drainage Studies Relevant to the Site

Based on the FEMA FIRM, Map 08035C0306G, effective date March 16, 2016, found in Appendix A, the Site is located within Zone X (Area of Minimal Flood Hazard) and is not located within a 100-year floodplain. The proposed site will not encroach into Mitchell Gulch or the regulated FEMA floodplain.

Soil Type

The Natural Resource Conservation Service (NRCS) soil survey map indicates that onsite soils are primarily composed of Coni rocky loam (90.9%), classified as hydrologic soil group is Type

D with a very slow infiltration rate, and Fondis clay loam (9.1%), classified as hydrologic soil group is Type C and has a slow infiltration rate. Surfacing bedrock is also preset throughout the Site, this will not have a significant impact on runoff and storm drainage infrastructure due to rock excavation and sub-excavation taking place prior to construction. Furthermore, no infiltration facilities are proposed with the development. Portions of the Site that will not be excavated will maintain their historical runoff conditions and drainage patterns, having very slow infiltration rates. A soil map has been included in Appendix A for reference. For the purposes of this report, the entire site was assumed to be Type D soil coverage.

Drainage Basin and Sub-Basins

Existing Basins

Based on the Phase III Drainage Report Founders Village Filing 24 – 1st Amendment by Redland dated May 28, 2021, the Site lies within major basins A1 and B1. Basin A1 generally flows northwest to Mitchell Gulch on the west side of the property. It includes the northern portion of the site, is comprised of 5.08 acres, and has an imperviousness of 2%. Basin B1 generally flows southwest to Mitchell Gulch on the west side of the property. It includes the southern portion of the site, is comprised of 3.78 acres, and has an imperviousness of 2%. Mitchell Gulch drains to Cherry Creek approximately two miles downstream from the property. It was anticipated that in the fully developed condition, Basin A1 and Basin B1 would have an overall imperviousness of 70%.

Major Basins

The proposed site has been divided into four basins: Basin A, Basin B, Basin C, and Offsite Basin OS.

Basin A includes the northern portion of the site and is comprised of 5.05 acres with an imperviousness of 70%. Basin A generally flows north and is collected by proposed storm sewer. The proposed storm sewer connects to the existing storm sewer at the northern edge of the Site. Ultimately, Basin A conveys flows towards Existing Detention Pond A constructed as a part of the Public Improvement Construction Plans for Founders Village Filing 24 – Phase 1A by Core Consultants dated December 28, 2018. Basin A will produce approximately 11.9 cfs in the 5-year event and 27.5 cfs in the 100-year event. The minor and major runoff are below the anticipated values described in the Phase III Drainage Report Founders Village Filing 24 – 1st Amendment by Redland dated May 28, 2021.

Basin B includes the southeastern portion of the site and is comprised of 2.14 acres with an imperviousness of 70%. The runoff from Basin B will flow north towards existing storm sewer and ultimately towards Existing Detention Pond A. Basin B will produce approximately 5.5 cfs in the 5-year event and 12.6 cfs in the 100-year event, both of which are below the anticipated values described in the Redland Report.

Basin C includes parts of the northern, western, and southern portions of the site, most of which was previously included in the Existing Basin B1. As anticipated by the Redland Report, the runoff from Basin C will generally flow west to Mitchell Gulch and south to Mikelson Boulevard. Basin C is comprised of 1.76 acres with an imperviousness of 40%. Basin C will produce approximately 2.8 cfs in the 5-year event and 9.1 cfs in the 100-year event. The combined minor and major runoff of Basin C and Basin B encompassed in Existing Basin B1, which both flow to Mitchell Gulch, and are below the anticipated values described in the Redland Report. The remainder of Basin C will remain as undisturbed land that continues to flow to Mitchell Gulch at the historic rate.

Offsite Basin OS includes parts of the western half of Mitchell Street along the eastern property boundary. It is comprised of 0.2 acres with an imperviousness of 95%. Offsite Basin OS will produce 0.7 cfs in the 5-year event and 1.5 cfs in the 100-year event. These basins will flow into the site and be collected by on-site storm sewer. The minor and major runoff contributed to Basin A and Basin B are below the anticipated values from the Redland Report.

Sub Basins

Basin A1 (0.38 Acres)

Basin A1 includes attached townhome units, sidewalk, and open space. Runoff from the basin generally sheet flows to swale 1 where it is conveyed to a Type C Inlet located in a sump condition at Design Point A1. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, flows will overtop the sidewalk to the southeast and be conveyed to existing storm sewer within Mitchell Street. The basin is approximately 0.38 acres with an imperviousness of 57%.

$C_5 = 0.50$ $C_{100} = 0.72$

$Q_5 = 0.7$ CFS $Q_{100} = 1.7$ CFS

Basin A2 (0.74 Acres)

Basin A2 includes attached townhome units, sidewalk, and open space. Runoff from the basin generally sheet flows to swale 2 where it is conveyed to a Type C Inlet located in a sump condition at Design Point A2. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, flows will enter Basin A1 where they overtop the sidewalk to the southeast and be conveyed to existing storm sewer within Mitchell Street. The basin is approximately 0.74 acres with an imperviousness of 51%.

$C_5 = 0.45$ $C_{100} = 0.69$

$Q_5 = 1.2$ CFS $Q_{100} = 3.5$ CFS

Basin A3 (0.33 Acres)

Basin A3 includes attached townhome units, roadway, and open space. Runoff from the basin sheet flows to the eastern flowline of private road Zola Sage Circle where it is collected in an on-grade Triple Type 16 Combination Inlet at Design Point A3. The flow is then conveyed to proposed storm sewer. The basin is approximately 0.33 acres and has an imperviousness of 76%.

$C_5 = 0.66$ $C_{100} = 0.80$

$Q_5 = 0.9$ CFS $Q_{100} = 2.1$ CFS

Basin A4 (0.35 Acres)

Basin A4 includes attached townhome units, roadway, and open space. Runoff from the basin sheet flows to the eastern flowline of private road Zola Sage Circle where it is collected in an on-grade Triple Type 16 Combination Inlet at Design Point A4. The flow is then conveyed to proposed storm sewer. The basin is approximately 0.35 acres and has an imperviousness of 78%.

$C_5 = 0.67$ $C_{100} = 0.80$

$Q_5 = 1.0$ CFS $Q_{100} = 2.2$ CFS

Basin A5 (0.35 Acres)

Basin A5 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin generally sheet flows to the eastern flowline of private road Zola Sage Circle where it is collected in a Type 16 Combination Inlet located in a sump condition at Design Point A4. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, emergency flows will overtop the roadway crown to the northwest and enter Basin A5 where it will be conveyed to proposed storm sewer. The basin is approximately 0.35 acres and has an imperviousness of 70%.

$C_5 = 0.61$ $C_{100} = 0.77$

$Q_5 = 1.0$ CFS $Q_{100} = 2.3$ CFS

Basin A6 (0.75 Acres)

Basin A6 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin sheet flows to the western flowline of private road Zola Sage Circle where it is collected in an on-grade Type 16 Combination Inlet at Design Point A6. The flow is then

conveyed to proposed storm sewer. The basin is approximately 0.75 acres and has an imperviousness of 78%.

$C_5 = 0.67$ $C_{100} = 0.80$

$Q_5 = 2.0$ CFS $Q_{100} = 4.3$ CFS

Basin A7 (0.10 Acres)

Basin A7 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin generally sheet flows to the western flowline of private road Zola Sage Circle where it is collected in a Triple Type 16 Combination Inlet located in a sump condition at Design Point A7. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, flows will overtop the curb to the north. The basin is approximately 0.10 acres and has an imperviousness of 83%.

$C_5 = 0.71$ $C_{100} = 0.82$

$Q_5 = 0.3$ CFS $Q_{100} = 0.7$ CFS

Basin A8 (1.20 Acres)

Basin A8 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin generally sheet flows to the centerline of Private Alley C where it is collected in a Type 16 Valley Inlet located in a sump condition at Design Point A8. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, emergency flows will be collected by the redundant Type 16 Valley inlets to the northeast and southwest along the centerline of Private Alley C. If all inlets clog, flows will overtop the alley west of Design Point A8 into Basin C1. The basin is approximately 1.20 acres and has an imperviousness of 74%.

$C_5 = 0.64$ $C_{100} = 0.79$

$Q_5 = 3.0$ CFS $Q_{100} = 6.7$ CFS

Basin A9 (0.85 Acres)

Basin A9 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin sheet flows to the centerline of Private Alley C where it is collected in a series of Type 16 Valley Inlets. The flows will first be conveyed to the single Valley Inlet at design point A9. In case of clogging, the additional triple Type 16 Valley Inlet in the sump condition will convey flows that are not captured. The basin is approximately 0.85 acres and has an imperviousness of 74%.

$C_5 = 0.64$ $C_{100} = 0.79$

Q_5 = 2.2 CFS Q_{100} = 5.0 CFS

Basin B

Basin B1 (0.37 Acres)

Basin B1 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin generally sheet flows to the northern flowline of private road Zola Sage Circle where it is collected in a Double Type 16 Combination Inlet located in a sump condition at Design Point B1. The flow is then conveyed to proposed storm sewer. In case of clogging, emergency flows will overtop the roadway crown to the southwest and enter Basin B2 where it will be conveyed to proposed storm sewer. The basin is approximately 0.37 acres and has an imperviousness of 61%.

C_5 = 0.54 C_{100} = 0.74

Q_5 = 0.9 CFS Q_{100} = 2.2 CFS

Basin B2 (0.60 Acres)

Basin B2 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin sheet flows to the southern flowline of private road Zola Sage Circle where it is collected in a Double Type 16 Combination Inlet located in a sump condition at Design Point B2. The flow is then conveyed to proposed storm sewer. In case of clogging, emergency flows will overtop the sidewalk to the south and enter Basin B3 where it will be conveyed to proposed storm sewer. The basin is approximately 0.60 acres and has an imperviousness of 73%.

C_5 = 0.63 C_{100} = 0.78

Q_5 = 1.5 CFS Q_{100} = 3.4 CFS

Basin B2.1 (0.20 Acres)

Basin B2.1 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin sheet flows to the southern flowline of private road Zola Sage Circle where it is collected in a Double Type 16 Combination Inlet located in a sump condition at Design Point B2.1. The flow that is then conveyed to proposed storm sewer. In case of clogging, emergency flows will overtop the sidewalk to the south and enter Basin B3 where it will be conveyed to proposed storm sewer. The basin is approximately 0.20 acres and has an imperviousness of 71%.

C_5 = 0.61 C_{100} = 0.77

Q_5 = 0.6 CFS Q_{100} = 1.4 CFS

Basin B3 (0.97 Acres)

Basin B3 includes attached townhome units, roadway, sidewalk, and open space. Runoff from the basin generally sheet flows to the centerline of Private Alley C and Private Alley D where it is collected in a Double Type 16 Combination Inlet located in a sump condition at Design Point B3. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, emergency flows will overtop the edge of alley to the west and leave the site where it will flow into Mitchell Gulch. The basin is approximately 0.97 acres and has an imperviousness of 72%.

$C_5 = 0.62$ $C_{100} = 0.78$

$Q_5 = 2.6$ CFS $Q_{100} = 5.9$ CFS

Basin C

Basin C1 (1.14 Acres)

Basin C1 consists of attached townhome units, sidewalk, and open space. The basin is approximately 1.14 acres with an imperviousness of 46%. Capturing runoff from this subbasin was considered impractical from a grading perspective; therefore, runoff from the basin generally sheet flows west towards Mitchell Gulch approximately 870 linear feet of the property boundary. There is no flow concentration; therefore, the runoff from this basin does not propose any erosion concerns. The runoff from this subbasin will be treated by a grass buffer on site and further by the undeveloped land and native grasses to the west. See Water Quality Enhancement for further details.

$C_5 = 0.42$ $C_{100} = 0.67$

$Q_5 = 2.3$ CFS $Q_{100} = 6.8$ CFS

Basin C2 (0.49 Acres)

Basin C2 consists of attached townhome units, sidewalk, and open space. Capturing runoff from this subbasin was considered impractical from a grading perspective; therefore, runoff from the basin generally sheet flows to the northern flowline of Mikelson Blvd where it is conveyed to an existing Type R Inlet and existing storm sewer. The basin is approximately 0.49 acres and has an imperviousness of 34%. Basin C2 will produce 0.5 cfs in the 5-year event and 1.9 cfs in the 100-year event. Per the Mikelson Boulevard Phase III Drainage and Erosion Control Report for Castlewood Ranch LLC. By Nolte Associates, Inc. dated May 2000, the existing flow conveyed to the existing inlet is 7.6 cfs for the 5-year event and 16.2 cfs for the 100-year event. The combined flow is within the capacity of the existing inlet; therefore, the additional flow conveyed to the existing inlet from Basin C2 will have no negative impact on

the existing storm sewer. The flow is then conveyed to existing Mikelson Boulevard Detention Pond.

$C_5 = 0.31$ $C_{100} = 0.62$

$Q_5 = 0.5$ CFS $Q_{100} = 1.9$ CFS

Basin C3 (0.13 Acres)

Basin C3 consists of undisturbed soil. Runoff from the basin generally sheet flows west towards Mitchell Gulch. The basin is approximately 0.13 acres with an imperviousness of 5%. This subbasin is excluded from permanent water quality treatment per section 3.3.2 of the Permanent Water Quality Determination Worksheet. See attached worksheet.

$C_5 = 0.08$ $C_{100} = 0.50$

$Q_5 = 0.03$ CFS $Q_{100} = 0.4$ CFS

Offsite Basin OS

Basin OSA5 (0.01 Acres)

Basin OSA5 includes roadway and sidewalk. Runoff from the sheet flows to the southern flowline of private road Zola Sage Circle where it is collected in a Type 16 Combination Inlet located in a sump condition at Design Point A5. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, emergency flows will overtop the roadway crown to the northwest and enter Basin A7 where it will be conveyed to existing storm sewer. The basin is approximately 0.01 acres with an imperviousness of 95%.

$C_5 = 0.81$ $C_{100} = 0.87$

$Q_5 = 0.04$ CFS $Q_{100} = 0.1$ CFS

Basin OSA7 (0.11 Acres)

Basin OSA7 includes roadway and sidewalk. Runoff from the basin sheet flows to the northern flowline of private road Zola Sage Circle where it is collected in a Type 16 Combination Inlet located in a sump condition at Design Point A7. The flow is then conveyed to proposed storm sewer. In case of inlet clogging, emergency flows will overtop the curb to the north. The basin is approximately 0.11 acres with an imperviousness of 95%.

$C_5 = 0.81$ $C_{100} = 0.87$

$Q_5 = 0.4$ CFS $Q_{100} = 0.8$ CFS

Basin OSB1 (0.06 Acres)

Basin OSB1 includes roadway and sidewalk. Runoff from the basin sheet flows to the northern flowline of private road Zola Sage Circle where it is collected in a Type 16 Combination Inlet located in a sump condition at Design Point B1. The flow is then conveyed to existing storm sewer. In case of clogging, emergency flows will overtop the roadway crown to the southwest and enter Basin B2 where it will be conveyed to proposed storm sewer. The basin is approximately 0.06 acres with an imperviousness of 95%.

$C_5 = 0.81$ $C_{100} = 0.87$

$Q_5 = 0.2$ CFS $Q_{100} = 0.5$ CFS

Basin OSB2 (0.02 Acres)

Basin OSB2 includes roadway and sidewalk. Runoff from the basin sheet flows to the southern flowline of private road Zola Sage Circle where it is collected in a Type 16 Combination Inlet located in a sump condition at Design Point B2. The flow is then conveyed to existing storm sewer. In case of clogging, emergency flows will overtop the sidewalk to the south and enter Basin B3 where it will be conveyed to proposed storm sewer. The basin is approximately 0.02 acres with an imperviousness of 95%.

$C_5 = 0.81$ $C_{100} = 0.87$

$Q_5 = 0.1$ CFS $Q_{100} = 0.1$ CFS

Drainage Design Criteria

Regulations, Drainage Studies, Development Criteria Reference and Constraints

This Phase III Drainage Report is in accordance with the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual dated February 2025, and the Mile High Flood District (MHFD) Storm Drainage Criteria Manual Volumes 1, 2, and 3 dated March 2024. These manuals were used as a basis of design for the Site.

This Site is within the Cherry Creek Basin and is subject to the Department of Public Health and Environment Water Quality Control Commission Cherry Creek Reservoir Control Regulation 5 CCR 1002-72.

The Site is shown within two existing drainage reports. The Site is a part of Major Basin FU-4 within Public Improvement Construction Plans for Founders Village Filing 24 – Phase 1A by

Core Consultants dated December 28, 2018, hereby referred to as the *Core Report*. The Site is also a part of Basins A1 and B1 within the Phase III Drainage Report for Founders Village Filing 24 – 1st Amendment, prepared by Redland, dated May 28, 2021 (CD21-0011), hereby referred to as the *Redland Report*.

The constraints for the site include the steep grades falling away from Mitchell Street and Mikelson Blvd. towards Mitchell Gulch as well as shallow bedrock.

Hydrological Criteria

The hydrologic design was computed using the Rational Method as defined by the Mile High Flood District. The 5-year storm was used as the minor storm event, while the 100-year storm was used as the major event. The one-hour point rainfall depth used for the 5-year storm was 1.43 inches and 2.60 inches for the 100-year event. Impervious values are based on Tables 6-2 and 6-3 of Chapter 6 of the MHFD Criteria Manual Volume 1. The areas of concrete driveways and walks, disturbed soil, and roof along with their associated impervious values from Tables 6-2 and 6-3 of Chapter 6 of the MHFD Criteria Manual Volume 1 were used to calculate a product specific impervious value for the townhome lot. This calculated value was then used throughout the calculations. The Rational Method was used to analyze the proposed condition, and calculations can be found in Appendix B and D.

Hydraulic Criteria

Preliminary street and inlet capacity calculations were completed using MHFD_Inlet, Version 6.00.

Channel Hydraulics are evaluated using the Hydraflow Express Extension for Autodesk Civil 3D, version 2020 modeling software. This method utilizes Manning's equation to compute flow rates at varying depths of flow.

$$Q = \frac{1.49}{n} AR^{2/3}\sqrt{S}$$

Where:

Q = Flow rate in cfs
n = Roughness coefficient
A = Cross-sectional area in sqft
R = Hydraulic radius
S = Channel slope in ft/ft

Water Quality Enhancement

Based on the Filing 24 Drainage Report, the existing regional extended detention basin was designed to provide water quality treatment for the full buildout of the Site, including Basins A and B. The pond has been reevaluated using the current Site layout, ultimate tributary area, and updated imperviousness assumptions. Based on the results of this evaluation, modifications to the outlet structure are necessary to accommodate the revised runoff

characteristics and ensure the pond functions in accordance with drainage and water quality criteria. The existing basin includes outlet structures designed to release the water quality capture volume (WQCV), excess urban runoff volume (EURV), and the 100-year storm event. Basin C1 will be treated through by a grass buffer on-site and further by the undeveloped open space and native grasses to the west of the Site. The land is designated as Town Open Space; therefore, it will remain undeveloped. The on-site grass buffer achieves 97.1% runoff reduction. An exhibit and calculations can be found in Appendix A. Basin C3 has been determined to be excluded from requirements for water quality enhancement and full-spectrum detention. See Variances and Appendix F for further details.

Stormwater Management and Facility Design

Stormwater Conveyance Facilities

Stormwater conveyance for the Site will rely on runoff sheet flowing to the curb and gutter and will be collected into stormwater inlets at necessary intervals. Swales will also be used to collect runoff generated from the Site improvements. The storm sewer will then convey the runoff to the existing sub-regional detention pond to the north. The existing sub-regional detention pond discharges to Mitchell Gulch.

Existing Stormwater Storage Facilities

The existing sub-regional pond is located north of the Site. As stated in the Core Report, "…the future development to the west of Mitchell Street will be included in the detention pond sizing," and "water quality measures have been included in the design of the proposed extended detention basins". With the Bella Mesa Filing No. 1, Tract A, which encompasses the existing sub-regional detention pond, is dedicated for open space, utilities, and detention. A permanent stormwater drainage easement for Tract A was dedicated on July 30, 2025, at Rec No. 2025040051. Additionally, due to the proximity to Mesa Middle School, a fence will need to be installed around the entire perimeter of the pond and associated structures including the emergency spillway and outlet pipe.

Pond Conformance

The existing detention pond is intended to provide water quality treatment and detention for runoff generated from the Site and its tributary drainage basins. The pond was originally designed as part of the Founders Filing No. 24 Drainage Report prepared by CORE Consultants. Within that report, the Site was included within Future Use Basin FU-4, which encompassed approximately 15.31 acres. Although future imperviousness values were not provided for FU-4, the report identified the future land use as multi-family residential and incorporated anticipated future development conditions into the design of the regional detention facility.

Following the CORE report, the Founders Village Filing 24 – 1st Amendment CD21-0011 Drainage Report was prepared by Redland Consultants in support of the Bella Mesa Planned Development Plan. This report refined the future drainage basin delineations and development assumptions for the area tributary to the pond. The Site was identified within Basins A1 and B1, which were assigned future imperviousness values of 70 percent. Basin A1 was identified as 5.08 acres and Basin B1 as 3.76 acres. In addition, updated drainage areas and future imperviousness assumptions were provided for several surrounding tributary basins, including A2, A3, B2, and C1.

For the current development, Basins A1 and B1 from the PLD report have been further refined into Basins A, B, and C. Basins A and B are tributary to the existing pond, while Basin C is routed separately and does not contribute runoff to the facility. To evaluate the continued adequacy of the pond, the tributary area was reevaluated using the current Site layout, future drainage assumptions from the PLD report, and the fully developed tributary basins identified in the original CORE report. The resulting tributary area to the pond was calculated to be 65.64 acres with a future imperviousness of 51.72 percent. Future imperviousness for Basins A2 and A3 was conservatively assumed to be 70 percent.

The original CORE detention design, documented within the UD-Detention spreadsheets, assumed a future tributary area of 65.41 acres with an overall imperviousness of 45.70 percent. Comparison of the original design assumptions to the updated analysis indicates a minor increase in tributary area of 0.23 acres and an increase in overall imperviousness of approximately 6.0 percent. While the tributary area remains generally consistent with the original design, the increase in imperviousness results in greater runoff volumes and peak flows being routed to the pond than were evaluated in the original analysis.

To determine conformance with current drainage criteria, the pond was reevaluated using the updated tributary area and imperviousness assumptions. Watershed length, watershed slope, hydrologic soil characteristics, and NOAA Atlas 14 rainfall data remained consistent with the original analysis. Storage-stage relationships were updated using available as-built information for the existing pond. The detention facility was then analyzed using the Mile High Flood District UD-Detention Spreadsheet, MHFD-Detention Version 4.08 (April 2026), to evaluate water quality and detention performance under current buildout conditions.

The reevaluation determined that the existing outlet structure does not provide sufficient discharge capacity to convey the increased runoff associated with the updated tributary imperviousness. Under the revised tributary conditions, the pond was unable to release the required 100-year detention volume prior to activation of the emergency spillway. As a result, modifications to the outlet structure were required to restore compliance with the original design intent and current drainage criteria.

To accommodate the increased runoff, the outlet structure was modified by raising the outlet elevation to 6.06 feet above the pond invert to and elevation of 6528.56, removing the sloped overflow grate weir, and eliminating the existing restrictor plate. These modifications increase the available outlet capacity and allow the detention facility to release the 100-year developed

flow without activating the emergency spillway. The modified outlet structure continues to satisfy the required water quality capture volume (WQCV) and excess urban runoff volume (EURV) release criteria while providing sufficient capacity to convey the 100-year storm event. The following tables provides the revised pond tributary and imperviousness values and a comparison on the pond from its existing condition to the proposed.

Pond Tributary Summary			
Basin	Area (ac)	Impervious (%)	Report
B (Ex)	30.27	49%	Founder Village Filing 24
C (Ex)	7.95	50%	
OS (Ex)	6.36	41%	
A2 (Future)	8.06	70%	PLD
A3 (Future)	2.6	70%	
C1 (Future)	3.22	2%	
A	5.04	70.18%	Bella Mesa South
B	2.14	70.19%	
Totals	65.64	51.72%	

Pond Comparison Summary		
	Existing	Proposed
Tributary Area (ac)	65.41	65.64
Imperviousness (%)	45.70	51.72
WQCV (ac-ft)	1.062	1.154
EURV (ac-ft)	2.518	2.066
100-yr (ac-ft)	6.835	6.270
Spillway Elev	9.5	9.5
Freeboard	1.26	0.96
WQCV Drain Time (hr)	40	43
5-yr Drain Time 97% (hr)	65	66
Peak Outflow (cfs)	43.5	67.5

Water Quality Enhancement Best Management Practices

The existing pond was analyzed, and it was determined that it can accept the full site runoff. Since the existing pond will accept all flows from Site, the pond will be modified to provide water quality.

Floodplain Modification

The applicable FEMA floodplain maps show that the floodplain for Mitchell Gulch lies outside the Site boundary. No floodplain modification or channel improvements are proposed with the Site. Adjacent to the Site, there is a 500-Year floodplain without base flood elevations. To the northwest of the Site, there is a 100-Year floodplain with a maximum base elevation of 6530' per Flood Insurance Rate Map (FIRM) Panel 08035C0306G with effective date March 16, 2016. The minimum lot elevation adjacent to the floodplains is 6571'. All adjacent structures, including crawlspaces, are a minimum of two feet above the adjacent floodplain base flood elevation. Floodplain maps can be found in Appendix A.

Geotechnical Investigation and Sub-surface Collection System Design

A Geologic and Preliminary Geotechnical Investigation for the Site was completed by A.G. Wassenaar Inc. dated October 10, 2018. Conclusions summarized within the report include the presence of expansive soils, shallow bedrock, and groundwater at depths between 12 to 32 feet encountered. Foundation subsurface drainage systems were determined to be necessary for all below grade areas. These drainage systems will daylight to grade or to proposed storm sewer.

Additional Permitting Requirements

No additional permits are anticipated with the proposed development.

Conclusion

Compliance with the Town of Castle Rock Code

The drainage design for Bella Mesa South conforms to the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual, with supplemental information developed from the Mile High Flood District Storm Drainage Criteria Manuals. This analysis demonstrates that the proposed facilities are developed in compliance with the appropriate criteria and constraints for the relevant development needs for the project.

Drainage Concept

This analysis demonstrates that the Site conforms to assumptions made in the existing drainage reports and the Site will have no negative impacts to existing downstream drainage facilities. The existing pond will be analyzed to determine if it can accept the full site runoff for water quality. If not, pond modifications will be proposed.

The Redland Report established Existing Basin A1 and Existing Basin B1. Existing Basin A1 had an area of 5.08 acres and an anticipated imperviousness of 70%. Major Basin A has an area of 5.09 acres and has an imperviousness of 70%. The proposed basin is 0.01 acre larger than originally assumed, which is 0.2% of the original basin. This increase in area is negligible. The Site will have no negative impact on the existing storm sewer system. Existing Basin B1 had an area of 3.76 acres and an anticipated imperviousness of 70%. This area now consists of Major Basin B and Minor Basins C1 and C2. The basins have a combined area of 3.74 and imperviousness of 59%. Both the area and the imperviousness are below the anticipated values: therefore, there should be no negative impact of Mitchell Gulch or the existing storm sewer system.

References

REFERENCES

1. Town of Castle Rock, Storm Drainage Design and Technical Criteria Manual, February 18, 2025.

2. Mile High Flood District, Denver, Colorado, Urban Storm Drainage Criteria Manual, Volume 1-3, latest online addition.

3. Public Improvement Construction Plans for Founders Village Filing 24 – Phase 1A, Core Consultants dated December 28, 2018

4. Phase III Drainage Report for Founders Village Filing 24 – 1st Amendment, Redland dated May 28, 2021.

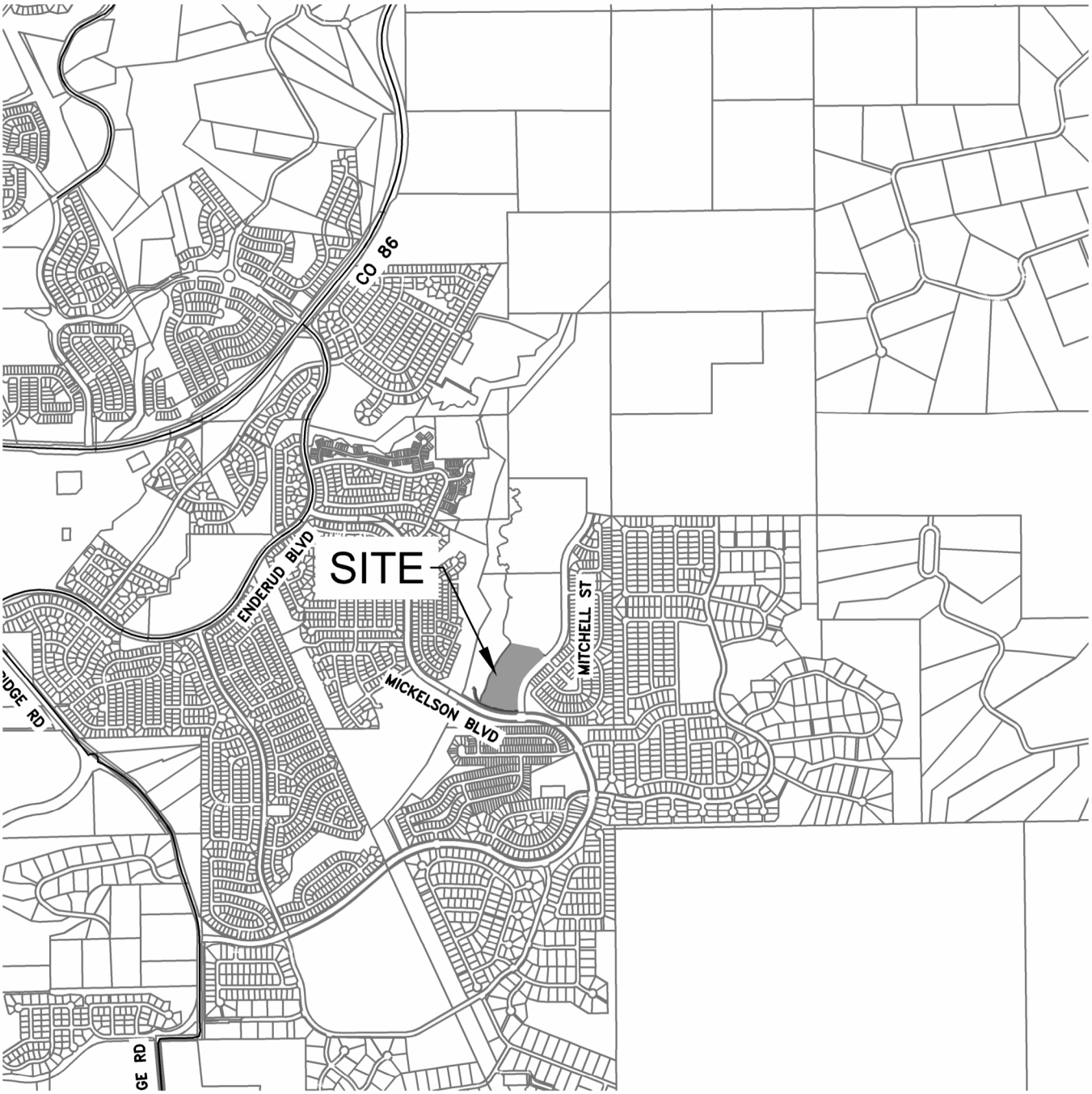
5. Stormwater Management Facility Operation and Maintenance (O&M) General Guidelines, Castle Rock Water, Stormwater Division dated December 12, 2012.

6. Geotechnical Site Development Study for Founders Village, Filing 24 West (Bella Mesa Duplexes), A.G. Wassenaar Inc., October 10, 2018.

7. Mikelson Boulevard Phase III Drainage and Erosion Control Report for Castlewood Ranch LLC., Nolte Associates Inc., November 1999, revised May 2000.

8. Department of Public Health and Environment Water Quality Control Commission Cherry Creek Reservoir Control Regulation 5 CCR 1002-72.

Appendix A - Vicinity Map, FIRM Map, Soils Map



0 1000 2000

SCALE : 1" = 2000'

BELLA MESA SOUTH

VICINITY MAP

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▪ Civil Engineering ▪ Construction Management

PROJECT NO: 17026.007

DATE: 06/04/2026

DRAWING NO: VIC

National Flood Hazard Layer FIRMette

FEMA

104°48'14"W 39°22'17"N

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

1:6,000

104°47'37"W 39°21'49"N

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/12/2025 at 5:26 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Hydrologic Soil Group—Castle Rock Area, Colorado
(Bella Mesa South)

Map Scale: 1:1,840 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Receiving Pervious Areas (Including Grass Buffers and Grass Swales)

SCM Design, Version 4.02 (June 2025)

Designer: Travis Frazier
Company: Redland Consulting Group
Date: May 18, 2026
Project: 17026.007 - Bella Mesa South
Location: Castle Rock
Outfall ID: C1

DESIGN PROCEDURE AND CRITERIA FOR ALL RPAs (User Input in Blue Cells)

1. Apply Four-Cover Land Use Model to Site Layout

Design Point ID	C1	Point A	Point B								
Area Type	RPA	UIA	RPA_Buffer								
Downstream Design Point ID	--	Point B									
DCIA (ft^2)	--	--	--								
UIA (ft^2)	--	17,551	--								
RPA (ft^2)	--	--	14,276								
SPA (ft^2)	--	--	--								

2. Protect the RPA from Traffic

RPA Protection Type	--	--									

3. Characterize On-site Topsoil and Determine Suitability for the RPA

HSG A (%)	--	--	0.0%								
HSG B (%)	--	--	0.0%								
HSG C/D (%)	--	--	100.0%								

4. Select Appropriate Vegetation

RPA Vegetation Type	--	--	Sod								
Irrigation Type	--	--	Permanent								

Notes:

GRASS BUFFER ADDITIONAL DESIGN PROCEDURE AND CRITERIA (User Input in Blue Cells)

1. Define the UIA:RPA pair, Ratio, and Interface Width

Sheet Flow Inflow Feature	--	--	Curbless								
Is Concrete Edger used?	--	--									
Spacing between slots (ft)	--	--	--								
Slot Opening Length (in)	--	--	--								
Blind Swale Type	--	--	--								
Spreader Energy Dissipation	--	--	--								
Total Area of UIA:RPA (ft^2)	--	--	31,827								
UIA:RPA Ratio	--	--	1.2								
UIA:RPA Interface Width (ft)	--	--	700								
L / W Ratio of UIA:RPA	--	--	0.06								

2. Buffer Length

Average Buffer Length (ft)	--	--	20								

3. Buffer Slope

Average Buffer Slope (ft/ft)	--	--	0.100								
Effective Distance (ft)	--	--	25								
Number of Level Spreaders	--	--	1								

4. Provide a Vertical Drop

Vertical Drop (in)	--	--									
Mowing Strip Provided?	--	--									

5. Calculate Runoff for UIA and RPA Pair

Imperviousness (%)	--	--	55.1%								
UIA:RPA Runoff (in)	--	--	0.01								
UIA:RPA Runoff (ft^3)	--	--	21								

6. Compare Runoff from UIA:RPA Pair to Runoff from UIA Only

UIA Runoff (ft^3)	--	--	731								
Runoff Reduction (ft^3)	--	--	710								
Runoff Reduction (%)	--	--	97.1%								

Notes: Grass Buffer is achieving 60% runoff reduction

GRASS SWALE ADDITIONAL DESIGN PROCEDURE AND CRITERIA (User Input in Blue Cells)

1. Delineate Areas Tributary to Swale											
Total Tributary Area (ft^2)	--	--	--								
Imperviousness (%)	--	--	--								
2. Swale Inflows											
Concentrated Flow Type	--	--	--								
Blind Swale Type	--	--	--								
Spreader Energy Dissipation	--	--	--								
Vertical Drop (in)	--	--	--								
Gutter Depression (in)	--	--	--								
Curb Opening Length (ft)	--	--	--								
Concrete Sediment Pad	--	--	--								
Min. Forebay Volume (ft^3)	--	--	--								
Design Forebay Volume (ft^3)	--	--	--								
Max. Forebay Depth (in)	--	--	--								
Design Forebay Depth (in)	--	--	--								
Calculated Notch Width (in)	--	--	--								
Design Notch Width (in)	--	--	--								
Drain Time (minutes)	--	--	--								
Energy Dissipation Type	--	--	--								
3. Swale Cross Section											
Length of Swale (ft)	--	--	--								
Bottom Width (ft)	--	--	--								
Bottom Area (ft^2)	--	--	--								
Side Slopes (horiz/vert)	--	--	--								
4. Longitudinal Slope											
Available Slope (ft/ft)	--	--	--								
Design Slope (ft/ft)	--	--	--								
Total Drop Height (ft)	--	--	--								
Underdrains Provided?	--	--	--								
5. Calculate Runoff from Tributary Area											
Tributary Runoff (ft^3)	--	--	--								
Reduced Trib. Runoff (ft^3)	--	--	--								
6. Calculate Runoff Reduction through Swale Bottom											
Volume Infiltrated (ft^3)	--	--	--								
Swale Discharge (ft^3)	--	--	--								
Runoff Reduction (%)	--	--	--								
7. Design Discharge											
2-year Discharge, Q2 (cfs)	--	--	--								
8. Design Velocity											
Vegetal Retardance Curve	--	--	--								
Velocity, V2 (fps)	--	--	--								
9. Design Flow Depth											
Flow Depth, D2 (ft)	--	--	--								
Flow Area, A (ft^2)	--	--	--								
Wetted Perimeter, P (ft)	--	--	--								
Top Width, T (ft)	--	--	--								
Hydraulic Radius, Rh (ft)	--	--	--								
VR Product (ft^2/sec)	--	--	--								
Manning's n value	--	--	--								
Hydraulic Depth, Dh (ft)	--	--	--								
Froude Number	--	--	--								
10. Swale Outflows											
Outflows Considered?	--	--	--								

Notes: _____

DESIGN POINT RESULT (Sums results for current column and all upstream design point columns.)

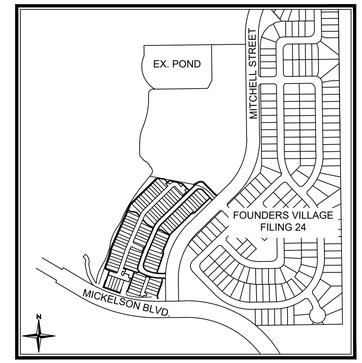
Design Point ID	C1	Point A	Point B								
Area Type	RPA	UIA	RPA_Buffer								
Total Area (ft^2)	0	17,551	31,827								
Imperviousness (%)		100.0%	55.1%								
Tributary Runoff (ft^3)		731	731								
Runoff Reduction (ft^3)	0	0	710								
Runoff Remaining (ft^3)	0	731	21								

Total Tributary Area entered on Site Layout Worksheet is: 49,658 square feet

SITE DEVELOPMENT PLAN

BELLA MESA SOUTH

LOCATED IN THE SOUTHEAST QUARTER SECTION 8,TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.
TOWN OF CASTLE ROCK PROJECT NUMBER SDP25-0014



KEY MAP
N.T.S

LEGEND
- GRASS BUFFER
- UNCONNECTED IMPERVIOUS AREA
- SEPARATE PERVIOUS AREA
- UIA: RPA INTERFACE WIDTH
- BASIN BOUNDARY

N

0 25 50 100
SCALE: 1" = 50'

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NOT FOR CONSTRUCTION

NO.	DATE	NOTES

PROJECT NO.	17026.007	
NO.	DATE	NOTES
1	05/30/2025	FIRST SUBMITTAL
2	08/17/2025	SECOND SUBMITTAL
3	11/26/2025	THIRD SUBMITTAL
4	01/13/2026	FOURTH SUBMITTAL
5	02/12/2026	FIFTH SUBMITTAL
6	02/26/2026	SIXTH SUBMITTAL

BELLA MESA SOUTH
SITE DEVELOPMENT PLAN
GRASS BUFFER EXHIBIT

SHEET
DRN

Appendix B - Hydrologic Calculations

Redland

STANDARD FORM SF-1 - DEVELOPED RUNOFF COEFFICIENTS

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

DATE: 8/13/2026
JURISDICTION: Castle Rock

LAND USE:	Roadways and Paved Streets	Concrete Driveways and Walks	Disturbed Soil	Townhome Lot	Undisturbed Soil
IMPERVIOUSNESS	95%	95%	20%	74%	5%
C_2	0.78	0.78	0.14	0.59	0.03
C_5	0.81	0.81	0.20	0.64	0.08
C_{10}	0.84	0.84	0.28	0.68	0.17
C_{100}	0.87	0.87	0.57	0.79	0.50

NRCS SOIL TYPE: TYPE D

OVERALL SITE STUDY AREA

DESIGN BASIN	DESIGN POINT	Roadways and Paved Streets (AC)	Concrete Driveways and Walks (AC)	Disturbed Soil (AC)	Townhome Lot (AC)	Undisturbed Soil (AC)	TOTAL AREA (AC)	$C_d(2)$	$C_d(5)$	$C_d(10)$	$C_d(100)$	Imp (%)
A1	A1	0	0.02	0.13	0.23	0	0.38	0.44	0.50	0.55	0.72	57%
A2	A2	0	0.05	0.34	0.35	0	0.74	0.39	0.45	0.51	0.69	51%
A3	A3	0.09	0	0.02	0.22	0	0.33	0.61	0.66	0.70	0.80	76%
A4	A4	0.09	0	0.01	0.25	0	0.35	0.63	0.67	0.71	0.80	78%
A5	A5	0.12	0.02	0.08	0.13	0	0.35	0.56	0.61	0.65	0.77	70%
A6	A6	0.20	0.06	0.05	0.44	0	0.75	0.63	0.67	0.71	0.80	78%
A7	A7	0.05	0.02	0.01	0.02	0	0.10	0.67	0.71	0.75	0.82	83%
A8	A8	0.31	0.04	0.13	0.72	0	1.20	0.59	0.64	0.68	0.79	74%
A9	A9	0.23	0.00	0.09	0.53	0	0.85	0.59	0.64	0.68	0.79	74%
BASIN A		**1.09**	**0.20**	**0.86**	**2.89**		**5.04**	0.56	0.61	0.65	0.77	**70%**
		21.6%	**4.0%**	**17.1%**	**57.3%**		**100.0%**					
B1	B1	0.08	0.03	0.13	0.13	0	0.37	0.48	0.54	0.59	0.74	61%
B2	B2	0.15	0.03	0.08	0.34	0	0.60	0.58	0.63	0.67	0.78	73%
B3	B3	0.25	0.03	0.15	0.54	0	0.97	0.57	0.62	0.66	0.78	72%
B2.1	B2.1	0.05	0.02	0.04	0.09		0.20	0.56	0.61	0.65	0.77	71%
BASIN B		**0.53**	**0.11**	**0.40**	**1.10**		**2.14**	0.56	0.61	0.65	0.77	**70%**
		24.8%	**5.1%**	**18.7%**	**51.4%**		**100.0%**					
C1	C1	0	0.12	0.63	0.39	0	1.14	0.35	0.42	0.48	0.67	46%
C2	C2	0	0.01	0.37	0.11	0	0.49	0.24	0.31	0.38	0.62	34%
C3	C3	0	0	0	0	0.13	0.13	0.03	0.08	0.17	0.50	5%
BASIN C			**0.13**	**1.00**	**0.50**	**0.13**	**1.76**	0.29	0.36	0.43	0.65	**40%**
			7.4%	**56.8%**	**28.4%**	**7.4%**	**100.0%**					
ON SITE STUDY AREA		**1.62**	**0.44**	**2.26**	**4.49**	**0.13**	**8.94**	0.50	0.56	0.61	0.75	**64%**
		18.1%	**5.0%**	**25.3%**	**50.2%**	**1.5%**	**100.0%**					
OSA5	A5	0.01	0.0	0	0	0	0.01	0.78	0.81	0.84	0.87	95%
OSA7	A7	0.09	0.02	0	0	0	0.11	0.78	0.81	0.84	0.87	95%
OSB1	B1	0.05	0.01	0	0	0	0.06	0.78	0.81	0.84	0.87	95%
OSB2	B2	0.01	0.01	0	0	0	0.02	0.78	0.81	0.84	0.87	95%
OFF SITE BASINS		**0.16**	**0.04**				**0.20**	0.78	0.81	0.84	0.87	**95%**
		82.1%	**17.9%**				**100.0%**					
OVERALL STUDY AREA		**1.78**	**0.48**	**2.26**	**4.49**	**0.13**	**9.14**	0.51	0.57	0.61	0.75	**65%**
		19.5%	**5.2%**	**24.7%**	**49.1%**	**1.4%**	**100.0%**					

Redland

STANDARD FORM SF-2 - DEVELOPED TIME OF CONCENTRATION

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

DATE: 8/13/2026
JURISDICTION: Castle Rock

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL Tc	RUNOFF COEFFICIENT	
DESIGN BASIN (1)	AREA (AC) (2)	C_5 (3)	LENGTH* (FT) (4)	SLOPE (%) (5)	T_i (MINUTES) (6)	LENGTH (FT) (7)	SLOPE (%) (8)	C_v (9)	Land Surface (10)	VEL (FPS) (11)	T_t (MINUTES) (12)	COMP. t_c (13)	TOTAL LENGTH (14)	REGIONAL tc (15)	Min. t_c	C_5	C_{100}
A1	0.38	0.50	60	2.0%	7	170	0.5%	7.0	Short Pasture/Lawn	0.5	5.7	12.4	230	16.7	12.4	0.50	0.72
A2	0.74	0.45	70	2.0%	7.9	200	2.4%	7.0	Short Pasture/Lawn	1.1	3.1	11.0	270	17.6	11.0	0.45	0.69
A3	0.33	0.66	60	2.0%	4.9	240	0.6%	20.0	Paved Areas	1.6	2.5	7.4	300	13.4	7.4	0.66	0.80
A4	0.35	0.67	60	2.0%	4.8	250	0.8%	20.0	Paved Areas	1.8	2.3	7.1	310	13.1	7.1	0.67	0.80
A5	0.35	0.61	50	2.0%	5.0	90	0.7%	20.0	Paved Areas	1.7	0.9	5.9	140	14.2	5.9	0.61	0.77
A6	0.75	0.67	50	2.0%	4.4	500	0.7%	20.0	Paved Areas	1.7	5.0	9.4	550	13.5	9.4	0.67	0.80
A7	0.10	0.71	50	2.0%	4.0	90	0.2%	20.0	Paved Areas	0.9	1.7	5.6	140	12.1	5.6	0.71	0.82
A8	1.20	0.64	90	2.0%	6.3	410	1.0%	20.0	Paved Areas	2.0	3.4	9.7	500	13.9	9.7	0.64	0.79
B1	0.37	0.54	95	2.0%	6.1	110	0.8%	20.0	Paved Areas	1.8	1.0	7.1	205	15.7	7.1	0.54	0.74
B2	0.60	0.63	100	2.0%	8.2	140	1.4%	20.0	Paved Areas	2.4	1.0	9.2	240	13.7	9.2	0.63	0.78
B3	0.97	0.62	70	2.0%	5.7	240	1.6%	20.0	Paved Areas	2.5	1.6	7.2	310	14.0	7.2	0.62	0.78
C1	1.14	0.42	40	15.0%	3.2	20	20.0%	7.0	Short Pasture/Lawn	3.1	0.1	3.3	60	18.1	5.0	0.42	0.67
C2	0.49	0.31	120	3.4%	10.5	400	2.3%	20.0	Paved Areas	3.0	2.2	12.7	520	20.6	12.7	0.31	0.62
C3	0.13	0.08	170	16.2%	9.7	170	2.1%	7.0	Short Pasture/Lawn	1.0	2.8	12.5	340	25.3	12.5	0.08	0.50
OSA5	0.01	0.81	30	2.0%	2.3	180	1.6%	20.0	Paved Areas	2.5	1.2	3.5	210	10.0	5.0	0.81	0.87
OSA7	0.11	0.81	20	2.0%	1.9	240	2.3%	20.0	Paved Areas	3.0	1.3	3.2	260	10.0	5.0	0.81	0.87
OSB1	0.06	0.81	31	2.0%	2.3	170	1.7%	20.0	Paved Areas	2.6	1.1	3.4	201	10.0	5.0	0.81	0.87
OSB2	0.02	0.81	40	16.2%	1.3	170	2.1%	20.0	Paved Areas	2.9	1.0	2.3	210	10.0	5.0	0.81	0.87
A9	0.85	0.64	75	2.0%	5.8	325	1.0%	20.0	Paved Areas	2.0	2.7	8.5	400	13.8	8.5	0.64	0.79
B2.1	0.20	0.61	30	2.0%	3.9	100	1.0%	20.0	Paved Areas	2.0	0.8	4.7	130	14.1	5.0	0.61	0.77

* L = 500' max for non-urban land uses and 300' max for urban land uses

$$T_i = \frac{0.395(1.1-C)L^{1/2}}{S^{1/3}}$$

$$T_t = \frac{L}{60V} \qquad V = C_v S_w^{0.5}$$

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

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

Table RO-2—Conveyance Coefficient, C_v

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

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

P_1 (1-Hour Rainfall) = 1.43

DATE: 8/13/2026
JURISDICTION: Castle Rock

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_5	t_c (minutes)	C*A(AC)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (Minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A1	A1	0.4	0.50	12.4	0.2	3.53	0.7													
	A2	A2	0.7	0.45	11.0	0.3	3.73	1.2													
	A3	A3	0.3	0.66	7.4	0.2	4.31	0.9													
	A4	A4	0.4	0.67	7.1	0.2	4.37	1.0													
	A5	A5	0.4	0.61	5.9	0.2	4.62	1.0													
	A6	A6	0.7	0.67	9.4	0.5	3.97	2.0													
	A7	A7	0.1	0.71	5.6	0.1	4.69	0.3													
	A8	A8	1.2	0.64	9.7	0.8	3.91	3.0													
	B1	B1	0.4	0.54	7.1	0.2	4.38	0.9													
	B2	B2	0.6	0.63	9.2	0.4	4.00	1.5													
	B3	B3	1.0	0.62	7.2	0.6	4.35	2.6													
	C1	C1	1.1	0.42	5.0	0.5	4.85	2.3													
	C2	C2	0.5	0.31	12.7	0.2	3.50	0.5													
	C3	C3	0.1	0.08	12.5	0.0	3.53	0.0													
	A5	OSA5	0.0	0.81	5.0	0.0	4.85	0.0	5.94	0.22	4.62	1.0									
	A7	OSA7	0.1	0.81	5.0	0.1	4.85	0.4	5.64	0.16	4.69	0.7									
	B1	OSB1	0.1	0.81	5.0	0.0	4.85	0.2	7.08	0.45	4.38	2.0									
	B2	OSB2	0.0	0.81	5.0	0.0	4.85	0.1	9.17	0.77	4.00	3.1									
	B2.1	B2.1	0.2	0.61	5.0	0.1	4.85	0.6	5.00	0.12	4.85	0.6									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

P_1 (1-Hour Rainfall) = 2.60

DATE: 8/13/2026
JURISDICTION: Castle Rock

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{100}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A1	A1	0.4	0.72	12.4	0.3	6.43	1.7													
	A2	A2	0.7	0.69	11.0	0.5	6.77	3.5													
	A3	A3	0.3	0.80	7.4	0.3	7.83	2.1													
	A4	A4	0.4	0.80	7.1	0.3	7.94	2.2													
	A5	A5	0.4	0.77	5.9	0.3	8.41	2.3													
	A6	A6	0.7	0.80	9.4	0.6	7.21	4.3													
	A7	A7	0.1	0.82	5.6	0.1	8.53	0.7													
	A8	A8	1.2	0.79	9.7	0.9	7.11	6.7													
	B1	B1	0.4	0.74	7.1	0.3	7.96	2.2													
	B2	B2	0.6	0.78	9.2	0.5	7.27	3.4													
	B3	B3	1.0	0.78	7.2	0.8	7.90	6.0													
	C1	C1	1.1	0.67	5.0	0.8	8.82	6.8													
	C2	C2	0.5	0.62	12.7	0.3	6.36	1.9													
	C3	C3	0.1	0.50	12.5	0.1	6.42	0.4													
	A5	OSA5	0.0	0.87	5.0	0.0	8.82	0.1	5.94	0.28	8.41	2.3									
	A7	OSA7	0.1	0.87	5.0	0.1	8.82	0.8	5.64	0.17	8.53	1.5									
	B1	OSB1	0.1	0.87	5.0	0.1	8.82	0.5	7.08	0.60	7.96	4.7									
	B2	OSB2	0.0	0.87	5.0	0.0	8.82	0.1	9.17	0.95	7.27	6.9									
	B2.1	B2.1	0.2	0.77	5.0	0.2	8.82	1.4	5.00	0.15	8.82	1.36									

Redland

PROJECT NAME:	Bella Mesa South	DATE:	8/13/2026
PROJECT NUMBER:	17026	JURISDICTION:	Castle Rock
CALCULATED BY:	RJH		
CHECKED BY:	RAO		

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
A1	0.38	0.50	0.72	57%	0.7	1.7
A2	0.74	0.45	0.69	51%	1.2	3.5
A3	0.33	0.66	0.80	76%	0.9	2.1
A4	0.35	0.67	0.80	78%	1.0	2.2
A5	0.35	0.61	0.77	70%	1.0	2.3
A6	0.75	0.67	0.80	78%	2.0	4.3
A7	0.10	0.71	0.82	83%	0.3	0.7
A8	1.20	0.64	0.79	74%	3.0	6.7
A9	0.85	0.64	0.79	74%	2.2	5.0

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
B1	0.37	0.54	0.74	61%	0.9	2.2
B2	0.60	0.63	0.78	73%	1.5	3.4
B3	0.97	0.62	0.78	72%	2.6	6.0
B2.1	0.20	0.61	0.77	71%	0.6	1.4

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
C1	1.14	0.42	0.67	46%	2.3	6.8
C2	0.49	0.31	0.62	34%	0.5	1.9
C3	0.13	0.08	0.50	5%	0.03	0.4

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
OSA5	0.01	0.81	0.87	95%	0.0	0.1
OSA7	0.11	0.81	0.87	95%	0.4	0.8
OSB1	0.06	0.81	0.87	95%	0.2	0.5
OSB2	0.02	0.81	0.87	95%	0.1	0.1

Redland

STANDARD FORM SF-1 - DEVELOPED RUNOFF COEFFICIENTS

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

DATE: 8/13/2026
JURISDICTION: Castle Rock

LAND USE:	Roadways and Paved Streets	Concrete Driveways and Walks	Disturbed Soil	Townhome Lot	Undisturbed Soil
IMPERVIOUSNESS	95%	95%	20%	74%	5%
C_2	0.78	0.78	0.14	0.59	0.03
C_5	0.81	0.81	0.20	0.64	0.08
C_{10}	0.84	0.84	0.28	0.68	0.17
C_{100}	0.87	0.87	0.57	0.79	0.50

NRCS SOIL TYPE: TYPE D

OVERALL SITE STUDY AREA

DESIGN BASIN	DESIGN POINT	Roadways and Paved Streets (AC)	Concrete Driveways and Walks (AC)	Disturbed Soil (AC)	Townhome Lot (AC)	Undisturbed Soil (AC)	TOTAL AREA (AC)	$C_d(2)$	$C_d(5)$	$C_d(10)$	$C_d(100)$	Imp (%)
A1	A1	0	0.02	0.13	0.23	0	0.38	0.44	0.50	0.55	0.72	57%
A2	A2	0	0.05	0.34	0.35	0	0.74	0.39	0.45	0.51	0.69	51%
A3	A3	0.09	0	0.02	0.22	0	0.33	0.61	0.66	0.70	0.80	76%
A4	A4	0.09	0	0.01	0.25	0	0.35	0.63	0.67	0.71	0.80	78%
A5	A5	0.12	0.02	0.08	0.13	0	0.35	0.56	0.61	0.65	0.77	70%
A6	A6	0.20	0.06	0.05	0.44	0	0.75	0.63	0.67	0.71	0.80	78%
A7	A7	0.05	0.02	0.01	0.02	0	0.10	0.67	0.71	0.75	0.82	83%
A8	A8	0.31	0.04	0.13	0.72	0	1.20	0.59	0.64	0.68	0.79	74%
A9	A9	0.23	0.00	0.09	0.53	0	0.85	0.59	0.64	0.68	0.79	74%
BASIN A		**1.09**	**0.20**	**0.86**	**2.89**		**5.04**	0.56	0.61	0.65	0.77	**70%**
		21.6%	**4.0%**	**17.1%**	**57.3%**		**100.0%**					
B1	B1	0.08	0.03	0.13	0.13	0	0.37	0.48	0.54	0.59	0.74	61%
B2	B2	0.15	0.03	0.08	0.34	0	0.60	0.58	0.63	0.67	0.78	73%
B3	B3	0.25	0.03	0.15	0.54	0	0.97	0.57	0.62	0.66	0.78	72%
B2.1	B2.1	0.05	0.02	0.04	0.09		0.20	0.56	0.61	0.65	0.77	71%
BASIN B		**0.53**	**0.11**	**0.40**	**1.10**		**2.14**	0.56	0.61	0.65	0.77	**70%**
		24.8%	**5.1%**	**18.7%**	**51.4%**		**100.0%**					
C1	C1	0	0.12	0.63	0.39	0	1.14	0.35	0.42	0.48	0.67	46%
C2	C2	0	0.01	0.37	0.11	0	0.49	0.24	0.31	0.38	0.62	34%
C3	C3	0	0	0	0	0.13	0.13	0.03	0.08	0.17	0.50	5%
BASIN C			**0.13**	**1.00**	**0.50**	**0.13**	**1.76**	0.29	0.36	0.43	0.65	**40%**
			7.4%	**56.8%**	**28.4%**	**7.4%**	**100.0%**					
ON SITE STUDY AREA		**1.62**	**0.44**	**2.26**	**4.49**	**0.13**	**8.94**	0.50	0.56	0.61	0.75	**64%**
		18.1%	**5.0%**	**25.3%**	**50.2%**	**1.5%**	**100.0%**					
OSA5	A5	0.01	0.0	0	0	0	0.01	0.78	0.81	0.84	0.87	95%
OSA7	A7	0.09	0.02	0	0	0	0.11	0.78	0.81	0.84	0.87	95%
OSB1	B1	0.05	0.01	0	0	0	0.06	0.78	0.81	0.84	0.87	95%
OSB2	B2	0.01	0.01	0	0	0	0.02	0.78	0.81	0.84	0.87	95%
OFF SITE BASINS		**0.16**	**0.04**				**0.20**	0.78	0.81	0.84	0.87	**95%**
		82.1%	**17.9%**				**100.0%**					
OVERALL STUDY AREA		**1.78**	**0.48**	**2.26**	**4.49**	**0.13**	**9.14**	0.51	0.57	0.61	0.75	**65%**
		19.5%	**5.2%**	**24.7%**	**49.1%**	**1.4%**	**100.0%**					

Redland

STANDARD FORM SF-2 - DEVELOPED TIME OF CONCENTRATION

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

DATE: 8/13/2026
JURISDICTION: Castle Rock

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)						tc CHECK (URBANIZED BASINS)			FINAL Tc	RUNOFF COEFFICIENT	
DESIGN BASIN (1)	AREA (AC) (2)	C_5 (3)	LENGTH* (FT) (4)	SLOPE (%) (5)	T_i (MINUTES) (6)	LENGTH (FT) (7)	SLOPE (%) (8)	C_v (9)	Land Surface (10)	VEL (FPS) (11)	T_t (MINUTES) (12)	COMP. t_c (13)	TOTAL LENGTH (14)	REGIONAL tc (15)	Min. t_c	C_5	C_{100}
A1	0.38	0.50	60	2.0%	7	170	0.5%	7.0	Short Pasture/Lawn	0.5	5.7	12.4	230	16.7	12.4	0.50	0.72
A2	0.74	0.45	70	2.0%	7.9	200	2.4%	7.0	Short Pasture/Lawn	1.1	3.1	11.0	270	17.6	11.0	0.45	0.69
A3	0.33	0.66	60	2.0%	4.9	240	0.6%	20.0	Paved Areas	1.6	2.5	7.4	300	13.4	7.4	0.66	0.80
A4	0.35	0.67	60	2.0%	4.8	250	0.8%	20.0	Paved Areas	1.8	2.3	7.1	310	13.1	7.1	0.67	0.80
A5	0.35	0.61	50	2.0%	5.0	90	0.7%	20.0	Paved Areas	1.7	0.9	5.9	140	14.2	5.9	0.61	0.77
A6	0.75	0.67	50	2.0%	4.4	500	0.7%	20.0	Paved Areas	1.7	5.0	9.4	550	13.5	9.4	0.67	0.80
A7	0.10	0.71	50	2.0%	4.0	90	0.2%	20.0	Paved Areas	0.9	1.7	5.6	140	12.1	5.6	0.71	0.82
A8	1.20	0.64	90	2.0%	6.3	410	1.0%	20.0	Paved Areas	2.0	3.4	9.7	500	13.9	9.7	0.64	0.79
B1	0.37	0.54	95	2.0%	6.1	110	0.8%	20.0	Paved Areas	1.8	1.0	7.1	205	15.7	7.1	0.54	0.74
B2	0.60	0.63	100	2.0%	8.2	140	1.4%	20.0	Paved Areas	2.4	1.0	9.2	240	13.7	9.2	0.63	0.78
B3	0.97	0.62	70	2.0%	5.7	240	1.6%	20.0	Paved Areas	2.5	1.6	7.2	310	14.0	7.2	0.62	0.78
C1	1.14	0.42	40	15.0%	3.2	20	20.0%	7.0	Short Pasture/Lawn	3.1	0.1	3.3	60	18.1	5.0	0.42	0.67
C2	0.49	0.31	120	3.4%	10.5	400	2.3%	20.0	Paved Areas	3.0	2.2	12.7	520	20.6	12.7	0.31	0.62
C3	0.13	0.08	170	16.2%	9.7	170	2.1%	7.0	Short Pasture/Lawn	1.0	2.8	12.5	340	25.3	12.5	0.08	0.50
OSA5	0.01	0.81	30	2.0%	2.3	180	1.6%	20.0	Paved Areas	2.5	1.2	3.5	210	10.0	5.0	0.81	0.87
OSA7	0.11	0.81	20	2.0%	1.9	240	2.3%	20.0	Paved Areas	3.0	1.3	3.2	260	10.0	5.0	0.81	0.87
OSB1	0.06	0.81	31	2.0%	2.3	170	1.7%	20.0	Paved Areas	2.6	1.1	3.4	201	10.0	5.0	0.81	0.87
OSB2	0.02	0.81	40	16.2%	1.3	170	2.1%	20.0	Paved Areas	2.9	1.0	2.3	210	10.0	5.0	0.81	0.87
A9	0.85	0.64	75	2.0%	5.8	325	1.0%	20.0	Paved Areas	2.0	2.7	8.5	400	13.8	8.5	0.64	0.79
B2.1	0.20	0.61	30	2.0%	3.9	100	1.0%	20.0	Paved Areas	2.0	0.8	4.7	130	14.1	5.0	0.61	0.77

* L = 500' max for non-urban land uses and 300' max for urban land uses

$$T_i = \frac{0.395(1.1-C)L^{1/2}}{S^{1/3}}$$

$$T_t = \frac{L}{60V} \qquad V = C_v S_w^{0.5}$$

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

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

Table RO-2—Conveyance Coefficient, C_v

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

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

P_1 (1-Hour Rainfall) = 1.43

DATE: 8/13/2026
JURISDICTION: Castle Rock

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_5	t_c (minutes)	C*A(AC)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (Minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A1	A1	0.4	0.50	12.4	0.2	3.53	0.7													
	A2	A2	0.7	0.45	11.0	0.3	3.73	1.2													
	A3	A3	0.3	0.66	7.4	0.2	4.31	0.9													
	A4	A4	0.4	0.67	7.1	0.2	4.37	1.0													
	A5	A5	0.4	0.61	5.9	0.2	4.62	1.0													
	A6	A6	0.7	0.67	9.4	0.5	3.97	2.0													
	A7	A7	0.1	0.71	5.6	0.1	4.69	0.3													
	A8	A8	1.2	0.64	9.7	0.8	3.91	3.0													
	B1	B1	0.4	0.54	7.1	0.2	4.38	0.9													
	B2	B2	0.6	0.63	9.2	0.4	4.00	1.5													
	B3	B3	1.0	0.62	7.2	0.6	4.35	2.6													
	C1	C1	1.1	0.42	5.0	0.5	4.85	2.3													
	C2	C2	0.5	0.31	12.7	0.2	3.50	0.5													
	C3	C3	0.1	0.08	12.5	0.0	3.53	0.0													
	A5	OSA5	0.0	0.81	5.0	0.0	4.85	0.0	5.94	0.22	4.62	1.0									
	A7	OSA7	0.1	0.81	5.0	0.1	4.85	0.4	5.64	0.16	4.69	0.7									
	B1	OSB1	0.1	0.81	5.0	0.0	4.85	0.2	7.08	0.45	4.38	2.0									
	B2	OSB2	0.0	0.81	5.0	0.0	4.85	0.1	9.17	0.77	4.00	3.1									
	B2.1	B2.1	0.2	0.61	5.0	0.1	4.85	0.6	5.00	0.12	4.85	0.6									

Redland

STANDARD FORM SF-3 - DEVELOPED
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Bella Mesa South
PROJECT NUMBER: 17026.007
CALCULATED BY: RJH
CHECKED BY: RAO

P_1 (1-Hour Rainfall) = 2.60

DATE: 8/13/2026
JURISDICTION: Castle Rock

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF C_{100}	t_c (minutes)	C*A(ac)	I (in/hr)	Q (cfs)	t_c(minutes)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	t_t (minutes)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	A1	A1	0.4	0.72	12.4	0.3	6.43	1.7													
	A2	A2	0.7	0.69	11.0	0.5	6.77	3.5													
	A3	A3	0.3	0.80	7.4	0.3	7.83	2.1													
	A4	A4	0.4	0.80	7.1	0.3	7.94	2.2													
	A5	A5	0.4	0.77	5.9	0.3	8.41	2.3													
	A6	A6	0.7	0.80	9.4	0.6	7.21	4.3													
	A7	A7	0.1	0.82	5.6	0.1	8.53	0.7													
	A8	A8	1.2	0.79	9.7	0.9	7.11	6.7													
	B1	B1	0.4	0.74	7.1	0.3	7.96	2.2													
	B2	B2	0.6	0.78	9.2	0.5	7.27	3.4													
	B3	B3	1.0	0.78	7.2	0.8	7.90	6.0													
	C1	C1	1.1	0.67	5.0	0.8	8.82	6.8													
	C2	C2	0.5	0.62	12.7	0.3	6.36	1.9													
	C3	C3	0.1	0.50	12.5	0.1	6.42	0.4													
	A5	OSA5	0.0	0.87	5.0	0.0	8.82	0.1	5.94	0.28	8.41	2.3									
	A7	OSA7	0.1	0.87	5.0	0.1	8.82	0.8	5.64	0.17	8.53	1.5									
	B1	OSB1	0.1	0.87	5.0	0.1	8.82	0.5	7.08	0.60	7.96	4.7									
	B2	OSB2	0.0	0.87	5.0	0.0	8.82	0.1	9.17	0.95	7.27	6.9									
	B2.1	B2.1	0.2	0.77	5.0	0.2	8.82	1.4	5.00	0.15	8.82	1.36									

Redland

PROJECT NAME:	Bella Mesa South	DATE:	8/13/2026
PROJECT NUMBER:	17026	JURISDICTION:	Castle Rock
CALCULATED BY:	RJH		
CHECKED BY:	RAO		

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
A1	0.38	0.50	0.72	57%	0.7	1.7
A2	0.74	0.45	0.69	51%	1.2	3.5
A3	0.33	0.66	0.80	76%	0.9	2.1
A4	0.35	0.67	0.80	78%	1.0	2.2
A5	0.35	0.61	0.77	70%	1.0	2.3
A6	0.75	0.67	0.80	78%	2.0	4.3
A7	0.10	0.71	0.82	83%	0.3	0.7
A8	1.20	0.64	0.79	74%	3.0	6.7
A9	0.85	0.64	0.79	74%	2.2	5.0

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
B1	0.37	0.54	0.74	61%	0.9	2.2
B2	0.60	0.63	0.78	73%	1.5	3.4
B3	0.97	0.62	0.78	72%	2.6	6.0
B2.1	0.20	0.61	0.77	71%	0.6	1.4

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
C1	1.14	0.42	0.67	46%	2.3	6.8
C2	0.49	0.31	0.62	34%	0.5	1.9
C3	0.13	0.08	0.50	5%	0.03	0.4

Basin Summary Table

Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
OSA5	0.01	0.81	0.87	95%	0.0	0.1
OSA7	0.11	0.81	0.87	95%	0.4	0.8
OSB1	0.06	0.81	0.87	95%	0.2	0.5
OSB2	0.02	0.81	0.87	95%	0.1	0.1

Appendix C - Hydraulic Calculations

Active Scenario: 5 - Year

Conduit Table - Time: 0.00 hours

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Velocity (ft/s)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (cfs)	Manning's n	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
P-1	SDIN 1-3	SDIN 1-2	6,572.22	6,571.89	35.4	4.06	0.009	24.0	1.61	0.013	6,572.66	6,572.59	6,572.81	6,572.63
P-3	SDMH 1-1	SDMH 1-2	6,569.75	6,569.02	146.9	4.44	0.005	18.0	4.72	0.013	6,570.62	6,570.02	6,570.93	6,570.24
P-4	SDIN 1-1	SDMH 1-1	6,570.25	6,570.00	50.7	4.44	0.005	18.0	4.77	0.013	6,571.13	6,570.84	6,571.43	6,571.18
P-5	SDIN 2-2	SDMH 2-1	6,569.75	6,568.64	111.4	7.81	0.010	24.0	16.10	0.013	6,571.20	6,569.89	6,571.88	6,570.84
P-6	SDMH 2-2	SDMH 2-3	6,564.93	6,564.82	22.2	6.68	0.005	30.0	26.69	0.013	6,566.95	6,566.87	6,567.56	6,567.47
P-7	SDMH 2-1	SDMH 2-2	6,565.23	6,565.18	10.4	6.54	0.005	30.0	24.71	0.013	6,567.34	6,567.32	6,567.83	6,567.79
P-8	SDMH 2-3	SDIN 2-5	6,564.57	6,563.41	231.3	6.71	0.005	30.0	26.64	0.013	6,566.55	6,565.81	6,567.19	6,566.28
P-9	SDIN 2-8	SDMH 2-4	6,562.45	6,562.29	31.4	6.51	0.005	30.0	31.94	0.013	6,564.56	6,564.22	6,565.37	6,565.18
P-10	SDIN 2-7	SDIN 2-8	6,569.90	6,569.74	31.0	3.49	0.005	18.0	1.78	0.013	6,570.40	6,570.24	6,570.58	6,570.43
P-11	SDIN 3-2	SDIN 3-1	6,572.87	6,571.13	174.0	3.98	0.010	18.0	1.23	0.013	6,573.29	6,571.78	6,573.43	6,571.83
P-12	SDIN 2-4	SDMH 2-2	6,569.52	6,569.18	33.7	5.78	0.010	18.0	4.62	0.013	6,570.35	6,569.88	6,570.68	6,570.39
P-13	SDIN 3-1	SDIN 2-4	6,570.88	6,569.77	111.0	5.25	0.010	18.0	3.28	0.013	6,571.57	6,570.51	6,571.84	6,570.73
P-14	SDIN 2-5	SDIN 2-8	6,563.16	6,562.70	91.5	6.75	0.005	30.0	29.62	0.013	6,565.44	6,565.05	6,566.06	6,565.64
P-15	SDIN 2-6	SDIN 2-5	6,569.56	6,569.40	31.0	3.47	0.005	24.0	1.92	0.013	6,570.04	6,569.86	6,570.21	6,570.05
P-16	SDIN 2-3	SDIN 2-2	6,570.35	6,570.25	20.7	4.58	0.005	18.0	5.74	0.013	6,571.65	6,571.60	6,571.84	6,571.79
P-17	SDIN 2-1	SDIN 2-2	6,570.35	6,570.25	19.3	4.28	0.005	18.0	3.77	0.013	6,571.62	6,571.60	6,571.71	6,571.68
P-18	SDMH 2-4	SDMH 2-5	6,561.79	6,561.38	82.3	7.15	0.005	36.0	31.86	0.013	6,563.62	6,563.47	6,564.39	6,564.04
P-19	SDMH 2-5	SDMH 2-6	6,561.18	6,560.04	114.4	9.30	0.010	36.0	31.67	0.013	6,563.01	6,562.12	6,563.77	6,562.69

Active Scenario: 5 - Year

Conduit Table - Time: 0.00 hours

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Velocity (ft/s)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (cfs)	Manning's n	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
P-20	SDMH 2-6	O-1	6,559.84	6,559.23	21.3	13.69	0.029	36.0	31.46	0.013	6,561.66	6,561.33	6,562.42	6,561.88
P-21	SDMH 1-2	SDMH 1-3	6,568.52	6,568.31	42.7	5.27	0.005	24.0	9.45	0.013	6,569.63	6,569.41	6,570.06	6,569.85
P-22	SDMH 1-3	SDMH 1-4	6,568.06	6,567.61	90.0	5.30	0.005	24.0	9.40	0.013	6,569.16	6,568.71	6,569.60	6,569.15
P-23	SDMH 1-4	SDMH 1-5	6,567.36	6,567.11	50.7	5.25	0.005	24.0	9.29	0.013	6,568.46	6,568.20	6,568.89	6,568.64

Active Scenario: 5 - Year

Manhole Table - Time: 0.00 hours

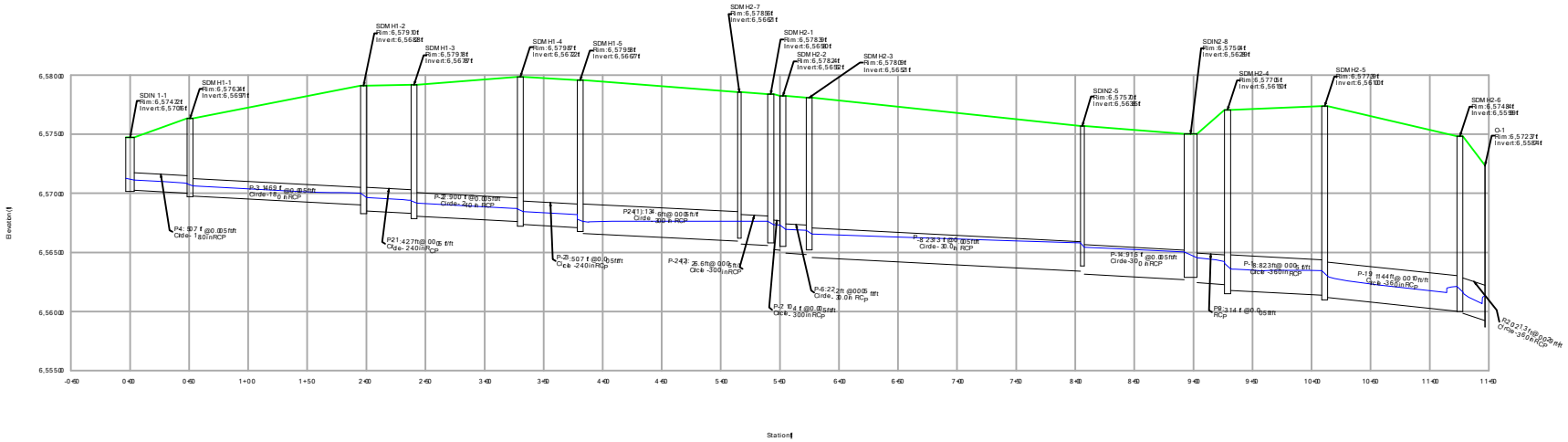
Label	Elevation (Rim) (ft)	Elevation (Invert in 1) (ft)	Elevation (Invert in 2) (ft)	Elevation (Invert Out) (ft)	Headloss Coefficient (Standard)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Flow (Total Out) (cfs)
SDMH 1-4	6,579.87	6,567.61	(N/A)	6,567.36	0.500	6,568.67	6,568.46	6,569.12	6,568.89	9.29
SDMH 1-5	6,579.58	6,567.11	(N/A)	6,566.61	0.500	6,567.81	6,567.62	6,568.25	6,568.00	9.23
SDMH 1-3	6,579.18	6,568.31	(N/A)	6,568.06	0.500	6,569.38	6,569.16	6,569.82	6,569.60	9.40
SDMH 1-2	6,579.10	6,569.02	6,571.16	6,568.52	0.900	6,570.02	6,569.63	6,570.24	6,570.06	9.45
SDMH 2-1	6,578.39	6,568.64	6,565.58	6,565.23	0.600	6,567.63	6,567.34	6,567.70	6,567.83	24.71
SDMH 2-2	6,578.24	6,565.18	6,569.18	6,564.93	0.600	6,567.32	6,566.95	6,567.79	6,567.56	26.69
SDMH 2-3	6,578.09	6,564.82	(N/A)	6,564.57	0.500	6,566.87	6,566.55	6,567.47	6,567.19	26.64
SDMH 2-5	6,577.39	6,561.38	(N/A)	6,561.18	0.600	6,563.47	6,563.01	6,564.04	6,563.77	31.67
SDMH 2-4	6,577.05	6,562.29	(N/A)	6,561.79	0.600	6,564.08	6,563.62	6,565.05	6,564.39	31.86
SDMH 1-1	6,576.34	6,570.00	(N/A)	6,569.75	0.600	6,570.80	6,570.62	6,571.15	6,570.93	4.72
SDMH 2-6	6,574.84	6,560.04	(N/A)	6,559.84	0.600	6,562.12	6,561.66	6,562.69	6,562.42	31.46

Active Scenario: 5 - Year

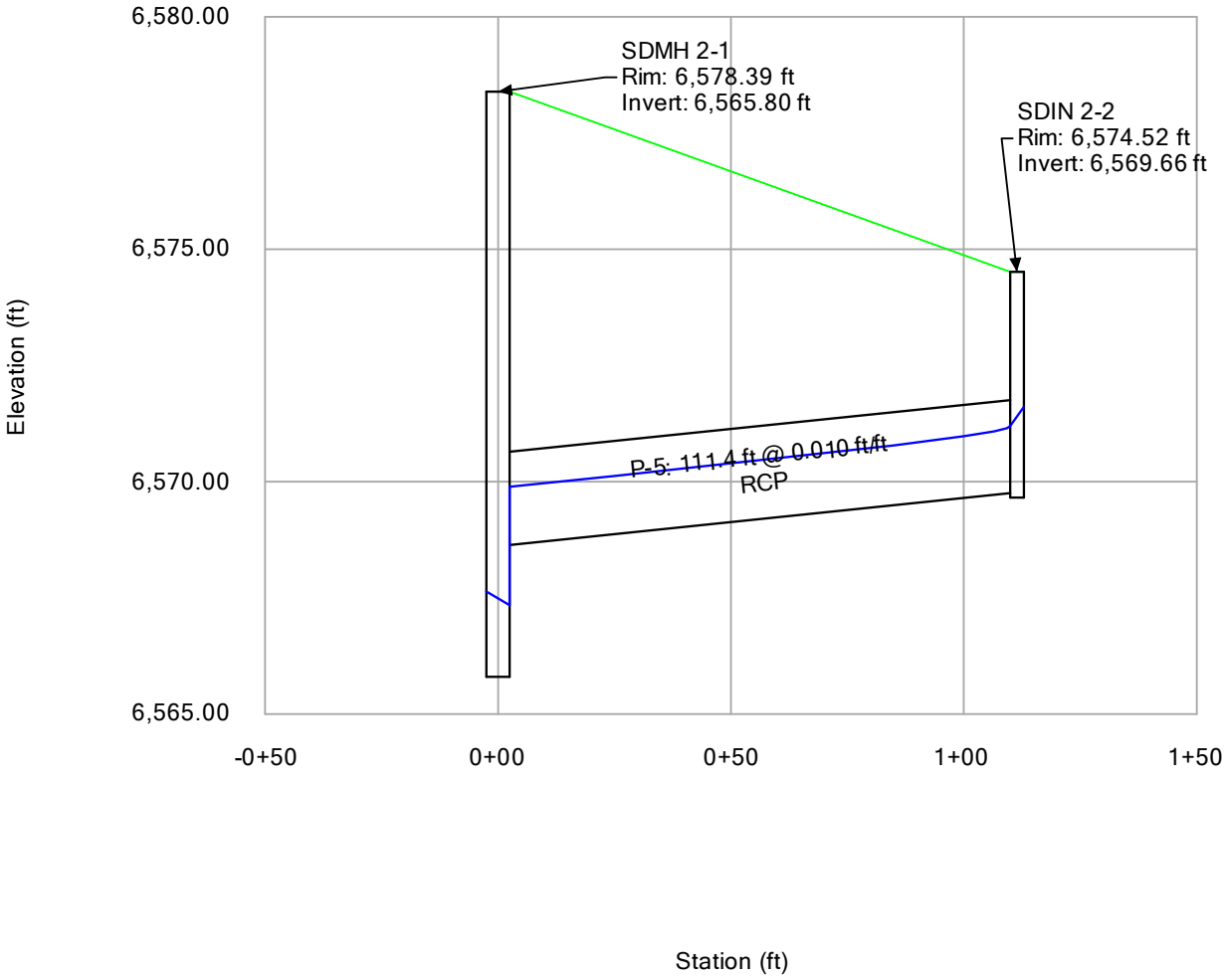
Catch Basin Table - Time: 0.00 hours

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Headloss Coefficient (Standard)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	External CA (acres)	External Tc (min)	Inlet Location
SDIN 3-2	6,576.91	6,572.88	0.500	1.23	6,573.36	6,573.29	6,573.51	6,573.43	0.190	12.440	In Sag
SDIN 3-1	6,577.00	6,570.94	0.800	3.28	6,571.78	6,571.57	6,571.83	6,571.84	0.330	10.980	In Sag
SDIN 2-8	6,575.04	6,562.89	0.600	31.94	6,565.05	6,564.56	6,565.64	6,565.37	0.210	5.600	In Sag
SDIN 2-7	6,575.04	6,569.41	0.500	1.78	6,570.49	6,570.40	6,570.68	6,570.59	0.210	5.940	In Sag
SDIN 2-6	6,575.70	6,569.01	0.500	1.92	6,570.13	6,570.04	6,570.30	6,570.21	0.240	7.140	In Sag
SDIN 2-5	6,575.70	6,563.85	0.600	29.62	6,565.81	6,565.44	6,566.28	6,566.06	0.330	9.380	In Sag
SDIN 2-4	6,577.71	6,569.53	0.500	4.62	6,570.51	6,570.35	6,570.73	6,570.68	0.220	7.440	In Sag
SDIN 2-3	6,574.62	6,570.27	0.500	5.74	6,571.74	6,571.65	6,571.94	6,571.84	0.800	9.700	In Sag
SDIN 2-2	6,574.52	6,569.66	0.600	16.10	6,571.60	6,571.20	6,571.68	6,571.88	0.950	5.000	In Sag
SDIN 2-1	6,574.57	6,570.26	0.500	3.77	6,571.66	6,571.62	6,571.75	6,571.71	0.500	8.500	In Sag
SDIN 1-3	6,578.36	6,572.16	0.000	1.61	6,572.66	6,572.66	6,572.81	6,572.81	0.200	7.080	In Sag
SDIN 1-2	6,578.11	6,571.61	0.600	4.39	6,572.59	6,572.43	6,572.63	6,572.70	0.400	9.200	In Sag
SDIN 1-1	6,574.72	6,570.16	0.500	4.77	6,571.28	6,571.13	6,571.59	6,571.43	0.600	7.310	In Sag

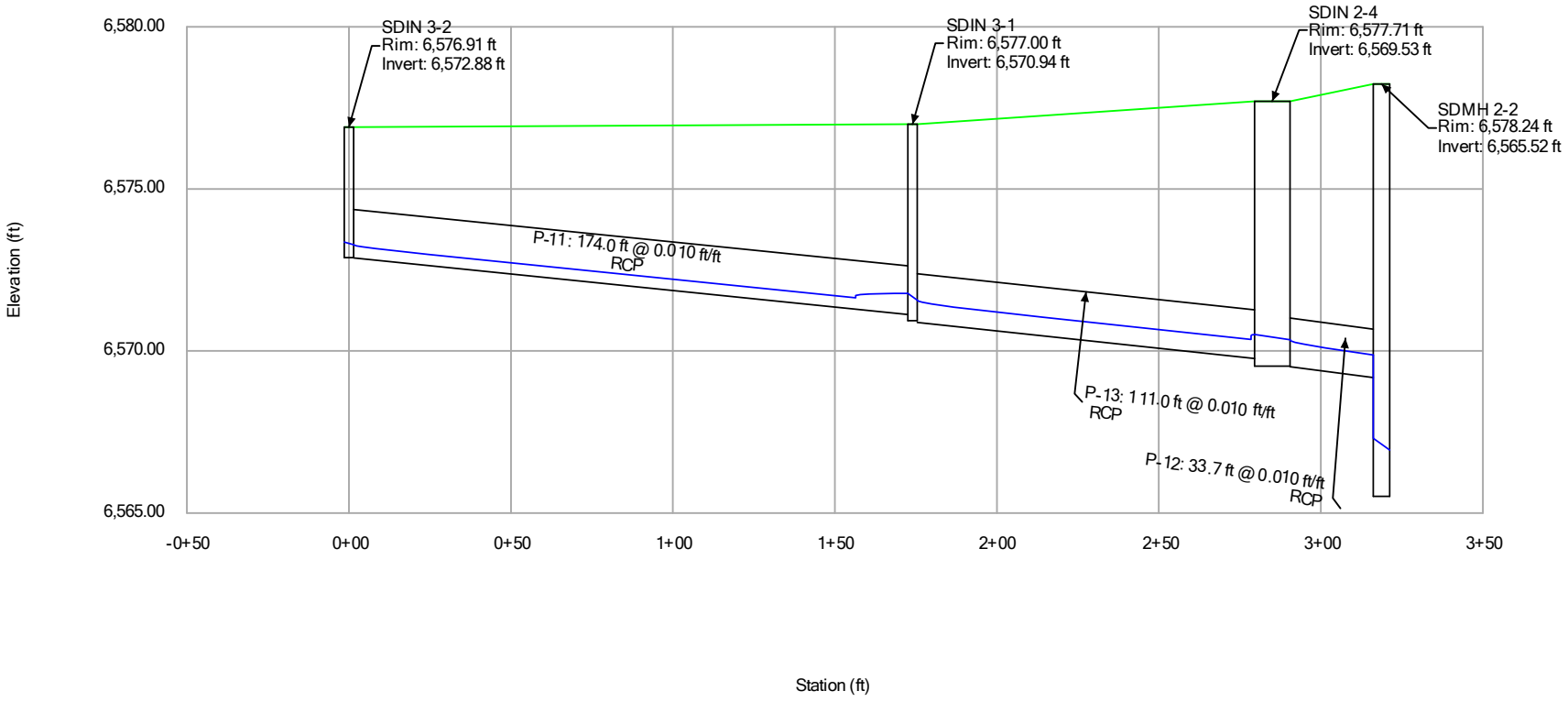
Active Scenario: 5 - Year
SDIN 1-1 to Outfall



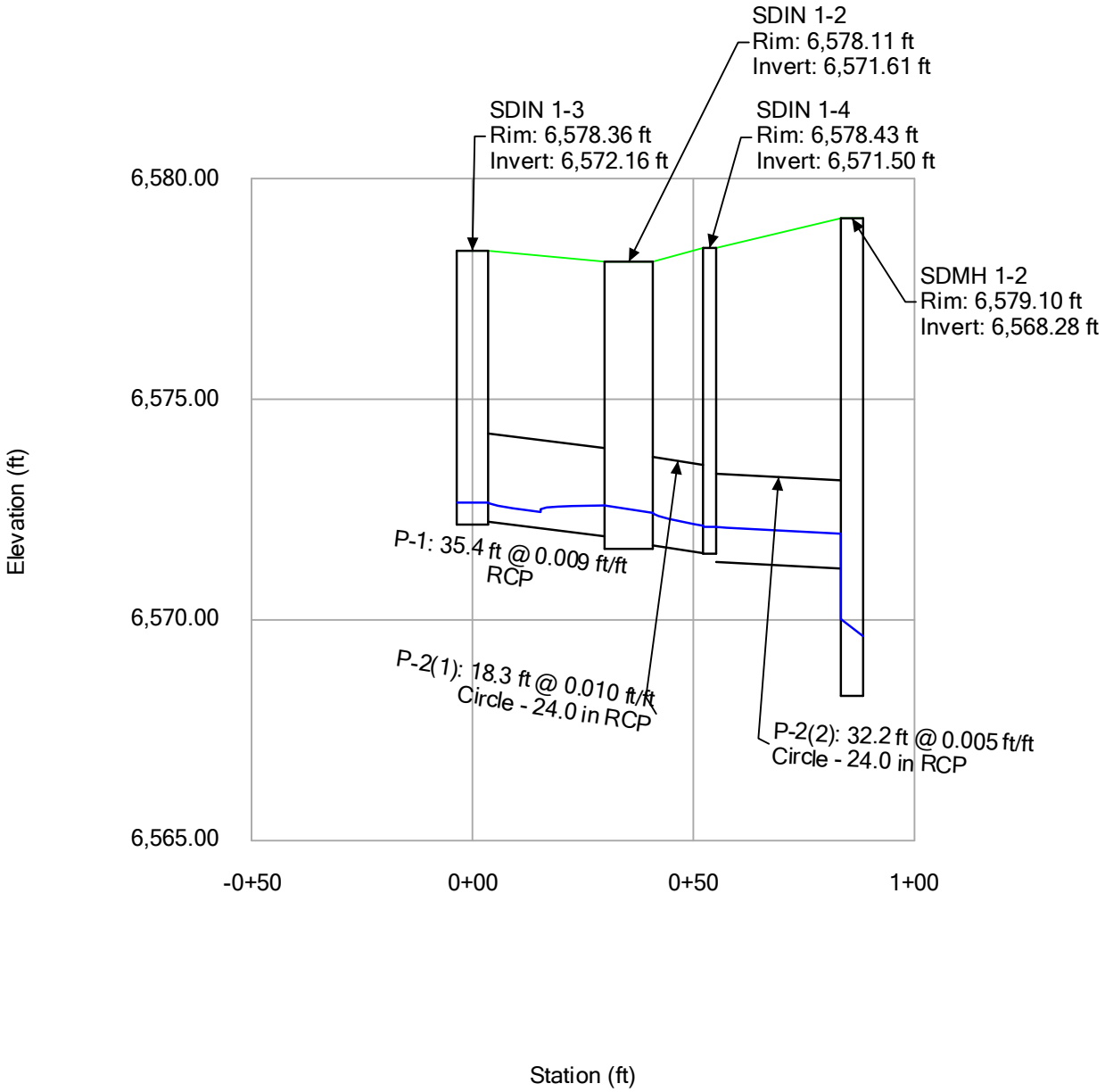
Active Scenario: 5 - Year
SDIN 2-1 to SDMH 2-1



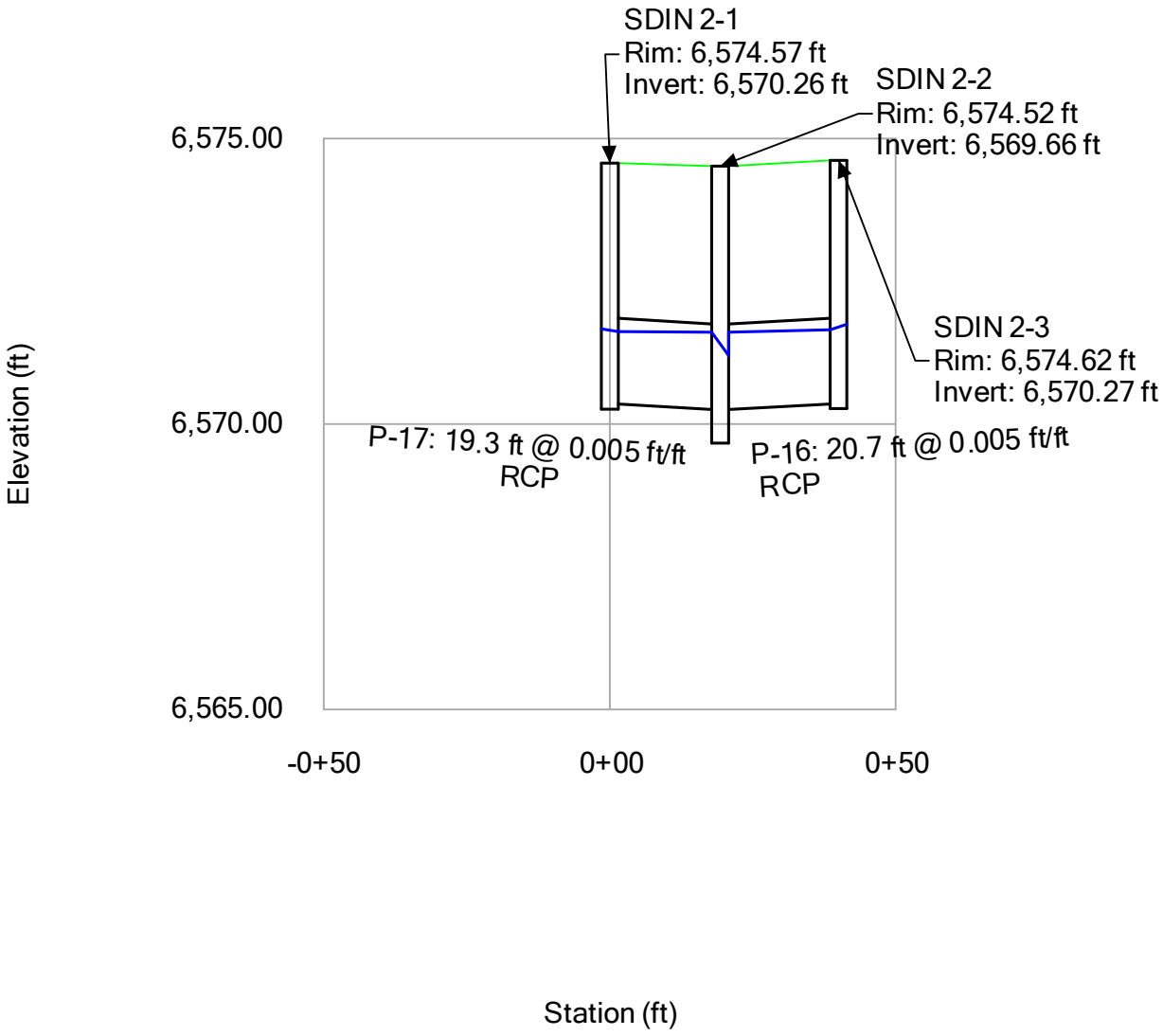
Active Scenario: 5 - Year
SDMH 2-2 to SDIN 3-2



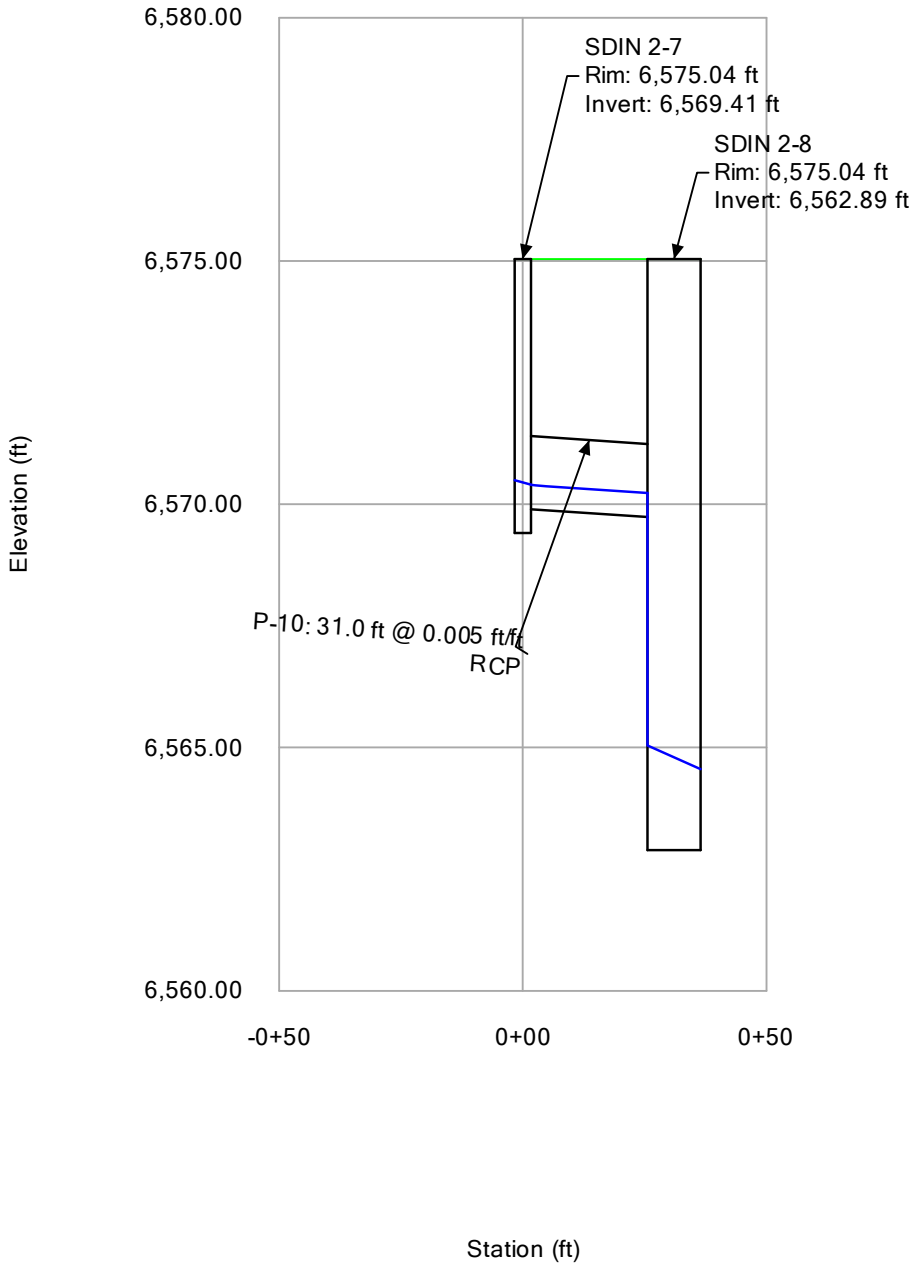
Active Scenario: 5 - Year
SDMH 1-2 to SDIN 1-3



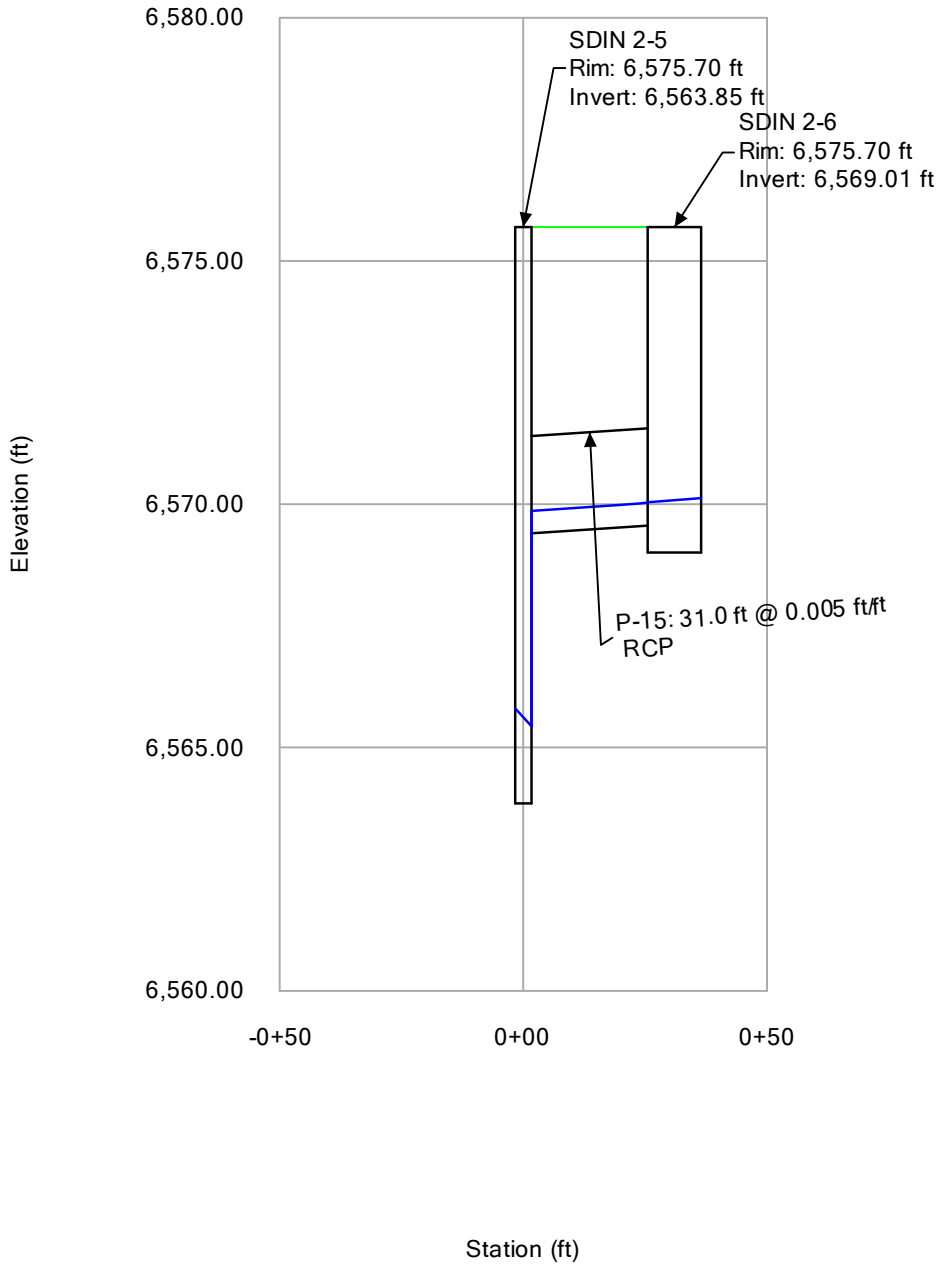
Active Scenario: 5 - Year
SDIN 2-1 to SDIN 2-3



Active Scenario: 5 - Year
SDIN 2-8 to SDIN 2-7



Active Scenario: 5 - Year
SDIN 2-5 to SDIN 2-6



Active Scenario: 100 - Year

Conduit Table - Time: 0.00 hours

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Velocity (ft/s)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (cfs)	Manning's n	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
P-1	SDIN 1-3	SDIN 1-2	6,572.22	6,571.89	35.4	4.44	0.009	24.0	2.17	0.013	6,572.73	6,572.70	6,572.91	6,572.75
P-3	SDMH 1-1	SDMH 1-2	6,569.75	6,569.02	146.9	3.33	0.005	18.0	5.89	0.013	6,571.56	6,571.10	6,571.74	6,571.27
P-4	SDIN 1-1	SDMH 1-1	6,570.25	6,570.00	50.7	3.37	0.005	18.0	5.96	0.013	6,571.83	6,571.67	6,572.01	6,571.84
P-5	SDIN 2-2	SDMH 2-1	6,569.75	6,568.64	111.4	8.15	0.010	24.0	20.59	0.013	6,571.38	6,570.14	6,572.26	6,571.17
P-6	SDMH 2-2	SDMH 2-3	6,564.93	6,564.82	22.2	7.09	0.005	30.0	34.79	0.013	6,569.11	6,568.95	6,569.89	6,569.73
P-7	SDMH 2-1	SDMH 2-2	6,565.23	6,565.18	10.4	6.22	0.005	30.0	30.55	0.013	6,569.64	6,569.58	6,570.24	6,570.18
P-8	SDMH 2-3	SDIN 2-5	6,564.57	6,563.41	231.3	7.07	0.005	30.0	34.73	0.013	6,568.56	6,566.91	6,569.34	6,567.69
P-9	SDIN 2-8	SDMH 2-4	6,562.45	6,562.29	31.4	8.37	0.005	30.0	41.07	0.013	6,564.94	6,564.53	6,566.03	6,565.75
P-10	SDIN 2-7	SDIN 2-8	6,569.90	6,569.74	31.0	3.74	0.005	18.0	2.29	0.013	6,570.47	6,570.31	6,570.68	6,570.52
P-11	SDIN 3-2	SDIN 3-1	6,572.87	6,571.13	174.0	4.41	0.010	18.0	1.75	0.013	6,573.37	6,572.02	6,573.55	6,572.06
P-12	SDIN 2-4	SDMH 2-2	6,569.52	6,569.18	33.7	6.28	0.010	18.0	6.51	0.013	6,570.51	6,570.04	6,570.94	6,570.64
P-13	SDIN 3-1	SDIN 2-4	6,570.88	6,569.77	111.0	5.85	0.010	18.0	4.94	0.013	6,571.73	6,570.72	6,572.08	6,570.99
P-14	SDIN 2-5	SDIN 2-8	6,563.16	6,562.70	91.5	7.66	0.005	30.0	37.60	0.013	6,566.36	6,565.59	6,567.27	6,566.50
P-15	SDIN 2-6	SDIN 2-5	6,569.56	6,569.40	31.0	3.63	0.005	24.0	2.24	0.013	6,570.08	6,569.90	6,570.27	6,570.11
P-16	SDIN 2-3	SDIN 2-2	6,570.35	6,570.25	20.7	3.65	0.005	18.0	6.46	0.013	6,571.98	6,571.90	6,572.19	6,572.11
P-17	SDIN 2-1	SDIN 2-2	6,570.35	6,570.25	19.3	2.99	0.005	18.0	5.28	0.013	6,571.95	6,571.90	6,572.09	6,572.04
P-18	SDMH 2-4	SDMH 2-5	6,561.79	6,561.38	82.3	7.50	0.005	36.0	40.98	0.013	6,564.06	6,563.83	6,564.85	6,564.51
P-19	SDMH 2-5	SDMH 2-6	6,561.18	6,560.04	114.4	9.89	0.010	36.0	40.74	0.013	6,563.26	6,562.48	6,564.20	6,563.16

Active Scenario: 100 - Year

Conduit Table - Time: 0.00 hours

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Velocity (ft/s)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (cfs)	Manning's n	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
P-20	SDMH 2-6	O-1	6,559.84	6,559.23	21.3	14.66	0.029	36.0	40.50	0.013	6,561.91	6,561.33	6,562.85	6,562.24
P-21	SDMH 1-2	SDMH 1-3	6,568.52	6,568.31	42.7	3.82	0.005	24.0	12.00	0.013	6,570.90	6,570.78	6,571.12	6,571.00
P-22	SDMH 1-3	SDMH 1-4	6,568.06	6,567.61	90.0	3.79	0.005	24.0	11.91	0.013	6,570.67	6,570.42	6,570.89	6,570.64
P-23	SDMH 1-4	SDMH 1-5	6,567.36	6,567.11	50.7	3.73	0.005	24.0	11.72	0.013	6,570.31	6,570.17	6,570.52	6,570.39

Active Scenario: 100 - Year

Manhole Table - Time: 0.00 hours

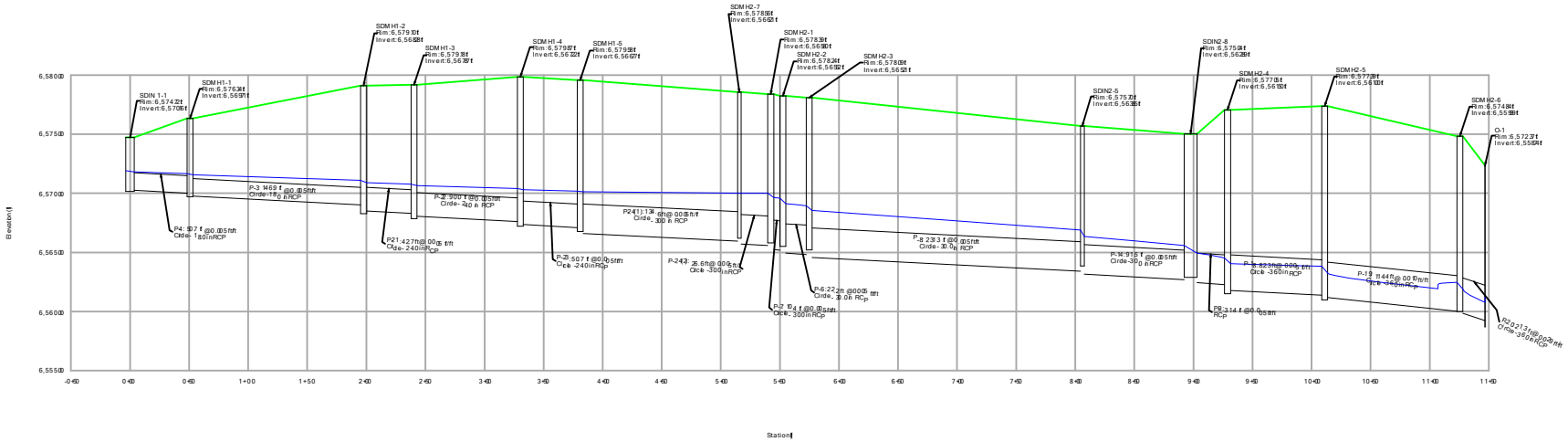
Label	Elevation (Rim) (ft)	Elevation (Invert in 1) (ft)	Elevation (Invert in 2) (ft)	Elevation (Invert Out) (ft)	Headloss Coefficient (Standard)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Flow (Total Out) (cfs)
SDMH 1-4	6,579.87	6,567.61	(N/A)	6,567.36	0.500	6,570.42	6,570.31	6,570.64	6,570.52	11.72
SDMH 1-5	6,579.58	6,567.11	(N/A)	6,566.61	0.500	6,570.17	6,570.13	6,570.39	6,570.22	11.62
SDMH 1-3	6,579.18	6,568.31	(N/A)	6,568.06	0.500	6,570.78	6,570.67	6,571.00	6,570.89	11.91
SDMH 1-2	6,579.10	6,569.02	6,571.16	6,568.52	0.900	6,571.10	6,570.90	6,571.27	6,571.12	12.00
SDMH 2-1	6,578.39	6,568.64	6,565.58	6,565.23	0.600	6,570.00	6,569.64	6,570.08	6,570.24	30.55
SDMH 2-2	6,578.24	6,565.18	6,569.18	6,564.93	0.600	6,569.58	6,569.11	6,570.18	6,569.89	34.79
SDMH 2-3	6,578.09	6,564.82	(N/A)	6,564.57	0.500	6,568.95	6,568.56	6,569.73	6,569.34	34.73
SDMH 2-5	6,577.39	6,561.38	(N/A)	6,561.18	0.600	6,563.83	6,563.26	6,564.51	6,564.20	40.74
SDMH 2-4	6,577.05	6,562.29	(N/A)	6,561.79	0.600	6,564.53	6,564.06	6,565.75	6,564.85	40.98
SDMH 1-1	6,576.34	6,570.00	(N/A)	6,569.75	0.600	6,571.67	6,571.56	6,571.84	6,571.74	5.89
SDMH 2-6	6,574.84	6,560.04	(N/A)	6,559.84	0.600	6,562.48	6,561.91	6,563.16	6,562.85	40.50

Active Scenario: 100 - Year

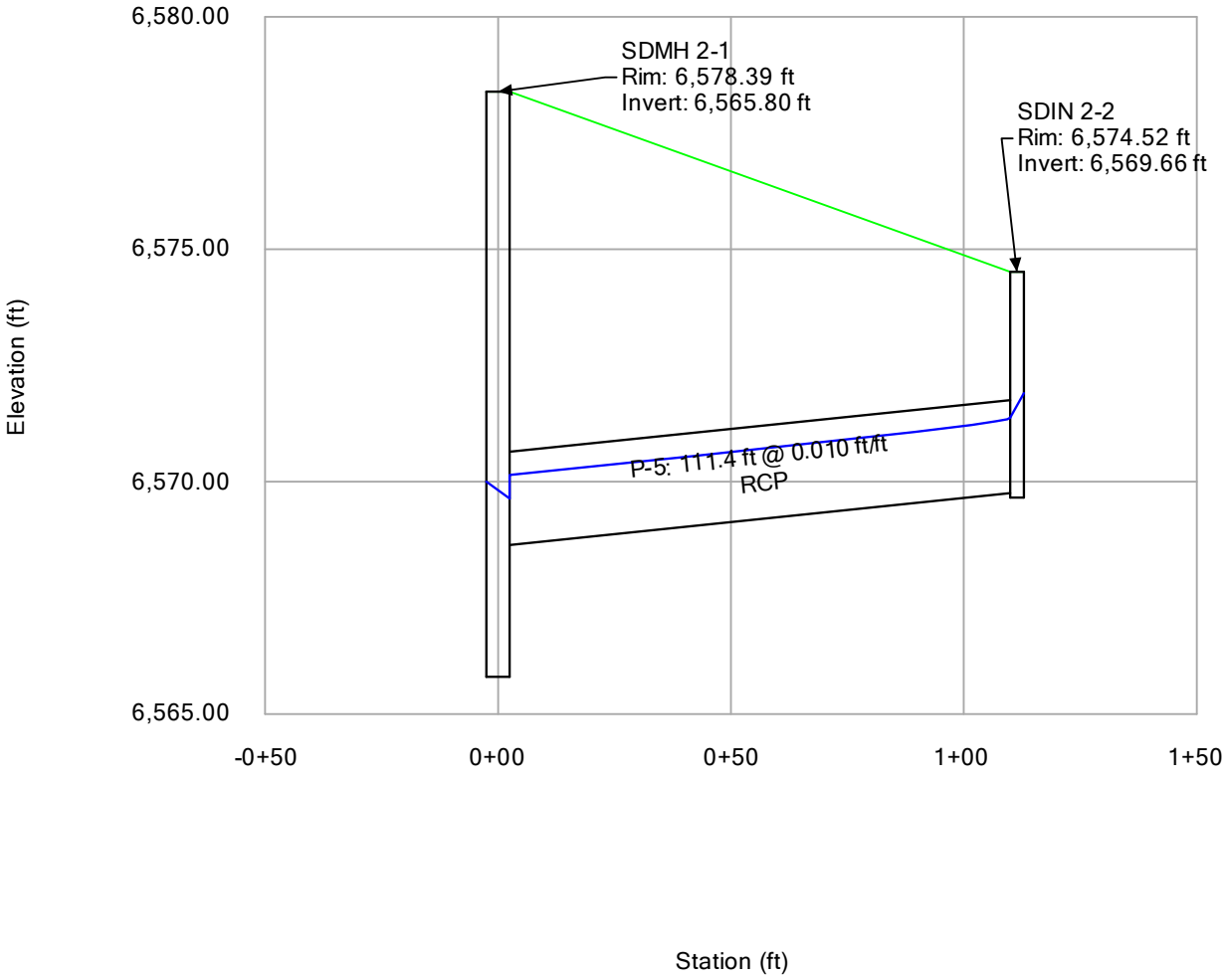
Catch Basin Table - Time: 0.00 hours

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Headloss Coefficient (Standard)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	External CA (acres)	External Tc (min)	Inlet Location
SDIN 3-2	6,576.91	6,572.88	0.500	1.75	6,573.46	6,573.37	6,573.64	6,573.55	0.270	12.440	In Sag
SDIN 3-1	6,577.00	6,570.94	0.800	4.94	6,572.02	6,571.73	6,572.06	6,572.09	0.510	10.980	In Sag
SDIN 2-8	6,575.04	6,562.89	0.600	41.07	6,565.59	6,564.94	6,566.50	6,566.03	0.340	5.600	In Sag
SDIN 2-7	6,575.04	6,569.41	0.500	2.29	6,570.58	6,570.47	6,570.79	6,570.68	0.270	5.940	In Sag
SDIN 2-6	6,575.70	6,569.01	0.500	2.24	6,570.17	6,570.08	6,570.36	6,570.27	0.280	7.140	In Sag
SDIN 2-5	6,575.70	6,563.85	0.600	37.60	6,566.91	6,566.36	6,567.69	6,567.27	0.290	9.380	In Sag
SDIN 2-4	6,577.71	6,569.53	0.500	6.51	6,570.72	6,570.51	6,570.99	6,570.94	0.260	7.440	In Sag
SDIN 2-3	6,574.62	6,570.27	0.500	6.46	6,572.09	6,571.98	6,572.29	6,572.19	0.900	9.700	In Sag
SDIN 2-2	6,574.52	6,569.66	0.600	20.59	6,571.90	6,571.38	6,572.04	6,572.26	1.280	5.000	In Sag
SDIN 2-1	6,574.57	6,570.26	0.500	5.28	6,572.02	6,571.95	6,572.16	6,572.09	0.700	8.500	In Sag
SDIN 1-3	6,578.36	6,572.16	0.000	2.17	6,572.73	6,572.73	6,572.91	6,572.91	0.270	7.080	In Sag
SDIN 1-2	6,578.11	6,571.61	0.600	5.49	6,572.70	6,572.52	6,572.75	6,572.83	0.480	9.200	In Sag
SDIN 1-1	6,574.72	6,570.16	0.500	5.96	6,571.92	6,571.83	6,572.10	6,572.01	0.750	7.310	In Sag

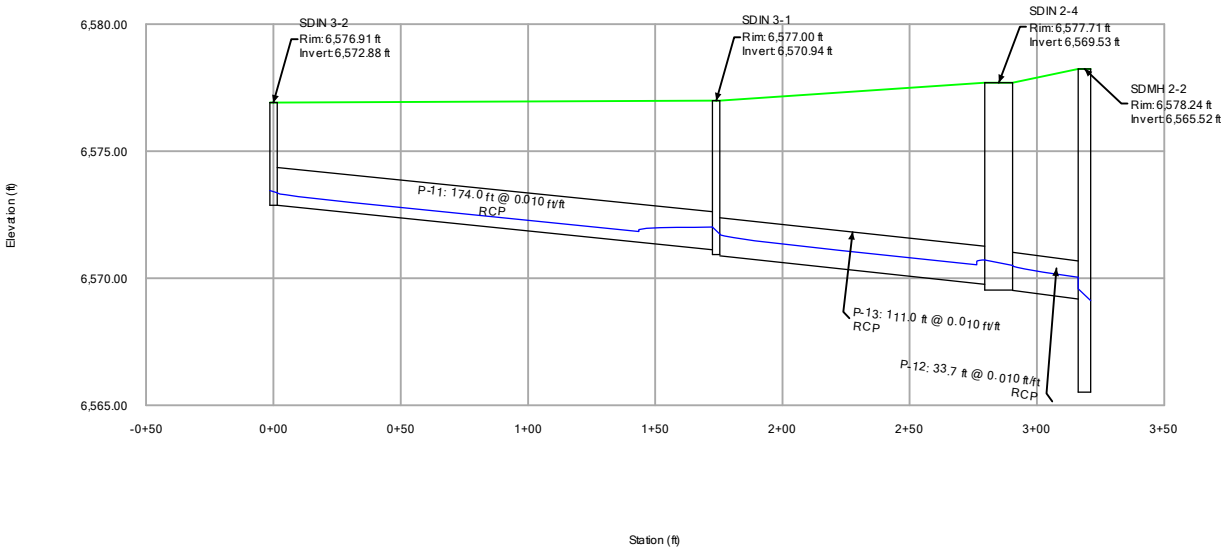
Active Scenario: 100 - Year
SDIN 1-1 to Outfall



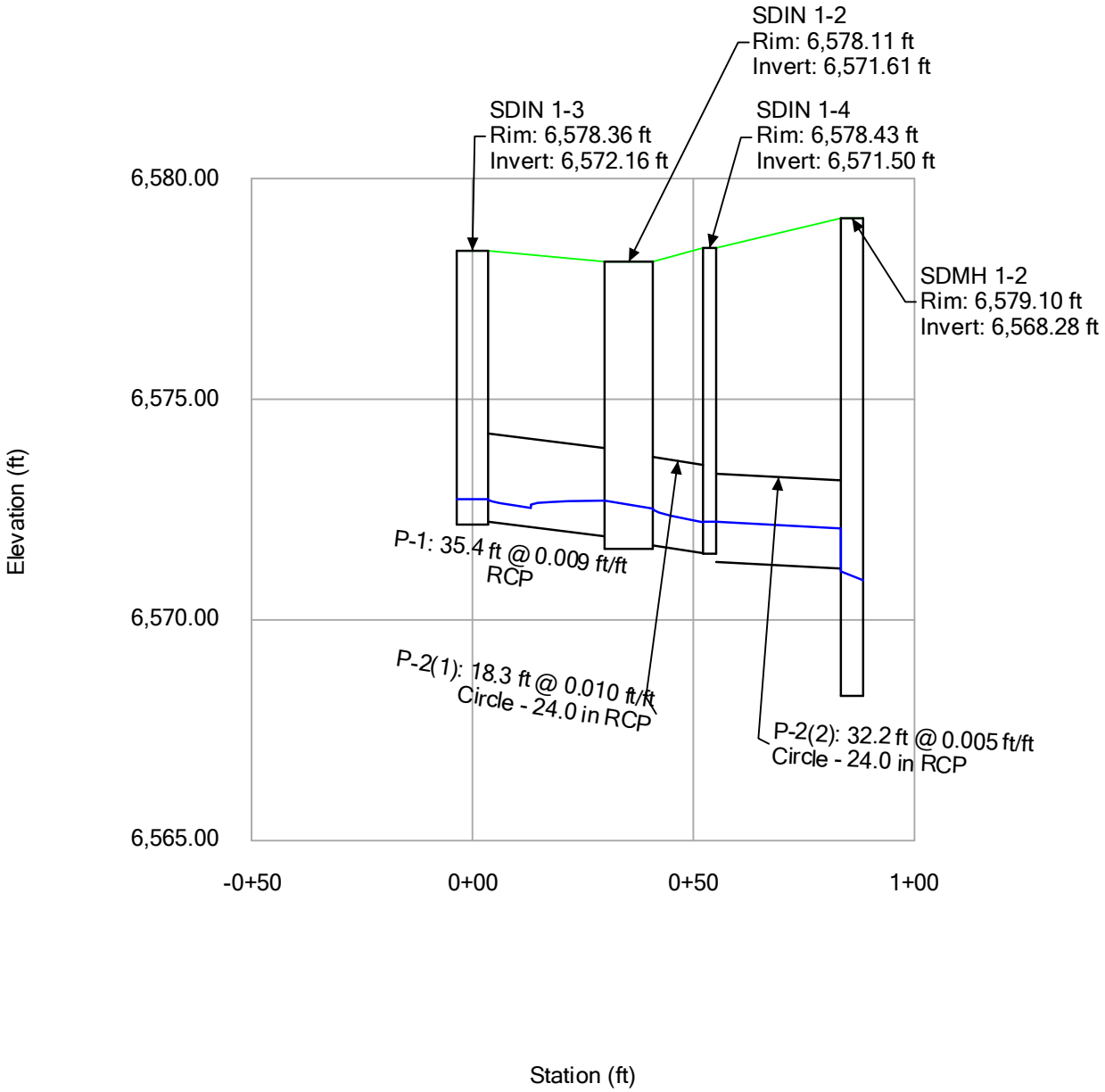
Active Scenario: 100 - Year
SDIN 2-1 to SDMH 2-1



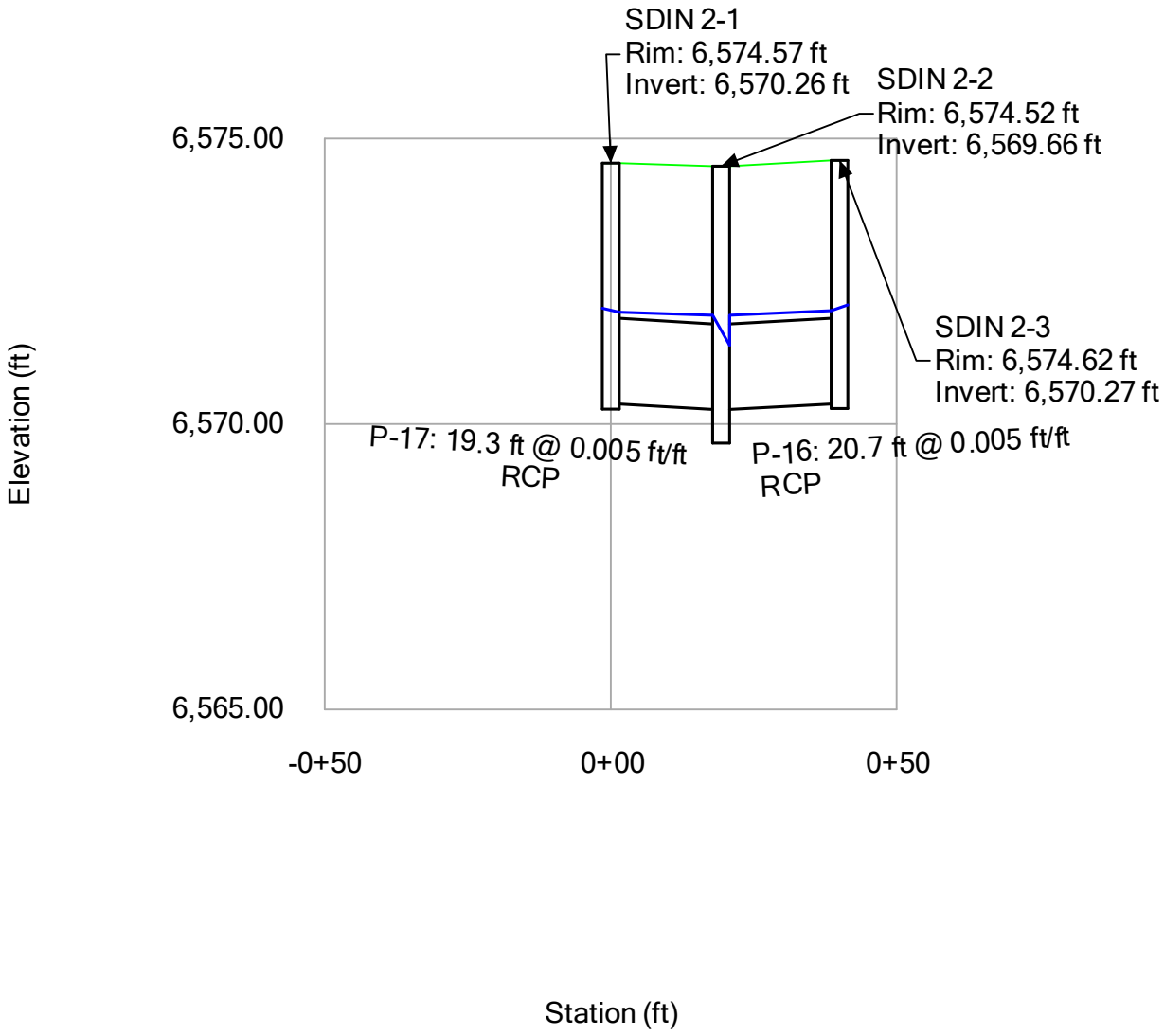
Active Scenario: 100 - Year
SDMH 2-2 to SDIN 3-2



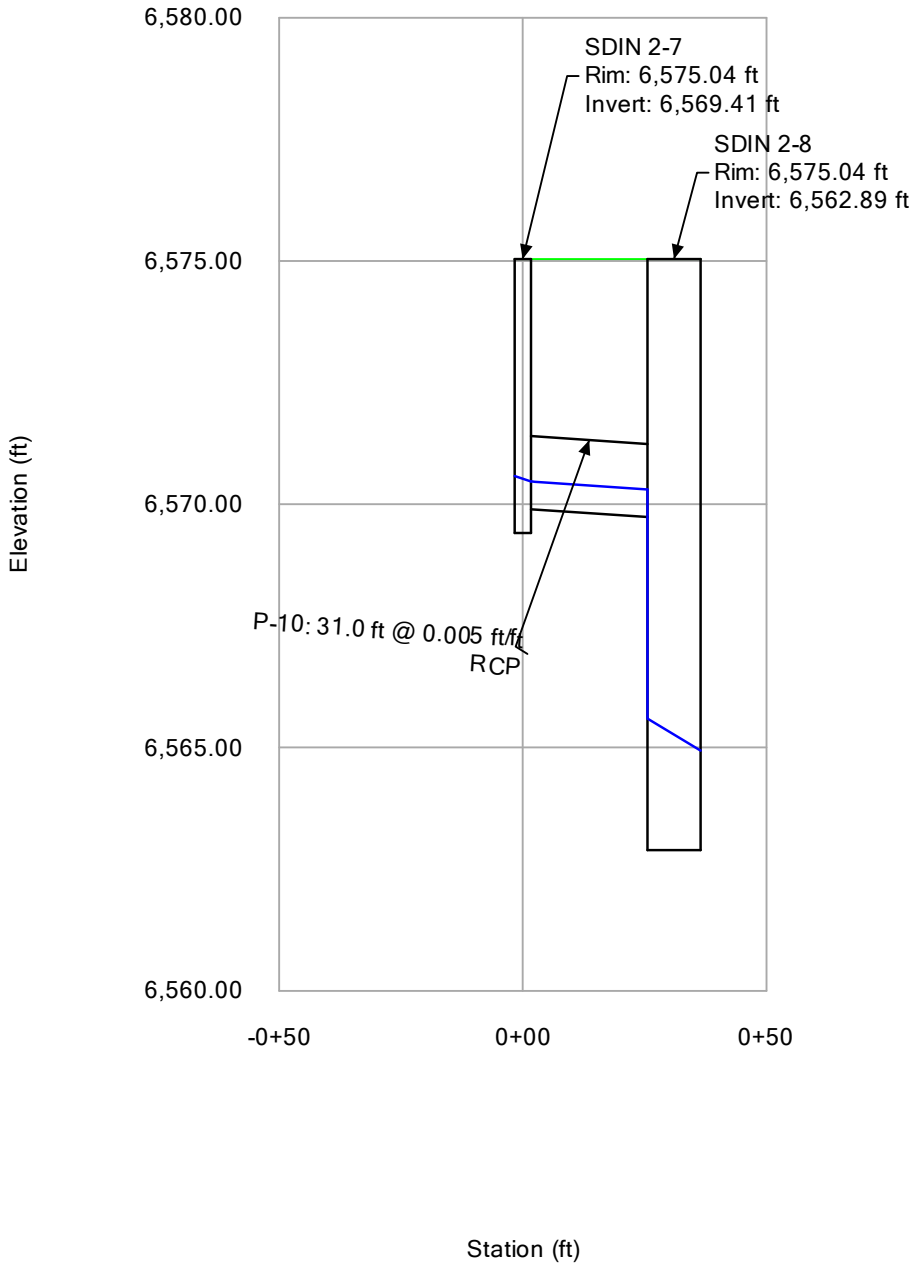
Active Scenario: 100 - Year
SDMH 1-2 to SDIN 1-3



Active Scenario: 100 - Year
SDIN 2-1 to SDIN 2-3



Active Scenario: 100 - Year
SDIN 2-8 to SDIN 2-7



MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A3	Inlet A4
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	On Grade	On Grade
Inlet Type	Denver No. 16 Combination	Denver No. 16 Combination
Number of Inlet Units	3	3

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.90	0.90
Major Peak Flow, Q (cfs)	2.10	2.10

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

Receive Bypass Flow from:	No Bypass Flow Received	Inlet A3
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	0.90	0.90
Major Total Design Peak Flow, Q (cfs)	2.10	2.10
Minor Inlet Interception Capacity, Q_a (cfs)	0.90	0.90
Major Inlet Interception Capacity, Q_a (cfs)	2.10	2.10
Minor Flow Bypassed Downstream, Qb (cfs)	0.00	0.00
Major Flow Bypassed Downstream, Qb (cfs)	0.00	0.00
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	100%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A5	Inlet A6
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	On Grade
Inlet Type	Denver No. 16 Combination	Denver No. 16 Combination
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	1.00	2.00
Major Peak Flow, Q (cfs)	2.30	4.30

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

Receive Bypass Flow from:	Inlet A4	No Bypass Flow Received
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	1.00	2.00
Major Total Design Peak Flow, Q (cfs)	2.30	4.30
Minor Inlet Interception Capacity, Q_a (cfs)	1.79	1.34
Major Inlet Interception Capacity, Q_a (cfs)	2.31	2.09
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	0.66
Major Flow Bypassed Downstream, Qb (cfs)	N/A	2.21
Minor Flow Capture Percentage, C%	100%	67%
Major Flow Capture Percentage, C%	100%	49%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A7	Inlet B1
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	In Sump
Inlet Type	Denver No. 16 Combination	Denver No. 16 Combination
Number of Inlet Units	3	2

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.30	0.90
Major Peak Flow, Q (cfs)	0.70	2.20

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	Inlet A6	No Bypass Flow Received
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.66	0.00
Major Bypass Flow Received, Q_b (cfs)	2.21	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	0.96	0.90
Major Total Design Peak Flow, Q (cfs)	2.91	2.20
Minor Inlet Interception Capacity, Q_a (cfs)	4.15	3.62
Major Inlet Interception Capacity, Q_a (cfs)	4.15	3.62
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	N/A
Major Flow Bypassed Downstream, Qb (cfs)	N/A	N/A
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	100%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A2	Inlet B3
Inlet Application (Street or Area)	AREA	STREET
Hydraulic Condition	Swale	In Sump
Inlet Type	CDOT Type C	Denver No. 16 Combination
Number of Inlet Units	1	2

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	1.20	2.60
Major Peak Flow, Q (cfs)	3.50	5.90

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	1.20	2.60
Major Total Design Peak Flow, Q (cfs)	3.50	5.90
Minor Inlet Interception Capacity, Q_a (cfs)	9.44	10.75
Major Inlet Interception Capacity, Q_a (cfs)	13.58	10.75
Minor Flow Bypassed Downstream, Qb (cfs)	0.00	N/A
Major Flow Bypassed Downstream, Qb (cfs)	0.00	N/A
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	100%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A1	Inlet A8
Inlet Application (Street or Area)	AREA	STREET
Hydraulic Condition	Swale	On Grade
Inlet Type	CDOT Type C	Denver No. 16 Valley Grate
Number of Inlet Units	1	2

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.70	3.00
Major Peak Flow, Q (cfs)	1.70	6.70

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	0.70	3.00
Major Total Design Peak Flow, Q (cfs)	1.70	6.70
Minor Inlet Interception Capacity, Q_a (cfs)	0.80	0.77
Major Inlet Interception Capacity, Q_a (cfs)	1.52	1.30
Minor Flow Bypassed Downstream, Qb (cfs)	0.00	2.23
Major Flow Bypassed Downstream, Qb (cfs)	0.18	5.40
Minor Flow Capture Percentage, C%	100%	26%
Major Flow Capture Percentage, C%	90%	19%

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INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A8-2	Inlet A9
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	On Grade
Inlet Type	Denver No. 16 Valley Grate	Denver No. 16 Valley Grate
Number of Inlet Units	2	2

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.10	2.20
Major Peak Flow, Q (cfs)	0.10	5.00

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	User-Defined	No Bypass Flow Received
Bypass Flow Description (Optional):	Inlet A9 and Inlet A8	
Minor Bypass Flow Received, Q_b (cfs)	3.81	0.00
Major Bypass Flow Received, Q_b (cfs)	9.33	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	3.91	2.20
Major Total Design Peak Flow, Q (cfs)	9.43	5.00
Minor Inlet Interception Capacity, Q_a (cfs)	1.80	0.62
Major Inlet Interception Capacity, Q_a (cfs)	1.80	1.08
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	1.58
Major Flow Bypassed Downstream, Qb (cfs)	N/A	3.92
Minor Flow Capture Percentage, C%	46%	28%
Major Flow Capture Percentage, C%	19%	22%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet A8-2	Inlet B2.1
Inlet Application (Street or Area)	AREA	STREET
Hydraulic Condition	Swale	On Grade
Inlet Type	User-Defined	Denver No. 16 Combination
Number of Inlet Units	1	2

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.10	0.60
Major Peak Flow, Q (cfs)	0.10	1.40

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	User-Defined	No Bypass Flow Received
Bypass Flow Description (Optional):	Inlet A8 and Inlet A9	
Minor Bypass Flow Received, Q_b (cfs)	3.81	0.00
Major Bypass Flow Received, Q_b (cfs)	9.33	0.00

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	3.91	0.60
Major Total Design Peak Flow, Q (cfs)	9.43	1.40
Minor Inlet Interception Capacity, Q_a (cfs)	5.77	0.60
Major Inlet Interception Capacity, Q_a (cfs)	10.09	1.35
Minor Flow Bypassed Downstream, Qb (cfs)	0.00	0.00
Major Flow Bypassed Downstream, Qb (cfs)	0.00	0.05
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	96%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Bella Mesa South
Minor: 5-year
Major: 100-year

Worksheet Protected

INLET NAME	Inlet B2
Inlet Application (Street or Area)	STREET
Hydraulic Condition	In Sump
Inlet Type	Denver No. 16 Combination
Number of Inlet Units	2

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	1.50
Major Peak Flow, Q (cfs)	3.40

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	Inlet B2.1
Bypass Flow Description (Optional):	
Minor Bypass Flow Received, Q_b (cfs)	0.00
Major Bypass Flow Received, Q_b (cfs)	0.05

CALCULATED OUTPUT

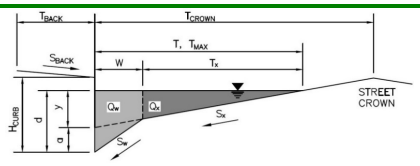
Minor Total Design Peak Flow, Q (cfs)	1.50
Major Total Design Peak Flow, Q (cfs)	3.45
Minor Inlet Interception Capacity, Q_a (cfs)	3.62
Major Inlet Interception Capacity, Q_a (cfs)	3.62
Minor Flow Bypassed Downstream, Qb (cfs)	N/A
Major Flow Bypassed Downstream, Qb (cfs)	N/A
Minor Flow Capture Percentage, C%	100%
Major Flow Capture Percentage, C%	100%

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	1.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.008	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.3	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} =**	**3.2**	**4.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.90 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.10 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

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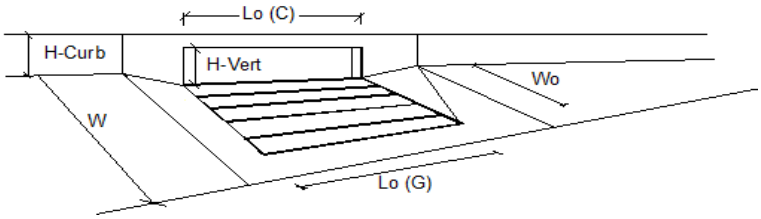


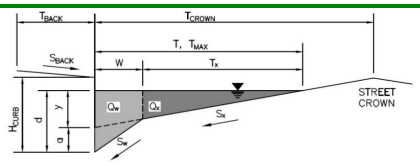
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**0.9**	**2.1**	**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**	**%**

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A4**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	1.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.008	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.3	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

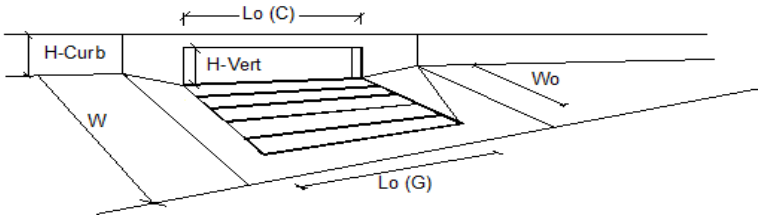
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**3.2**	**4.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.90 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.10 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



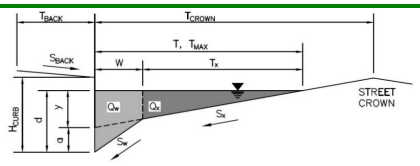
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**0.9**	**2.1**	**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**	**%**

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A5**



Gutter Geometry:

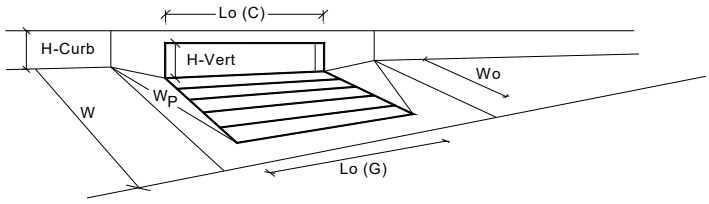
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	1.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	4.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.4	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	4.4	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	4.50	4.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.36	0.39	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.17	0.20	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.63	0.68	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.63	0.68	

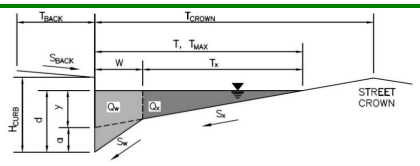
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.8**	**2.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.0	2.3	cfs

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A6**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.008	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.5	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

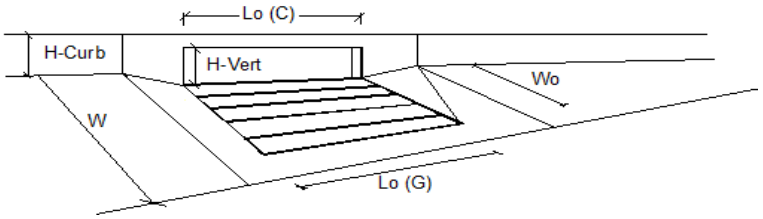
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**5.4**	**5.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.00 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.30 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



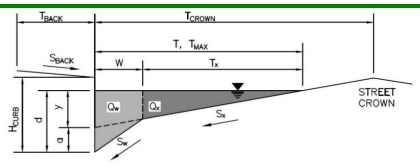
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**1.3**	**2.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.7**	**2.2**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**67**	**49**	**%**

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A7**



Gutter Geometry:

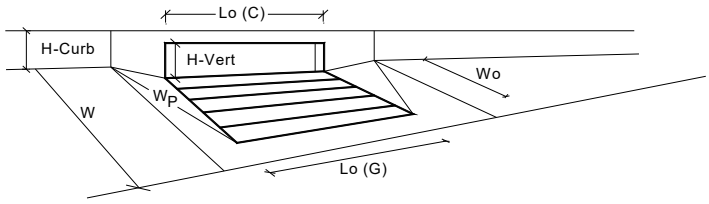
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.5	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



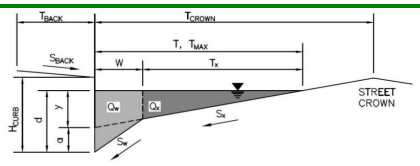
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	4.6	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.41	0.41	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	0.22	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.44	0.44	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.44	0.44	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**4.2**	**4.2**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.0	2.9	cfs

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet B1**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.5	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

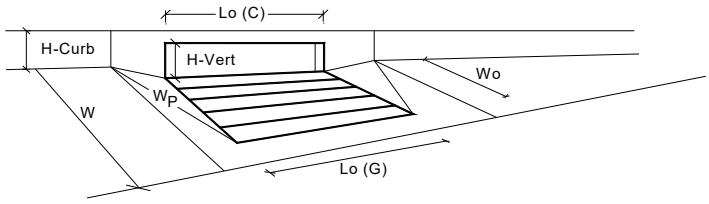
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

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

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)

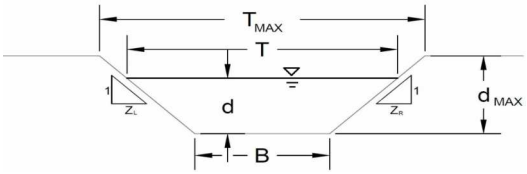


Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	4.6	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.41	0.41	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	0.22	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.54	0.54	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.54	0.54	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.6**	**3.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.9	2.2	cfs

AREA INLET IN A SWALE

Bella Mesa South

Inlet A2



This worksheet uses the NRCS vegetal retardance method to determine Manning's n for grass-lined channels.

An override Manning's n can be entered for other channel materials.

Analysis of Trapezoidal Channel (Grass-Lined uses SCS Method)

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =	D	
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	see details below	
Channel Invert Slope	S_O =	0.0050	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	5.00	ft/ft
Right Side Sloe	Z2 =	10.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- ○ Non-Cohesive
- ○ Cohesive
- ◉ Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**35.00**	**35.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**2.00**	**2.00**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**91.0**	**91.0**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**2.00**	**2.00**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**1.2**	**3.5**	**cfs**
Water Depth	**d** =	**0.64**	**0.81**	**ft**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

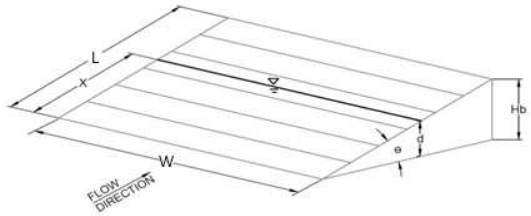
AREA INLET IN A SWALE

Bella Mesa South

Inlet A2

Inlet Design Information (Input)

Type of Inlet	CDOT Type C	Inlet Type =	CDOT Type C	
Angle of Inclined Grate (must be <= 30 degrees)		θ =	0.00	degrees
Width of Grate		W =	3.00	ft
Length of Grate		L =	3.00	ft
Open Area Ratio		A_{RATIO} =	0.70	
Height of Inclined Grate		H_B =	0.00	ft
Clogging Factor		C_f =	0.50	
Grate Discharge Coefficient		C_d =	0.96	
Orifice Coefficient		C_o =	0.64	
Weir Coefficient		C_w =	2.05	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.64	0.81	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**9.4**	**13.6**	**cfs**
Bypassed Flow	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Qa/Qo	**C% =**	**100**	**100**	**%**

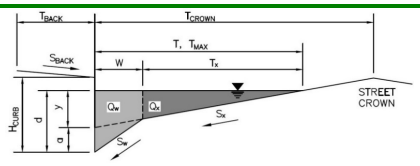
Warning 03: Velocity exceeds USDCM Volume I recommendation.
Warning 04: Froude No. exceeds USDCM Volume I recommendation.

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet B3**



Gutter Geometry:

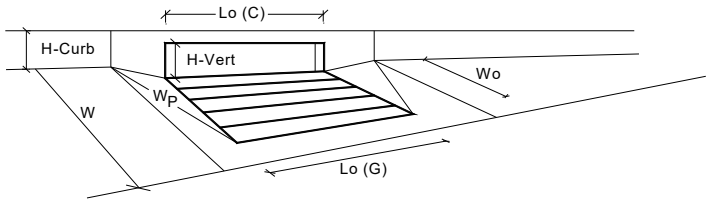
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	5.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	30.0	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 =	0.020	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	30.0	30.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	

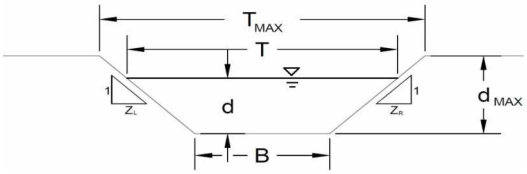
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.58	0.58	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.46	0.46	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.71	0.71	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.71	0.71	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**10.7**	**10.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	2.6	5.9	cfs

AREA INLET IN A SWALE

Bella Mesa South

Inlet A1



This worksheet uses the NRCS vegetal retardance method to determine Manning's n for grass-lined channels.

An override Manning's n can be entered for other channel materials.

Analysis of Trapezoidal Channel (Grass-Lined uses SCS Method)

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =		
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	0.013	
Channel Invert Slope	S_O =	0.0050	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	6.67	ft/ft
Right Side Sloe	Z2 =	20.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- ○ Non-Cohesive
- ○ Cohesive
- ◉ Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**32.00**	**32.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**2.00**	**2.00**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Top Width Criterion	Q_{allow} =	**109.7**	**109.7**	**cfs**
MAJOR STORM Allowable Capacity is based on Top Width Criterion	d_{allow} =	**1.12**	**1.12**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**0.7**	**1.7**	**cfs**
Water Depth	**d** =	**0.12**	**0.19**	**ft**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

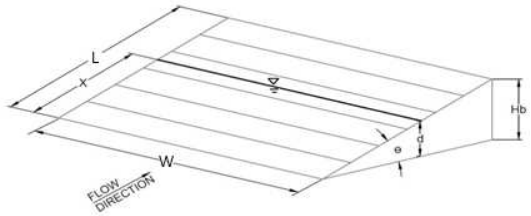
AREA INLET IN A SWALE

Bella Mesa South

Inlet A1

Inlet Design Information (Input)

Type of Inlet	CDOT Type C	Inlet Type =	CDOT Type C
Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grate	W =	3.00	ft
Length of Grate	L =	3.00	ft
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grate	H_B =	0.00	ft
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	0.96	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.12	0.19	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**0.8**	**1.5**	**cfs**
Bypassed Flow	**Q_b =**	**0.0**	**0.2**	**cfs**
Capture Percentage = Qa/Qo	**C% =**	**100**	**90**	**%**

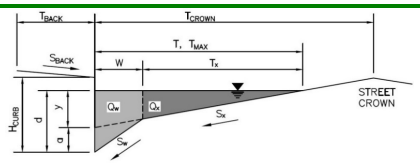
Warning 03: Velocity exceeds USDCM Volume I recommendation.
Warning 04: Froude No. exceeds USDCM Volume I recommendation.

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A8**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	15.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	0.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	15.0	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 =	0.020	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.005	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	15.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

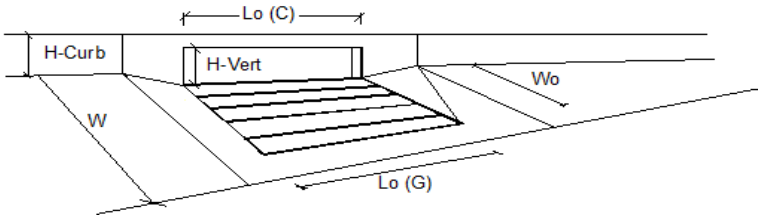
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**10.6**	**10.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.00 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.70 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



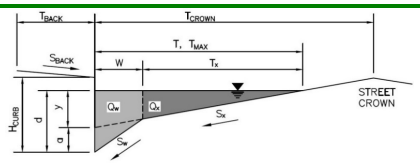
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Valley Grate)	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**0.8**	**1.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**2.2**	**5.4**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**26**	**19**	**%**

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A8-2**



Gutter Geometry:

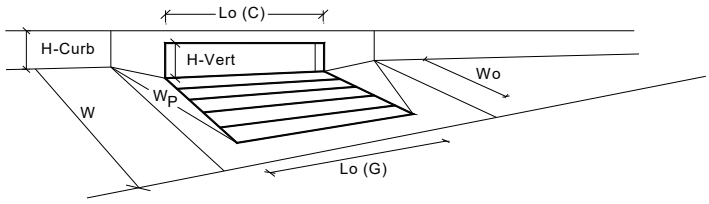
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	15.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	0.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	15.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.040	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	15.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



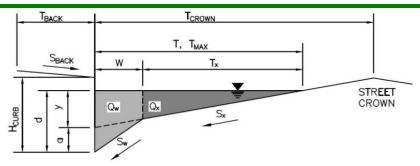
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Valley Grate)	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	4.0	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches
Angle of Throat	Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.39	0.39	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.47	0.47	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.8**	**1.8**	**cfs**
WARNING: Inlet Capacity < Q Peak for Minor and Major Storms	$Q_{PEAK\ REQUIRED}$ =	3.9	9.4	cfs

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet A9**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	15.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	0.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	15.0	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 =	0.020	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.005	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	15.0	ft
Warning 02 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.0	4.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

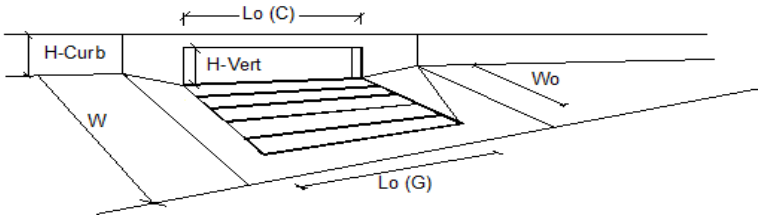
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**10.6**	**10.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.20 cfs on sheet 'Inlet Management'

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

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



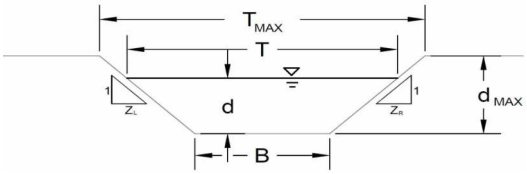
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Valley Grate)	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	N/A	N/A	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**0.6**	**1.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.6**	**3.9**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**28**	**22**	**%**

AREA INLET IN A SWALE

Bella Mesa South

Inlet A8-2



This worksheet uses the NRCS vegetal retardance method to determine Manning's n for grass-lined channels.

An override Manning's n can be entered for other channel materials.

Analysis of Trapezoidal Channel (Grass-Lined uses SCS Method)

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =		
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	0.015	
Channel Invert Slope	S_O =	0.0100	ft/ft
Bottom Width	B =	2.00	ft
Left Side Slope	Z1 =	25.00	ft/ft
Right Side Sloe	Z2 =	25.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- ○ Non-Cohesive
- ○ Cohesive
- ◉ Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**30.00**	**30.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**0.60**	**0.60**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Top Width Criterion	Q_{allow} =	**39.7**	**39.7**	**cfs**
MAJOR STORM Allowable Capacity is based on Top Width Criterion	d_{allow} =	**0.56**	**0.56**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**3.9**	**9.4**	**cfs**
Water Depth	**d** =	**0.21**	**0.31**	**ft**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

AREA INLET IN A SWALE

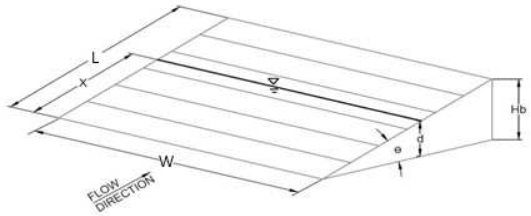
Bella Mesa South

Inlet A8-2

Inlet Design Information (Input)

Type of Inlet	User-Defined	Inlet Type =	User-Defined

Angle of Inclined Grade (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grade	W =	1.73	ft
Length of Grade	L =	18.00	ft
Open Area Ratio	A_{RATIO} =	0.31	
Height of Inclined Grade	H_B =	0.00	ft
Clogging Factor	C_f =	0.50	
Grade Discharge Coefficient	C_d =	N/A	
Orifice Coefficient	C_o =	0.60	
Weir Coefficient	C_w =	3.60	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.21	0.31	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.8**	**10.1**	**cfs**
Bypassed Flow	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Qa/Qo	**C% =**	**100**	**100**	**%**

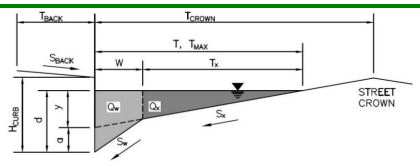
Warning 03: Velocity exceeds USDCM Volume I recommendation.
Warning 04: Froude No. exceeds USDCM Volume I recommendation.

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet B2.1**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	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} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.005	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.5	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

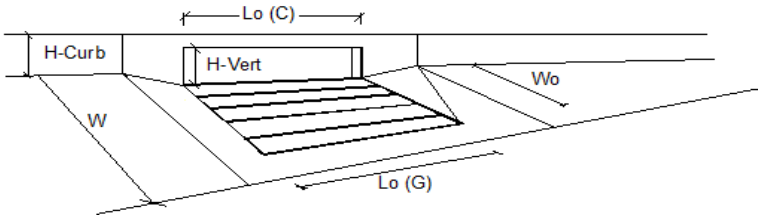
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**4.3**	**4.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.60 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.40 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 6.00 (August 2025)



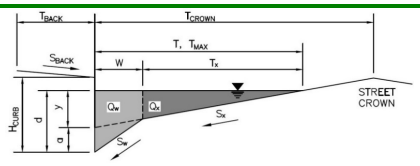
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q_a =**	**0.6**	**1.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**96**	**%**

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

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

Project: **Bella Mesa South**

Inlet ID: **Inlet B2**



Gutter Geometry:

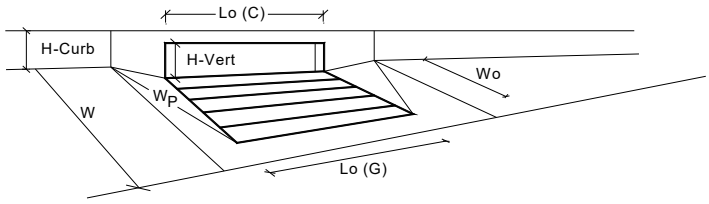
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.015	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	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 =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.015	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.5	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



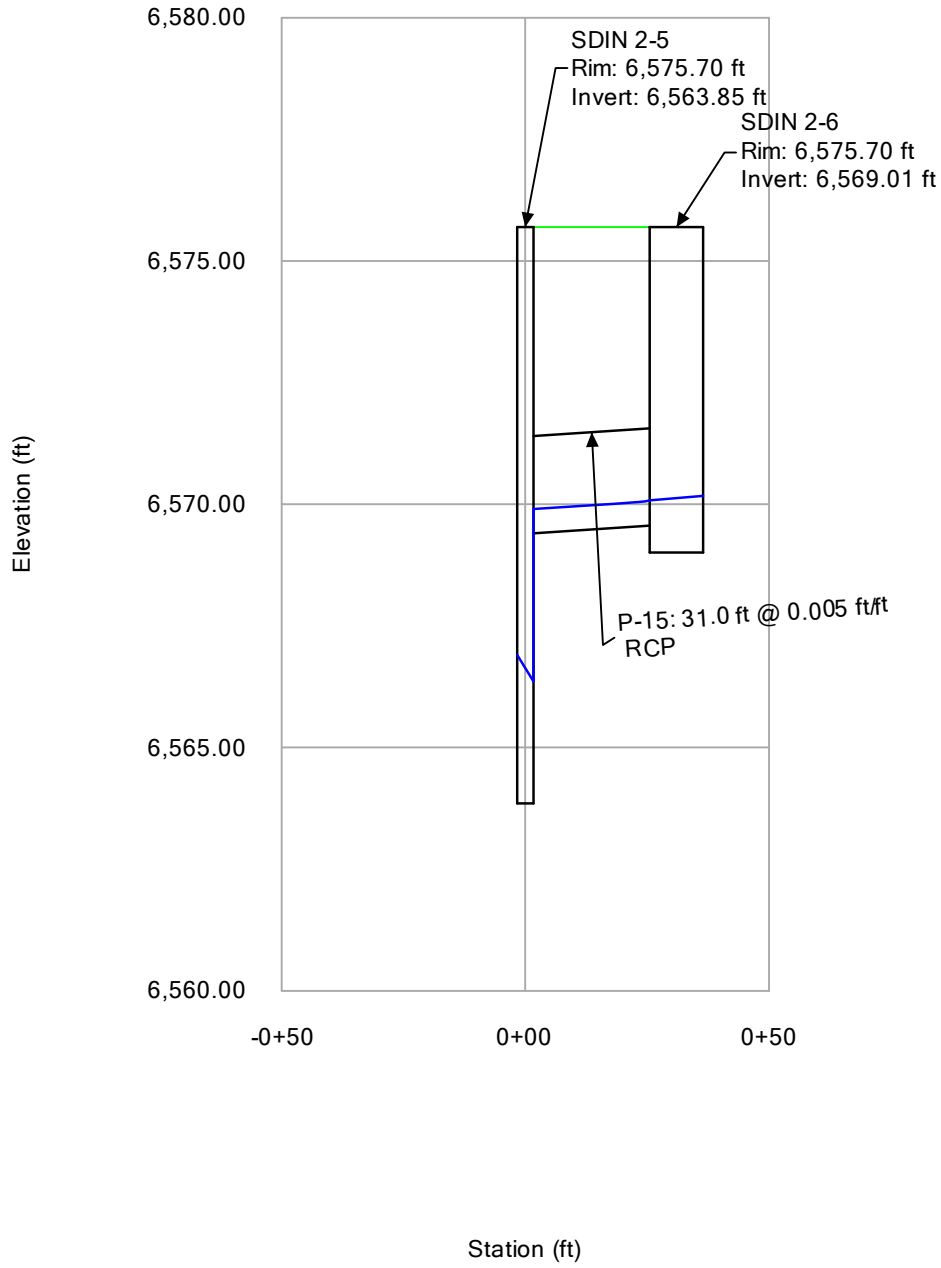
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (Denver No. 16 Combination)	Type =	Denver No. 16 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.6	4.6	inches
Grate Information		MINOR	MAJOR	☐ Override Depths
Length of a Unit Grate	L_o (G) =	3.00	3.00	feet
Width of a Unit Grate	W_o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.31	0.31	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	3.60	3.60	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	0.60	0.60	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.50	6.50	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	5.25	5.25	inches
Angle of Throat	Theta =	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.66	0.66	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	0.41	0.41	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.22	0.22	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	0.54	0.54	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.54	0.54	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**3.6**	**3.6**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.5	3.5	cfs

Active Scenario: 100 - Year

SDIN 2-5 to SDIN 2-6



Public Works
4175 N. Castleton Court, Castle Rock, CO 80109
720-733-2462, Fax 303-660-1025

Permit No: CON CD 18-0015

DETENTION VOLUME CERTIFICATION

Project Name: Founders Village Filing 24 - Phase 1A

Location/Address: _____

Subdivision: Founders Village

Drainage Report Title: Phase III Drainage Report for Founders Village Filing 24 - Phase 1A Construction

No. of Ponds: 1 * *For multiple ponds, copy and paste table below.*

Name of Pond (Tract):

Include Units (CY or ac-ft)	Required Volume	Design Volume	As-Built Volume	Design Elevation	As-Built Elevation
Water Quality Capture Volume	1.062 ac-ft	1.062 ac-ft	1.062 ac-ft	6525.77 ft	6525.98 ft
EURV	1.746 ac-ft	1.746 ac-ft	2.518 ac-ft	6527.76 ft	6527.80 ft
WQCV + 100-Year Detention	6.805 ac-ft	7.221 ac-ft	6.835 ac-ft	6532.00 ft	6532.03 ft
Emergency Overflow				6532.00 ft	6532.03 ft

Engineer's Statement:

I hereby certify that the detention facility *(facilities)* identified above has *(have)* been constructed according to the design presented in the approved drainage report, as surveyed by Aztec Consultants, Inc. on 03-31-2020**. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed, constructed and/or certified by others.

Name: Kevin Rohrbough

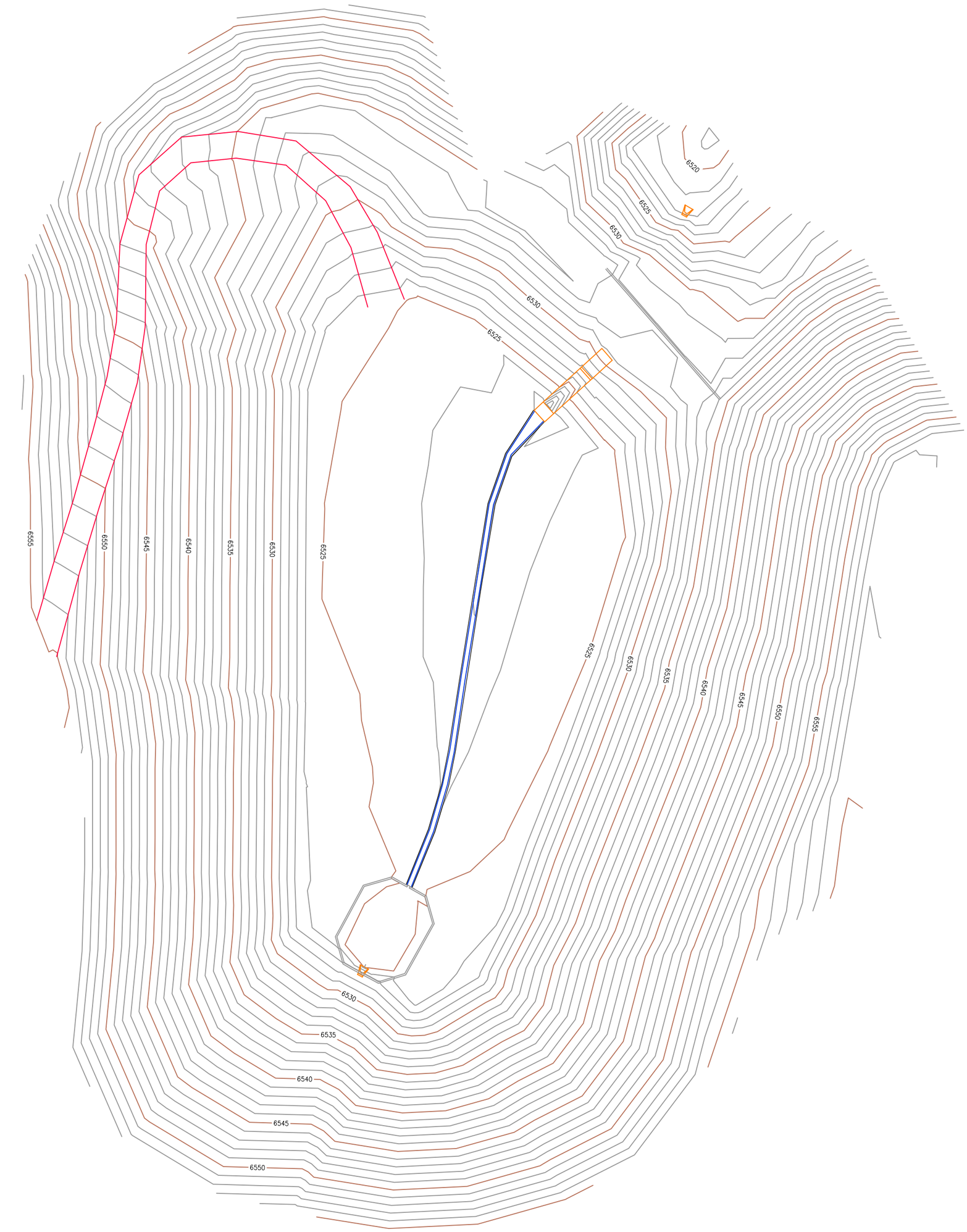
Signature: _____

Date: 04-15-2020

Company: CORE Consultants

COLORADO REGISTERED KEVIN J. ROHRBOUGH 48992 04-15-2020 PROFESSIONAL ENGINEER

** *Include supporting documentation.*



CHECKED BY: _____ DATE:_____

JOB NO. 21419-03

SHEET 1 OF 1 SHEETS

2020-03-31 POND TOPO
FOUNDERS 24

PREPARED FOR

AZTEC CONSULTANTS, INC.
300 E. Mineral Ave, Suite 1
Littleton, Colorado 80122
Phone: (303)713-1898
Fax: (303)713-1897
www.aztecconsultants.com

0 20 40 80

1 inch = 40 ft.

DATE 2020-04-13 JMS

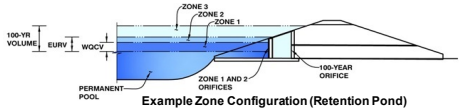
N:\21419-03 - Founders village 24\Dwg\2020-02-17 POND TOPO.dwg, 4/13/2020 7:37:47 AM, jsparer, 1:1

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)

Project: Bella Mesa South

Basin ID: Pond B Conformance



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	EDB	
Watershed Area =	65.64	acres
Watershed Length =	2,746	ft
Watershed Length to Centroid =	1,200	ft
Watershed Slope =	0.026	ft/ft
Watershed Imperviousness =	51.72%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

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

		Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.154 acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	3.220 acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	3.081 acre-feet	1.06	inches
5-yr Runoff Volume (P1 = 1.43 in.) =	4.938 acre-feet	1.43	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	6.181 acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 1.69 in.) =	6.543 acre-feet		inches
50-yr Runoff Volume (P1 = 2.26 in.) =	9.762 acre-feet	2.26	inches
100-yr Runoff Volume (P1 = 2.6 in.) =	11.904 acre-feet	2.60	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	15.032 acre-feet		inches
Approximate 2-yr Detention Volume =	2.537 acre-feet		
Approximate 5-yr Detention Volume =	4.017 acre-feet		
Approximate 10-yr Detention Volume =	4.557 acre-feet		
Approximate 25-yr Detention Volume =	4.383 acre-feet		
Approximate 50-yr Detention Volume =	5.393 acre-feet		
Approximate 100-yr Detention Volume =	6.270 acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.154	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.066	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	3.050	acre-feet
Total Detention Basin Volume =	6.270	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

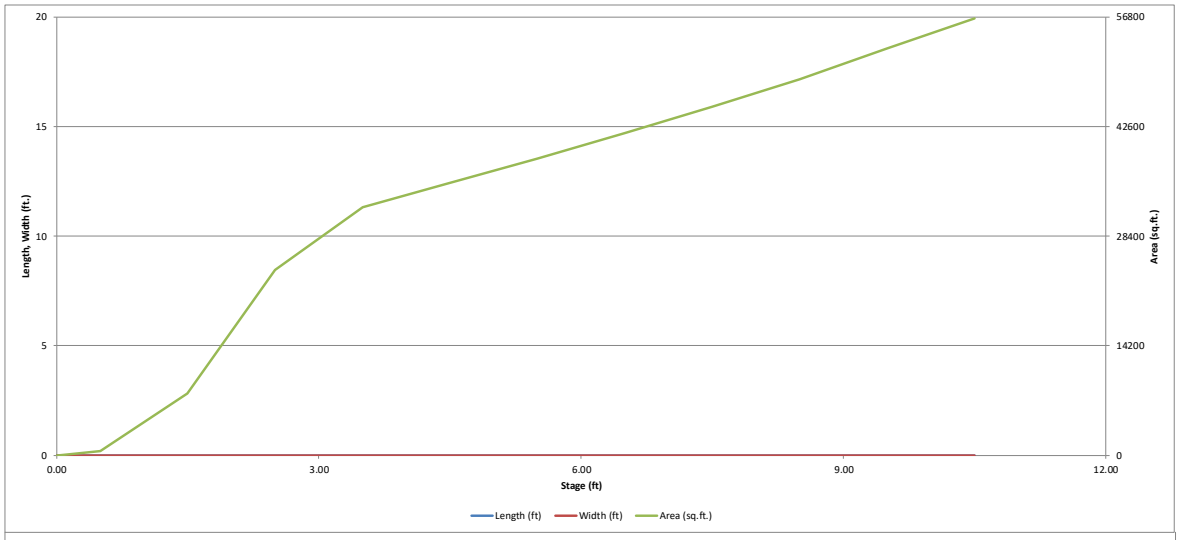
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

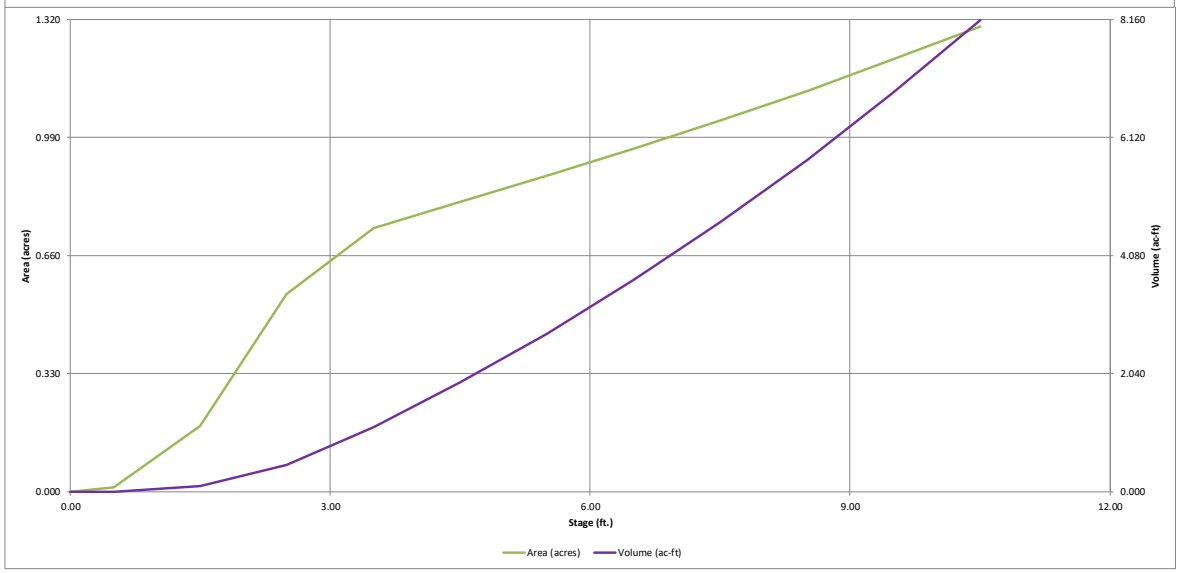
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6523	--	0.50	--	--	--	500	0.011	125	0.003
6524	--	1.50	--	--	--	8,000	0.184	4,375	0.100
6525	--	2.50	--	--	--	24,038	0.552	20,394	0.468
6526	--	3.50	--	--	--	32,112	0.737	48,469	1.113
6527	--	4.50	--	--	--	35,277	0.810	82,163	1.886
6528	--	5.50	--	--	--	38,454	0.883	119,029	2.733
6529	--	6.50	--	--	--	41,744	0.958	159,128	3.653
6530	--	7.50	--	--	--	45,170	1.037	202,585	4.651
6531	--	8.50	--	--	--	48,774	1.120	249,557	5.729
6532	--	9.50	--	--	--	52,687	1.210	300,287	6.894
6533	--	10.50	--	--	--	56,681	1.301	354,971	8.149

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)



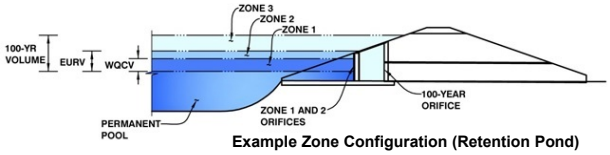


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)

Project: **Bella Mesa South**

Basin ID: **Pond B Conformance**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.56	1.154	Orifice Plate
Zone 2 (EURV)	6.05	2.066	Orifice Plate
Zone 3 (100-year)	8.98	3.050	Weir&Pipe (Restrict)
Total (all zones)		6.270	

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

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 SCM)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	6.06	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.00	4.00					
Orifice Area (sq. inches)	4.70	4.70	12.00					

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

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	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 =	6.06	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.06	N/A	feet
Overflow Weir Front Edge Length =	5.50	N/A	feet	Overflow Weir Slope Length =	11.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	8.58	N/A	
Horiz. Length of Weir Sides =	11.00	N/A	feet	Overflow Grate Open Area w/o Debris =	42.11	N/A	ft^2
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	21.05	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 =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	4.91	N/A	ft^2
Outlet Pipe Diameter =	30.00	N/A	inches	Outlet Orifice Centroid =	1.25	N/A	feet
Restrictor Plate Height Above Pipe Invert =	30.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	1.04	feet
Spillway Crest Length =	60.00	feet	Stage at Top of Freeboard =	11.54	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.30	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	8.15	acre-ft

Calculated Parameters for Spillway

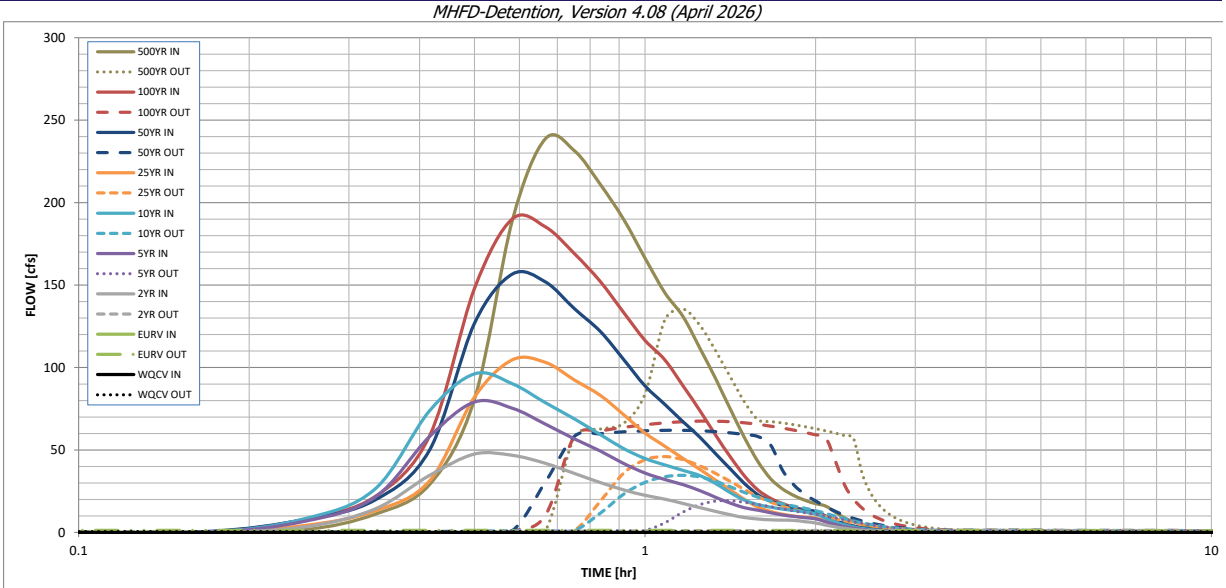
Routed Hydrograph Results

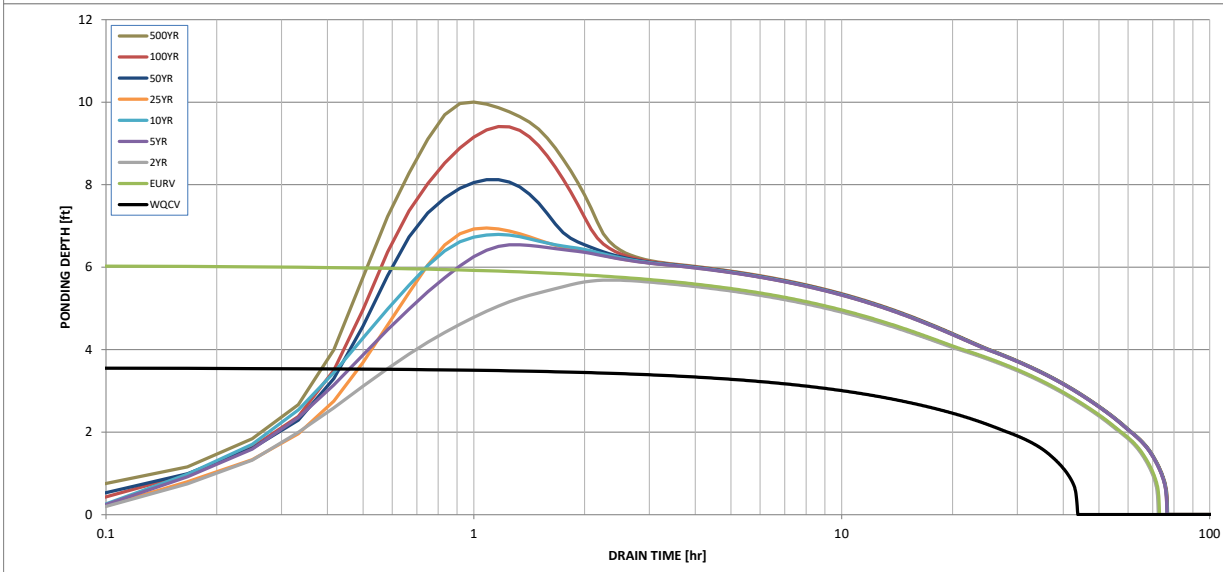
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

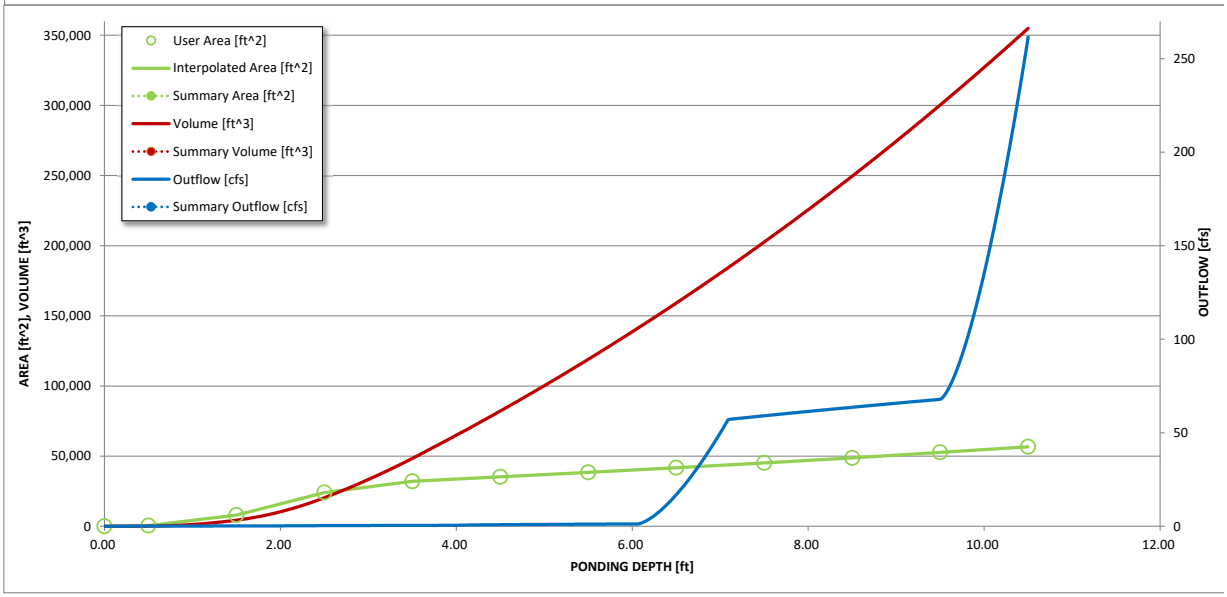
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.06	1.43	1.66	1.69	2.26	2.60	3.14
CUHP Runoff Volume (acre-ft) =	1.154	3.220	3.081	4.938	6.181	6.543	9.762	11.904	15.032
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	3.081	4.938	6.181	6.543	9.762	11.904	15.032
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	7.9	25.4	35.1	44.2	75.6	97.7	127.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.12	0.39	0.53	0.67	1.15	1.49	1.95
Peak Inflow Q (cfs) =	N/A	N/A	47.6	79.1	96.2	104.7	156.7	190.2	238.7
Peak Outflow Q (cfs) =	0.5	1.3	1.2	19.2	34.7	46.0	62.0	67.5	135.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	1.0	1.0	0.8	0.7	1.1
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.4	0.8	1.1	1.4	1.6	1.6
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) =	41	66	66	66	64	63	59	56	53
Time to Drain 99% of Inflow Volume (hours) =	**43**	70	70	72	72	71	69	68	66
Maximum Ponding Depth (ft) =	3.56	6.04	5.68	6.54	6.79	6.95	8.12	9.41	10.00
Area at Maximum Ponding Depth (acres) =	0.74	0.92	0.90	0.96	0.98	0.99	1.09	1.20	1.26
Maximum Volume Stored (acre-ft) =	1.157	3.220	2.893	3.691	3.934	4.082	5.310	6.773	7.510

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.25	1.63
	0:15:00	0.00	0.00	3.29	6.68	8.27	4.15	7.76	7.89	10.97
	0:20:00	0.00	0.00	14.16	21.28	26.22	13.00	19.61	21.68	29.16
	0:25:00	0.00	0.00	34.65	58.27	73.81	31.35	50.12	58.73	80.83
	0:30:00	0.00	0.00	47.57	79.12	96.20	82.11	126.81	147.93	189.37
	0:35:00	0.00	0.00	46.75	75.34	90.16	104.65	156.68	190.15	238.69
	0:40:00	0.00	0.00	41.91	65.71	78.67	103.16	151.90	185.28	231.49
	0:45:00	0.00	0.00	35.79	56.79	68.89	92.51	135.72	169.15	211.11
	0:50:00	0.00	0.00	30.29	49.40	59.39	83.19	121.93	152.18	189.83
	0:55:00	0.00	0.00	25.82	41.88	50.86	71.46	104.92	133.38	166.33
	1:00:00	0.00	0.00	22.50	36.03	44.88	60.27	88.85	116.46	145.44
	1:05:00	0.00	0.00	20.22	32.13	40.96	52.34	77.69	104.73	131.03
	1:10:00	0.00	0.00	17.60	29.01	37.67	44.89	67.19	88.96	111.67
	1:15:00	0.00	0.00	15.05	25.35	34.46	38.28	57.75	73.87	93.11
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	1:25:00	0.00	0.00	10.66	17.71	23.97	25.63	38.29	45.45	57.18
	1:30:00	0.00	0.00	9.05	14.97	19.50	19.90	29.55	34.10	42.94
	1:35:00	0.00	0.00	8.13	13.50	16.93	15.36	22.85	25.69	32.57
	1:40:00	0.00	0.00	7.71	11.95	15.31	12.71	18.93	20.70	26.35
	1:45:00	0.00	0.00	7.48	10.63	14.15	11.05	16.40	17.48	22.29
	1:50:00	0.00	0.00	7.34	9.69	13.34	9.96	14.72	15.25	19.49
	1:55:00	0.00	0.00	6.56	8.99	12.46	9.21	13.54	13.67	17.49
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	2:05:00	0.00	0.00	4.52	6.50	8.70	6.88	10.01	9.64	12.34
	2:10:00	0.00	0.00	3.38	4.80	6.39	5.04	7.30	6.95	8.89
	2:15:00	0.00	0.00	2.53	3.56	4.68	3.73	5.37	5.13	6.54
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	2:35:00	0.00	0.00	0.69	0.92	1.27	1.03	1.47	1.44	1.83
	2:40:00	0.00	0.00	0.46	0.63	0.87	0.72	1.03	1.01	1.28
	2:45:00	0.00	0.00	0.28	0.41	0.55	0.47	0.67	0.65	0.83
	2:50:00	0.00	0.00	0.15	0.24	0.30	0.27	0.39	0.37	0.47
	2:55:00	0.00	0.00	0.06	0.11	0.13	0.13	0.18	0.17	0.22
	3:00:00	0.00	0.00	0.02	0.03	0.03	0.04	0.05	0.05	0.06
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix D - Reference Documents

PHASE III DRAINAGE REPORT
FOR
FOUNDERS VILLAGE FILING 24 – PHASE 1A CONSTRUCTION
TOWN OF CASTLE ROCK, CO
PROJECT NO. CD18-0015

PREPARED FOR:

RICHMOND AMERICAN HOMES
4350 S. MONACO STREET
DENVER, CO 80237
PHONE: 720-977-3862
CONTACT: ERIC KUBLY

PREPARED BY:

CORE CONSULTANTS, INC.
1950 W. LITTLETON BOULEVARD, SUITE 109
LITTLETON, CO 80120
PHONE: 303-703-4444
CONTACT: BLAKE CALVERT
CORE PROJECT NUMBER: 18-007

DECEMBER 28, 2018

II. DRAINAGE BASINS AND SUB-BASINS

A. MAJOR DRAINAGE BASINS

The drainage patterns for the major basins will generally follow the historic patterns. The property generally drains northwest to Mitchell Gulch on the west side of the property. Mitchell Gulch drains to Cherry Creek approximately two miles downstream of the property. The site falls within Zone X, as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel 08035C0306G (revised March 16, 2016). A copy of this map is included in the appendix.

B. MINOR DRAINAGE BASINS

Minor Drainage Basins have been delineated using the proposed site plan and grading, as well as the lot layout for future development. In addition, the portion of Mitchell Street that has already been constructed and the future development to the west of Mitchell Street will be included in the detention pond sizing. Overall, the proposed drainage patterns for the sub-basins will generally follow the historic patterns prior to development. Although Mitchell Street has been partially constructed, the existing condition for the site will be considered fully undeveloped and the roadway will be included as part of the proposed drainage design in the total amount of detention and water quality. For sub-basins within the site, runoff will drain towards low points in the roadways. The developed minor basins will include overland flow and storm sewer collection systems which will direct stormwater to the extended detention basins at the north edge of the site and west of Mitchell Street. The site drainage will not be impacted by any irrigation facilities. The Site is to be constructed in three phases, Phase 1A, Phase 1B, and Phase 2. During grading of Phase 1A, the area for Phase 1B will be overlot graded. The storm system has been designed for the ultimate runoff from Phase 1A and Phase 1B. Minor basins have been established for the site for Phase 1A and Phase 1B, and are described below:

On-Site Basins:

Basin B-1
Basin B-1 is a 0.57-acre area with a peak flow of 3.5 cfs, comprised of roadway and landscaping. Runoff generated within this basin will drain to a type-R inlet at DP50. The flow that is captured by the inlet at DP50 combines with the flow from DP48 and DP49 at the manhole at DP51 for a cumulative flow of 136.7 cfs and is conveyed west to Detention Pond B via the proposed storm sewer system.

Basin B-2
Basin B-2 is a 1.75-acre area with a peak flow of 9.7 cfs, comprised of roadway and landscaping. Runoff generated within this basin will drain to a type-R inlet at at DP49. The flow that is captured by the inlet at DP50 combines with the flow from

the adjacent property to the east (Castlewood Ranch). Runoff for this basin will sheet flow northwest onto Basin B-6.

Basin OS-12
Basin OS-12 is a 1.61 acre area with a peak flow of 5.7 cfs, comprised entirely of landscaping and roadway. Runoff for this basin will sheet flow to the existing drainage pan at the intersection of Mitchell Street and Mikelson Boulevard as it has historically and is reduced from the historic rate. Detention Pond B has been over sized to provide full spectrum detention for this Basin.

Basin OS-13
Basin OS-13 is a 0.99-acre area with a peak flow of 5.5 cfs, comprised entirely of offsite single family residential (rear portion of existing lots with Type-B drainage) on the adjacent property to the east (Castlewood Ranch). Runoff for this basin will sheet flow northwest onto Basin B-9.

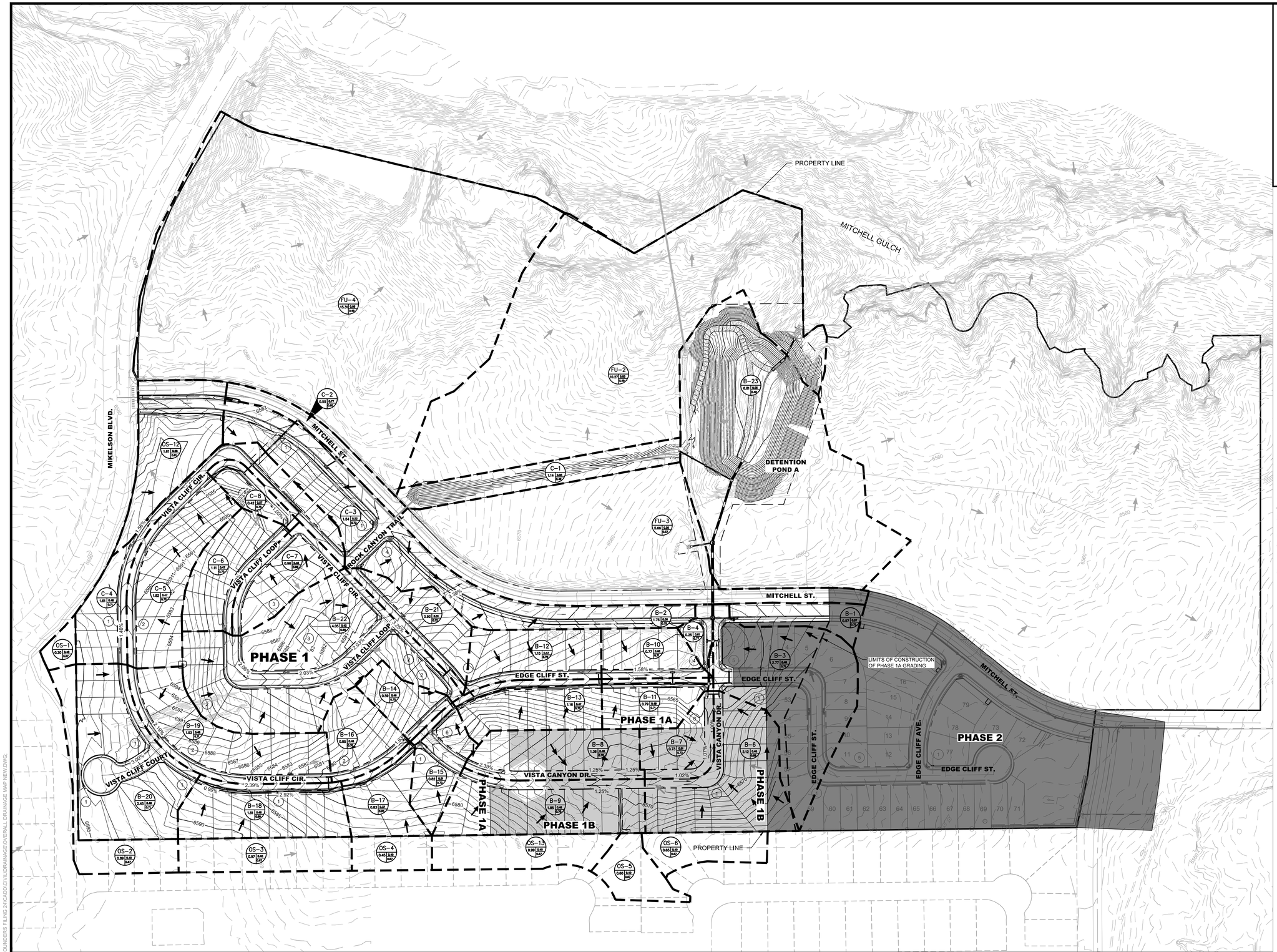
Basin FU-2
Basin FU-2 is a 10.27-acre area with a peak flow of 21.5 cfs, comprised of undeveloped land. Although the proposed construction limits do not disturb this basin, future development assumptions were made to conservatively size Detention Pond B. The future runoff for this basin was approximated using impervious values for multi family residential and a future elementary school.

Basin FU-3
Basin FU-3 is a 5.66-acre area with a peak flow of 14.4 cfs, comprised of undeveloped land and a portion of roadway. Runoff generated within this basin will drain to a type-C inlet at the sump at DP52 and conveyed north to DP53 where it is combined with flow from DP51 for a cumulative flow of 118.0 cfs. Any overflow from a clogged inlet will spill northwest to Detention Pond B.

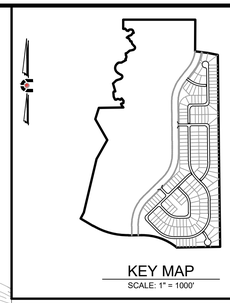
Basin FU-4
Basin FU-4 is a 15.31-acre area with a peak flow of 36.0 cfs, comprised of undeveloped land. A portion of this basin drains into an existing detention pond and although the proposed construction limits do not disturb this basin, future development assumptions were made to conservatively size Detention Pond B. The future runoff for this basin was approximated using impervious values for multi family residential and a future elementary school.

Existing Basins:

The existing basins west of Mitchell Street will continue to flow as they have historically. The Detention Ponds have been designed to accommodate future development of these basins. The runoff from these basins was approximated using impervious values for an elementary school and multifamily residential as it is zoned.



OVERALL PROPOSED DRAINAGE MAP



0 120' 240'

1 inch = 120 ft.

LEGEND

- BASIN DESIGNATION
- 5 YEAR COEFFICIENTS
- 100 YEAR COEFFICIENTS
- DESIGN POINT *FLOWS ARE NOT CONCENTRATED BUT SHEET FLOWS
- DIRECTIONAL FLOW AROW
- PROPOSED EASEMENT
- PROPOSED R.O.W.
- EXISTING LOT LINE
- PROPOSED PROPERTY BOUNDARY
- MAJOR BASIN BOUNDARY
- MINOR BASIN BOUNDARY
- PROPOSED MANHOLE AND PIPE
- PROPOSED INLETS
- PROPOSED FLARED END SECTION
- EXISTING MANHOLE AND PIPE
- EXISTING INLETS
- EXISTING FLARED END SECTION
- RIPRAP

CIVIL ENGINEERING
DEVELOPMENT CONSULTING
NATURAL RESOURCES CONSULTING
LAND SURVEYING
303.703.4444
1950 W. Littleton Blvd., Ste. 109
Littleton, CO 80120

CORE CONSULTANTS

#	REVISION DESCRIPTION	DATE	BY
1	2ND SUBMITTAL	09/04/18	RCY
2	3RD SUBMITTAL	10/26/18	RCY
3	4TH SUBMITTAL	12/10/18	RCY
4	5TH SUBMITTAL	12/21/18	RCY
5	ISSUED FOR CONSTRUCTION	XX/XX/XX	RCY

FOUNDERS VILLAGE FILING 24
TOWN OF CASTLE ROCK, DOUGLAS COUNTY

DRAINAGE PLANS - PHASE I
OVERALL PROPOSED DRAINAGE MAP

DESIGNED BY: RCY
DRAWN BY: BB
CHECKED BY: BC

JOB NO. 18-007

SHEET 2 OF 6

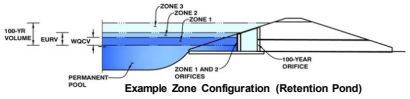
12/21/2018 3:26 PM X:\18-007 FOUNDERS FILING 24\CAD\CIVIL\DRAINAGE\OVERALL DRAINAGE MAP NEW DWG

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: FOUNDERS FILING NO. 24

Basin ID: POND B



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	65.41	acres
Watershed Length =	2,746	ft
Watershed Slope =	0.026	ft/ft
Watershed Imperviousness =	45.70%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	1.062	acre-feet
Excess Urban Runoff Volume (EURV) =	2.808	acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	2.343	acre-feet
5-yr Runoff Volume (P1 = 1.43 in.) =	3.786	acre-feet
10-yr Runoff Volume (P1 = 1.66 in.) =	4.925	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 2.26 in.) =	8.860	acre-feet
100-yr Runoff Volume (P1 = 2.6 in.) =	11.102	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	2.197	acre-feet
Approximate 5-yr Detention Volume =	3.569	acre-feet
Approximate 10-yr Detention Volume =	4.052	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	4.848	acre-feet
Approximate 100-yr Detention Volume =	5.743	acre-feet

Optional User Override 1-hr Precipitation	
1.06	inches
1.43	inches
1.66	inches
	inches
2.26	inches
2.60	inches
	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	1.062	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.746	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.935	acre-feet
Total Detention Basin Volume =	5.743	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

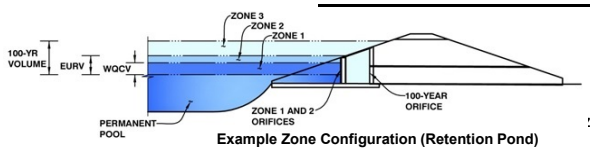
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6523	--	0.50	--	--	--	255	0.006	61	0.001
6524	--	1.50	--	--	--	5,901	0.135	3,083	0.071
6525	--	2.50	--	--	--	27,672	0.635	19,928	0.457
6526	--	3.50	--	--	--	33,774	0.775	50,651	1.163
6527	--	4.50	--	--	--	36,968	0.849	86,022	1.975
6528	--	5.50	--	--	--	40,287	0.925	124,650	2.862
6529	--	6.50	--	--	--	43,747	1.004	166,667	3.826
6530	--	7.50	--	--	--	47,347	1.087	212,214	4.872
6531	--	8.50	--	--	--	51,124	1.174	261,449	6.002
6532	--	9.50	--	--	--	55,067	1.264	314,545	7.221

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: FOUNDERS FILING NO. 24

Basin ID: POND B



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.37	1.062	Orifice Plate
Zone 2 (EURV)	5.45	1.746	Orifice Plate
Zone 3 (100-year)	8.28	2.935	Weir&Pipe (Restrict)
		5.743	Total

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)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	5.50	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	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	2.00	4.00					
Orifice Area (sq. inches)	4.70	4.70	12.00					

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

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.30	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	8.05	N/A	feet
Overflow Weir Front Edge Length =	5.50	N/A	feet	Over Flow Weir Slope Length =	11.34	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)	Grate Open Area / 100-yr Orifice Area =	14.20	N/A	should be ≥ 4
Horiz. Length of Weir Sides =	11.00	N/A	feet	Overflow Grate Open Area w/o Debris =	43.65	N/A	ft^2
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	21.83	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 =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	3.08	N/A	ft^2
Outlet Pipe Diameter =	30.00	N/A	inches	Outlet Orifice Centroid =	0.85	N/A	feet
Restrictor Plate Height Above Pipe Invert =	18.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.77	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

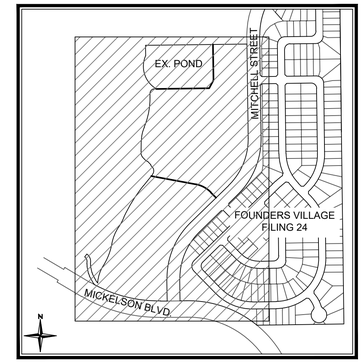
User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.92	feet
Spillway Crest Length =	60.00	feet	Stage at Top of Freeboard =	11.42	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.26	acres
Freeboard above Max Water Surface =	1.00	feet			

Calculated Parameters for Spillway

Routed Hydrograph Results

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) =	0.53	1.07	1.06	1.43	1.66	0.00	2.26	2.60	0.00
Calculated Runoff Volume (acre-ft) =	1.062	2.808	2.343	3.786	4.925	0.000	8.860	11.102	0.000
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	1.060	2.805	2.341	3.782	4.921	#N/A	8.848	11.092	#N/A
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.11	0.30	0.00	0.99	1.32	0.00
Predevelopment Peak Q (cfs) =	0.0	0.0	0.8	7.2	19.7	0.0	64.4	86.5	0.0
Peak Inflow Q (cfs) =	16.7	43.7	36.6	58.7	76.0	#N/A	134.5	167.4	#N/A
Peak Outflow Q (cfs) =	0.5	1.1	1.0	7.4	19.8	#N/A	40.2	43.5	#N/A
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.0	1.0	#N/A	0.6	0.5	#N/A
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	#N/A	Outlet Plate 1	N/A	#N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.4	#N/A	0.9	1.0	#N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	#N/A	N/A	N/A	#N/A
Time to Drain 97% of Inflow Volume (hours) =	38	64	59	65	63	#N/A	58	55	#N/A
Time to Drain 99% of Inflow Volume (hours) =	**40**	67	63	70	69	#N/A	67	66	#N/A
Maximum Ponding Depth (ft) =	3.27	5.26	4.77	5.93	6.44	#N/A	8.22	9.50	#N/A
Area at Maximum Ponding Depth (acres) =	0.74	0.91	0.87	0.96	1.00	#N/A	1.15	1.26	#N/A
Maximum Volume Stored (acre-ft) =	0.981	2.642	2.198	3.257	3.766	#N/A	5.677	7.221	#N/A



KEY MAP

LEGEND:

- EXISTING MINOR CONTOUR (2FT)
- EXISTING MAJOR CONTOUR (10 FT)
- PROPOSED MINOR CONTOUR (2FT)
- PROPOSED MAJOR CONTOUR (10 FT)
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- 100 YR — EXISTING 100 YEAR WATER SURFACE ELEVATION
- PROPOSED DRAINAGE BASIN
- PROPOSED STORM SEWER
- EXISTING FLOW DIRECTION
- ANTICIPATED FUTURE FLOW DIRECTION
- 1 — DESIGN POINT

DRAINAGE BASIN ID — A
BASIN ACREAGE (AC) — 2.30 | 0.18 | 0.52 (C_5 / C_{100})

Redland
WHERE GREAT PLACES BEGIN
720.283.6783 Office
1500 West Canal Court
Littleton, Colorado 80120
REDLAND.COM

LICENSED PROFESSIONAL ENGINEER — 54401 — 05/28/19

DRAWN	EBR
CHECKED	MTP
APPROVED	EBR
PROJECT NO.	17026.002
HORZ. SCALE	1" = 50'
VERT. SCALE	N/A

NOTES

NO.	DATE

FOUNDERS VILLAGE FILING 24 WEST

DRAINAGE MAP

SHEET

DRG-1

I:\2017\17026 — Bella Mesa\CADD\Sheet Sets\17026.002 — Bella Mesa PLD\Drainage\17026.002 — Bella Mesa PLD — SDP Drainage Map_recover.dwg tab: Layout1 Apr 13, 2021 – 7:56am erumney

Phase III Drainage Report

Founders Village Filing 24 – 1st Amendment
CD21-0011

Prepared for:

Fourth Investments, LLC
PO Box 5127
Gypsum, Colorado 81637
(970) 470.2087 voice
Contact: John V. Hill

Prepared by:

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WHERE GREAT PLACES BEGIN

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1500 West Canal Court
Littleton, Colorado 80120
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May 28, 2021
Project No. 17026.002

in a proposed storm sewer main to the west then north before out falling into the existing detention pond. By routing these flows further west before conveying it to the pond Tract B will become a more efficient parcel to develop in the future. The proposed storm sewer will be sized to not only accommodate the flows from the 'C' Basins of Founders Village Filing 24 but also future developed flows from Lot 1 and Tract B. This application does not propose an increase in the current impervious area but will approximate the future impervious values in order to ensure the storm sewer is being designed for future developed use.

Flood Hazard and Drainage Studies Relevant to the Site

Based on the FEMA FIRM, Map 08035C0306G, effective date March 16, 2016, which can be found in Appendix A, the PLD parcel and the future multi-family parcel are located within Zone X (Area of Minimal Flood Hazard) and are not located within a 100-year floodplain. Located in the existing Tract S of Founders Village Filing 24 is Mitchell Gulch which contains a FEMA designated Zone AE floodway. Proposed Tracts A, B, and Lot 1 will not encroach into Mitchell Gulch or the regulated FEMA floodplain.

Soil Type

The Natural Resource Conservation Service (NRCS) soil survey site map indicates that the soil on site is primarily Coni rocky loam (79.9%), whose hydrologic soil group is Type D, having a very slow infiltration rate and Fondis clay loam (20.1%), whose hydrologic soil group is Type C, having a slow infiltration rate. A soil map has been included in Appendix A for reference.

Drainage Basin and Sub-Basins

Major Basins

Based on the Founders Village Filing 24 Rock Canyon Phase III Drainage Report by TCB dated April 2006, the Site lies within major Basins H-1 and H-3. These basins generally flowed northwest to Mitchell Gulch on the west side of the property. Mitchell Gulch outfalls to Cherry Creek approximately two miles downstream of the property. These major Basins were divided into sub-basins in the Approved Report by Core Consultants. The intent of this application is to remain in conformance with the Approved Report and modify the sub-basins west of Mitchell Street to better route runoff around Tract B and ultimately to the existing detention pond.

Sub Basins

Basin A1 (5.08 Acres)

Basin A1 is undeveloped land located within Lot 1 on the west side of Mitchell Street. Generally, runoff from this basin sheet flows to the west and is collected in various ravines that outfall into

Mitchell Gulch. The current overall imperviousness is 2%. This condition will remain until future development will be required to treat and detain the runoff. It is anticipated that the future development will have an overall imperviousness of 70% and the runoff will flow northwest to Design Point 1 where it will be collected and enter the proposed storm sewer. Runoff will then be conveyed north in the storm sewer to the existing detention pond. Basin A1 is anticipated to produce approximately 13.0 cfs in the 5-year event and 29.9 cfs in the 100-year event in the fully developed condition.

$C_5 = 0.61$ $C_{100} = 0.77$

$Q_5 = 13.0$ CFS $Q_{100} = 29.9$ CFS

Basin A2 (8.06 Acres)

Basin A2 is undeveloped land located in Tract B on the west side of Mitchell Street just south of the existing detention pond and Mesa Middle School. Generally, runoff from this basin sheet flows to the north and west. The basin currently contains a swale running from the southeast end of the basin up to the northwestern corner. This swale conveys runoff from the Founders Village Filing 24 development on the east side of Mitchell Street to the existing detention pond.

The current overall imperviousness is 2%. This condition will remain until future development will be required to treat and detain the runoff. It is anticipated that the future development will have an overall imperviousness of 70% and the runoff will flow northwest to Design Point 2 where it will be collected and enter the proposed storm sewer. The anticipated impervious value was provided by the Douglas County School District engineer, the correspondence with the School District engineer can be found in Appendix D. Runoff will then be conveyed north in the storm sewer to the existing detention pond. Basin A2 is anticipated to produce approximately 19.9 cfs in the 5-year event and 45.8 cfs in the 100-year event in the fully developed condition.

$C_5 = 0.61$ $C_{100} = 0.77$

$Q_5 = 19.9$ CFS $Q_{100} = 45.8$ CFS

Basin A3 (2.60 Acres)

Basin A3 is undeveloped land located in Tract B on the west side of Mitchell Street, just east of the existing detention pond and south of Mesa Middle School. Generally, runoff from this basin sheet flows to the west and is collected in the existing detention pond. The current overall imperviousness is 2%. This condition will remain until future development will be required to treat and detain the runoff. It is anticipated that the future development will have an overall imperviousness of 70% and the runoff will flow west to Design Point 3 where it will enter the

existing detention pond. Basin A3 is anticipated to produce approximately 7.8 cfs in the 5-year event and 17.9 cfs in the 100-year event in the fully developed condition.

$C_5 = 0.61$ $C_{100} = 0.77$

$Q_5 = 7.8$ CFS $Q_{100} = 17.9$ CFS

Basin B1 (3.76 Acres)

Basin B1 is undeveloped land located in Lot 1 at the northwest corner of Mitchell Street and Mickelson Boulevard. Generally, runoff from this basin sheet flows to the southwest and into Mitchell Gulch. The current overall imperviousness is 2%. This condition will remain until future development will be required to treat and detain the runoff. Since this basin currently flows away from the existing detention pond, it is anticipated that the future development will provide water quality for this runoff and will over-detain in the existing detention pond so the site as a whole remains at historical release rates. It is also anticipated the overall imperviousness of the site will be 70% and the runoff will flow west to Mitchell Gulch at Design Point 4. Basin B1 is anticipated to produce approximately 8.1 cfs in the 5-year event and 18.6 cfs in the 100-year event in the fully developed condition.

$C_2 = 0.61$ $C_{100} = 0.77$

$Q_2 = 8.1$ CFS $Q_{100} = 18.6$ CFS

Basin B2 (1.46 Acres)

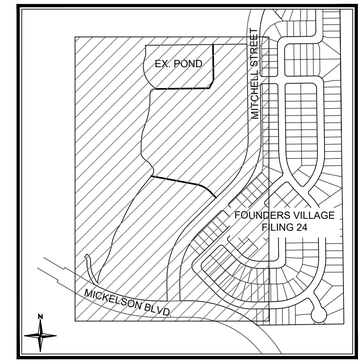
Basin B2 is undeveloped land located in Tract B at the northwest corner of the Site, directly south of the existing detention pond. Generally, runoff from this basin sheet flows to the west and into Mitchell Gulch at Design Point 5. The current overall imperviousness is 2%. This condition will remain, since it is highly unlikely that this basin is developed due to the proximity to Mitchell Gulch and the prevailing existing grades. Basin B2 is anticipated to produce approximately 0.2 cfs in the 5-year event and 4.0 cfs in the 100-year event.

$C_5 = 0.05$ $C_{100} = 0.49$

$Q_5 = 0.2$ CFS $Q_{100} = 4.0$ CFS

Basin C1 (3.32 Acres)

Basin C1 is undeveloped land located in Tract A at the northwest corner of the Site. Generally, runoff from this basin sheet flows into the existing detention pond and outfalls to Mitchell Gulch at Design Point 6. The current overall imperviousness is 2%. This condition will remain, since it is



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- 1 — DESIGN POINT

DRAINAGE BASIN ID — A
BASIN ACREAGE (AC) — 2.30 | 0.18 | 0.52 (C_5 / C_{100})

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PROJECT NO.	17026.002
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VERT. SCALE	N/A

NOTES

NO.	DATE

FOUNDERS VILLAGE FILING 24 WEST

DRAINAGE MAP

SHEET

DRG-1

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MIKELSON BOULEVARD PHASE III DRAINAGE AND EROSION CONTROL REPORT

for

Castlewood Ranch LLC.

David J. Erb
Orchard Pointe, Suite 5550
8480 East Orchard Road
Englewood, Colorado 80111
(303) 740-7557

prepared by

Nolte Associates, Inc.
7000 S. Yosemite Street, Suite 200
Englewood, Colorado 80112
(303) 220-1001

November 1999
Revised May 2000

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
DESIGN STORM: 5-YEAR DEVELOPED

Calc. by: RBM
Chk'd by: TAJ
Date: 10/11/99

LOCATION: CASTLEWOOD RANCH PHASE III DESIGN TOWN OF CASTLE ROCK

STATION	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF					REMARKS Rev 4/24/00
		BASIN	AREA (AC)	COEFF. (C)	Tc (Min.)	C*A	I (in./ hr.)	Q (cfs)	Sum AREA	Sum Tc (min.)	I (in./hr.)	Sum CA	Total Q (cfs)	
	M13	M-10.2A	7.51	0.50	16	3.76	3.18	12.0						
	M14	M-10.2B	17.03	0.50	21	8.52	2.75	23.5	24.54	21	2.75	12.27	33.8	Total runoff includes DP M13
	M15	M-10.2C1	5.92	0.35	14	2.07	3.32	6.9						
	M16	M-10.2C2	29.38	0.50	24	14.69	2.53	37.2	59.84	24	2.53	29.03	73.5	Total runoff includes DP M14 and M15
	M20	M-9A	59.48	0.40	19	23.91	2.88	68.8	119.32	24	2.53	52.94	134.0	Total into 2-60" Culvert (DP M17+M16)
	M21	M-9B	5.27	0.60	15	3.18	3.26	10.4						
	M22	M-9C	1.67	0.88	12	1.47	3.64	5.4	6.94	15	3.26	4.65	15.2	Total into inlet and pipe at DP M22
	M23	M-9D	2.99	0.74	14	2.20	3.31	7.3	6.47	14	3.31	4.40	14.6	Total into inlet at DP M24
	M24	M-9E	3.48	0.63	14	2.20	3.34	7.3	13.40	15	3.26	9.05	29.5	Total in pipe at DP M24
			2.88			1.30		4.3						
	W20A	W-3A4A	2.66	0.45	14	1.20	3.32	4.0						15' on-grade inlet
	W21A	W-3A4B	0.43	0.70	5	0.30	4.91	1.5		1.5+	16 co.	=	3.1	Flows down Mitchell Dr.
	M29	M-7C1	1.36	0.69	9	0.94	3.95	3.7						Flows down Milbridge Ave.
	M30	M-7C2	6.55	0.45	15	2.95	3.29	9.7	7.91	15	3.29	3.88	12.8	Total runoff includes DP M29
	M31	M-7C3	20.13	0.59	13	11.84	3.42	40.5	28.04	20	2.85	15.72	44.7	Total runoff includes DP M30
	M32	M-7C4	2.37	0.63	11	1.48	3.66	5.4	30.40	20	2.85	17.20	48.9	Total runoff includes DP M31
	M33	M-7C5	5.31	0.56	16	2.97	3.12	9.3	35.71	21	2.77	20.17	55.9	Total in 48" (DP M33+M32)
	M34	M-7C6	1.13	0.65	10	0.74	3.94	2.9	2.98	10	3.87	1.96	7.6	Total into inlet (DP M34 and M35)
	M35	M-7C7	1.85	0.66	10	1.22	3.87	4.7	38.69	23	2.64	22.13	58.4	Total in pipe from center of road to DP M36
	M36	M-7C8	3.79	0.39	14	1.47	3.41	5.0	5.32	14	3.41	2.36	8.0	Total into inlet (DP M36 and M37)
	M37	M-7C9	1.53	0.58	10	0.89	3.87	3.4	44.00	23	2.64	24.49	64.6	Total into Mikelson Pond (DP M29-M37)

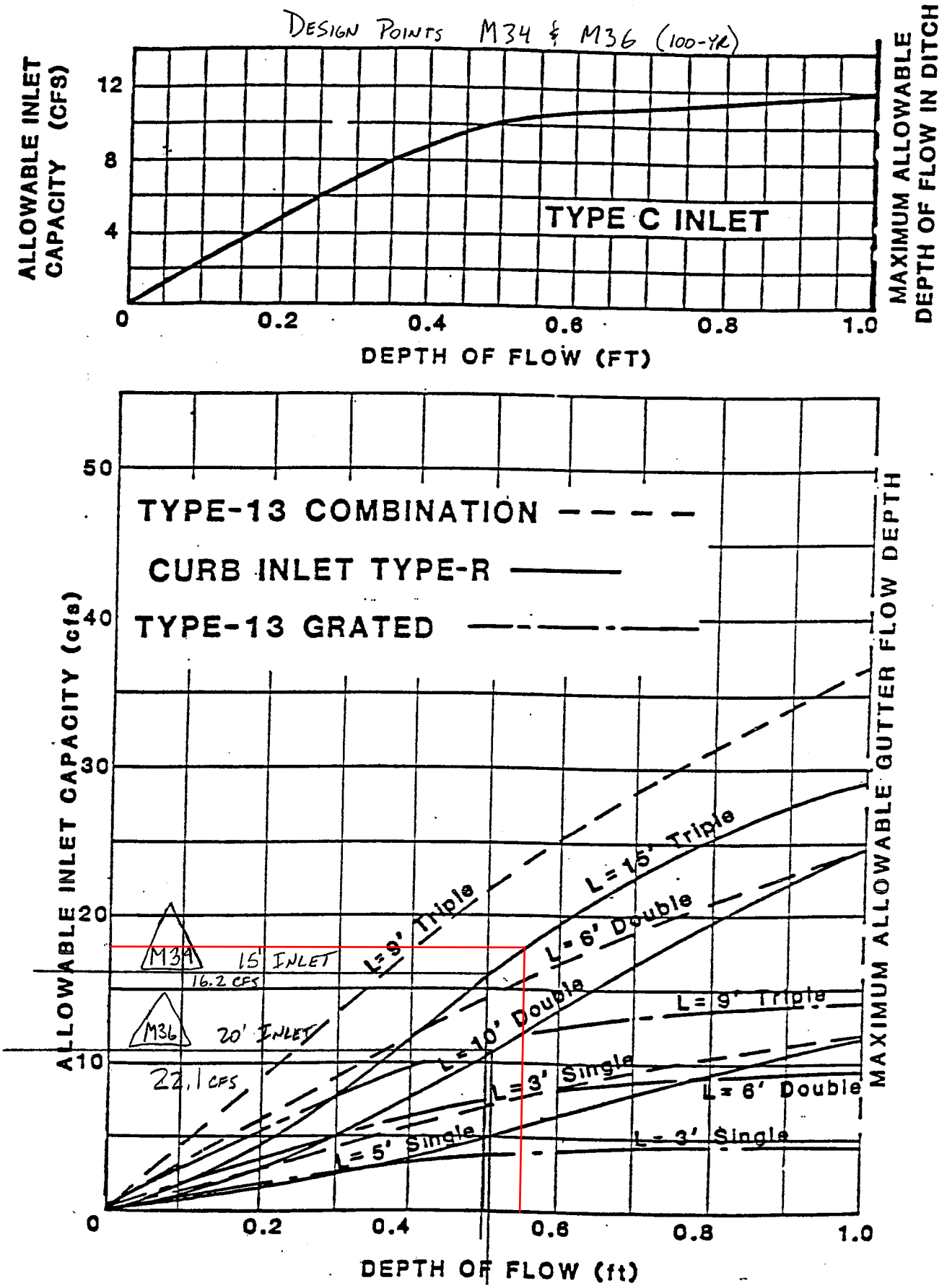
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
DESIGN STORM: 100-YEAR DEVELOPED

Calc. by: RBM
Chk'd by: TAN
Date: 10/11/99

LOCATION: CASTLEWOOD RANCH PHASE III DESIGN TOWN OF CASTLE ROCK

STATION	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF					REMARKS
		BASIN	AREA (AC)	COEFF. (C)	Tc (Min.)	C*A	I (in./ hr.)	Q (cfs)	Sum AREA	Sum Tc (min.)	I (in./hr.)	Sum CA	Total Q (cfs)	
	M13	M-10.2A	7.51	0.70	16	5.26	5.79	30.4						
	M14	M-10.2B	17.03	0.70	21	11.92	5.01	59.7	24.54	21	5.01	17.18	86.0	Total runoff includes DP M13
	M15	M-10.2C1	5.92	0.60	14	3.55	6.04	21.4						
	M16	M-10.2C2	29.38	0.70	24	20.57	4.60	94.7	59.84	24	4.60	41.30	190.1	Total runoff includes DP M14 and M15
	M20	M-9A	59.48	0.60	19	35.47	5.23	185.6	119.32	24	4.60	76.76	353.3	Total into 2-60" Culvert (DP M17+M16)
	M21	M-9B	5.27	0.72	15	3.78	5.94	22.4						
	M22	M-9C	1.67	0.93	12	1.56	6.62	10.3	6.94	15	5.94	5.34	31.7	Total into inlet and pipe at DP M22
	M23	M-9D	2.99	0.82	14	2.45	6.02	14.7	6.47	14	6.02	5.02	30.2	Total into inlet at DP M24
	M24	M-9E	3.48	0.74	14	2.57	6.06	15.6	13.40	15	5.94	10.36	61.5	Total in pipe at DP M24
			2.88			1.73		10.4						
	W20A	W-3A4A	2.66	0.60	14	1.60	6.04	9.6						15' on-grade inlet
	W21A	W-3A4B	0.43	0.83	5	0.36	8.93	3.2	3.2 +	3.7 c.o.	=		6.9	Flows down Mitchell Dr.
	M29	M-7C1	1.36	0.82	9	1.11	7.18	8.0						Flows down Milbridge Ave.
	M30	M-7C2	6.55	0.60	15	3.93	5.98	23.5	7.91	15	5.98	5.04	30.2	Total runoff includes DP M29
	M31	M-7C3	20.13	0.75	13	15.15	6.22	94.2	28.04	20	5.17	20.19	104.4	Total runoff includes DP M30
	M32	M-7C4	2.37	0.78	11	1.85	6.66	12.3	30.40	20	5.17	22.03	114.0	Total runoff includes DP M31
	M33	M-7C5	5.31	0.68	16	3.63	5.68	20.6	35.71	21	5.04	25.66	129.3	Total in 48" (DP M33+M32)
	M34	M-7C6	1.13	0.80	10	0.90	7.15	6.4	2.98	10	7.03	2.31	16.2	Total into inlet (DP M34 and M35)
	M35	M-7C7	1.85	0.76	10	1.41	7.03	9.9	38.69	23	4.79	27.97	134.1	Total in pipe from center of road to DP M36
	M36	M-7C8	3.79	0.64	14	2.42	6.20	15.0	5.32	14	6.20	3.57	22.1	Total into inlet (DP M36 and M37)
	M37	M-7C9	1.53	0.75	10	1.15	7.03	8.1	44.00	23	4.79	31.54	151.2	Total into Mikelson Pond (DP M29-M37)

A8



BY: RBD	TOWN OF CASTLE ROCK PUBLIC WORKS	STD. DWG NO.	
APPROVED BY:	ALLOWABLE INLET CAPACITY - SUMP CONDITIONS – ALL INLETS	FIGURE 803	A20
DATE: 4/11/98			

SUMMARY RUNOFF TABLE

DESIGN PT.	TOTAL AREA (ACRES)	TOTAL Q_5 (CFS)	TOTAL Q_{100} (CFS)	DESIGN PT.	TOTAL AREA (ACRES)	TOTAL Q_5 (CFS)	TOTAL Q_{100} (CFS)
M13	7.51	12.0	30.4	W21A	0.43	3.1	6.9
M14	24.54	33.8	86.0	M29	1.36	3.7	8.0
M15	5.92	6.9	21.4	M30	7.91	12.8	30.2
M16	59.84	73.5	190.1	M31	28.04	44.7	104.4
M20	119.32	134.0	353.3	M32	30.40	48.9	114.0
M21 & M22	6.94	15.2	31.7	M33	35.71	55.9	129.3
M23 & M24	13.4	29.5	61.5	M34 & M35	38.69	58.4	134.1
W20A	2.88	4.3	10.3	M36 & M37	44.00	64.6	151.2

LEGEND:

- BASIN BOUNDARY
- REVISED BASIN BOUNDARY
- M-10L (112.3 | 0.33 | 0.78) — BASIN DESIGNATION; BASIN AREA; 5 YEAR RUNOFF COEFFICIENT; 100 YEAR RUNOFF COEFFICIENT
- W-3A4A (2.88 | 0.45 | 0.80) — REVISED BASIN
- 11 — DESIGN POINT
- FLOW ARROW

NOLTE

0 100 200 400

1 inch = 200 ft.

BK.1309 PG.577
REC. NO. 9561922

BK.1087 PG.396
REC. NO. 9233629

MIKELSON BOULEVARD DETENTION POND

M-7C7 (1.85 | 0.66 | 0.76) — SDIN # 1, 15' TYPE "R" INLET
M-7C9 (1.53 | 0.58 | 0.75) — SDIN # 2, 20' TYPE "R" INLET
M-7C6 (1.13 | 0.65 | 0.80)
M-7C8 (3.79 | 0.39 | 0.64)
M-7C4 (2.37 | 0.63 | 0.78)
M-7C5 (5.31 | 0.56 | 0.68)
M-7C3 (20.13 | 0.59 | 0.75)
M-7C2 (6.55 | 0.45 | 0.60)
M-7C1 (1.36 | 0.69 | 0.82)
M-9D (2.99 | 0.74 | 0.82)
M-9B (5.27 | 0.60 | 0.72)
M-9A (59.48 | 0.40 | 0.60)
M-9E (3.48 | 0.63 | 0.74)
M-9C (1.67 | 0.88 | 0.93)
M-10.2C2 (29.38 | 0.50 | 0.70)
M-10.2B (17.03 | 0.50 | 0.70)
M-10.2A (7.51 | 0.50 | 0.70)
W-3A4B (0.43 | 0.70 | 0.83)
W-3A4A (2.88 | 0.45 | 0.80)
W-3A4A (2.66 | 0.45 | 0.68)

48" RCP; 24" PLUG; 12" MIN. DIA. UNIFORM GROUTED BOULDERS; TYPE "L" RIP-RAP; 6" MIN. DIA. UNIFORM GROUTED BOULDERS; 2-60" CMP CULVERT C-M1; 30" RCP; 18" RCP; SEDIMENT TRAP

SDIN # 3, 15' TYPE "R" INLET

SDIN # 5, 30' TYPE "R" INLET

SDIN # 4, 30' TYPE "R" INLET

1' FREEBOARD; 0.6'-1.16'; CHANNEL CH-M2, SLOPE = 1.5%-1.8%

SECTION A-A
N.T.S.

MITCHELL GULCH

MIKELSON BOULEVARD

TURNSTONE AVE.

MITCHELL DR.

BRANTLY AVENUE

MILL BRIDGE COURT

MILL BRIDGE AVENUE

FUTURE PA 28

FUTURE PA 38A

FUTURE PA 39

FUTURE PA 44A

FUTURE SCHOOL SITE

FOUNDERS VILLAGE FILING NO. 7

A-1

W. RULE

SUFFOLK CIRCLE

ROSEDALE CIRCLE

KINGSFIELD STREET

BONNESS STREET

REGENCY COURT

MEDFORD COURT

RANDOLPH AVENUE

TEABERRY AVENUE

LANTERN TRAIL

SEE SHEET A2 OF THE APPENDIX FOR OFFSITE AREAS.

DATE PRINTED
APR 27 2000
NOLTE & ASSOC.

1	RBM	04-26-00	Basin W-3A4A increased in size

CAUTION: The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

XREFS: BASE.dwg...1EXCN.dwg...1EXPN.dwg...11PRUT.dwg...11EXUT.dwg...11PRPN.dwg...11TB.dwg...11PRCN.dwg...

NOLTE
BEYOND ENGINEERING
7000 S. YOSEMITE ST., SUITE 200 ENGLEWOOD, CO. 80112
303.220.1001 TEL 303.220.9001 FAX WWW.NOLTE.COM

CASTLEWOOD RANCH
MIKELSON BOULEVARD
DRAINAGE EXHIBIT

PREPARED FOR: CASTLEWOOD RANCH LLC

HORIZONTAL SCALE	VERTICAL SCALE
1" = 200'	N.T.S

DESIGNER	DRAFTER	CHECKED
RBM	HQD	GVM

DRAWING NAME	PLOTTING DATE
11DR1.DWG	04/25/00

PATH: N:\Dv1600\CIVIL\Cadd\PH 11\

SHEET DR1 OF 1 SHEETS

JOB NUMBER DV1611

Ref #2025040051, Date: 8/27/2025 8:10 AM, Pages: 1 of 9 ,RECORDING $43.00
Electronically Recorded Douglas County, CO. Sheri Davis, Clerk and Recorder

PERMANENT STORMWATER DRAINAGE EASEMENT AGREEMENT

(Tract A, Bella Mesa Filing No.1)

DATE: July 30, 2025.

GRANTOR: **BELLA MESA METROPOLITAN DISTRICT**, a quasi-municipal corporation and political subdivision of the State of Colorado, c/o Icenogle Seaver Pogue, P.C., 4725 S. Monaco Street, Suite 360, Denver CO 80237.

GRANTEE: **TOWN OF CASTLE ROCK**, a home rule municipal corporation, 100 N. Wilcox Street, Castle Rock, Colorado 80104.

RECITALS

A. Grantee has determined that it needs to acquire a non-exclusive permanent stormwater drainage easement in, through, across, over, and under property owned by Grantor.

B. Grantor and Grantee have agreed to the terms and consideration for the grant of the Easement, which are hereinafter set forth in this Permanent Stormwater Drainage Easement Agreement (the "Agreement").

GRANT

Grantor, as its interests may appear and in consideration of the sum of ten dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is acknowledged by Grantor, hereby grants to Grantee, its successors and assigns, a permanent, non-exclusive, stormwater drainage easement (the "Easement") in, through, across, over, and under certain property located in Douglas County, Colorado, as more particularly described in the legal description and map attached hereto as ***Exhibit A*** (the "Easement Property"), for the uses set forth below.

TERMS

1. Grantor warrants to Grantee that, as the record owner of the Easement Property, Grantor has the requisite power and lawful authority to grant this Easement, free of prior liens and encumbrances which would preclude the Grantee from utilizing the site for its stated purpose, as reasonably determined by Grantee.

2. The Easement is a non-exclusive permanent easement to allow Grantee, its employees, contractors, and agents the right to enter, re-enter, occupy, and use the Easement Property to construct, lay, install, inspect, monitor, maintain, repair, renew, substitute, change the size of, replace, remove, and operate, from time to time, underground and surface stormwater drainage facilities and all related underground and surface appurtenances, of such size and capacity as necessary or required by Grantee.

3. Pursuant to the Town of Castle Rock Stormwater Drainage Design and Technical Criteria Manual, as amended from time to time (the "Town Regulations"), it is the responsibility

of Grantor, as the owner of the Easement Property, to maintain stormwater drainage facilities and related appurtenances located on the Easement Property, except as may otherwise be provided by written agreement between Grantor and Grantee. Should Grantor fail to adequately maintain such facilities and appurtenances, Grantee, its employees, contractors and agents may undertake any maintenance and/or repairs it deems necessary to correct any damage caused by Grantor's failure. Grantor shall reimburse Grantee for the actual costs of such maintenance and/or repairs (including all actual costs for labor, equipment and materials and applicable fees pursuant to the Town Regulations).

4. All activity by Grantee, its employees, contractors, and agents shall be maintained within the boundaries of the Easement Property and, upon completion of any construction or other operations which disturb the surface of the Easement Property, Grantee will restore the general surface of the ground as nearly as may reasonably be done to its to its pre-existing grade and condition, except as necessarily modified to accommodate Grantee's facilities.

5. Grantee shall exercise its rights under this Agreement in a manner that does not materially interfere with the use of, or access to, the Easement Property by Grantor, its successors and assigns.

6. Grantor retains the right to the undisturbed use and occupancy of the Easement Property, insofar as such use and occupancy are consistent with and do not materially interfere with Grantee's use and enjoyment of the Easement.

7. Grantee shall have and exercise the right of subjacent and lateral support to whatever extent is necessary or desirable for the full, complete and unmolested enjoyment of the rights herein granted. Grantor shall neither take nor permit any action which would materially impair the lateral or subjacent support for any of Grantee's underground facilities or appurtenances. Grantor shall not modify the earth cover over any of Grantee's underground facilities or appurtenances without advance written authorization from Grantee.

8. Nothing in this Agreement shall constitute a waiver or release by Grantor or Grantee of any immunity or limitation on liability under the Colorado Governmental Immunity Act, Section 24-10-101, et seq., C.R.S.

9. Any breach of this Agreement shall give rise to the non-breaching party's right to bring an action against the breaching party for injunctive or other equitable relief and/or damages. In the event of such action, the prevailing party shall be entitled to recover its reasonable attorney's fees from the other party.

10. This Agreement runs with the land and shall continue in full force and effect unless sooner terminated by separate agreement between Grantor, its successors and assigns, and Grantee, its successors and assigns.

11. Any notice, demand or election under this Agreement shall be in writing and shall be deemed to have been given for all purposes if sent by registered or certified mail, postage and fees prepaid, addressed as follows:

If to Grantor:	Bella Mesa Metropolitan District c/o Icenogle Seaver Pogue, P.C. 4725 S. Monaco Street, Suite 360 Denver, CO 80237
If to Grantee:	Town of Castle Rock – Castle Rock Water 175 Kellogg Court Castle Rock, CO 80109 Attn: Director of Castle Rock Water
With a copy to:	Town of Castle Rock 100 N. Wilcox Street Castle Rock, CO 80104 Attn: Town Attorney

or as otherwise provided by notice given as set forth in this paragraph. All notices, demands or elections given in such manner shall be effective on the date of receipt thereof. The address to which notices are to be sent may be changed by providing notice as set forth in this paragraph.

12. This Agreement supersedes all prior agreements and understandings and sets forth the entire agreement between Grantor and Grantee with respect to the subject matter hereof. Any modification, amendment or extension must be in writing signed by both Grantor and Grantee.

13. This Agreement shall be governed and construed in accordance with the laws of the State of Colorado.

14. Venue for any legal action relating to this Agreement shall lie in the District Court in and for the County of Douglas, Colorado.

15. This Agreement shall be recorded by Grantee with the Douglas County Clerk and Recorder and shall be binding and enforceable upon the assigns and successors of the parties.

Attached Exhibit:

Exhibit A – Easement Property

(Remainder of page intentionally left blank)

IN WITNESS WHEREOF, Grantor and Grantee have executed this instrument as of the date first written above.

GRANTOR:

BELLA MESA METROPOLITAN DISTRICT

By: _____

Its: President

STATE OF TEXAS)
) **ss.**
COUNTY OF COLLIN)

The foregoing instrument was acknowledged before me this 30th day of June, 2025, by John V. Hill, in their capacity as President of the Bella Mesa Metropolitan District.

Witness my official hand and seal.
My commission expires: 5/11/27

(SEAL)

SHARON J GOTTING
Notary ID #125619302
My Commission Expires
May 11, 2027

_____
Notary Public

GRANTEE: DS

ATTEST:

DocuSigned by:
Lisa Anderson
298A8A4EDEE34AF...

Lisa Anderson, Town Clerk

TOWN OF CASTLE ROCK

Signed by:
David L. Corliss
1BB5457CEE75414...

David L. Corliss, Town Manager

Approved as to form:

DocuSigned by:
Michael J. Hyman
E7347E32A6794D1...

Michael J. Hyman, Town Attorney

Approved as to content:

Signed by:
Mark Marlowe
FEA6D2E651B241D...

Mark Marlowe, Director, Castle Rock Water

STATE OF COLORADO)
) **ss.**
COUNTY OF DOUGLAS)

The foregoing instrument was acknowledged before me this 12th day of August, 2025, by David L. Corliss, in his capacity as Town Manager, and Lisa Anderson, in her capacity as the Town Clerk, of the Town of Castle Rock.

Witness my official hand and seal.
My commission expires: 9/30/2028 DAN#20084033388-338555

(SEAL) DS

DocuSigned by:
2C2E9A3FF54D4A3...

Notary Public

SHANNON EKLUND
NOTARY PUBLIC
STATE OF COLORADO
Notary ID: 20084033388
My commission expires 9/30/2028

EXHIBIT A
EASEMENT PROPERTY

Tract A, Bella Mesa Filing No.1, recorded on November 30, 2021, at Reception No. 2021132396 in the records of the Clerk and Recorder for the County of Douglas, State of Colorado

BELLA MESA FILING NO. 1

A REPLAT OF TRACTS I, J, K, L, M, N, O, P, Q, AND R, FOUNDERS VILLAGE FILING NO. 24,
BEING A PART OF THE EAST HALF OF SECTION 8, TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.
24.564 ACRES – PL21-0010

PURPOSE

THE PURPOSE OF THIS REPLAT IS TO REVISE AS SHOWN ON SHEET 2 OF 3.

PROPERTY DESCRIPTION

A PARCEL OF LAND BEING ALL OF TRACTS I, J, K, L, M, N, O, P, Q, AND R, FOUNDERS VILLAGE FILING NO. 24 RECORDED UNDER RECEPTION NO. 2006064806 OF THE RECORDS OF THE DOUGLAS COUNTY CLERK AND RECORDER'S OFFICE AND LOCATED IN THE EAST HALF OF SECTION 8, TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO

CONTAINING AN AREA OF 24.564 ACRES, (1,070,028 SQUARE FEET), MORE OR LESS.

CERTIFICATE OF DEDICATION AND OWNERSHIP

THE UNDERSIGNED, BEING ALL THE OWNERS, MORTGAGEES, AND LIENHOLDERS OF CERTAIN LANDS IN THE TOWN OF CASTLE ROCK, DOUGLAS COUNTY, COLORADO, DESCRIBED HEREON HAVE LAID OUT, PLATTED, AND SUBDIVIDED THE SAME INTO 3 TRACTS, AS SHOWN ON THIS AMENDED PLAT UNDER THE NAME AND STYLE OF BELLA MESA FILING NO. 1. THE UNDERSIGNED HEREBY DEDICATE TO THE TOWN OF CASTLE ROCK FOR PURPOSES OF OWNERSHIP AND MAINTENANCE ALL UTILITY EASEMENTS AS DESCRIBED AND SHOWN HEREON.

THE UNDERSIGNED HEREBY FURTHER DEDICATE TO THE PUBLIC, UTILITIES AND CABLEVISION THE RIGHT TO INSTALL, MAINTAIN AND OPERATE MAINS, TRANSMISSION LINES, SERVICE LINES, STREET LIGHTS, CABLE TELEVISION LINES AND APPURTENANCES TO PROVIDE SUCH UTILITY, COMMUNICATION AND CABLE TELEVISION SERVICES WITHIN THIS SUBDIVISION, OR PROPERTY CONTIGUOUS THERETO UNDER, ALONG AND ACROSS PUBLIC ROADS AS SHOWN ON THIS PLAT AND ALSO UNDER, ALONG AND ACROSS THOSE UTILITY EASEMENTS AS DESCRIBED AND IDENTIFIED FOR SPECIFIC USES HEREON.

OWNERSHIP CERTIFICATE

FOURTH INVESTMENT USA, LLC, A COLORADO LIMITED LIABILITY COMPANY

BY: _____
MAXINE HEFFERL

AS: ASSET VICE PRESIDENT

NOTARY CERTIFICATE

STATE OF COLORADO)
) SS
COUNTY OF Arapahoe)

SUBSCRIBED AND SWORN TO BEFORE ME THIS 7th DAY OF October 2021

BY Judith M Pamplin

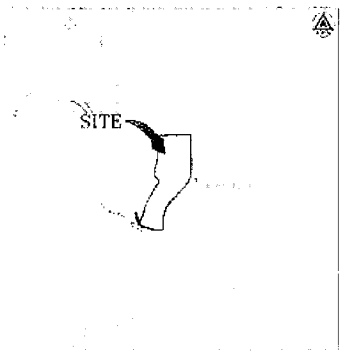
AS ASSET VICE PRESIDENT OF FOURTH INVESTMENT USA LLC, A COLORADO LIMITED LIABILITY COMPANY

WITNESS MY HAND AND OFFICIAL SEAL

NOTARY PUBLIC Judith M Pamplin

MY COMMISSION EXPIRES 11/27/2025

JUDITH M PAMPLIN
NOTARY PUBLIC
STATE OF COLORADO



VICINITY MAP
Scale: 1" = 1000'

SHEET INDEX

SHEET 1 – COVER SHEET

SHEET 2 – EASEMENTS TO BE ABANDONED

SHEET 3 – LINE MAP OVERALL & DATA

OWNERS

FOURTH INVESTMENT USA LLC
C/O INTERNATIONAL CAPITAL INC.
17130 Dallas Parkway Suite 240
Dallas, Texas 75248

SURVEYOR

AZTEC CONSULTANTS, INC.
300 East Mineral Avenue, Suite 1
Littleton, Colorado 80122
303-713-1898

SURVEYOR'S CERTIFICATE

I, ANTHONY K. PEALL, A DULY LICENSED PROFESSIONAL LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THIS AMENDED PLAT TRULY AND CORRECTLY REPRESENTS THE RESULTS OF A SURVEY MADE ON FEBRUARY 11, 2016 BY ME OR UNDER MY DIRECT SUPERVISION AND THAT ALL MONUMENTS EXIST AS SHOWN HEREON; THAT MATHEMATICAL CLOSURE ERRORS ARE LESS THAN 1:10,000 (SECOND ORDER); AND THAT SAID AMENDED PLAT HAS BEEN PREPARED IN FULL COMPLIANCE WITH ALL APPLICABLE LAWS OF THE STATE OF COLORADO DEALING WITH MONUMENTS, SUBDIVISIONS, OR SURVEYING OF LAND AND ALL APPLICABLE ORDINANCES, WITHIN MY CONTROL OF THE TOWN OF CASTLE ROCK, HEREIN, IN SPECIFICATIONS.

ANTHONY K. PEALL, LICENSED PROFESSIONAL LAND SURVEYOR
COLORADO P.L.S. NO. 38530
FOR AND ON BEHALF OF AZTEC CONSULTANTS INC.

NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

NOTICE: PER THE STATE OF COLORADO BOARD OF LICENSURE FOR ARCHITECTS, PROFESSIONAL ENGINEERS, AND PROFESSIONAL LAND SURVEYORS RULE 1.6.8.2 THE WORD "CERTIFY" AS USED HEREON MEANS AN EXPRESSION OF PROFESSIONAL OPINION AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE EXPRESSED OR IMPLIED. THE SURVEY REPRESENTED HEREON HAS BEEN PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE AND IS BASED UPON MY KNOWLEDGE, INFORMATION AND BELIEF.

STATEMENT OF DIRECTOR OF DEVELOPMENT SERVICES APPROVAL

THIS AMENDED PLAT WAS APPROVED BY THE DIRECTOR OF DEVELOPMENT SERVICES OF THE TOWN OF CASTLE ROCK, COLORADO, THIS 14th DAY OF October 2021

DIRECTOR OF DEVELOPMENT SERVICES

GENERAL NOTES:

1. STEWART TITLE GUARANTY COMPANY COMMITMENT ORDER NO. 21000310.566 WITH AN EFFECTIVE DATE OF MARCH 22, 2021 AT 5:30 P.M. WAS RELIED UPON FOR RECORD INFORMATION REGARDING RIGHTS-OF-WAY, EASEMENTS AND ENCUMBRANCES. THIS SURVEY DOES NOT REPRESENT A TITLE SEARCH BY AZTEC CONSULTANTS, INC. TO DETERMINE OWNERSHIP, RIGHTS-OF-WAY, EASEMENTS OR OTHER MATTERS OF PUBLIC RECORD.
2. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT, OR LAND BOUNDARY MONUMENT OR ACCESSORY COMMITS A CLASS 2 MISDEMEANOR PURSUANT TO STATE STATUTE 18-4-508 C.R.S.
3. BASIS OF BEARINGS: BEARINGS ARE BASED ON THE SOUTH LINE OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 8 TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN ASSUMED TO BEAR SOUTH 88°36'05" WEST, A DISTANCE OF 1322.91 FEET BETWEEN THE MONUMENTS SHOWN HEREON.
4. [illegible]
5. DISTANCES ON THIS PLAT ARE GROUND DISTANCES EXPRESSED IN U.S. SURVEY FEET AND DECIMALS THEREOF. A U.S. SURVEY FOOT IS DEFINED AS EXACTLY 1200/3937 METERS.
6. BASED ON A GRAPHICAL REPRESENTATION OF FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) NO. 08035C0305G WITH A MAP REVISED DATE OF MARCH 16, 2016, THE SUBJECT PROPERTY LIES WITHIN "OTHER AREAS ZONE X" WHICH IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.
7. THE TOWN OF CASTLE ROCK HEREBY ABANDONS CERTAIN SITE DISTANCE, UTILITY, DRAINAGE AND ACCESS EASEMENTS AND ANY EASEMENTS WITHIN TRACTS P, Q, AND R AS DEDICATED TO THE TOWN ON THE FOUNDERS VILLAGE FILING NO. 24 PLAT RECORDED UNDER RECEPTION NO. 2006064806 OF THE DOUGLAS COUNTY, COLORADO RECORDS, AS DEPICTED HEREIN.
8. MONUMENTS, ORNAMENTAL COLUMNS, WINDOW WELLS, COUNTERFORTS, PATIOS, DECKS, RETAINING WALLS AND THEIR COMPONENTS ARE NOT PERMITTED TO ENCROACH INTO UTILITY EASEMENTS.
9. TRACT B IS TO BE DEDICATED TO THE TOWN OF CASTLE ROCK BY SEPARATE DOCUMENT AFTER THE RECORDING OF THIS PLAT.

TITLE CERTIFICATE

I, LAURA KIHNE, AN AUTHORIZED REPRESENTATIVE OF STEWART TITLE GUARANTY COMPANY, A TITLE INSURANCE COMPANY LICENSED TO DO BUSINESS IN THE STATE OF COLORADO, HAVE MADE AN EXAMINATION OF THE PUBLIC RECORDS AND STATE THAT ALL OWNERS, MORTGAGEES AND LIENHOLDERS OF THE PROPERTY ARE LISTED IN THE CERTIFICATION OF OWNERSHIP AND DEDICATION.

SIGNED THIS 14th DAY OF October 2021

BY: _____ OF STEWART TITLE GUARANTY COMPANY AS AN AUTHORIZED REPRESENTATIVE

NOTARY CERTIFICATE

STATE OF COLORADO)
) SS
COUNTY OF Denver)

SUBSCRIBED AND SWORN TO BEFORE ME THIS 14th DAY OF October 2021

BY: Laura Kihne OF STEWART TITLE GUARANTY COMPANY AS AN AUTHORIZED REPRESENTATIVE

WITNESS MY HAND AND OFFICIAL SEAL

MY COMMISSION EXPIRES _____

NOTARY _____

STATEMENT OF TOWN APPROVAL AND ACCEPTANCE

ON BEHALF OF THE TOWN COUNCIL OF THE TOWN OF CASTLE ROCK, COLORADO, I HEREBY CERTIFY THAT THIS AMENDED PLAT WAS APPROVED IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS AND THAT THE DEDICATIONS ON THIS AMENDED PLAT ARE HEREBY ACCEPTED BY THE TOWN.

ATTEST: _____
TOWN CLERK
10-19-2021
DATE

_____
MAYOR, TOWN OF CASTLE ROCK
10-19-2021
DATE

DOUGLAS COUNTY CLERK AND RECORDER'S CERTIFICATE

THIS AMENDED PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK AND RECORDER OF DOUGLAS COUNTY AT 12:36 PM ON THE 30th DAY OF November, 2021 AT RECEPTION NO. 2021132396

DOUGLAS COUNTY CLERK AND RECORDER

BY: _____
DEPUTY

BELLA MESA FILING NO. 1 – LAND SUMMARY TABLE

PARCEL NAME	SQ.FT.	ACREAGE	USE	OWNER / MAINTENANCE
TRACT A	142,849	3.279	OPEN SPACE, DRAINAGE	FOURTH INVESTMENT, LLC
TRACT B	234,654	10.788	FUTURE SCHOOL SITE	TOWN OF CASTLE ROCK
TRACT C	692,524	15.897	FUTURE DEVELOPMENT	FOURTH INVESTMENT, LLC
BELLA MESA FILING NO. 1	1,070,028	24.564		

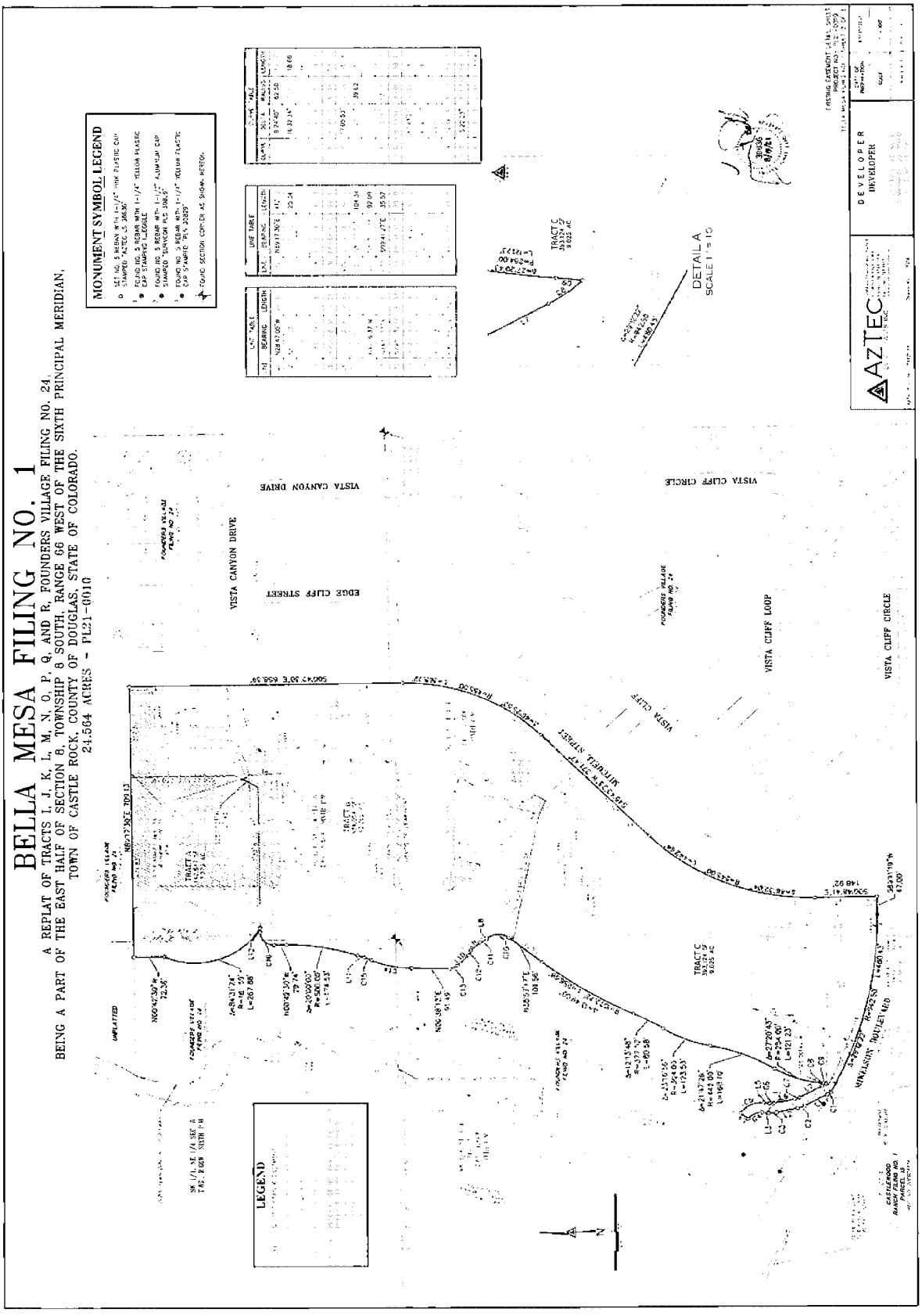
COVER SHEET
PROJECT NO: PL21-0010
BELLA MESA FILING NO. 1 SHEET 1 OF 3

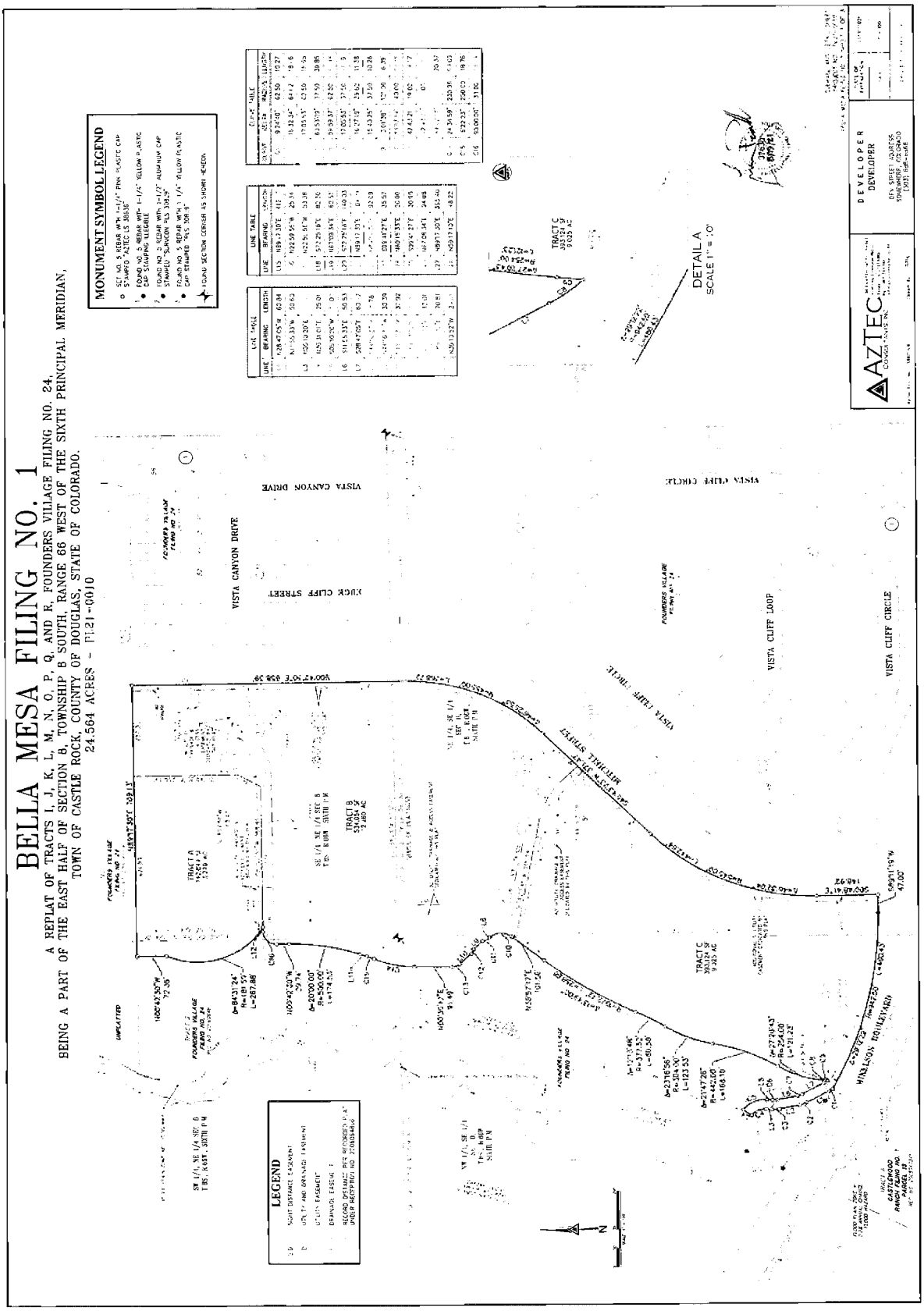
AZTEC CONSULTANTS, INC. [illegible]

LAST REVISED 08/19/2021 Field Book No. FB[illegible] Drawn By: RBA

DEVELOPER
DEVELOPER
NEW STREET ADDRESS
SOMEWHERE, COLORADO
(303) 688-9668

DATE OF PREPARATION: 08/30/2021
SCALE: N/A
SHEET 1 OF 3



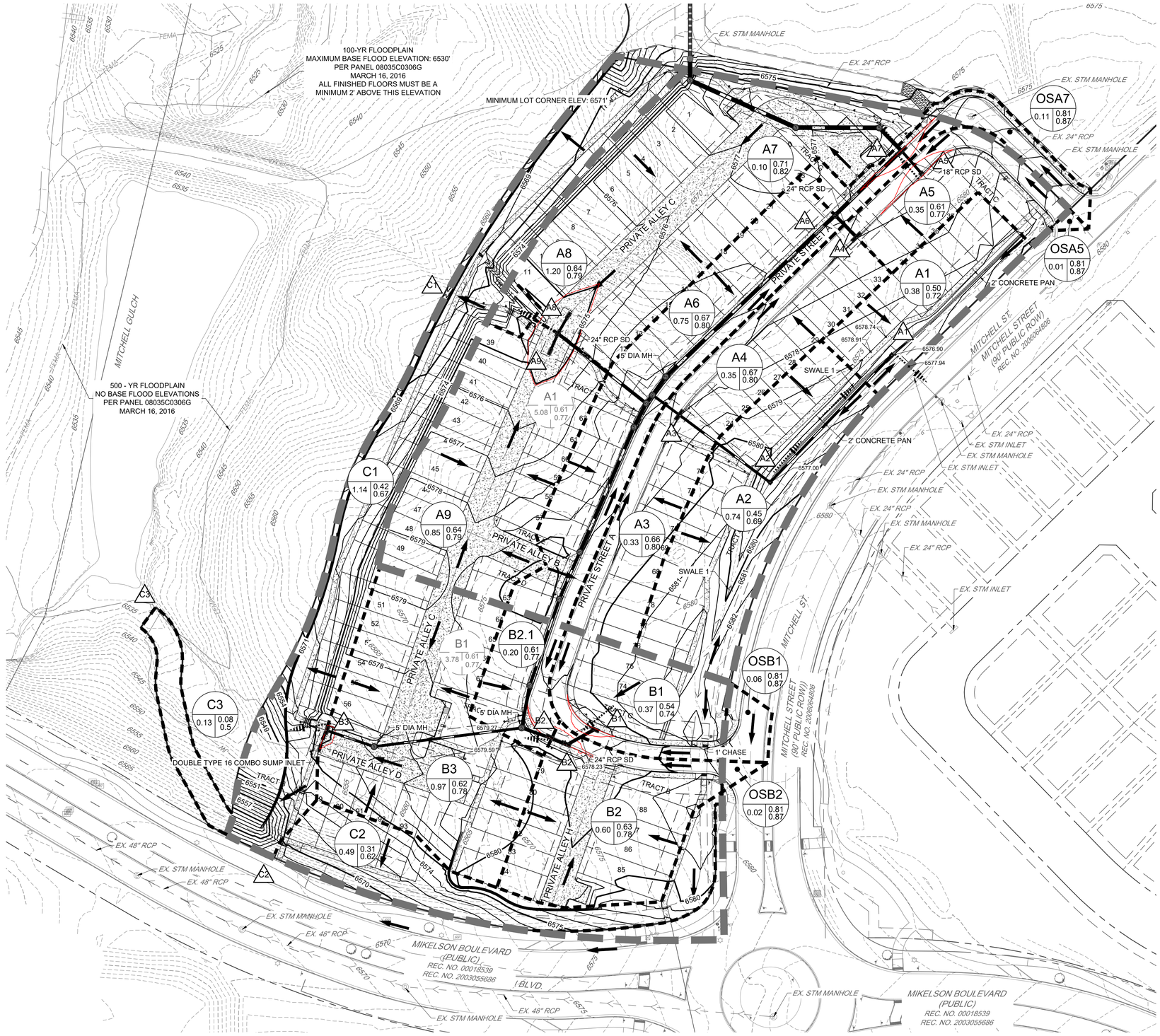


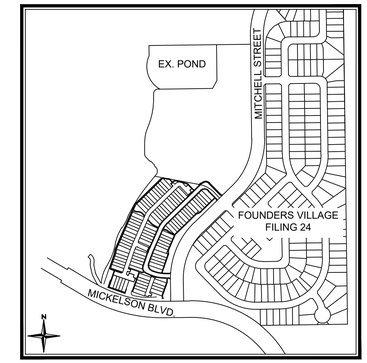
Appendix E - Drainage Maps

SITE DEVELOPMENT PLAN

BELLA MESA SOUTH

LOCATED IN THE SOUTHEAST QUARTER SECTION 8,TOWNSHIP 8 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
TOWN OF CASTLE ROCK, COUNTY OF DOUGLAS, STATE OF COLORADO.
TOWN OF CASTLE ROCK PROJECT NUMBER SDP25-0014





KEY MAP

N.T.S

DRAINAGE LEGEND

- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED STORM SEWER LINE
- PROPOSED OPEN CHANNEL
- FEMA 100-YEAR FLOOD PLAIN
- PROPOSED BASIN BOUNDARY
- EXISTING BASIN BOUNDARY
- CURB AND GUTTER

A1 — BASIN ID
00.00 | 0.00 | 0.00 — 5 YEAR RUNOFF / 100 YEAR RUNOFF
BASIN AREA (ACRES)

00 — PROPOSED DESIGN POINT

E1 — EXISTING BASIN ID
00.00 | 0.00 | 0.00 — 5 YEAR RUNOFF / 100 YEAR RUNOFF
BASIN AREA (ACRES)

FLOW ARROW

EMERGENCY OVERFLOW PATH ARROW

100 YEAR PONDING DEPTH

Basin Summary Table						
Basin	Area (AC)	Runoff Coefficients C5	Runoff Coefficients C100	I (%)	Peak Flows (cfs) Q5	Peak Flows (cfs) Q100
A1	0.38	0.50	0.72	57%	0.7	1.7
A2	0.74	0.45	0.69	51%	1.2	3.5
A3	0.33	0.66	0.80	76%	0.9	2.1
A4	0.35	0.67	0.80	78%	1.0	2.2
A5	0.35	0.61	0.77	70%	1.0	2.3
A6	0.75	0.67	0.80	78%	2.0	4.3
A7	0.10	0.71	0.82	83%	0.3	0.7
A8	1.20	0.64	0.79	74%	3.0	6.7
A9	0.85	0.64	0.79	74%	2.2	5.0

Basin Summary Table						
Basin	Area (AC)	Runoff Coefficients C5	Runoff Coefficients C100	I (%)	Peak Flows (cfs) Q5	Peak Flows (cfs) Q100
B1	0.37	0.54	0.74	61%	0.9	2.2
B2	0.80	0.63	0.78	72%	2.0	4.5
B3	0.97	0.62	0.78	72%	2.6	5.9
B2.1	0.10	0.64	0.79	74%	0.3	0.7

Basin Summary Table						
Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
C1	1.14	0.42	0.67	46%	2.3	6.8
C2	0.49	0.31	0.62	34%	0.5	1.9
C3	0.13	0.08	0.50	5%	0.03	0.4

Basin Summary Table						
Basin	Area (AC)	Runoff Coefficients C_5	Runoff Coefficients C_{100}	I (%)	Peak Flows (cfs) Q_5	Peak Flows (cfs) Q_{100}
OSA5	0.01	0.81	0.87	95%	0.0	0.1
OSA7	0.11	0.81	0.87	95%	0.4	0.8
OSB1	0.06	0.81	0.87	95%	0.2	0.5
OSB2	0.02	0.81	0.87	95%	0.1	0.1

N

0 25 50 100

SCALE: 1" = 50'

Redland
WHERE GREAT PLACES BEGIN
720.283.6783 REDLAND.COM
• Land Planning • Civil Engineering • Landscape Architecture • Construction Management

NOT FOR CONSTRUCTION

NOTES	NO.	DATE

PROJECT NO. 17026.007

NO	DATE	NOTES
1	05/30/2025	FIRST SUBMITTAL
2	09/17/2025	SECOND SUBMITTAL
3	11/26/2025	THIRD SUBMITTAL
4	01/13/2026	FOURTH SUBMITTAL
5	02/12/2026	FIFTH SUBMITTAL
6	02/20/2026	SIXTH SUBMITTAL

BELLA MESA SOUTH
SITE DEVELOPMENT PLAN
DRAINAGE PLAN

SHEET
DRN

Appendix F - MS4 Permit and Water Quality Determination Worksheet

Permanent Water Quality Determination Worksheet (Taken from 2019 SDDTCM Sections 13.1.4 and 13.1.5)

Project:	Bella Mesa South	**Project#**	SDP25-0014	**Applicant:** Cardel Homes
Section	**Questions**	**Response**	**Check those that apply**	**Instructions**
1	**Non-applicable Sites**			
1.1	Will the project result in a temporary disturbance of greater than one acre?	No	☐	Proceed to section 1.2.
		Yes	☒	Proceed to section 2.
1.2	Is the project part of a larger common plan of development or sale where multiple separate and distinct construction activities may be taking place at different times on different schedules, but remain related and are within 1/4 mile of each other? (A common plan of development will generally be documented on a site development plan, master plan, or equivalent, for the property/project)	No	☐	Proceed to section 1.3.
		Yes	☐	Proceed to section 2.
1.3	Is the project within the Cherry Creek Watershed?	Yes	☐	Permanent water quality control measures may be required. Refer to Water Qualtiy Control Regulation 72.7 for details and allowable exclusions.
		No	☐	Permanent water quality control measures are not required.
2	**Applicable Site Types and Exclusions by Variance**			
2.1	Does the project have more than 35% impervious area on the existing site?	No	☒	Project is an applicable Development Site. Proceed to section 3.
		Yes	☐	Proceed to 2.2.
2.2	Does the project have greater than 75% impervious area on the existing site?	No	☐	Project is an applicable Redevelopment Site. Proceed to section 3.
		Yes	☐	Project is an applicable Constrainted Redevelopment Site. Proceed to 2.3.
2.3	Will 100% of the runoff from the existing and proposed site be captured and treated using one or more of the allowable design standards for permanent water quality?	Yes	☐	No further action required.
		No	☐	Proceed to 2.4.
2.4	Do any other water quality exclusions apply to the site?	No	☐	Portions of the project are excluded. Proceed with design in accordance with Constrained Redevelopment standards and apply for **variance** for Constrained Redevelopment Sites.
		Yes	☐	Proceed to section 3. Following approval of other exclusions, design remaining site in accordance with Constrained Redevelopment standards and apply for **variance** for Constrained Redevelopment Sites.
3	**Applicable Sites with Other Exclusions by Variance**			
3.1	**Category 1: Roadways, bridges and trails only**			
3.1.1	Is the project a bike or pedestrian trail?	Yes	☐	Proceed to next line.
		No	☒	Proceed to 3.1.2.
	Is the trail for a roadway?	Yes	☐	Proceed to 3.1.2.
		No	☐	Project is excluded. Submit **variance** for Trails Excluded from Permanent Water Quality Requirements.
3.1.2	Is the project primarily used for parking or access to parking?	Yes	☐	This exclusion does not apply. Permanent water quality is required.
		No	☒	Proceed to 3.1.3.
3.1.3	Does the project add impervious area?	No	☐	Project is excluded. Submit **variance** for Pavement Management Sites Excluded from Permanent Water Quality Requirements.
		Yes	☒	Proceed to 3.1.4.

Section	Questions	Response	Check those that apply	Instructions
3.1.4	Does the project add more than 8.25 feet of paved width at any location to the existing roadway?	No	☒	Project is excluded. Submit **variance** for Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements.
		Yes	☐	Proceed to next line.
	Does the project add more than one acre of paved area per mile to an existing roadway?	No	☒	Project is excluded. Submit **variance** for Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements.
		Yes	☐	Proceed to next line.
	Does the project increase the width by two times or more, on average, of the original roadway area?	No	☒	Existing areas of site are excluded only. Submit **variance** for Existing Roadway Surfaces Only Excluded from Permanent Water Quality Requirements.
		Yes	☐	This exclusion does not apply. Permanent water quality is required.
3.2	**Category 2: Non-residential and non-commercial projects only**			
3.2.1	Is the project associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities, including activities necessary to prepare a site for drilling and the movement and placement of drilling equipment?	Yes	☐	Project is excluded. Submit **variance** for Oil and Gas Exploration Sites Excluded from Permanent Water Quality Requirements.
		No	☒	Proceed to 3.2.2.
3.2.2	Is the project for stream stabilization?	Yes	☐	Project is excluded. Submit **variance** for Stream Stabilization Sites Excluded from Permanent Water Quality Requirements.
		No	☒	Proceed to 3.2.3.
3.2.3	Is the project for installation or maintenance of aboveground or underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity including activities to install, replace or maintain utilities under roadways or other paved areas that return the surface to the same condition?	Yes	☐	Project is excluded. Submit **variance** for Aboveground and Underground Utilities Excluded from Permanent Water Quality Requirements.
		No	☒	Proceed to 3.2.4.
3.2.4	Is the project on undeveloped land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the project?	Yes	☐	Project is excluded. Submit **variance** for Sites with Land Disturbances to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements.
		No	☒	Proceed to 3.2.5.
3.2.5	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	No	☐	Project is excluded. Submit **study** along with **variance** for Non-residential and Non-commercial Infiltration Conditions Excluded from Permanent Water Quality Requirements.
		Yes	☒	This exclusion does not apply. Permanent water quality is required.
3.3	**Category 3: Residential, Agricultural and Commercial projects**			
3.3.1	Is the project a single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling unit?	Yes	☐	Proceed to next line.
		No	☒	Proceed to 3.3.2.
	Is the project site greater than 10% impervious?	No	☐	Project is excluded. Submit **variance** for Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements.
		Yes	☐	Proceed to next line.
	Is the project site greater than 20% impervious?	Yes	☐	This exclusion does not apply. Permanent water quality is required.
		No	☐	Proceed to next line.
	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	No	☐	Project is excluded. Submit **study** along with **variance** for Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements.
		Yes	☐	This exclusion does not apply. Permanent water quality is required.

Section	Questions	Response	Check those that apply	Instructions
3.3.2	Will 100% of the runoff from the residential or commercial site be captured?	Yes	☐	This exclusion does not apply. Permanent water quality is required.
		No	☒	Proceed to next line.
	Is all or a portion of the site undeveloped or will it remain undeveloped after construction?	Yes	☒	This portion of the project is excluded. Submit **variance** for Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements. Proceed to next line.
		No	☐	Proceed to next line.
	Is the remaining untreated impervious area greater than 20% of the site?	Yes	☐	This exclusion does not apply. Permanent water quality is required.
		No	☒	Proceed to next line.
	Is the remaining untreated impervious area greater than one acre?	Yes	☒	This exclusion does not apply. Permanent water quality is required.
		No	☐	Proceed to next line.
	Is it practicable to capture runoff from portions of the site that will not drain to a control measure?	No	☒	Document justification demonstrating that it is not practicable to capture runoff from this portion of the site in the **drainage report**. No further action is needed.
		Yes	☐	This exclusion does not apply. Permanent water quality is required.

Summary of Water Quality Conformance to MS4 Permit

The purpose of this worksheet is to document conformance with the Town of Castle Rock's MS4 permit with regard to permanent water quality on land disturbance projects.

Project Name Bella Mesa South

Project Owner Cardel Homes

Project Location Northwest corner of Mikelson Blvd. and Mitchell St

ToCR Project Number SDP25-0014

Total Site Area 8.941 **acres**

Total Size of Common Plan of Development _____ **acres**

Check all that apply:

- ☐ **Project within Plum Creek Basin**
- ☑ **Project within Cherry Creek Basin**

Estimated construction completion date _____

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1. The water quality control measure(s) for applicable development sites shall meet one of the following base design standards as per the SDDTCM Section 14.4. Please select all design standards that were applied to meet conformance with the MS4 on this site.

   - ❒ WQCV standard
   - ❒ Pollutant removal standard
   - ☑ Runoff reduction standard
   - ☑ Applicable site draining to regional WQVC control measure (accepts drainage prior to discharging to WOTS)
   - ❒ Applicable site draining to regional WQVC control facility (with receiving pervious area control measure upstream of WOTS)
   - ❒ Constrained redevelopment sites standard
     - Imperviousness of existing site _____/_____(Imp. Ac/Site Ac) =____%
     - Variance required TCV No. _____
   - ❒ Existing control measure with WQCV per previous criteria standards
     - Reference Construction Permit No. _____
   - ❒ Cherry Creek Basin only, choose one: ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
   - ❒ No control measures provided (See Permanent WQ Worksheet for applicability)

Summary of Water Quality Conformance to MS4 Permit

2. Was an exclusion to water quality applied as per SDDTCM Section 13.1.5? ☑ Yes ☐ No

   i. If yes, please select all that apply, provide total excluded impervious area(s) and submit variance, as applicable: TCV No. _____

   ☐ Pavement management site

   Excluded impervious area: _____ acres

   ☐ Excluded roadway redevelopment

   Excluded impervious area: _____ acres

   ☐ Excluded existing roadway areas

   Excluded impervious area: _____ acres

   ☐ Above ground and below ground utilities

   ☐ Large lot single family home

   ☐ Non-residential and non-commercial infiltration

   Excluded impervious area: _____ acres

   ☑ Land disturbance for land to remain undeveloped

   Excluded impervious area: 0.13 acres

   ☐ Stream Stabilization Sites

   Excluded impervious area: _____ acres

   ☐ Trails

   Excluded impervious area: _____ acres

   ☐ Oil and Gas Exploration

3. For Development and Redevelopment sites, following any exclusions claimed above, was any portion of the site excluded up to 20% of the site and not to exceed one acre? ☐ Yes ☑ No

   If yes, complete the following:

   Excluded area: _____ acres

   Total Site area: _____ acres, _____ % site excluded

4. For Constrained sites, was any portion of the site excluded up to 50% of the site and not to exceed 50% of the impervious area? ☐ Yes ☑ No

   If yes, complete the following:

   Excluded area: _____ acres

   Excluded impervious area: _____ acres

   Total Site area: _____ acres, _____ % site excluded

   Total Impervious area: _____ acres, _____ % impervious excluded