



**FINAL DRAINAGE REPORT
FOR
MONUMENT JUNCTION WEST
FILING NO. 1 LOT 4**

Prepared for:
BurgerWorks, LLC
908 N. John Redditt
Lufkin, TX 75904

Mr. William Tamminga

Date prepared 04/14/22

Job no. 2589.20

PREPARED BY:



Engineer’s Statement

This report and plan for the drainage design of **Monument Junction West Filing No. 1 Lot 4** was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal): _____
Catherine M. Tessin Colorado P.E. No. 45004 Date

Developer’s Statement

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

BurgerWorks, LLC
Name of Developer

Authorized Signature Date

William Tamminga
Printed Name

Title

908 N. John Redditt Lufkin, TX 75904
Address

City of Colorado Springs Statement:

Filed in accordance with Section 12.13.010 of the Subdivision Ordinance for the Town of Monument, revised 1997 and 13.11.160 of the Zoning ordinance for the Town of Monument, revised 1997.

For Town of Monument
Conditions:

Date

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FINAL DRAINAGE REPORT FOR MONUMENT JUNCTION WEST FILING NO. 1 LOT 4

PURPOSE

This document is the Final Drainage Report for Monument Junction West Filing No. 1 Lot 4. The purpose of this report is to identify onsite and offsite drainage patterns, storm sewer, inlet locations, and areas tributary to the site, and to safely route developed storm water runoff to adequate outfall facilities.

GENERAL DESCRIPTION

Monument Junction West Filing No. 1 Lot 4 is a 1.790-acre site located in Section 14, Township 11 South, Range 67 West of the Sixth Principal Meridian in Town of Monument, County of El Paso, State of Colorado. The site is bound on the south and east by existing Jackson Creek Parkway, to the south and west by future Fat Tire Drive public right-of-way, and to the north by future Laughing Lab Way public right-of-way. This site contains a proposed commercial/ retail building use. This Final Drainage Report is being submitted in conjunction with the proposed PUD plan and Final Plat application for the Monument Junction West Filing No. 1 Lot 4.

The average soil condition reflects Hydrologic Group “B” (Tomah-Crowfoot Loamy Sand) as determined by the “Soil Survey of El Paso County Area,” prepared by the Web Soil Survey (NRCS). (See map in Appendix).

EXISTING DRAINAGE CONDITIONS

The site is located within the Dirty Woman Creek Drainage Basin. Historically, this site drains in a southwesterly direction with slopes ranging from 1% to 3%.

The subject site was studied as a commercial/retail land use within the “Final Drainage Report for Monument Junction West Filing No. 1. The site was identified within the 1.4 acre “Basin B” and 1.0 acre “Basin E” with “C” values of $C_5=0.81$ and $C_{100}=0.88$. Total flow from “Basin B” in the approved Monument Junction West Filing No. 1 is $Q_5 = 5$ cfs, $Q_{100}= 8$ cfs. Total flow from “Basin E” in the approved Monument Junction West Filing No. 1 is $Q_5 = 3$ cfs, $Q_{100}= 6$ cfs. The proposed site development matches the land use, grading configuration, and outfall locations assumed in the Final Drainage Report for Monument Junction West Filing No. 1, also matching “C” values for developed conditions.

As described in this report, developed flows are routed to the adjacent public right of way, Laughing Lab Way and Fat Tire Drive. “Basin B” is described to drain to a 10’ Type R sump inlet, labeled as Design

FINAL DRAINAGE REPORT FOR MONUMENT JUNCTION WEST FILING NO. 1 LOT 4

Point 2 with total flows anticipated as $Q_5 = 6$ cfs, $Q_{100} = 10$ cfs. "Basin E" is described to drain to a 5' Type R sump inlet, labeled as Design Point 5 with total flows anticipated as $Q_5 = 4$ cfs, $Q_{100} = 8$ cfs. Flows intercepted at Design Point 2 and 5 are ultimately routed to a 36" public storm sewer outfall that is conveyed to the west through Monument Junction West Filing No. 1 Lot 3 and 5. A public full spectrum detention pond is proposed within Monument Junction West Filing No. 1 Tract A. This 6.555 ac-ft facility has been sized to accept developed flows from the subject site. Stormwater will be detained and treated for water quality prior to being released through an outlet structure near the southwest side of Tract A.

PROPOSED DRAINAGE CONDITIONS

Developed runoff from Monument Junction West Filing No. 1 Lot 4 development will be conveyed to the south and west in accordance with the Final Drainage Report for Monument Junction West Filing No. 1. Stormwater will be routed into public storm laterals and then connected ultimately to the Full Spectrum Detention Pond located in Tract A Monument Junction West Filing No. 1. Proposed development matches the commercial/retail land use and associated "C" values and time of concentration rates previously assumed in the overall Final Drainage Report, therefore proposed drainage conditions described herein closely match developed flowrates and outfall points in conformance with that report. A detailed description of the developed flows is as follows:

Design Point 1 ($Q_5 = 0.7$ cfs, $Q_{100} = 1.5$ cfs) is composed of Basin D (0.25 ac). Basin D consists of proposed private drive, parking, landscape areas. Flows from this basin is surface routed a 3'x5' D-9 private inlet. Pipe 1 is a private 12" storm sewer that is collecting Basin A (0.09 ac) of roof drains. A 12" private storm sewer (Pipe 3) will combine Design Point 1 flows with upstream Pipe 1 flows and then are routed in a proposed 12" private storm pipe (Pipe Run 3) and are ultimately routed to the outfall into FSD Facility in Monument Junction West Filing No. 1 Tract A. Overflow routing from this inlet is to the south, where flows will overtop the high point in the asphalt and will drain along the south side of the site to the next low point.

Design Point 2 ($Q_5 = 0.6$ cfs, $Q_{100} = 1.8$ cfs) is composed of Basin E (0.38 ac). Basin E consists of proposed private drive, parking, landscape areas. Flows are surface routed to a 3'x5' D-9 private inlet. Along with upstream Pipe Run 3, stormwater is routed in a 12" private storm sewer (Pipe Run 4) and will connect to the 5' Type R sump inlet in adjacent Fat Tire Drive. Proposed stormwater will ultimately outfall into FSD Facility in Monument Junction West Filing No. 1 Tract A. Overflow routing from this

FINAL DRAINAGE REPORT FOR MONUMENT JUNCTION WEST FILING NO. 1 LOT 4

inlet is to the south, where flows will overtop the high point in the asphalt and will drain along the southerly to the next low point.

Basin E ($Q_5 = 0.6$ cfs, $Q_{100} = 1.8$ cfs) is 0.38 acres. Basin E consists of proposed private drive, parking, landscape areas. **Basin F** ($Q_5 = 0.3$ cfs, $Q_{100} = 0.5$ cfs) is 0.06 acres. Basin E consists of proposed private drive, parking, landscape areas. Basin F consists of landscape areas. Flows from both Basins are surface routed along the private drive into the adjacent Fat Tire Drive north curbline to the 5' Type R inlet. Proposed stormwater will ultimately outfall into FSD Facility in Monument Junction West Filing No. 1 Tract A. Overflow routing from this inlet is to the south, where flows will overtop the high point in the asphalt and will drain along the southerly to the next low point.

Basin B ($Q_5 = 1.6$ cfs, $Q_{100} = 3.3$ cfs) is 0.60 acres. Basin B consists of proposed private drive, parking, landscape areas. **Basin C** ($Q_5 = 0.02$ cfs, $Q_{100} = 0.2$ cfs) is 0.06 acres. Basin E consists of proposed private drive, parking, landscape areas. Basin C consists of landscape areas. Flows from both basins are surface routed along the private drive into the adjacent Laughing Lab Way south curbline to the 10' Type R inlet. Proposed stormwater will ultimately outfall into FSD Facility in Monument Junction West Filing No. 1 Tract A. Overflow routing from this inlet is to the south, where flows will overtop the high point in the asphalt and will drain along the southerly to the next low point.

REGIONAL DETENTION AND STORMWATER QUALITY

The Drainage Criteria Manual specifies that this site is required to provide Full Spectrum Detention (FSD). This site is part of an overall commercial development with a regional FSD facility located in Monument Junction West Filing No. 1 that serves the subject property and adjacent lots with Filing No. 1. The FSD facility has been sized to fully accept developed flows from the subject site. This facility will be privately owned and maintained.

DRAINAGE CRITERIA

Hydrologic calculations were performed using the Town of Monument Standards, which follow the City of Colorado Springs/ El Paso County Drainage Criteria Manual dated January 2021. The Rational Method was used to estimate stormwater runoff anticipated from design storms for the 2 year- 100 year recurrence intervals.

**FINAL DRAINAGE REPORT FOR MONUMENT JUNCTION WEST FILING
NO. 1 LOT 4
FLOODPLAIN STATEMENT**

No portion of this site is located within a floodplain as determined by the Flood Insurance Rate Map (F.I.R.M.) Map Number 08041C 0278G effective date, December 7, 2018 (See Appendix).

SUMMARY

The proposed Monument Junction West Filing No. 1 Lot 4 is proposed to drain to onsite proposed private storm facilities. Since the approved prior reports and MDDP anticipated the same land use, “C” runoff coefficients, and time of concentration rates, the total stormwater from this development generally is equal to what was anticipated in the previously approved reports and MDDP. All stormwater quality and detention is handled in the Facility located in Tract A Monument Junction West Filing No. 1. All stormwater is detained, and will be released at or below historic levels for all stormwater events prior to being discharged to the approved private downstream storm outfall. No public drainage facilities are anticipated with the development of this project site. All drainage facilities were sized using the current Town of Monument and Drainage Criteria Manual and will safely discharge storm water runoff to adequate outfalls. Development of this site will not adversely affect the downstream and surrounding developments.

PREPARED BY:

Classic Consulting Engineers & Surveyors, LLC

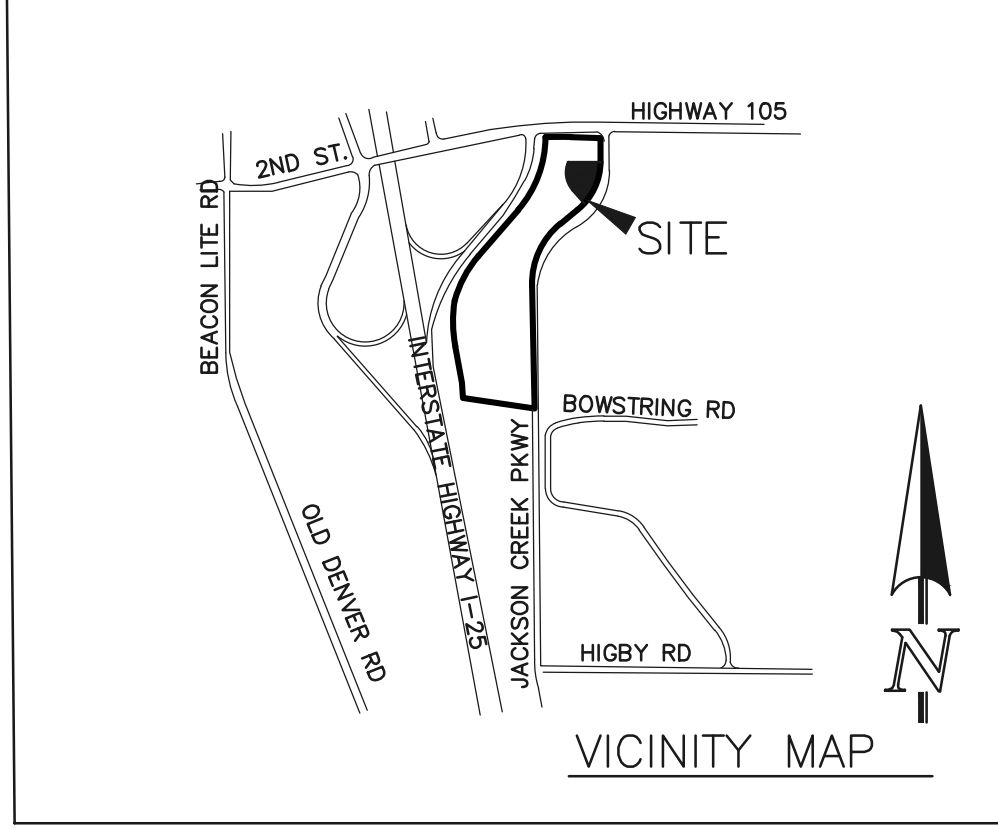
Cathy M. Tessin, P.E.
Project Manager

**FINAL DRAINAGE REPORT FOR MONUMENT JUNCTION WEST FILING
NO. 1 LOT 4
REFERENCES**

1. City of Colorado Springs Drainage Criteria Manual dated 2021.
2. “Final Drainage Report for Monument Junction West Filing No. 1”, dated March 2022, prepared by Classic Consulting Engineers and Surveyors.

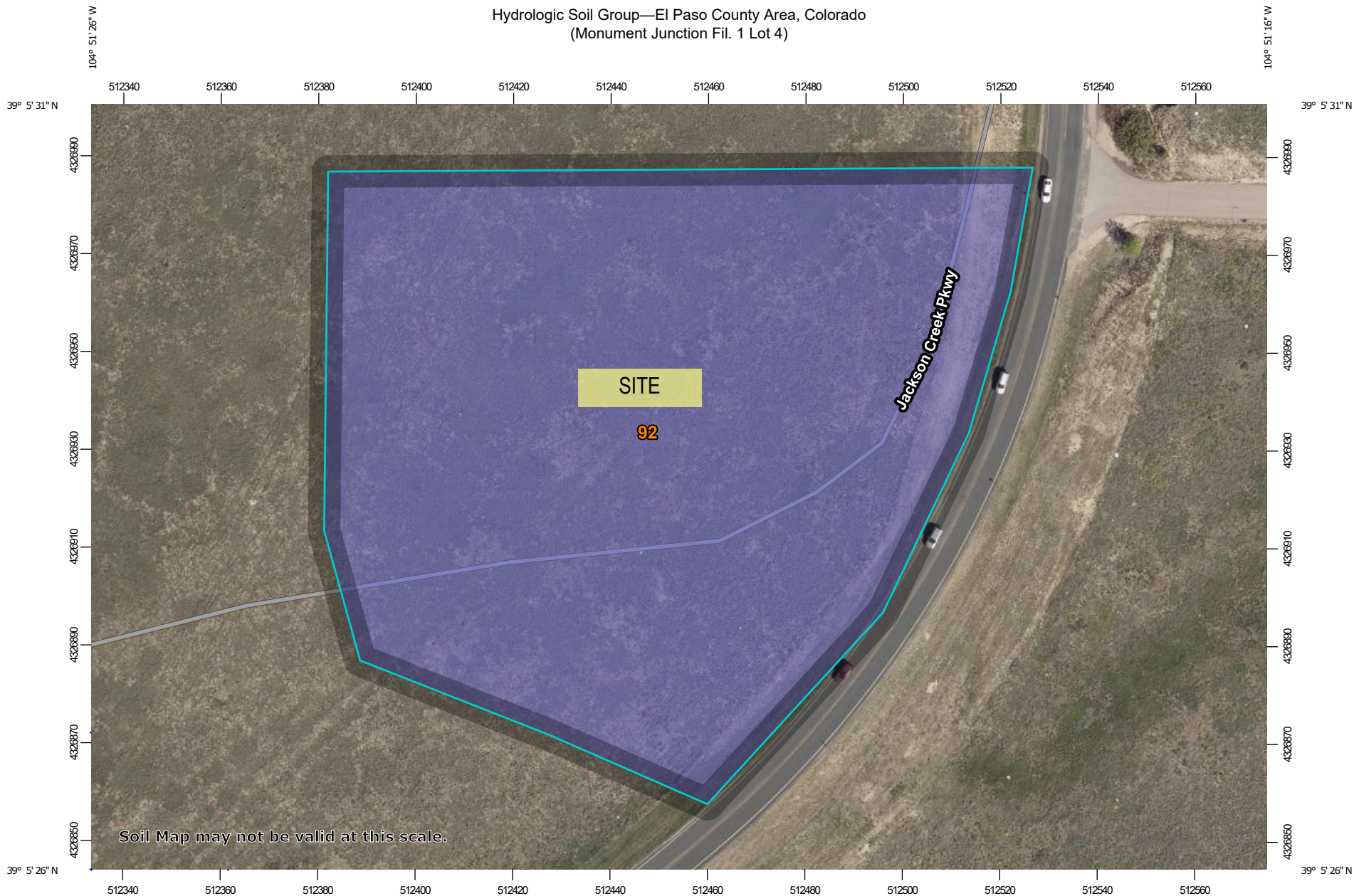
APPENDIX

VICINITY MAP

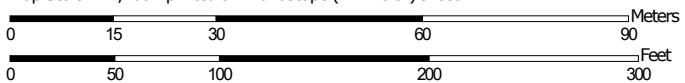


SOILS MAP (S.C.S SURVEY)

Hydrologic Soil Group—El Paso County Area, Colorado
(Monument Junction Fil. 1 Lot 4)



Map Scale: 1:1,100 if printed on A landscape (11" x 8.5") sheet.




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



Hydrologic Soil Group—El Paso County Area, Colorado
(Monument Junction Fil. 1 Lot 4)

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines


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

Soil Rating Points






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

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


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

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

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|---|--------|--------------|----------------|
| 92 | Tomah-Crowfoot loamy sands, 3 to 8 percent slopes | B | 3.6 | 100.0% |
| Totals for Area of Interest | | | 3.6 | 100.0% |

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

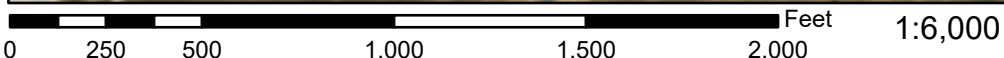
F.E.M.A. MAP



National Flood Hazard Layer FIRMMette



104°51'41"W 39°5'39"N



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

Legend

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

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

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

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

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

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

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



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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/6/2022 at 6:00 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/ HYDRAULIC CALCULATIONS:
CALCUATION SHEETS
UD INLET CALCUATIONS
PIPE WORKSHEETS**

JOB NAME: LOT 4 MONUMENT JUNCTION WEST FIL. 1
 JOB NUMBER: 2589.20
 DATE: 05/26/22
 CALCULATED BY: CMT

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

| BASIN | TOTAL AREA (AC) | DEVELOPED AREA/IMPERVIOUS AREA | | | | LANDSCAPE/UNDEVELOPED AREAS | | | | WEIGHTED | | | WEIGHTED CA | | |
|-------|-----------------|--------------------------------|------|------|--------|-----------------------------|------|------|--------|----------|------|--------|-------------|-------|---------|
| | | AREA (AC) | C(2) | C(5) | C(100) | AREA (AC) | C(2) | C(5) | C(100) | C(2) | C(5) | C(100) | CA(2) | CA(5) | CA(100) |
| A | 0.09 | 0.09 | 0.89 | 0.90 | 0.96 | 0.00 | 0.02 | 0.08 | 0.35 | 0.89 | 0.90 | 0.96 | 0.08 | 0.08 | 0.09 |
| B | 0.60 | 0.39 | 0.89 | 0.90 | 0.96 | 0.21 | 0.02 | 0.08 | 0.35 | 0.59 | 0.61 | 0.75 | 0.35 | 0.37 | 0.45 |
| C | 0.06 | 0.00 | 0.89 | 0.90 | 0.96 | 0.06 | 0.02 | 0.08 | 0.35 | 0.02 | 0.08 | 0.35 | 0.00 | 0.00 | 0.02 |
| D | 0.25 | 0.15 | 0.89 | 0.90 | 0.96 | 0.10 | 0.02 | 0.08 | 0.35 | 0.54 | 0.57 | 0.72 | 0.14 | 0.14 | 0.18 |
| E | 0.38 | 0.11 | 0.89 | 0.90 | 0.96 | 0.27 | 0.02 | 0.08 | 0.35 | 0.28 | 0.33 | 0.53 | 0.11 | 0.12 | 0.20 |
| F | 0.06 | 0.06 | 0.89 | 0.90 | 0.96 | 0.00 | 0.02 | 0.08 | 0.35 | 0.89 | 0.90 | 0.96 | 0.05 | 0.05 | 0.06 |

JOB NAME: LOT 4 MONUMENT JUNCTION WEST FIL. 1
 JOB NUMBER: 2589.20
 DATE: 02/01/07
 CALC'D BY: CMT

Table 6-7. Conveyance Coefficient, C_v

| Type of Land Surface | C_v |
|---|-------|
| Heavy meadow | 2.5 |
| Tillage/field | 5 |
| Riprap (not buried)* $t_c = \frac{L}{180} + 10$ | 6.5 |
| Short pasture and lawns | 7 |
| Nearly bare ground | 10 |
| Grassed waterway | 15 |
| Paved areas and shallow paved swales | 20 |

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

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

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

$$V = C_v S_w^{0.5} \quad Tc = LV$$

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

| BASIN | WEIGHTED | | | OVERLAND | | | | STREET / CHANNEL FLOW | | | | Tc TOTAL (min) | INTENSITY | | | TOTAL FLOWS | | |
|-------|----------|-------|---------|----------|----------------|----------------|-------------|-----------------------|--------------|-------------------|-------------|----------------------|-----------------|-----------------|-------------------|---------------|---------------|-----------------|
| | CA(2) | CA(5) | CA(100) | C(5) | Length (ft) | Height (ft) | Tc (min) | Length (ft) | Slope (%) | Velocity (fps) | Tc (min) | | I(2) (in/hr) | I(5) (in/hr) | I(100) (in/hr) | Q(2) (cfs) | Q(5) (cfs) | Q(100) (cfs) |
| A | 0.08 | 0.08 | 0.09 | 0.08 | 0 | 0 | 0.0 | 50 | 1.0% | 2.0 | 0.4 | 5.0 | 4.12 | 5.17 | 8.68 | 0.3 | 0.4 | 0.7 |
| B | 0.35 | 0.37 | 0.45 | 0.08 | 60 | 4 | 7.6 | 100 | 1.5% | 2.4 | 0.7 | 8.3 | 3.52 | 4.41 | 7.40 | 1.2 | 1.6 | 3.3 |
| C | 0.00 | 0.00 | 0.02 | 0.08 | 15 | 1 | 3.8 | 10 | 2.0% | 2.8 | 0.1 | 5.0 | 4.12 | 5.17 | 8.68 | 0.0 | 0.02 | 0.2 |
| D | 0.14 | 0.14 | 0.18 | 0.08 | 20 | 1 | 4.8 | 60 | 1.0% | 2.0 | 0.5 | 5.3 | 4.04 | 5.07 | 8.51 | 0.5 | 0.7 | 1.5 |
| E | 0.11 | 0.12 | 0.20 | 0.08 | 10 | 0.5 | 3.4 | 120 | 2.0% | 2.8 | 0.7 | 5.0 | 4.12 | 5.17 | 8.68 | 0.4 | 0.6 | 1.8 |
| F | 0.05 | 0.05 | 0.06 | 0.08 | 10 | 0.5 | 3.4 | 5 | 2.0% | 2.8 | 0.0 | 5.0 | 4.12 | 5.17 | 8.68 | 0.2 | 0.3 | 0.5 |

JOB NAME: LOT 4 MONUMENT JUNCTION WEST FIL. 1
 JOB NUMBER: 2589.20
 DATE: 05/26/22
 CALCULATED BY: CMT

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

| Design Point(s) | Contributing Basins | Equivalent CA(5) | Equivalent CA(100) | Maximum Tc | Intensity | | Flow | | Inlet Size |
|-----------------|---------------------|------------------|--------------------|------------|-----------|--------|------|--------|--------------------|
| | | | | | I(5) | I(100) | Q(5) | Q(100) | |
| 1 | BASIN D | 0.14 | 0.18 | 5.3 | 5.07 | 8.51 | 0.7 | 1.5 | 3'x5' GRATED INLET |
| 2 | BASIN E | 0.12 | 0.20 | 5.0 | 5.17 | 8.68 | 0.6 | 1.8 | 3'x5' GRATED INLET |

JOB NAME: LOT 4 MONUMENT JUNCTION WEST FIL. 1
 JOB NUMBER: 2589.20
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* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE.
 REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

| Pipe Run | Contributing Basins | Equivalent CA(5) | Equivalent CA(100) | Maximum Tc | Intensity | | Flow | | Pipe Size* |
|----------|---------------------|------------------|--------------------|------------|-----------|--------|------|--------|-------------------|
| | | | | | I(5) | I(100) | Q(5) | Q(100) | |
| 1 | BASIN A | 0.08 | 0.09 | 5.0 | 5.17 | 8.68 | 0.4 | 0.7 | 12" PRIVATE STORM |
| 2 | DP 1 | 0.14 | 0.18 | 5.3 | 5.07 | 8.51 | 0.7 | 1.5 | 12" PRIVATE STORM |
| 3 | PIPE 1 + PIPE 2 | 0.22 | 0.27 | 5.3 | 5.07 | 8.51 | 1.1 | 2.3 | 12" PRIVATE STORM |
| 4 | DP 2 + PIPE 3 | 0.35 | 0.47 | 5.3 | 5.07 | 8.51 | 1.8 | 4.0 | 18" PRIVATE STORM |

INLET MANAGEMENT

Worksheet Protected

| | | |
|------------------------------------|--------------|--------------|
| INLET NAME | DP1 | DP2 |
| Site Type (Urban or Rural) | URBAN | URBAN |
| Inlet Application (Street or Area) | AREA | AREA |
| Hydraulic Condition | Swale | Swale |
| Inlet Type | User-Defined | User-Defined |

USER-DEFINED INPUT**User-Defined Design Flows**

| | | |
|--------------------------------|-----|-----|
| Minor Q_{Known} (cfs) | 0.7 | 0.6 |
| Major Q_{Known} (cfs) | 1.5 | 1.8 |

Bypass (Carry-Over) Flow from Upstream

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

Watershed Characteristics

| | | |
|---------------------------|--|--|
| Subcatchment Area (acres) | | |
| Percent Impervious | | |
| NRCS Soil Type | | |

Watershed Profile

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

Minor Storm Rainfall Input

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

Major Storm Rainfall Input

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

CALCULATED OUTPUT

| | | |
|--|------------|------------|
| Minor Total Design Peak Flow, Q (cfs) | 0.7 | 0.6 |
| Major Total Design Peak Flow, Q (cfs) | 1.5 | 1.8 |
| Minor Flow Bypassed Downstream, Q_b (cfs) | 0.0 | 0.0 |
| Major Flow Bypassed Downstream, Q_b (cfs) | 0.0 | 0.0 |

Minor Storm (Calculated) Analysis of Flow Time

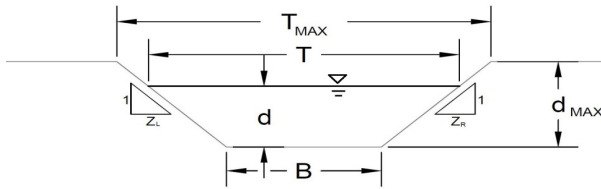
| | | |
|---|-----|-----|
| C | N/A | N/A |
| C_5 | N/A | N/A |
| Overland Flow Velocity, V_i | N/A | N/A |
| Channel Flow Velocity, V_t | N/A | N/A |
| Overland Flow Time, T_i | N/A | N/A |
| Channel Travel Time, T_t | N/A | N/A |
| Calculated Time of Concentration, T_c | N/A | N/A |
| Regional T_c | N/A | N/A |
| Recommended T_c | N/A | N/A |
| T_c selected by User | N/A | N/A |
| Design Rainfall Intensity, I | N/A | N/A |
| Calculated Local Peak Flow, Q_p | N/A | N/A |

Major Storm (Calculated) Analysis of Flow Time

| | | |
|---|-----|-----|
| C | N/A | N/A |
| C_5 | N/A | N/A |
| Overland Flow Velocity, V_i | N/A | N/A |
| Channel Flow Velocity, V_t | N/A | N/A |
| Overland Flow Time, T_i | N/A | N/A |
| Channel Travel Time, T_t | N/A | N/A |
| Calculated Time of Concentration, T_c | N/A | N/A |
| Regional T_c | N/A | N/A |
| Recommended T_c | N/A | N/A |
| T_c selected by User | N/A | N/A |
| Design Rainfall Intensity, I | N/A | N/A |
| Calculated Local Peak Flow, Q_p | N/A | N/A |

AREA INLET IN A SWALE

DP1



This worksheet uses the NRCS vegetative retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)
 Manning's n (Leave cell D16 blank to manually enter an n value)
 Channel Invert Slope
 Bottom Width
 Left Side Slope
 Right Side Slope

A, B, C, D or E

| | |
|------------------|--------------|
| n = | 0.012 |
| S _o = | 0.0050 ft/ft |
| B = | 0.00 ft |
| Z ₁ = | 40.00 ft/ft |
| Z ₂ = | 40.00 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

Max. Allowable Top Width of Channel for Minor & Major Storm
 Max. Allowable Water Depth in Channel for Minor & Major Storm

| | Minor Storm | Major Storm | |
|--------------------|-------------|-------------|------|
| T _{MAX} = | 20.00 | 20.00 | feet |
| d _{MAX} = | 0.50 | 0.67 | feet |

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Top Width Criterion
 MAJOR STORM Allowable Capacity is based on Top Width Criterion

| | Minor Storm | Major Storm | |
|----------------------|-------------|-------------|-----|
| Q _{allow} = | 5.5 | 5.5 | cfs |
| d _{allow} = | 0.25 | 0.25 | ft |

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow
 Water Depth

| | | | |
|------------------|------|------|------|
| Q _o = | 0.7 | 1.5 | cfs |
| d = | 0.12 | 0.15 | feet |

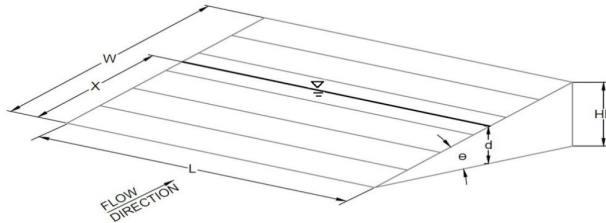
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
 Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Inlet Design Information (Input)

Type of Inlet User-Defined

Inlet Type = User-Defined

Angle of Inclined Grate (must be <= 30 degrees)
 Width of Grate
 Length of Grate
 Open Area Ratio
 Height of Inclined Grate
 Clogging Factor
 Grate Discharge Coefficient
 Orifice Coefficient
 Weir Coefficient



| | | |
|----------------------|------|---------|
| θ = | 0.00 | degrees |
| W = | 3.00 | feet |
| L = | 5.00 | feet |
| A _{RATIO} = | 0.70 | |
| H _B = | 0.00 | feet |
| C _r = | 0.50 | |
| C _d = | N/A | |
| C _o = | 0.64 | |
| C _w = | 2.05 | |

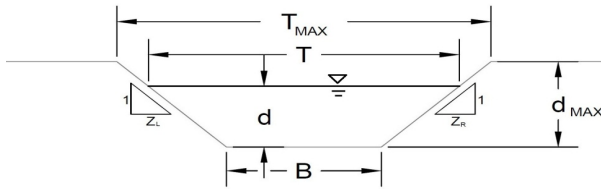
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)

Total Inlet Interception Capacity (assumes clogged condition)

| | MINOR | MAJOR | |
|--|-------|-------|-----|
| d = | 0.12 | 0.15 | |
| Q _a = | 1.0 | 1.5 | cfs |
| Bypassed Flow, Q _b = | 0.0 | 0.0 | cfs |
| Capture Percentage = Q _a /Q _o = C% | 100 | 100 | % |

AREA INLET IN A SWALE

DP2



This worksheet uses the NRCS vegetative retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)
 Manning's n (Leave cell D16 blank to manually enter an n value)
 Channel Invert Slope
 Bottom Width
 Left Side Slope
 Right Side Slope

A, B, C, D or E

| | |
|------------------|--------------|
| n = | 0.020 |
| S ₀ = | 0.0050 ft/ft |
| B = | 0.00 ft |
| Z ₁ = | 40.00 ft/ft |
| Z ₂ = | 40.00 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

Max. Allowable Top Width of Channel for Minor & Major Storm
 Max. Allowable Water Depth in Channel for Minor & Major Storm

| | Minor Storm | Major Storm | |
|--------------------|-------------|-------------|------|
| T _{MAX} = | 20.00 | 20.00 | feet |
| d _{MAX} = | 0.50 | 0.67 | feet |

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Top Width Criterion
 MAJOR STORM Allowable Capacity is based on Top Width Criterion

| | Minor Storm | Major Storm | |
|----------------------|-------------|-------------|-----|
| Q _{allow} = | 3.3 | 3.3 | cfs |
| d _{allow} = | 0.25 | 0.25 | ft |

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow
 Water Depth

| | | | |
|------------------|------|------|------|
| Q _o = | 0.6 | 1.8 | cfs |
| d = | 0.13 | 0.20 | feet |

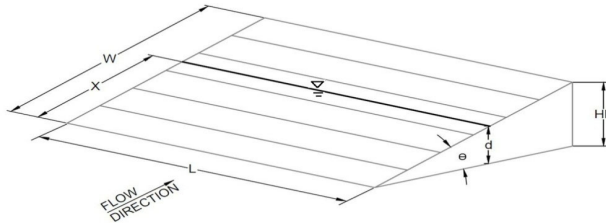
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
 Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Inlet Design Information (Input)

Type of Inlet User-Defined

Inlet Type = User-Defined

Angle of Inclined Grate (must be <= 30 degrees)
 Width of Grate
 Length of Grate
 Open Area Ratio
 Height of Inclined Grate
 Clogging Factor
 Grate Discharge Coefficient
 Orifice Coefficient
 Weir Coefficient



| | | |
|----------------------|------|---------|
| θ = | 0.00 | degrees |
| W = | 3.00 | feet |
| L = | 5.00 | feet |
| A _{RATIO} = | 0.70 | |
| H _B = | 0.00 | feet |
| C _r = | 0.50 | |
| C _d = | N/A | |
| C _o = | 0.64 | |
| C _w = | 2.05 | |

Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)

Total Inlet Interception Capacity (assumes clogged condition)

| | MINOR | MAJOR | |
|--|-------|-------|-----|
| d = | 0.13 | 0.20 | |
| Q _a = | 1.2 | 2.3 | cfs |
| Bypassed Flow, Q _b = | 0.0 | 0.0 | cfs |
| Capture Percentage = Q _a /Q _o = C% | 100 | 100 | % |

Worksheet for PIPE 1

| Project Description | |
|-----------------------------|---------------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |
| Input Data | |
| Roughness Coefficient | 0.013 |
| Channel Slope | 0.005 ft/ft |
| Diameter | 12.0 in |
| Discharge | 0.70 cfs |
| Results | |
| Normal Depth | 4.3 in |
| Flow Area | 0.3 ft ² |
| Wetted Perimeter | 1.3 ft |
| Hydraulic Radius | 2.4 in |
| Top Width | 0.96 ft |
| Critical Depth | 4.2 in |
| Percent Full | 36.0 % |
| Critical Slope | 0.006 ft/ft |
| Velocity | 2.74 ft/s |
| Velocity Head | 0.12 ft |
| Specific Energy | 0.48 ft |
| Froude Number | 0.939 |
| Maximum Discharge | 2.71 cfs |
| Discharge Full | 2.52 cfs |
| Slope Full | 0.000 ft/ft |
| Flow Type | Subcritical |
| GVF Input Data | |
| Downstream Depth | 0.0 in |
| Length | 0.0 ft |
| Number Of Steps | 0 |
| GVF Output Data | |
| Upstream Depth | 0.0 in |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Average End Depth Over Rise | 0.0 % |
| Normal Depth Over Rise | 0.0 % |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 4.3 in |
| Critical Depth | 4.2 in |
| Channel Slope | 0.005 ft/ft |
| Critical Slope | 0.006 ft/ft |

Worksheet for PIPE 2

| Project Description | |
|-----------------------------|---------------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |
| Input Data | |
| Roughness Coefficient | 0.013 |
| Channel Slope | 0.005 ft/ft |
| Diameter | 12.0 in |
| Discharge | 1.50 cfs |
| Results | |
| Normal Depth | 6.7 in |
| Flow Area | 0.4 ft ² |
| Wetted Perimeter | 1.7 ft |
| Hydraulic Radius | 3.2 in |
| Top Width | 0.99 ft |
| Critical Depth | 6.2 in |
| Percent Full | 55.6 % |
| Critical Slope | 0.006 ft/ft |
| Velocity | 3.35 ft/s |
| Velocity Head | 0.17 ft |
| Specific Energy | 0.73 ft |
| Froude Number | 0.879 |
| Maximum Discharge | 2.71 cfs |
| Discharge Full | 2.52 cfs |
| Slope Full | 0.002 ft/ft |
| Flow Type | Subcritical |
| GVF Input Data | |
| Downstream Depth | 0.0 in |
| Length | 0.0 ft |
| Number Of Steps | 0 |
| GVF Output Data | |
| Upstream Depth | 0.0 in |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Average End Depth Over Rise | 0.0 % |
| Normal Depth Over Rise | 0.0 % |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 6.7 in |
| Critical Depth | 6.2 in |
| Channel Slope | 0.005 ft/ft |
| Critical Slope | 0.006 ft/ft |

Worksheet for PIPE 3

| Project Description | |
|-----------------------------|---------------------|
| Friction Method | Manning |
| | Formula |
| Solve For | Normal Depth |
| Input Data | |
| Roughness Coefficient | 0.013 |
| Channel Slope | 0.005 ft/ft |
| Diameter | 12.0 in |
| Discharge | 2.30 cfs |
| Results | |
| Normal Depth | 9.0 in |
| Flow Area | 0.6 ft ² |
| Wetted Perimeter | 2.1 ft |
| Hydraulic Radius | 3.6 in |
| Top Width | 0.86 ft |
| Critical Depth | 7.8 in |
| Percent Full | 75.1 % |
| Critical Slope | 0.007 ft/ft |
| Velocity | 3.64 ft/s |
| Velocity Head | 0.21 ft |
| Specific Energy | 0.96 ft |
| Froude Number | 0.749 |
| Maximum Discharge | 2.71 cfs |
| Discharge Full | 2.52 cfs |
| Slope Full | 0.004 ft/ft |
| Flow Type | Subcritical |
| GVF Input Data | |
| Downstream Depth | 0.0 in |
| Length | 0.0 ft |
| Number Of Steps | 0 |
| GVF Output Data | |
| Upstream Depth | 0.0 in |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Average End Depth Over Rise | 0.0 % |
| Normal Depth Over Rise | 0.0 % |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 9.0 in |
| Critical Depth | 7.8 in |
| Channel Slope | 0.005 ft/ft |
| Critical Slope | 0.007 ft/ft |

Worksheet for PIPE 4

| Project Description | |
|-----------------------------|---------------------|
| Friction Method | Manning |
| Solve For | Formula |
| | Normal Depth |
| Input Data | |
| Roughness Coefficient | 0.013 |
| Channel Slope | 0.005 ft/ft |
| Diameter | 18.0 in |
| Discharge | 4.00 cfs |
| Results | |
| Normal Depth | 9.4 in |
| Flow Area | 0.9 ft ² |
| Wetted Perimeter | 2.4 ft |
| Hydraulic Radius | 4.6 in |
| Top Width | 1.50 ft |
| Critical Depth | 9.2 in |
| Percent Full | 52.3 % |
| Critical Slope | 0.005 ft/ft |
| Velocity | 4.28 ft/s |
| Velocity Head | 0.28 ft |
| Specific Energy | 1.07 ft |
| Froude Number | 0.956 |
| Maximum Discharge | 7.99 cfs |
| Discharge Full | 7.43 cfs |
| Slope Full | 0.001 ft/ft |
| Flow Type | Subcritical |
| GVF Input Data | |
| Downstream Depth | 0.0 in |
| Length | 0.0 ft |
| Number Of Steps | 0 |
| GVF Output Data | |
| Upstream Depth | 0.0 in |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Average End Depth Over Rise | 0.0 % |
| Normal Depth Over Rise | 0.0 % |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 9.4 in |
| Critical Depth | 9.2 in |
| Channel Slope | 0.005 ft/ft |
| Critical Slope | 0.005 ft/ft |

REFERENCES



INNOVATIVE DESIGN. CLASSIC RESULTS.

FOR REFERENCE ONLY

**FINAL DRAINAGE REPORT
FOR
MONUMENT JUNCTION WEST FILING NO. 1**

March 2022

Prepared for:
CLASSIC COMPANIES
2138 FLYING HORSE CLUB DR.
COLORADO SPRINGS, CO 80921

Prepared by:
CLASSIC CONSULTING
619 N. CASCADE AVE., SUITE 200
COLORADO SPRINGS CO 80903
(719) 785-0790

Job no. 1302.20



JOB NAME: **MONUMENT JUNCTION WEST FILING NO. 1**
 JOB NUMBER: **1302.20**
 DATE: **04/01/22**
 CALC'D BY: **MAW**

FOR
REFERENCE
ONLY

Table 6-7. Conveyance Coefficient, C_v

| Type of Land Surface | C_v |
|---|-------|
| Heavy meadow | 2.5 |
| Tillage/field | 5 |
| Riprap (not buried)* $t_c = \frac{L}{180} + 10$ | 6.5 |
| Short pasture and lawns | 7 |
| Nearly bare ground | 10 |
| Grassed waterway | 15 |
| Paved areas and shallow paved swales | 20 |

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

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

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

$$V = C_v S_w^{0.5} \quad Tc=L/V$$

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

| BASIN | WEIGHTED | | | OVERLAND | | | STREET / CHANNEL FLOW | | | | Tc TOTAL (min) | INTENSITY | | | TOTAL FLOWS | | | |
|-------|----------|-------|---------|----------|----------------|----------------|-----------------------|----------------|--------------|-------------------|----------------------|-------------|-----------------|-----------------|-------------------|---------------|---------------|-----------------|
| | CA(2) | CA(5) | CA(100) | C(5) | Length (ft) | Height (ft) | Tc (min) | Length (ft) | Slope (%) | Velocity (fps) | | Tc (min) | I(2) (in/hr) | I(5) (in/hr) | I(100) (in/hr) | Q(2) (cfs) | Q(5) (cfs) | Q(100) (cfs) |
| A | 2.05 | 2.11 | 2.29 | 0.08 | 30 | 0.9 | 7.0 | 300 | 1.5% | 2.4 | 2.0 | 9.1 | 3.41 | 4.28 | 7.18 | 7 | 9 | 16 |
| B | 1.11 | 1.13 | 1.23 | 0.08 | 40 | 1 | 8.6 | 300 | 1.5% | 2.4 | 2.0 | 10.6 | 3.22 | 4.03 | 6.77 | 4 | 5 | 8 |
| C | 0.87 | 0.89 | 0.97 | 0.08 | 30 | 0.9 | 7.0 | 250 | 1.5% | 2.4 | 1.7 | 8.7 | 3.46 | 4.33 | 7.28 | 3 | 4 | 7 |
| D | 0.87 | 0.89 | 0.97 | 0.08 | 30 | 0.9 | 7.0 | 250 | 1.5% | 2.4 | 1.7 | 8.7 | 3.46 | 4.33 | 7.28 | 3 | 4 | 7 |
| E | 0.79 | 0.81 | 0.88 | 0.08 | 40 | 1 | 8.6 | 230 | 1.5% | 2.4 | 1.6 | 10.2 | 3.27 | 4.10 | 6.89 | 3 | 3 | 6 |
| F | 0.67 | 0.70 | 0.81 | 0.08 | 30 | 0.9 | 7.0 | 200 | 1.5% | 2.4 | 1.4 | 8.4 | 3.51 | 4.39 | 7.38 | 2 | 3 | 6 |
| G | 0.08 | 0.09 | 0.13 | 0.12 | 30 | 1.5 | 5.7 | | | | | 5.7 | 3.96 | 4.97 | 8.35 | 0.33 | 0.5 | 1.1 |
| H | 0.10 | 0.14 | 0.27 | 0.12 | 40 | 2 | 6.6 | | | | | 6.6 | 3.79 | 4.76 | 7.99 | 0.4 | 0.7 | 2.2 |
| I | 4.14 | 4.51 | 5.70 | 0.08 | 50 | 1 | 10.4 | 800 | 2.0% | 2.8 | 4.7 | 15.1 | 2.81 | 3.51 | 5.90 | 12 | 16 | 34 |
| J | 1.44 | 1.57 | 1.98 | 0.08 | 40 | 0.8 | 9.3 | 400 | 2.0% | 2.8 | 2.4 | 11.6 | 3.12 | 3.90 | 6.55 | 4 | 6 | 13 |
| K | 0.49 | 0.53 | 0.68 | 0.12 | 30 | 0.9 | 6.7 | 450 | 3.0% | 3.5 | 2.2 | 8.9 | 3.43 | 4.30 | 7.22 | 2 | 2 | 5 |
| L | 0.25 | 0.59 | 1.91 | 0.08 | 100 | 2 | 14.7 | 200 | 2.0% | 2.8 | 1.2 | 15.8 | 2.75 | 3.44 | 5.78 | 1 | 2 | 11 |
| M | 0.64 | 0.68 | 0.79 | 0.08 | 50 | 1 | 10.4 | 300 | 2.0% | 2.8 | 1.8 | 12.1 | 3.07 | 3.84 | 6.45 | 2 | 3 | 5 |
| N | 5.99 | 6.52 | 8.25 | 0.12 | 100 | 2 | 14.1 | 800 | 1.5% | 2.4 | 5.4 | 19.5 | 2.50 | 3.13 | 5.25 | 15 | 20 | 43 |

FOR REFERENCE ONLY

NOTE:
SEE SHEET 4 OF 4
FOR CALCULATIONS

| FINAL DRAINAGE REPORT - BASIN RUNOFF COEFFICIENT SUMMARY | | | | | | | | | | | | | | | |
|--|--------------------------------|-----------|------|------|-----------------------------|-----------|------|------|----------|------|------|-------------|-------|-------|------------------|
| BASIN | DEVELOPED AREA IMPERVIOUS AREA | | | | LANDSCAPE UNDEVELOPED AREAS | | | | WEIGHTED | | | WEIGHTED CA | | | IMPERVIOUSNESS % |
| | TOTAL AREA (AC) | AREA (AC) | C(2) | C(5) | C(100) | AREA (AC) | C(2) | C(5) | C(100) | C(2) | C(5) | C(100) | CA(2) | CA(5) | |
| A | 2.60 | 2.60 | 0.79 | 0.81 | 0.88 | 0.00 | 0.02 | 0.08 | 0.35 | 0.79 | 0.81 | 0.88 | 2.05 | 2.11 | 2.29 |
| B | 1.40 | 1.40 | 0.79 | 0.81 | 0.88 | 0.00 | 0.02 | 0.08 | 0.35 | 0.79 | 0.81 | 0.88 | 1.11 | 1.13 | 1.23 |
| C | 1.10 | 1.10 | 0.79 | 0.81 | 0.88 | 0.00 | 0.02 | 0.08 | 0.35 | 0.79 | 0.81 | 0.88 | 0.87 | 0.89 | 0.97 |
| D | 1.10 | 1.10 | 0.79 | 0.81 | 0.88 | 0.00 | 0.02 | 0.08 | 0.35 | 0.79 | 0.81 | 0.88 | 0.87 | 0.89 | 0.97 |
| E | 1.00 | 1.00 | 0.79 | 0.81 | 0.88 | 0.00 | 0.02 | 0.08 | 0.35 | 0.79 | 0.81 | 0.88 | 0.79 | 0.81 | 0.88 |
| F | 1.10 | 0.50 | 0.79 | 0.81 | 0.88 | 0.60 | 0.45 | 0.49 | 0.62 | 0.60 | 0.64 | 0.74 | 0.67 | 0.70 | 0.81 |
| G | 0.20 | 0.10 | 0.79 | 0.81 | 0.88 | 0.10 | 0.05 | 0.12 | 0.39 | 0.42 | 0.47 | 0.64 | 0.08 | 0.09 | 0.13 |
| H | 0.57 | 0.10 | 0.79 | 0.81 | 0.88 | 0.47 | 0.05 | 0.12 | 0.39 | 0.18 | 0.24 | 0.48 | 0.10 | 0.14 | 0.27 |
| I | 9.20 | 9.20 | 0.45 | 0.49 | 0.62 | 0.00 | 0.02 | 0.08 | 0.35 | 0.45 | 0.49 | 0.62 | 4.14 | 4.31 | 5.79 |
| J | 3.20 | 3.20 | 0.45 | 0.49 | 0.62 | 0.00 | 0.02 | 0.08 | 0.35 | 0.45 | 0.49 | 0.62 | 1.44 | 1.57 | 1.98 |
| K | 0.98 | 0.60 | 0.79 | 0.81 | 0.88 | 0.38 | 0.05 | 0.12 | 0.39 | 0.50 | 0.54 | 0.69 | 0.49 | 0.53 | 0.68 |
| L | 4.90 | 4.90 | 0.05 | 0.12 | 0.39 | 0.00 | 0.02 | 0.08 | 0.35 | 0.05 | 0.12 | 0.39 | 0.25 | 0.59 | 1.91 |
| M | 1.10 | 0.50 | 0.79 | 0.81 | 0.88 | 0.60 | 0.41 | 0.45 | 0.59 | 0.58 | 0.61 | 0.72 | 0.64 | 0.68 | 0.79 |
| N | 13.30 | 13.30 | 0.45 | 0.49 | 0.62 | 0.00 | 0.02 | 0.08 | 0.35 | 0.45 | 0.49 | 0.62 | 5.99 | 6.52 | 9.25 |
| O | 2.00 | 0.00 | 0.03 | 0.09 | 0.36 | 2.00 | 0.05 | 0.12 | 0.39 | 0.05 | 0.12 | 0.39 | 0.10 | 0.24 | 0.78 |
| P | 0.39 | 0.39 | 0.03 | 0.09 | 0.36 | 0.00 | 0.02 | 0.08 | 0.35 | 0.03 | 0.09 | 0.36 | 0.01 | 0.04 | 0.14 |
| OS-1 | 3.90 | 1.50 | 0.89 | 0.90 | 0.96 | 2.40 | 0.02 | 0.08 | 0.35 | 0.35 | 0.40 | 0.58 | 1.38 | 1.54 | 2.28 |
| OS-2 | 0.33 | 0.20 | 0.41 | 0.45 | 0.59 | 0.13 | 0.02 | 0.08 | 0.35 | 0.26 | 0.30 | 0.50 | 0.08 | 0.10 | 0.16 |
| OS-3 | 3.80 | 2.00 | 0.45 | 0.49 | 0.62 | 1.80 | 0.03 | 0.09 | 0.36 | 0.26 | 0.30 | 0.50 | 0.95 | 1.14 | 1.89 |
| OS-4 | 2.50 | 2.50 | 0.07 | 0.16 | 0.41 | 0.00 | 0.02 | 0.08 | 0.35 | 0.07 | 0.16 | 0.41 | 0.18 | 0.40 | 1.03 |
| OS-5 | 4.60 | 4.60 | 0.07 | 0.16 | 0.41 | 0.00 | 0.02 | 0.08 | 0.35 | 0.07 | 0.16 | 0.41 | 0.32 | 0.74 | 1.89 |
| OS-6 | 0.82 | 0.50 | 0.41 | 0.45 | 0.59 | 0.32 | 0.02 | 0.08 | 0.35 | 0.26 | 0.31 | 0.50 | 0.21 | 0.25 | 0.41 |
| OS-7 | 18.10 | 18.10 | 0.03 | 0.06 | 0.36 | 0.00 | 0.02 | 0.08 | 0.35 | 0.03 | 0.09 | 0.36 | 0.54 | 1.63 | 6.52 |
| OS-8 | 2.70 | 0.54 | 0.89 | 0.90 | 0.96 | 2.16 | 0.03 | 0.09 | 0.36 | 0.20 | 0.25 | 0.48 | 0.55 | 0.88 | 1.30 |
| OS-9 | 1.10 | 0.30 | 0.89 | 0.90 | 0.96 | 0.80 | 0.03 | 0.09 | 0.36 | 0.26 | 0.31 | 0.52 | 0.29 | 0.36 | 0.48 |
| OS-10 | 4.10 | 0.50 | 0.89 | 0.90 | 0.96 | 3.60 | 0.03 | 0.09 | 0.36 | 0.16 | 0.21 | 0.45 | 0.64 | 0.86 | 1.24 |
| OS-11 | 1.70 | 0.80 | 0.89 | 0.90 | 0.96 | 0.90 | 0.02 | 0.08 | 0.35 | 0.43 | 0.47 | 0.64 | 0.73 | 0.79 | 1.08 |
| OS-12 | 0.51 | 0.27 | 0.89 | 0.90 | 0.96 | 0.24 | 0.03 | 0.09 | 0.36 | 0.49 | 0.52 | 0.68 | 0.25 | 0.26 | 0.35 |
| OS-13 | 0.67 | 0.40 | 0.89 | 0.90 | 0.96 | 0.27 | 0.03 | 0.09 | 0.36 | 0.54 | 0.57 | 0.72 | 0.36 | 0.38 | 0.46 |
| OS-14 | 1.60 | 0.15 | 0.89 | 0.90 | 0.96 | 1.45 | 0.03 | 0.09 | 0.36 | 0.49 | 0.52 | 0.68 | 0.15 | 0.16 | 0.19 |
| OS-15 | 1.60 | 1.20 | 0.89 | 0.90 | 0.96 | 0.40 | 0.03 | 0.09 | 0.36 | 0.68 | 0.70 | 0.81 | 1.08 | 1.12 | 1.30 |
| OS-16 | 1.00 | 0.70 | 0.89 | 0.90 | 0.96 | 0.30 | 0.02 | 0.08 | 0.35 | 0.63 | 0.65 | 0.78 | 0.63 | 0.65 | 0.78 |
| OS-17 | 0.53 | 0.43 | 0.89 | 0.90 | 0.96 | 0.10 | 0.03 | 0.09 | 0.36 | 0.73 | 0.75 | 0.85 | 0.39 | 0.40 | 0.45 |
| OS-18 | 0.30 | 0.30 | 0.89 | 0.90 | 0.96 | 0.00 | 0.03 | 0.09 | 0.36 | 0.89 | 0.90 | 0.96 | 0.27 | 0.27 | 0.29 |
| OS-19 | 0.18 | 0.00 | 0.89 | 0.90 | 0.96 | 0.18 | 0.05 | 0.12 | 0.39 | 0.05 | 0.12 | 0.39 | 0.01 | 0.02 | 0.07 |
| OS-20 | 0.11 | 0.01 | 0.89 | 0.90 | 0.96 | 0.10 | 0.03 | 0.09 | 0.36 | 0.11 | 0.16 | 0.41 | 0.01 | 0.02 | 0.05 |
| OS-21 | 0.36 | 0.02 | 0.89 | 0.90 | 0.96 | 0.34 | 0.03 | 0.09 | 0.36 | 0.08 | 0.14 | 0.39 | 0.09 | 0.05 | 0.14 |
| OS-22 | 2.50 | 1.30 | 0.41 | 0.45 | 0.59 | 1.20 | 0.03 | 0.09 | 0.36 | 0.23 | 0.28 | 0.48 | 0.57 | 0.69 | 1.20 |
| OS-23 | 1.50 | 0.90 | 0.41 | 0.45 | 0.59 | 0.60 | 0.03 | 0.09 | 0.36 | 0.26 | 0.31 | 0.50 | 0.39 | 0.46 | 0.75 |
| JCP1 | 0.35 | 0.32 | 0.89 | 0.90 | 0.96 | 0.03 | 0.03 | 0.09 | 0.36 | 0.82 | 0.83 | 0.91 | 0.29 | 0.29 | 0.32 |
| JCP2 | 0.28 | 0.25 | 0.89 | 0.90 | 0.96 | 0.03 | 0.03 | 0.09 | 0.36 | 0.80 | 0.81 | 0.90 | 0.22 | 0.23 | 0.25 |
| JCP3 | 0.45 | 0.30 | 0.89 | 0.90 | 0.96 | 0.15 | 0.03 | 0.09 | 0.36 | 0.76 | 0.78 | 0.87 | 0.35 | 0.36 | 0.40 |
| JCP4 | 0.38 | 0.33 | 0.89 | 0.90 | 0.96 | 0.05 | 0.03 | 0.09 | 0.36 | 0.78 | 0.79 | 0.88 | 0.30 | 0.30 | 0.33 |
| JCP5 | 3.00 | 2.50 | 0.89 | 0.90 | 0.96 | 0.50 | 0.03 | 0.09 | 0.36 | 0.75 | 0.77 | 0.86 | 2.24 | 2.30 | 2.58 |
| JCP6 | 2.00 | 1.58 | 0.89 | 0.90 | 0.96 | 0.42 | 0.03 | 0.09 | 0.36 | 0.75 | 0.77 | 0.86 | 1.50 | 1.54 | 1.73 |
| JCP7 | 0.59 | 0.50 | 0.89 | 0.90 | 0.96 | 0.09 | 0.03 | 0.09 | 0.36 | 0.76 | 0.78 | 0.87 | 0.45 | 0.46 | 0.51 |

LEGEND

DESCRIPTION **SYMBOL**

EXISTING GROUND CONTOUR 6910

PROPOSED FINISHED CONTOUR 6910

MAJOR BASIN BOUNDARY [Dashed Green Line]

BASIN BOUNDARY [Dashed Red Line]

DESIGN POINT [Circle with Number]

PIPE ROUTING [Line with Number]

BASIN IDENTIFIER [Circle with 'BB' and Number]

AREA IN ACRES [Circle with Number]

EXISTING DIRECTION OF FLOW [Arrow]

PROPOSED DIRECTION OF FLOW [Arrow]

EXIST. STORM SEWER [Dashed Grey Line]

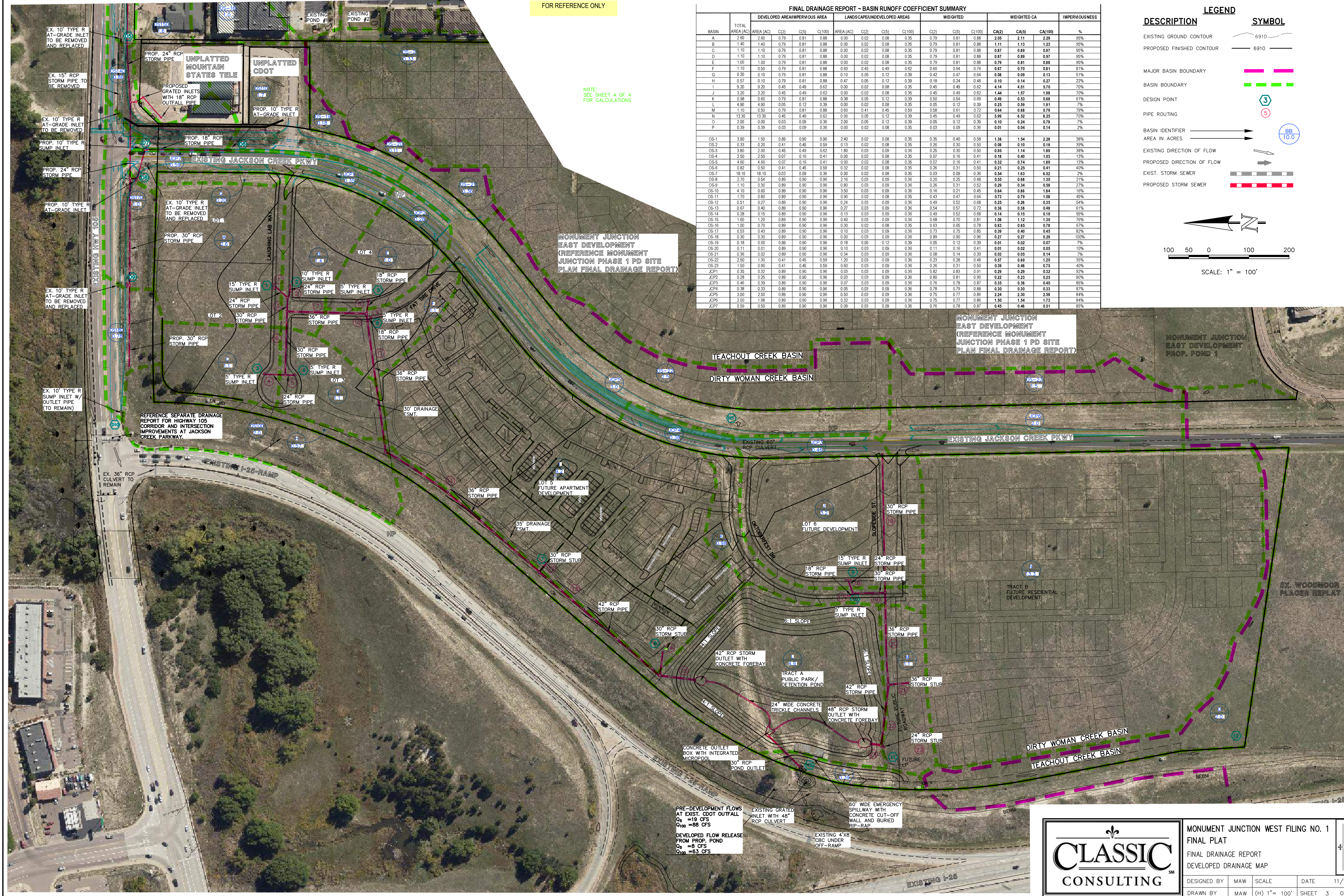
PROPOSED STORM SEWER [Dashed Red Line]

SCALE: 1" = 100'

MONUMENT JUNCTION
EAST DEVELOPMENT
JUNCTION PHASE 1 PD SITE
PLAN FINAL DRAINAGE REPORT

MONUMENT JUNCTION
EAST DEVELOPMENT
JUNCTION PHASE 1 PD SITE
PLAN FINAL DRAINAGE REPORT

MONUMENT JUNCTION
EAST DEVELOPMENT
PROP. POND 1



PRE-DEVELOPMENT FLOWS
AT EXIST. CDOT OUTFALL
Q_s = 19 CFS
Q₁₀₀ = 88 CFS

DEVELOPED FLOW RELEASE
FROM PROP. POND
Q_s = 9 CFS
Q₁₀₀ = 63 CFS

EXISTING 4'x8' CBC UNDER OFF-RAMP

60' WIDE EMERGENCY SPILLWAY WITH CONCRETE CUT-OFF WALL AND BURIED RIP-RAP

CLASSIC CONSULTING

MONUMENT JUNCTION WEST FILING NO. 1
FINAL PLAT
FINAL DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY MAW SCALE DATE 11/17/21

DRAWN BY MAW (H) 1" = 100' SHEET 3 OF 4

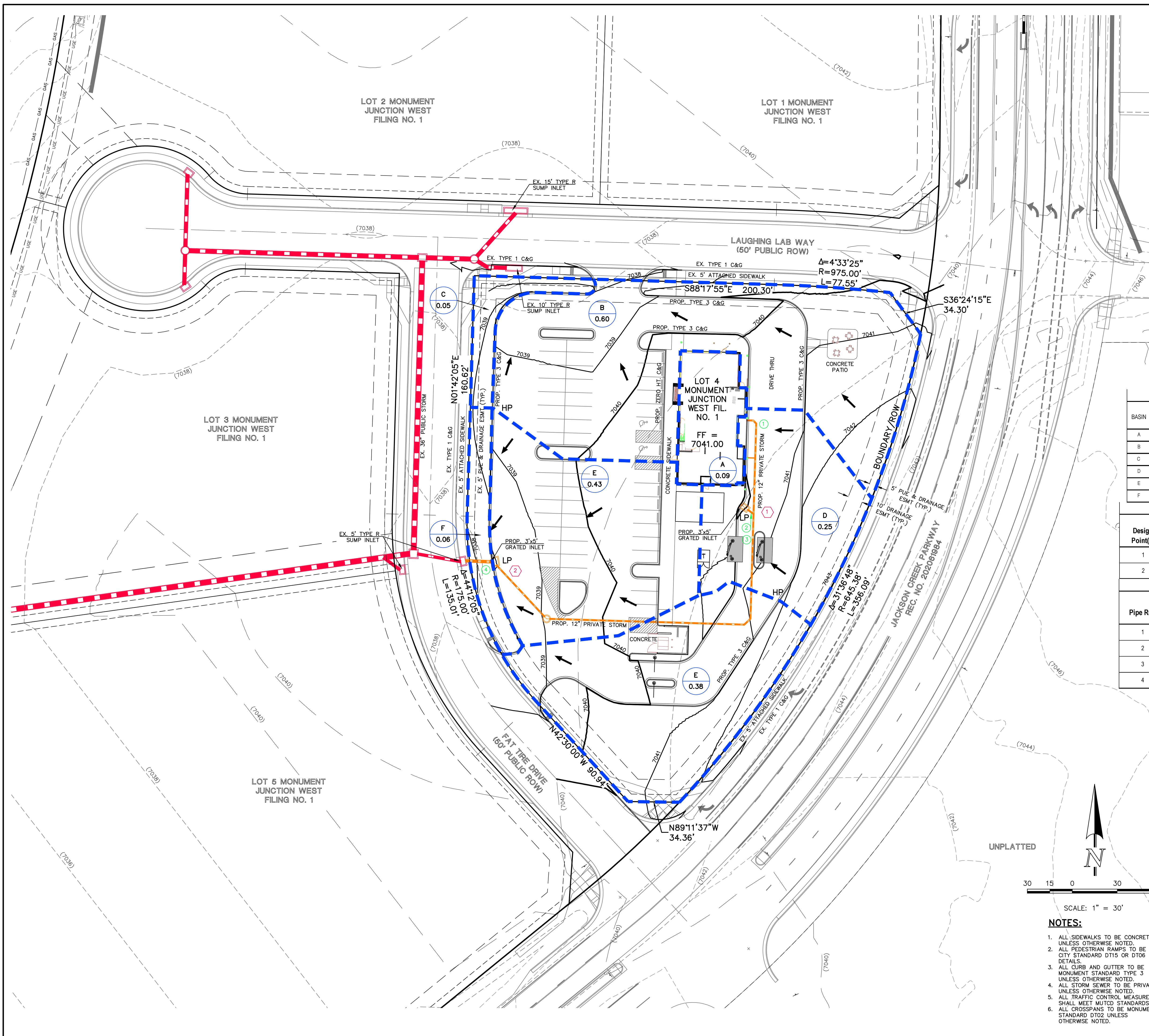
CHECKED BY (V) 1" = N/A JOB NO. 1302.20

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

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DEVELOPED CONDITIONS DRAINAGE MAP





LEGEND:

| DESCRIPTION | SYMBOL |
|---------------------------------|--------|
| EXISTING GROUND CONTOUR | (6600) |
| PROPOSED FINISHED GRADE CONTOUR | 6600 |
| PROPOSED STORM SEWER PIPE | |
| PROPOSED STORM INLET | |
| EXISTING STORM SEWER PIPE | |
| EXISTING STORM INLET | |
| BOUNDARY LINE | |
| PROPERTY LINE | |
| PROPOSED HIGH POINT | H.P. |
| PROPOSED LOW POINT | L.P. |
| PROPOSED FLOW DIRECTION | |
| EXISTING FLOW DIRECTION | |

| BASIN | TOTAL AREA (AC) |
|-------|-----------------|
| A | 0.09 |
| B | 0.60 |
| C | 0.06 |
| D | 0.25 |
| E | 0.38 |
| F | 0.06 |

FINAL DRAINAGE REPORT - BASIN RUNOFF SUMMARY

| BASIN | WEIGHTED CA | | | | OVERLAND | | | | STREET / CHANNEL FLOW | | | | TOTAL FLOWS | | | | | |
|-------|-------------|-------|---------|-------|-------------|-------------|----------|-------------|-----------------------|----------------|----------|-------------|--------------|--------------|----------------|------------|------------|--------------|
| | CA(2) | CA(5) | CA(100) | CA(5) | Length (ft) | Height (ft) | Tc (min) | Length (ft) | Slope (%) | Velocity (fps) | Tc (min) | TOTAL (cfs) | I(2) (in/hr) | I(5) (in/hr) | I(100) (in/hr) | Q(2) (cfs) | Q(5) (cfs) | Q(100) (cfs) |
| A | 0.08 | 0.08 | 0.09 | 0.08 | 0 | 0 | 0.0 | 50 | 1.0% | 2.0 | 0.4 | 5.0 | 4.12 | 5.17 | 8.68 | 0.3 | 0.4 | 0.7 |
| B | 0.35 | 0.37 | 0.45 | 0.08 | 60 | 4 | 7.6 | 100 | 1.5% | 2.4 | 0.7 | 8.3 | 3.52 | 4.41 | 7.40 | 1.2 | 1.8 | 3.3 |
| C | 0.00 | 0.00 | 0.02 | 0.08 | 15 | 1 | 3.8 | 10 | 2.0% | 2.8 | 0.1 | 5.0 | 4.12 | 5.17 | 8.68 | 0.0 | 0.02 | 0.2 |
| D | 0.14 | 0.14 | 0.18 | 0.08 | 20 | 1 | 4.8 | 60 | 1.0% | 2.0 | 0.5 | 5.3 | 4.04 | 5.07 | 8.51 | 0.5 | 0.7 | 1.5 |
| E | 0.11 | 0.12 | 0.20 | 0.08 | 10 | 0.5 | 3.4 | 120 | 2.0% | 2.8 | 0.7 | 5.0 | 4.12 | 5.17 | 8.68 | 0.4 | 0.6 | 1.8 |
| F | 0.05 | 0.05 | 0.06 | 0.08 | 10 | 0.5 | 3.4 | 5 | 2.0% | 2.8 | 0.0 | 5.0 | 4.12 | 5.17 | 8.68 | 0.2 | 0.3 | 0.5 |

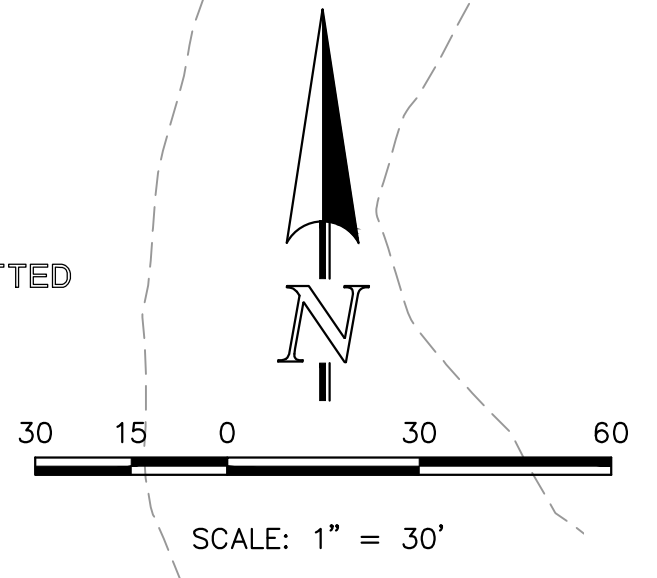
FINAL DRAINAGE REPORT - SURFACE ROUTING SUMMARY

| Design Point(s) | Contributing Basins | Equivalent CA(5) | Equivalent CA(100) | Maximum Tc | Intensity | | Flow | | Inlet Size |
|-----------------|---------------------|------------------|--------------------|------------|-----------|--------|------|--------|-------------------|
| | | | | | I(5) | I(100) | Q(5) | Q(100) | |
| 1 | BASIN D | 0.14 | 0.18 | 5.3 | 5.07 | 8.51 | 0.7 | 1.5 | 3x5" GRATED INLET |
| 2 | BASIN E | 0.12 | 0.20 | 5.0 | 5.17 | 8.68 | 0.6 | 1.8 | 3x5" GRATED INLET |

FINAL DRAINAGE REPORT - PIPE ROUTING SUMMARY

| Pipe Run | Contributing Basins | Equivalent CA(5) | Equivalent CA(100) | Maximum Tc | Intensity | | Flow | | Pipe Size* |
|----------|---------------------|------------------|--------------------|------------|-----------|--------|------|--------|-------------------|
| | | | | | I(5) | I(100) | Q(5) | Q(100) | |
| 1 | BASIN A | 0.08 | 0.09 | 5.0 | 5.17 | 8.68 | 0.4 | 0.7 | 12" PRIVATE STORM |
| 2 | DP 1 | 0.14 | 0.18 | 5.3 | 5.07 | 8.51 | 0.7 | 1.5 | 12" PRIVATE STORM |
| 3 | PIPE 1 + PIPE 2 | 0.22 | 0.27 | 5.3 | 5.07 | 8.51 | 1.1 | 2.3 | 12" PRIVATE STORM |
| 4 | DP 2 + PIPE 3 | 0.35 | 0.47 | 5.3 | 5.07 | 8.51 | 1.8 | 4.0 | 18" PRIVATE STORM |

NOTE:
STORMWATER QUALITY AND DETENTION TO BE PROVIDED IN TRACT A MONUMENT JUNCTION WEST FILING NO. 1



LEGEND

| | | | |
|---------------------------|------|----------------------|--|
| EXISTING GROUND CONTOUR | 5910 | EXISTING STORM SEWER | |
| PROPOSED FINISHED CONTOUR | 5910 | EXISTING STORM INLET | |
| SUBDIVISION BOUNDARY | | PROPOSED STORM SEWER | |
| LOT LINE | | PROPOSED STORM INLET | |
| PROPOSED BASIN BOUNDARY | | BASIN IDENTIFIER | |
| OVERFLOW ROUTE | | AREA IN ACRES | |
| DIRECTION OF DRAINAGE | | DESIGN POINT | |
| | | PIPE RUN | |

- NOTES:**
1. ALL SIDEWALKS TO BE CONCRETE UNLESS OTHERWISE NOTED.
 2. ALL PEDESTRIAN RAMPS TO BE PER CITY STANDARD DTIS OR DT06 DETAILS.
 3. ALL CURB AND GUTTER TO BE MONUMENT STANDARD TYPE 3 UNLESS OTHERWISE NOTED.
 4. ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED.
 5. ALL TRAFFIC CONTROL MEASURES SHALL MEET MUTCD STANDARDS.
 6. ALL CROSSPANS TO BE MONUMENT STANDARD DT02 UNLESS OTHERWISE NOTED.

619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903

(719) 785-0790
(719) 785-0799 (Fax)

LOT 4 MONUMENT JUNCTION WEST
FILING NO. 1
FINAL DRAINAGE REPORT
DEVELOPED CONDITIONS DRAINAGE MAP

| | | | | |
|-------------|-----|--------------|---------|------------|
| DESIGNED BY | CMT | SCALE | DATE | 03/01/2022 |
| DRAWN BY | CMT | (H) 1" = 30' | SHEET | 1 OF 1 |
| CHECKED BY | | (V) 1" = N/A | JOB NO. | 2589.20 |

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