FINAL DRAINAGE REPORT

For

TRAILS AT ASPEN RIDGE
Filing No. 4

Prepared for:
EL PASO COUNTY
Engineering Development Review Team
2880 International Circle
Colorado Springs, CO 80910

On Behalf of:
COLA, LLC.
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Prepared by:

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Project No. 21.886.038

PCD File No. SF-21-024

Engineer's Statement:
This report and plan for the drainage design of Trails at Aspen Ridge Filing No. 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 El Paso County Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

____ SEAL

Jesse Sullivan Date
Registered Professional Engineer
State of Colorado
No. 55600

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

COLA, LLC
Business Name

By: ______________________________ ____________
Tim Buschar Date

Title: Director of Land Acquisition and Development

Address: 555 Middle Creek Parkway, Suite 380
Colorado Springs, CO 80921

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

______________________________ ____________________
Jennifer Irvine, P.E. Date
County Engineer / ECM Administrator

Conditions:

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I. Introduction

The Trails at Aspen Ridge Filing No. 4 development is within the Waterview East (Waterview II) Subdivision, which is within El Paso County jurisdiction and is comprised of a total of 17.903 acres of single-family residential, open space, and public right-of-way. The site is located within the 721.8-acre Waterview Development in the 419.8-acre portion of the development east of Powers. The Trails at Aspen Ridge development was referred to as Waterview East or Waterview II in the original Waterview Master Development Drainage Study (MDDP).

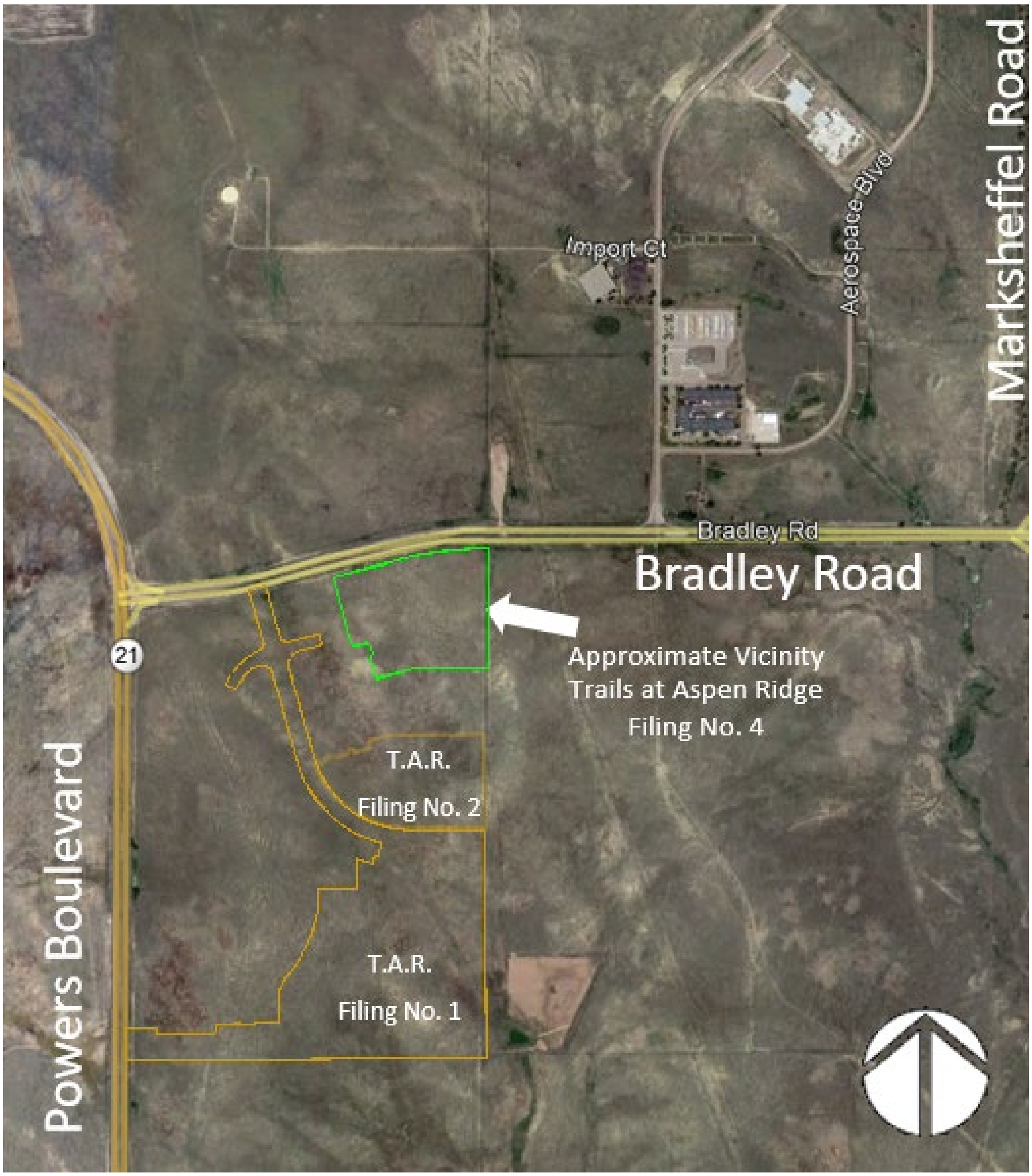


Figure 1 - Project Location

II. PURPOSE AND SCOPE OF STUDY

The purpose of this Final Drainage Report (FDR) is to identify and evaluate the offsite and onsite drainage patterns associated with Filing No. 4 of the Trails at Aspen Ridge development (17.903 acres) and to provide hydrologic and hydraulic analyses of this area to ensure compliance with the El Paso County Drainage Criteria Manual (DCM) and the most recent MDDP Amendment, as well as provide effective, safe routing to downstream outfalls.

III. GENERAL LOCATION AND DESCRIPTION

Trails at Aspen Ridge Filing No. 4 is within the Waterview subdivision, which extends from Grinnell Road on the west to approximately one-half mile east of the north-south portion of Powers Boulevard. The west portion of the subdivision (Waterview I) is bounded on the north by an east-west portion of Powers Boulevard and on the south by Bradley Road. The east portion of the subdivision (Waterview East/Waterview II) is bounded on the north by the Colorado Springs Airport and on the south, approximately 3,260 feet south of the Bradley and Powers intersection by property owned by the State of Colorado. The subject of this report, Trails at Aspen Ridge Filing No. 4, is in the Waterview East portion of the overall Waterview Subdivision and located southeast of the intersection of Powers Boulevard and Bradley Road. More specifically, the study area is located as follows:

A. **<u>General Location:</u>** The southwest ¼ and the northwest ¼ of Section 9, Township 15 South, Range 65 West of the 6th P.M. in the County of El Paso, State of Colorado.

B. **<u>Surrounding Streets and Developments:</u>**

- **a.** **<u>North:</u>** Bradley Road.
- **b.** **<u>East:</u>** Several undeveloped properties. See DR-02 for location and ownership
- **c.** **<u>South:</u>** Trails at Aspen Ridge PUDSP, Filing No. 1, and Filing No. 2
- **d.** **<u>West:</u>** Legacy Hill Drive, commercially zoned property owned at time of report writing by CRP Entitlements, LLC, and portions of Trails at Aspen Ridge PUDSP

C. **<u>Drainageway:</u>** This site is located within the West Fork Jimmy Camp Creek Drainage Basin and the Marksheffel Tributary to Jimmy Camp Creek basins.

- **a.** **<u>West Fork Jimmy Camp Creek</u>**: There appears to be a broad swale running along the west edge of the project area. Flows are conveyed in a southeasterly direction. Total area of basin considered in this report for the East Pond is approximately 165.2 acres. This includes approximately 52.5 acres in Trails at Aspen Ridge Filing No. 1, 77.3 acres of the Trails at Aspen Ridge PUDSP (Including the 15.730 Acres in Trails at Aspen Ridge Filing No. 2 and 17.903 acres of Filing No. 4), and 35.1 acres of offsite areas.
- **b.** **<u>Marksheffel Tributary Jimmy Camp Creek:</u>** A small portion in the northeast corner of the overall Trails at Aspen Ridge site is within the Marksheffel Tributary sub-basin of the Jimmy Camp Creek Drainage Basin. The total basin area considered in this report is 14.35 acres. Approximately 4.6 acres along Bradley Road are outside of Trails at Aspen Ridge and

the other 9.75 acres are within the proposed development. Note that because of the details of site grading, the area differs somewhat from the 12.2 acres indicated in PDRA-Matrix, however, detention will be designed to over detain and maintain the same level of flows. Also, both basins are within the Jimmy Camp Creek basin and thus the flows remain within the same general stream.

D. Irrigation Facilities

No known functioning irrigation facilities are within the project area.

E. Utilities and Encumbrances

a) Storm Sewer: A 36" storm sewer is extended out of a bend on the main Filing No. 2 storm sewer to drain an existing low spot just north of Legacy Hill Drive in Trails at Aspen Ridge Filing No. 2. (This storm sewer will be extended across the portion of the PUDSP area not in Filing 6 in order to provide storm sewer to the portion of Filing 6 which is within the West Fork Jimmy Camp Creek basin.

b) Sanitary Sewer: Sanitary sewer associated with Trails at Aspen Ridge Filing No. 1 has been stubbed out along Frontside Drive at the west boundary of this development. Sanitary sewer will also be extended up to the development from Filing No. 2 along Big Johnson Drive.

c) Gas: There is an existing petroleum line running just inside the Powers Boulevard easement west of the proposed development. No known gas encumbrances on the project site.

d) Water: A 12-inch water main associated with Trails at Aspen Ridge Filing No. 1 has been stubbed out along Frontside Drive at the west boundary of this development.

e) Electric: There is an existing overhead electric easement parallel to the east side of this development with two sets of overhead lines.

F. Referenced Drainage Reports

This site is within the Waterview II or Waterview East portion of the Waterview Subdivision. This study looks at Trails at Aspen Ridge Filing No. 2, which takes up the south 15.730 acres of the Waterview East Subdivision. The three reports below were used as references for this report.

"Amendment to Waterview Master Drainage Development Plan", completed by Springs Engineering, dated July 2014 *(MDDP-2014)*

"MDDP for Waterview East and PDR for Trails at Aspen Ridge", completed by Matrix Design Group, Dated September 2019. (MDDPA-Matrix)
Note: This report supersedes a previously approved PDR "Springs East at Waterview" by Stantec (SP-17-010).

"Final Drainage Report for Trails at Aspen Ridge Filing No. 1", completed by Matrix Design Group, Dated January 2020. (FDR-F1)

"Final Drainage Report for Trails at Aspen Ridge Filing No. 2", completed by Matrix Design Group, Dated February 2021. (FDR-F2) (in review)

"Final Drainage Report for Trails at Aspen Ridge Filing No. 3", completed by Matrix Design Group, Dated March 2021. (FDR-F3) (in review)

"PDR Amendment for Trails at Aspen Ridge", completed by Matrix Design Group, Dated April 2021. (PDRA-Matrix).

G. Land Uses

Land uses for the proposed development will be single family residential, public roads, and open space.

IV. SOIL CONDITIONS

Soils can be classified in four different hydrologic groups, A, B, C, or D to help predict stormwater runoff rates. Hydrologic group "A" is characterized by deep, well-drained coarse-grained soils with a rapid infiltration rate when thoroughly wet and having a low runoff potential. Group "D" typically has a clay layer at or near to the surface, or a very shallow depth to impervious bedrock and has a very slow infiltration rate and a high runoff potential. See Soils Map; Appendix C. Table 3.1 on the following page lists the soil types present in the development area:

Table 3.1 – NRCS Soil Survey for El Paso County

SOIL ID NUMBER	*SOIL*	*HYDROLOGIC CLASSIFICATION*	*PERMEABILITY*	*PERCENT ON SITE*
52	Manzanst clay loam, 0 to 3 percent slopes	C	Well Drained	45.3%
56	Nelson-Tassel fine sandy loams, 3 to 18 percent slopes	B	Well Drained	54.7%

Predevelopment site conditions are undeveloped and ground cover consists of sparse natural vegetative land cover.

V. Project Characteristics

A. Major Basin Description

West Fork Jimmy Camp Creek:

a. **Onsite Flows:** 3.55 Acres of Filing No. 4 are within the West Fork Jimmy Camp Creek Basin. Under predevelopment conditions flows in this area generally flow south. After development flows will generally sheet flow to adjacent streets, where they will be conveyed via gutter flow towards sump or at-grade inlets which will capture the flows. Flows will then be conveyed to the proposed East Pond via storm sewer.

b. **Offsite Flows:**

1. A portion of offsite flows to the East Pond are upstream of the Trails at Aspen Ridge PUDSP. There are two offsite areas. The first is approximately 14.5 acres of

commercially zoned area in two lots just north of the PUDSP and south of Bradley Road. (Legacy Hill Drive runs between the two lots). The second, on the north side of Bradley Road, is approximately 19.6 acres (12.3 acres of the West Fork Jimmy Camp Creek Basin plus an additional 7.3 acres of Big Johnson Reservoir drainage area diverted into the West Fork Jimmy Camp Creek by CDOT construction of Powers Boulevard). Runoff south of Bradley Road under predevelopment conditions generally sheet flows to the south and slightly east within the West Fork Jimmy Camp Creek Drainage Basin (DBPS-WFJCC) at slopes ranging from 2 to 9 percent. There appears to be a broad swale running along the middle of this basin in a southeasterly direction. These offsite areas are analyzed in more detail in MDDP-Matrix and FDR-F1.

Marksheffel Tributary to Jimmy Camp Creek:

1. This portion of the project is located at the most northwestern extent of the Marksheffel Tributary to Jimmy Camp Creek. Runoff from the approximately 14.35 acres of this basin within the project area sheet flow to the northeast towards Bradley Road at slopes between 7 and 8 percent and flows channelized in the road ditch then run to the east at a slope of approximately 3 percent. The other 4.6 acres of this basin analyzed by MDDPA-Matrix are along Bradley Road. Flows from this portion of the basin sheet flow off Bradley Road and into the road ditch to be carried east at slopes of approximately 3 percent.

B. Regulatory Floodplain

Per the ***Flood Insurance Rate Map (FIRM)*** 08041C0768-G, effective date December 7, 2018, published by the Federal Emergency Management Agency (FEMA), no portion of Trails at Aspen Ridge (Waterview East) lies within any designated 100-year floodplain. This map can be found in Appendix C.

VI. Drainage Design Criteria

B. Design References

As required by El Paso County, Colorado, this report has been prepared in accordance to the criteria set forth in the ***City of Colorado Springs and El Paso County Drainage Criteria Manual Volume 1 & 2*** (Drainage Criteria Manual or DCM), the El Paso County Engineering Criteria Manual (ECM), and El Paso County Resolutions 15-042 and 19-245.

In addition to the DCM, the ***Urban Storm Drainage Criteria Manuals, Volumes 1-3*** (UDFCD), published by the Urban Drainage and Flood Control District, latest update, have been used to supplement the Drainage Criteria Manual for water quality capture volume (WQCV).

C. Design Frequency

Design frequency is based on the DCM. The 100-year storm event was used as the major storm for the project, and the 5-year storm event was used as the minor storm.

D. Design Discharge

a. Method of Analysis

The hydrology for this project uses the Rational Method as recommended by the Drainage Criteria Manual for the minor and major storms for drainage basins less than 100-acres in size. The Rational Method uses the following equation: Q=C*i*A

Where:

Q = Maximum runoff rate in cubic feet per second (cfs)
C = Runoff coefficient
i = Average rainfall intensity (inches per hour)
A = Area of drainage sub-basin (acres)

b. Runoff Coefficient

Rational Method coefficients from Table 6-6 of the Drainage Criteria Manual for developed land were utilized in the Rational Method calculations. See Appendix B for more information.

c. Time of Concentration

The time of concentration consists of the initial time of overland flow and the travel time in a channel to the inlet or point of interest. A minimum time of concentrations of 5 minutes is utilized for urban areas.

d. Rainfall Intensity

The hypothetical rainfall depths for the 1-hour storm duration were taken from Table 6-2 of the Drainage Criteria Manual. Table 5.1, below, lists the rainfall depth for the Major and Minor 1-hour storm events.

Table 5.1 – Project Area 1-Hour Rainfall Depth

Storm Recurrence Interval	Rainfall Depth (inches)
5-year	1.50
100-year	2.52

The rainfall intensity equation for the Rational Method was taken from Drainage Criteria Manual Volume 1 Figure 6-5.

e. StormCAD Analysis

1. Routing

Storm CAD was utilized to analyze the routing of runoff through the proposed storm sewer system. Catchments were created in the model and calibrated to match the values calculated in the Rational Method spreadsheet.

2. HGL Profiles

StormCAD was also used to determine the Hydraulic Grade Profiles for the major and

Table 9-4. STORMCAD Standard Method Coefficients

Bend Loss		
Bend Angle	**K Coefficient**	
0°	0.05	
22.5°	0.10	
45°	0.40	
60°	0.64	
90°	1.32	
LATERAL LOSS		
One Lateral K Coefficient		
Bend Angle	Non-surcharged	Surcharged
45°	0.27	0.47
60°	0.52	0.90
90°	1.02	1.77
Two Laterals K Coefficient		
45°	0.96	
60°	1.16	
90°	1.52	

minor storms. The standard method was used to calculate head loss in the system with K coefficients taken from Table 9-4 of the DCM.

VII. Drainage Basins and Sub-basins

A. The ***predevelopment conditions*** for the site have been analyzed and are presented by design points (Table 6.2) and are described as follows:

a. West Fork Jimmy Camp Creek:

The south portion of the studied area is within the West Fork tributary to Jimmy Camp Creek. A portion of this basin is upstream of Bradley Road. Flows in that sub-basin (OS-1: Q_5 = 11.8 cfs, Q_{100} = 47.4 cfs) sheet flow to the road ditch and are conveyed to two 42-inch CMP crossroad pipes which direct the water across Bradley Road and on to the proposed development area.

The next downstream sub-basin is WF-1 (Q_5 = 33.2 cfs, Q_{100} = 139.1 cfs) which includes 14.5 Acres of commercially zoned offsite area, 66.10 acres of offsite Trails at Aspen Ridge PUD (Originally 8.99), 32.09 Acres of Trails at Aspen Ridge Filing No. 1, 15.89 Acres of Trails at Aspen Ridge Filing No. 2 (PUD area reduced), and 5.00 Acres which are in both Filing No. 1 and the PUD. Flows in this sub-basin sheet flow towards the middle of the sub-basins where they join flows from OS-1 and are conveyed via a broad swale in a southeasterly direction and out of the study area.

The third sub-basin within the West Fork basin is sub-basin WF-2 (Q_5 = 5.5 cfs, Q_{100} = 31.1 cfs) which includes 15.77 Acres of Filing No. 1 and 5.38 Acres of the PUD. Flows in this basin sheet flow in an easterly direction where they are captured by another broad swale at the south limit of the study area and conveyed in a southeasterly direction.

Total discharge to the West Fork Jimmy Camp Creek basin is approximately 37.0 cfs for the Q_5 event and 170.0 cfs for the Q_{100} event. (* Below indicates SWMM Values)

Trails at Aspen Ridge **Existing Conditions Sub-basin Summary Table**			
Area ID	**Area (Acres)**	**Q5 (cfs)**	**Q100 (cfs)**
West Fork Jimmy Camp Creek / OS - 1	19.60	11.8*	47.4*
West Fork Jimmy Camp Creek / WF-1	119.08	33.2*	139.1*
West Fork Jimmy Camp Creek / WF-2	21.15	5.5*	31.1*

Trails at Aspen Ridge **Existing Design Point Summary**				
Design Point	**Sub-Basins**	**Total Area (ac.)**	**Q(5) (cfs)**	**Q(100) (cfs)**
OS-1	OS-1 (7.3 Acres diverted by CDOT from Big Johnson)	19.60	11.8*	47.4*
WF-1	WF-1 & OS-1	138.69	33.2*	139.1*
WF-2	WF-2	21.15	5.5*	31.1*
TO WEST FORK JIMMY CAMP CREEK	WF-1, WF-2, & OS-1 (Basins are parallel, so this is a sum of WF-1 & WF-2.)	**159.84**	**37.0***	**170.0***

b. Marksheffel Tributary to Jimmy Camp Creek:
The eastern portion of the studied area is within the Marksheffel Tributary to Jimmy Camp Creek. This basin is represented by Sub-basin MKT-1 (Q_5 = 5.4 cfs, Q_{100} = 36.5 cfs). Flows in this sub basin sheet flow to the northeast to the Bradley Road ditch where they are conveyed eastward. The total discharge from the studied area under predevelopment conditions is approximately 5.4 cfs for the Q_5 event and 36.5 cfs for the Q_{100} event.

Trails at Aspen Ridge, Filing No. 1 FDR Existing Conditions Sub-basin Summary Table			
Area ID	**Area (Acres)**	**Q5 (cfs)**	**Q100 (cfs)**
Marksheffel Tributary to Jimmy Camp Creek / MKT-1	7.21	1.6	10.9

Trails at Aspen Ridge, Filing No. 1 FDR Existing Design Point Summary				
Design Point	**Sub-Basins**	**Total Area (ac.)**	**Q(5) (cfs)**	**Q(100) (cfs)**
MKT-1 TO MARKSHEFFEL TRIBUTARY TO JIMMY CAMP CREEK	MKT-1	**7.21**	**1.63**	**10.95**

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

a. West Fork – Jimmy Camp Creek:
Under proposed conditions, flows for this basin will be directed to a proposed detention pond (East Pond) near the southeast corner of the proposed Trails at Aspen Ridge development. Sub-basins and Design Points for this major basin are summarized in hydrology tables below and on the following pages. (Note that grey shading indicates sub-basins within the West Fork Jimmy Camp Creek basin that are covered in previous drainage reports. Sub-basins C-7 and C-8 were covered in ***MDDP-Matrix***, but, as the HGLs for the inlets serving these two sub-basins are included in this report, they are not shaded gray.)

Trails at Aspen Ridge West Fork - Jimmy Camp Creek Proposed Conditions - Sub-basin Summary *(Gray shading: Covered in previous drainage report)*			
Basin	**Area**	**Q5**	**Q100**
	acres	**cfs**	**cfs**
OS-1	19.67	4.0	26.8
A-1	12.34	4.4	18.9
A-2	1.09	2.7	5.2
A-3	4.98	2.2	9.0
A-4	0.12	0.6	1.0
B-1	1.06	1.8	4.1
C-1	3.27	5.9	12.9
C-2	1.19	2.4	5.3

Trails at Aspen Ridge **West Fork - Jimmy Camp Creek** **Proposed Conditions - Sub-basin Summary** *(Gray shading: Covered in previous drainage report)*			
Basin	**Area**	**Q5**	**Q100**
	acres	**cfs**	**cfs**
C-3	4.60	8.4	18.5
C-4	0.36	1.6	3.0
C-5	3.13	5.7	12.5
C-6	0.07	0.3	0.6
C-7+8 (MDDP Sub-basins C7 and C8 combined)	2.26	4.2	9.2
D-1	2.21	1.6	5.2
E-1	6.43	3.9	12.2
E-2	2.14	3.9	8.7
F-1	1.49	2.7	6.0
F-2	0.58	1.1	2.5
F-3	1.25	2.3	5.0
F-4	0.58	1.1	2.5
F-5	2.27	3.5	7.8
F-6	1.00	1.7	3.9
F-7	5.06	7.5	16.5
F-8	0.84	1.5	3.3
G-1	1.11	2.1	4.6
H-1	3.60	5.6	12.3
H-2	1.16	1.9	4.2
H-3	2.97	4.7	10.3
H-4	0.92	1.6	3.6
H-5	2.42	4.0	8.9
H-6	2.46	4.1	9.1
H-7	2.03	3.0	6.6
H-8	0.97	1.7	3.8
H-9a	1.95	2.3	5.8
H-9b	0.38	0.6	1.3
H-10	1.33	2.5	5.5
H-11	3.42	5.0	11.0
I-3	4.18	7.1	15.6
K-1+2	2.37	3.2	7.9
K-3+4	1.23	2.9	6.3
K-5	0.95	2.0	4.4
K-6	0.72	1.5	3.3
K-7	3.26	2.9	7.9
K-8	0.15	0.5	0.9
K-9	1.16	2.1	4.7
K-10	1.10	2.2	4.7
K-11	1.39	2.6	5.8
K-12	0.67	1.4	3.0
K-13	0.09	0.3	0.6
K-14	2.78	5.0	11.0
OS-East Side	4.15	0.6	4.0
J1	5.89	10.2	23.5
J2	0.90	1.7	3.8
J3	1.81	3.7	8.1
J4	0.56	1.2	2.6
K15	1.65	3.0	6.6

Trails at Aspen Ridge **West Fork - Jimmy Camp Creek** **Proposed Conditions - Sub-basin Summary** *(Gray shading: Covered in previous drainage report)*			
Basin	**Area**	**Q5**	**Q100**
	acres	**cfs**	**cfs**
K16	1.20	2.4	5.4
K17	0.41	0.9	1.9
K18	1.90	3.5	7.8
K19	0.93	1.8	4.0
K20	2.78	5.4	11.8
K21	0.44	0.9	2.0
K22	2.18	3.7	9.2

Design Point Summary - StormCAD *(Gray shading: Covered in previous drainage report)*						
Design Point	**Total Drainage Area**	**Surface**		**Storm Sewer**		**Downstream Design Point**
		Q5 (cfs)	**Q100 (cfs)**	**Q5 (cfs)**	**Q100 (cfs)**	
1-OS	**19.67**	4.0	26.8	**-**	**-**	A
1-A	**12.34**	3.5	17.6	**-**	**-**	A
2-A	**1.09**	2.7	5.2	**-**	**-**	A
3-A	**4.98**	2.2	8.9	**-**	**-**	A
4-A	**0.12**	0.6	1.0	**-**	**-**	A
A	**38.20**	-	-	12.0	55.6	B
1-B	**1.06**	1.8	4.1	-	-	B
B	**39.26**	-	-	12.7	57.1	C
1-C	**3.27**	5.9	12.9	-	-	C
2-C	**1.19**	2.4	5.3	-	-	C
3-C	**4.60**	8.4	18.5	-	-	C
4-C	**0.36**	1.6	3.0	-	-	C
5-C	**3.13**	5.7	12.5	-	-	C
6-C	**0.07**	0.3	0.6	-	-	C
7+8-C	**2.26**	4.2	9.2	-	-	C
C	**54.13**	-	-	27.6	90.2	D
1-D	**2.21**	1.6	5.2	-	-	D
D	**56.34**	0.0	0.0	28.1	92.1	E
1-E	**6.43**	2.6	11.4	-	-	E
2-E	**2.14**	3.9	8.7	-	-	E
E	**64.91**	-	-	33.7	108.8	F
1-F	**2.07**	2.7	6.0	2.7	6.0	3-F
2-F	**0.58**	1.1	2.5	1.6	3.6	3-F
3-F	**3.32**	2.3	5.0	3.8	8.4	4-F
4-F	**3.89**	1.1	2.5	5.0	11.1	5-F
5-F	**6.16**	3.5	7.8	6.6	14.6	6-F
6-F	**7.16**	1.7	3.9	7.9	17.5	8-F

Design Point Summary - StormCAD *(Gray shading: Covered in previous drainage report)*						
Design Point	Total Drainage Area	Surface		Storm Sewer		Downstream Design Point
		Q5 (cfs)	Q100 (cfs)	Q5 (cfs)	Q100 (cfs)	
7-F	**5.06**	7.5	16.5	7.5	16.5	8-F
8-F	**13.07**	1.5	3.3	16.2	35.8	F
F	**77.97**	-	-	43.5	131.0	G
1-G	**1.11**	2.1	4.6	-	-	G
G	**79.08**	-	-	44.2	132.7	M
1-H	**3.60**	5.9	13.1	-	-	1-2 H
2-H	**1.16**	1.9	4.2	-	-	1-2 H
1-2 H	**4.76**	-	-	9.0	19.8	1-4 H
3-H	**2.97**	4.7	10.3	-	-	1-4 H
4-H	**0.92**	1.6	3.6	-	-	1-4 H
1-4 H	**8.65**	-	-	16.4	36.1	1-6 H
5-H	**2.42**	4.0	8.9	-	-	1-6 H
6-H	**2.46**	3.9	8.6	-	-	1-6 H
1-6 H	**13.53**	-	-	20.2	44.9	1-8 H
7-H	**2.03**	2.9	6.4	-	-	1-8 H
8-H	**0.97**	1.7	3.7	-	-	1-8 H
1-8 H	**16.52**	-	-	23.3	49.3	1-10 H
9a-H	**1.95**	2.3	5.7	-	-	9b-H
9b-H	**0.38**	0.6	1.4	2.8	6.5	10-H
10-H	**1.33**	2.4	5.2	-	-	1-10 H
1-10 H	**20.17**	-	-	29.6	66.5	11-H
11-H	**3.42**	5.0	11.0	-	-	H
H	**23.59**			37.4	83.0	M
1-J	**5.89**	10.2	23.5	-	-	1-2-J
2-J	**0.90**	1.7	3.8	-	-	1-2-J
1-2-J	**6.79**			5.6	13.6	1-4-J
3-J	**1.81**	3.7	8.1	-	-	1-4-J
4-J	**0.56**	1.2	2.6	-	-	1-4-J
1-4-J	**9.16**			14.8	36.0	5-J
15-K	**1.65**	3.0	6.6	-	-	15-16-K
16-K	**1.20**	2.4	5.4	-	-	15-16-K
15-16-K	**2.85**			4.1	9.6	15-18-K
17-K	**0.41**	0.9	1.9	-	-	15-18-K
18-K	**1.90**	3.5	7.8	-	-	15-18-K
15-18-K	**5.17**			8.2	19.1	6-J
19-K	**0.93**	1.8	4.0	-	-	19-20-K
20-K	**2.78**	5.4	11.8	-	-	19-20-K
19-20-K	**3.71**			6.7	15.6	5-J

Design Point Summary - StormCAD (Gray shading: Covered in previous drainage report)						
Design Point	Total Drainage Area	Surface		Storm Sewer		Downstream Design Point
		Q5 (cfs)	Q100 (cfs)	Q5 (cfs)	Q100 (cfs)	
21-K	**0.44**	0.9	2.0	-	-	7-J
22-K	**2.18**	3.7	9.2	-	-	7-J
5-J	**12.87**	-	-	23.8	58.6	6-J
6-J	**18.04**	-	-	30.2	72.6	7-J
7-J	**20.66**	-	-	30.8	73.9	OS-2-K
1-K	**0.78**	0.8	2.3	-	-	OS-2-K
2-K	**1.58**	2.7	5.9	-	-	OS-2-K
OS-2-K	**23.02**	-	-	33.3	81.2	OS-12-K
3+4-K	**1.23**	2.9	6.3	-	-	3-4-K
OS-4-K	**24.25**	-	-	35.2	85.4	OS-12-K
5-K	**0.95**	2.0	4.4	-	-	6-K
6-K	**0.72**	1.5	3.3	3.4	7.6	5-8-K
7-K	**3.26**	2.9	7.9	-	-	5-8-K
8-K	**0.15**	0.5	0.9	-	-	5-8-K
5-8-K	**5.08**	-	-	5.2	12.0	5-10-K
9-K	**1.16**	2.1	4.7	-	-	9-10-K
10-K	**1.10**	2.2	4.7	-	-	9-10-K
9-10-K	**2.26**	-	-	4.0	8.8	5-10-K
5-10-K	**7.34**	-	-	7.8	18.0	5-12-K
11-K	**1.39**	2.6	5.8	-	-	5-12-K
12-K	**0.67**	1.4	3.0	-	-	5-12-K
5-12-K	**9.40**	-	-	10.3	23.6	OS-12-K
OS-12-K	**33.65**	-	-	36.9	89.9	OS-14-K
13-K	**0.09**	0.3	0.6	-	-	OS-14-K
OS-E	**4.15**	3.1	3.4	-	-	14-K
14-K	**2.78**	5.0	11.0	5.1	11.0	OS-14-K
OS-14-K	**36.52**	-	-	43.6	100.9	K
K	**40.23**	-	-	48.0	110.6	3-I
1-I	**3.13**	6.9	12.3	-	-	K
2-I	**0.59**	2.3	4.1	-	-	K
3-I	**4.18**	9.3	16.5	8.7	15.5	M
I	**44.42**	-	-	52.0	120.3	M
M	**158.79**	-	-	**154.5**	**383.7**	East Pond Discharge
East Pond Discharge (Filing 1 & 2 Buildout)	**158.79**	-	-	6.7	120.0	Existing Swale

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
1-OS	- This design point is at the downstream end of the offsite sub-basin (OS-1) north of Bradley Road. Flows in Sub-basin OS-1 will sheet flow to the road ditch running along Bradley and Powers Boulevard. Once channelized in the ditch flows will be directed to a proposed 24-inch RCP storm pipe sleeved into one of the existing 42-inch CMP crossroad pipes to minimize disturbance to Bradley Road and avoid conflicts with existing utilities along the north side of Bradley Road. From there flows will be conveyed on to design point A. The second existing 42" CMP will be plugged. - Please note that approximately 7.3 acres of the area tributary to this design point have been diverted from the Big Johnson Reservoir by CDOT construction of Powers Boulevard. Future development of that portion of the tributary sub-basin must redirect these flows to the Big Johnson Reservoir to maintain compliance with the two relevant DBPS reports. - Development of the OS-1 Sub-basin will require onsite detention and an FDR.	A
1-A	-This design point is located at a sump inlet on the north side of Frontside Drive and just west of the Legacy Hill Drive Roundabout. -Please note that the commercial lot to within Sub-basin A-1 will be treated as undeveloped for the purposes of this report. Per MDDPA-Matrix, future development of this lot will require on-site detention as described in the referenced MDDP. -Development of this basin will require onsite detention and an FDR.	A
2-A	-This design point is located at a sump inlet on the south side of Frontside Drive and just west of the Legacy Hill Drive Roundabout. -Flow to This design point is primarily from street drainage along Frontside Drive.	A
3-A	-This design point is located at a sump inlet on the north side of Frontside Drive and just east of the Legacy Hill Drive Roundabout. -Please note that the commercial lot to within Sub-basin A-3 will be treated as undeveloped for the purposes of this report. Per MDDPA-Matrix, future development of this lot will require on-site detention as described in the referenced MDDP. -Development of this basin will require onsite detention and an FDR.	A
4-A	-This design point is located at a sump inlet on the south side of Frontside Drive and just east of the Legacy Hill Drive Roundabout. -Flow to This design point is almost exclusively from street drainage along Frontside Drive.	A
A	-This design point represents the manhole combining drainage from Design points OS-1 and 1-A through 4-A.	B
1-B	-This design point represents the on-grade inlet south of Frontside Drive.	B

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
B	-This design point represents the manhole on Legacy Hill Drive combining the flows from design point A with design point 1-B.	C
1-C	-This is an offsite design point in a future filing. This is located at a sump inlet on the west side of Drinking Horse Drive. -Future filing	C
2-C	-This is an offsite design point in a future filing. This is located at a sump inlet on the east side of Drinking Horse Drive. -Future filing	C
3-C	-This design point is at a sump inlet just west of Legacy Hill Drive on the north side of Moose Meadow Street.	C
4-C	-This design point is at a sump inlet just west of Legacy Hill Drive on the south side of Moose Meadow Street.	C
5-C	-This design point is at a sump inlet just east of Legacy Hill Drive on the north side of Moose Meadow Street.	C
6-C	-This design point is at a sump inlet just east of Legacy Hill Drive on the south side of Moose Meadow Street.	C
7+8-C	- This design point is located at a sump inlet on the south side of Moose Meadow Street between Roundhouse Drive and Beartrack Point. Sub-basins C-7+8 is tributary to this location. This sub-basin will not be developed in this filing excepting the extension of Moose Meadow Drive from its Filing No. 1 termination point just east of Legacy Hill Drive over to its intersection with Bear Track Point.	C
C	-This design point is at a manhole in Legacy Hill Drive at its intersection with Moose Meadow Street. It reflects the combination of flows from design points 1-C through 8-C with flows from design point B.	D
1-D	-This design point is an on-grade inlet on Legacy Hill Drive northwest of its intersection with Sunday Gulch.	D
D	-This design point combines flows from design point 1-D with flows from design point C at a manhole in Legacy Hill Drive northwest of its intersection with Sunday Gulch Drive.	E
1-E	-This design point is located at a sump inlet on Falling Rock Drive just west of Sunday Gulch Drive which captures flows from Sub-basin E-1 and flow bypass from design point 1-D.	E
2-E	-This is a sump inlet across the street from design point 1-E. -During lower probability events flows to design point 1-E may equalize across the street to this design point.	E

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
E	This design point is at a manhole at the intersection of Sunday Gulch Drive and Falling Rock Drive. Flows from Design points 1-E, 2-E, and D are combined at this design point.	F
1-F	-This design point is at an at-grade inlet on the west side of future Lazy Ridge Drive. (Future filing)	3-F
2-F	-This design point is at an at-grade inlet on the east side of future Lazy Ridge Drive. (Future filing)	3-F
3-F	-This design point is at an at-grade inlet on the west side of future Lazy Ridge Drive. -Flows from Sub-basin F-3 are combined with storm sewer flows from design points 1-F and 2-F (Future filing)	4-F
4-F	-This design point is at an at-grade inlet on the east side of future Lazy Ridge Drive. -Flows from sub-basin F-4 are combined with flows from 1-F, 2-F and 3-F. (Future filing)	5-F
5-F	-This design point is at an at-grade inlet on the west side of Wagon Hammer Drive. -Flows from Sub-basin F-5 are combined with storm sewer flows from design points 1-F, 2-F, 3-F, and 4-F	6-F
6-F	-This design point is at an at-grade inlet on the east side of Wagon Hammer Drive. -Flows from Sub-basin F-6 are combined with storm sewer flows from design points 1-F, 2-F, 3-F, 4-F, and 5-F	8-F
7-F	-This design point is at a sump inlet located on the north side of Lookout Court just west of its intersection with Sunday Gulch Drive. -This inlet captures flows from Sub-basin F-7	8-F
8-F	-This design point is at a sump inlet and manhole on the south side of Lookout Court just west of its intersection with Sunday Gulch Drive. -Flows from Sub-basin F-8 are combined with flows from design points 1-F, 2-F, 3-F, 4-F, 5-F, 6-F, and 7-F.	F
F	-This design point combines flows from design points 1-F through 8-F with flows from design point E. -Variance Drop Manhole	G
1-G	-This design point is at an at-grade inlet capturing flows from Sub-basin G.	G
G	-This design point reflects the combination of surface flows from design point 1-G with storm sewer flows from design point F	M
1-H	-This design point is at a sump inlet on the west side of Lazy Ridge Drive capturing flows from Sub-basin H-1.	1-2 H

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
2-H	-This design point is at a sump inlet on the east side of Lazy Ridge Drive capturing flows from Sub-basin H-2.	1-2 H
1-2 H	-Flows from design points 1-H and 2-H are combined at this manhole on the south side of Buffalo Horn Drive at its intersection with Lazy Ridge Drive.	1-4 H
3-H	-This design point is at a sump inlet on the west side of Wagon Hammer Drive capturing flows from Sub-basin H-3	1-4 H
4-H	-This design point is at a sump inlet on the east side of Wagon Hammer Drive capturing flows from Sub-basin H-5	1-4 H
1-4 H	-Flows from design point 1-2 H are combined with flows from 3-H and 4-H at this manhole on the south side of Buffalo Horn Drive at its intersection with Wagon Hammer Drive.	1-6 H
5-H	-This is an at-grade inlet on the north side of Buffalo Horn Drive just west of its intersection with Windy Pass Court.	1-6 H
6-H	-This is an at-grade inlet on the south side of Buffalo Horn Drive just west of its intersection with Windy Pass Court.	1-6 H
1-6 H	-Flows from design point 1-4 H are combined with flows from 5-H and 6-H at this manhole on the south side of Buffalo Horn Drive west of its intersection with Windy Pass Court.	1-8 H
7-H	-This design point is at an on-grade inlet on the west side of Sunday Gulch Drive just north of its intersection with Buffalo Horn Drive. -This inlet captures flows from Sub-basin H-7	1-8 H
8-H	-This design point is at an on-grade inlet on the east side of Sunday Gulch Drive just north of its intersection with Buffalo Horn Drive. -This inlet captures flows from Sub-basin H-8	1-8 H
1-8 H	-Flows from design point 1-6 H are combined with flows from 7-H and 8-H at this manhole on the south side of Buffalo Horn Drive west of its intersection with Sunday Gulch Drive.	1-10 H
9a-H	-This design point is near the south boundary of Filing No. 1 where a flared end section captures flows from a swale running along this southern boundary of the study area. -This design point captures flows from Sub-basin H-9a.	9b-H
9b-H	-This design point is near the south boundary of Filing No. 1 where a Type C Inlet captures flows within Sub-basin H-9b. -This design point combines flows from Sub-basins H-9a and H-9b.	10-H

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
10-H	-This design point is at a sump inlet on the south side of the cul-de-sac at the east end of Buffalo Horn Drive. Surface flows from Sub-basin H-10 are combined with storm sewer flows from design point 9-H.	1-10 H
1-10 H	-Flows from design points 10-H and 1-8 H are combined at a manhole towards the north side of the cul-de-sac at the east end of Buffalo Horn Drive.	11-H
11-H	-This design point is at a sump inlet on the north side of the cul-de-sac at the east end of Buffalo Horn Drive. -This inlet captures flows from Sub-basin H-11	H
H	-This design point combines storm sewer flows from design point 11-H and 1-10 H	M
1-J	-This is design point is at an at-grade inlet on the north side of Schoonover Drive just east of the intersection of Keyhole Drive and Schoonover Drive. Bypass flows to DP 3-J	1-2-J
2-J	-This is design point is at an at-grade inlet on the sourth side of Schoonover Drive just east of the intersection of Keyhole Drive and Schoonover Drive. Bypass flows to DP 3-J	1-2-J
1-2-J	This design point represents a manhole combining flows from design points 1-J and 2-J	1-4-J
3-J	-This design point is at a 10-foot Type R Sump inlet on the north side of Schoonover Drive and between its intersections with Big Johnson Drive and Fishhook Drive. Q100 equalizes between inlets at 3-J and 4-J.	1-4-J
4-J	-This design point is at a 10-foot Type R Sump inlet on the sourth side of Schoonover Drive and between its intersections with Big Johnson Drive and Fishhook Drive.	1-4-J
1-4-J	-This design point represents a manhole combining flows from Design Point 3-J and 4-J with flows from design point 1-2-J.	5-J
15-K	This is an at-grade inlet in a future filing on the south side of Hazelton Drive just west of its intersection with Bird Ridge Drive.	15-16-K
16-K	This is an at-grade inlet in a future filing on the north side of Hazelton Drive just west of its intersection with Bird Ridge Drive.	15-16-K
15-16-K	This design point (future filing) represents the combination of flows from Design Points 15-J and 16-J.	15-18-K
17-K	This design point represents a sump inlet on the south side of Hazelton Drive just west of its intersection with Big Johnson Drive. This inlet will be constructed as part of a future filing.	15-18-K
18-K	This design point represents a sump inlet on the north side of Hazelton Drive just west of its intersection with Big Johnson Drive. This inlet will be constructed as part of a future filing.	15-18-K

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
15-18-K	This design point is a manhole combining flows from inlets 17-K and 18-K with flows from design point 15-16-K. This manhole will be constructed as part of a future filing.	6-J
19-K	This design point represents a sump inlet on the south side of Lowline Drive just west of its intersection with Big Johnson Drive. This inlet will be constructed as part of a future filing.	19-20-K
20-K	This design point represents a sump inlet on the north side of Lowline Drive just west of its intersection with Big Johnson Drive. This inlet will be constructed as part of a future filing.	19-20-K
19-20-K	This design point is at a manhole combining flows from 19-K and 20-K. This manhole will be constructed as part of a future filing.	5-J
21-K	This design point is at an at-grade inlet on the west side of Big Johnson Drive south of its intersection with Hazelton Drive and just north of Trails at Aspen Ridge Filing No. 2. This inlet will be constructed as part of a future filing.	7-J
22-K	This design point represents two at-grade inlets on the east side of Big Johnson Drive. One inlet is located roughly halfway up the basin at the Big Johnson and Lowline Drive intersection and the other is located just north of Trails at Aspen Ridge Filing No. 2. This inlet will be constructed as part of a future filing.	7-J
5-J	This design point represents a manhole in Big Johnson Drive combining flows from Design Points 19-20-K, 1-4-J, and roughly half of 22-K	6-J
6-J	This design point represents a manhole in Big Johnson Drive at its intersection with Hazelton Drive combining flows from Design Points 5-J and 15-18-K	7-J
7-J	This design point represents a manhole in Big Johnson Drive just north of Trails at Aspen Ridge Filing No. 2 which combines the flows from 6-J with flows from Design Point 21-K and 22-K	OS-2-K
1-K	- Type C inlet in open space represented by Sub-basin K-1	**OS-2 -K**
2-K	- Sump inlet on Nutterbutter Point just west of the intersection of Nutterbutter Point and Big Johnson Drive. Captures flows from Sub-basin K-2.	**OS-2 -K**
OS-2 -K	This manhole in Big Johnson Drive combines flows from Design Points K-OS and 1+2-K	**OS-4-K**
3+4-K	-At-grade inlet on Turtle Lake Way just west of the intersection of Turtle Lake Way and Big Johnson. Captures flows from Sub-basin K-3+4.	**OS-4-K**
OS-4-K	-Manhole in Big Johnson Drive and Turtle Lake Way intersection combining Design Points 3+4-K and OS-2-K	**OS-12-K**
5-K	-At-grade inlet west of the intersection of Bear Track Point and Bird Ridge Drive (north side of Bear Track Point). Captures flows from Sub-basin K-5.	**5-6-K**

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
6-K	-At-grade inlet west of the intersection of Bear Track Point and Bird Ridge Drive (south side of Bird Ridge Drive). Combines captured flows from Sub-basin K-6 with flows from Design Point 5-K.	**5-8-K**
7-K	-At-grade inlet on Bird Ridge Drive north of intersection with Roundhouse Drive (west side of road). Captures flows from Sub-basin K-7.	**5-8-K**
8-K	-At-grade inlet on Bird Ridge Drive north of intersection with Roundhouse Drive (east side of road). Captures flows from Sub-basin K-8.	**5-8-K**
5-8-K	-Manhole in Bird Ridge Drive combining flows from Design Point 5-6-K with flows from Design Points 7-K and 8-K	**5-10-K**
9-K	-At-grade inlet on Roundhouse drive west of intersection with Bird Ridge Drive. Captures flows from Sub-basin K-9.	**9-10-K**
10-K	-At-grade inlet on Roundhouse drive west of intersection with Bird Ridge Drive. Captures flows from Sub-basin K-10.	**9-10-K**
9-10-K	-Manhole in Roundhouse Drive combining flows from Design Points 9-K and 10-K	**5-10-K**
5-10-K	-Manhole in Roundhouse Drive and Bird Ridge Drive intersection combining flows from Design Points 9-10-K and 5-8-K	**5-12-K**
11+12-K	-Sump inlet on Roundhouse Drive just west of intersection with Big Johnson Drive on the south side road. Captures flows from Sub-basins K-11 and K-12.	**5-12-K**
5-12-K	-Manhole combining flows from 5-10-K and 11+12-K	**OS-12-K**
OS-12-K	-Manhole combining flows from 5-12-K and OS-4-K at intersection of Big Johnson Drive and Roundhouse Drive.	**OS-14-K**
13-K	-Sump inlet on the west side of Big Johnson Drive located mid-block between Roundhouse Drive and Legacy Hill Drive. Captures flows from Sub-basin K-13.	**OS-14-K**
14-K	-Sump inlet on the east side of Big Johnson Drive located mid-block between Roundhouse Drive and Legacy Hill Drive. This inlet captures flows from sub-basin K-14 and combines them with flows captured from Sub-basin OS-East Side.	**OS-14-K**
OS-14-K	-Manhole combining flows from OS-12-K, 13-K, and 14-K	K
OS-E	-Type C inlet capturing flows from sub-basin OS-East Side. Flows will be conveyed to Design Point 14-K via 18-inch storm pipe.	K

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
K	-This design point combines storm sewer flows from design points 1-14-K, 2-I, and 1-I in a manhole located at the intersection of Big Johnson Drive and Legacy Hill Drive.	3-I
1-I	-This design point is at a sump inlet on the north side of Legacy Hill Drive just west of its intersection with Big Johnson Drive. -Flows from Sub-basin I-1 are captured at this inlet.	K
2-I	-This design point is at a sump inlet on the south side of Legacy Hill Drive just west of its intersection with Big Johnson Drive. -Flows from Sub-basin I-2 are captured at this inlet.	K
3-I	-This design point is at a sump inlet at the south side of the cul-de-sac at the east end of Falling Rock Drive. -Flows from Sub-basin I-3 are captured by this inlet	M
I	-This design point represents the combination of storm sewer flows from design point K with flows captured by the inlet at design point 3-I	M
M	-This design point represents the combinate of all of the flows directed to the East Pond. -Included Sub-basins: OS-1, A-1 to A-4, B-1, C-1 to C-8, D-1, E-1, E-2, F-1 to F-8, H-1 to H-11, I-1 to I-3, K1 to K-14, K15-22, OS-East Side, and M	East Pond Discharge
East Pond Discharge	-This design point is at the discharge structure from the East Pond. -Developed flows from the proposed improvements will be metered out by this structure at predevelopment levels as determined by a combination of UD-Detention and SWMM modeling of the Full Spectrum Extended Detention Basin	Existing Swale

- Generally, flows will sheet flow off developed lots towards adjacent streets which will capture flows and direct them downstream to the nearest inlets. After capture in inlets the flows will be conveyed onwards towards the downstream detention basin via storm sewer.

b. **Marksheffel Tributary to Jimmy Camp Creek:**

Under proposed conditions flows for this small basin at the northeast corner of the study area will be directed to a small proposed detention pond near the northeast corner of the proposed Trails at Aspen Ridge development. Sub-basins and Design Points within this major basin are summarized and described in the following tables:

SUB-BASIN SUMMARY TRAILS AT ASPEN RIDGE FILING NO. 4 MARKSHEFFEL TRIBUTARY TO JIMMY CAMP CREEK			
Basin	Area	Q5	Q100
	acres	cfs	cfs
L1	2.23	4.1	9.2
L2	2.91	5.9	13.0
L3	1.43	3.0	6.6
L4	1.70	3.3	7.6
L5	0.10	0.2	0.5
L6	0.05	0.1	0.2
L7	0.68	0.5	2.4
L8	0.20	0.2	0.9

PROPOSED DESIGN POINT SUMMARY TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6) Marksheffel Tributary to Jimmy Camp Creek				
Design Point	Sub-Basins	Total Area (ac.)	Q(5) (cfs)	Q(100) (cfs)
SUB-BASIN L5	SUB-BASIN L5	0.10	0.23	0.50
SUB-BASIN L6	SUB-BASIN L6	0.05	0.11	0.24
1-L	SUB-BASINS L5 & L6	0.15	0.34	0.74
SUB-BASIN L2	SUB-BASIN L2	2.91	5.90	12.99
2-L	SUB-BASINS L2, L5 & L6	3.06	6.19	13.64
3-L	SUB-BASIN L3	1.43	2.98	6.57
4-L	SUB-BASINS L2, L3, L5 & L6	4.49	9.08	20.01
5-L	SUB-BASINS L1-L6	8.42	15.64	34.94
6-L	NE POND (SUB-BASINS L1-L7)	9.09	15.53	35.92
7-L	NE POND DISCHARGE	9.09	0.70	7.80
8-L	SITE DISCHARGE	9.30	0.89	8.67

DESIGN POINT DESCRIPTIONS *(Gray shading: Covered in previous drainage report)*		
Design Point	**Description**	**Downstream Design Point**
SUB-BASIN L5	At this point SUB-BASIN L5 is captured by an at-grade inlet on the north boundary of the development.	1-L
SUB-BASIN L6	At this point SUB-BASIN L6 is captured by an at-grade inlet on the north boundary of the development.	1-L
1-L	This design point represents a manhole combining flows from SUB-BASINS L5 & L6.	2-L
SUB-BASIN L2	At this point flows from SUB-BASIN L2 are captured by an at-grade inlet on the south side of Winner Creek Drive at its intersection with Blackmer Street.	2-L
2-L	This design point represents a manhole combining flows from SUB-BASINS L2, L5 & L6.	4-L
3-L	At this point flows from SUB-BASIN L3 are captured by an at-grade inlet on the east side of Big Johnson Drive just south of its intersection with Winner Creek Drive.	4-L
4-L	This design point represents a manhole combining flows from SUB-BASINS L2, L3, L5 & L6.	5-L
5-L	This design point represents a pair of sump inlets capturing flows from SUB-BASIN L4 & L1 and combining these flows with flows from SUB-BASINS L2, L3, L4, L5 & L6.	6-L
6-L	This represents the total flow into the NE POND (SUB-BASINS L1-L7)	7-L
7-L	NE POND Discharge.	8-L
8-L	Total site discharge.	Bradley Road Ditch

VIII. Drainage Facility Design

A. Street Capacity

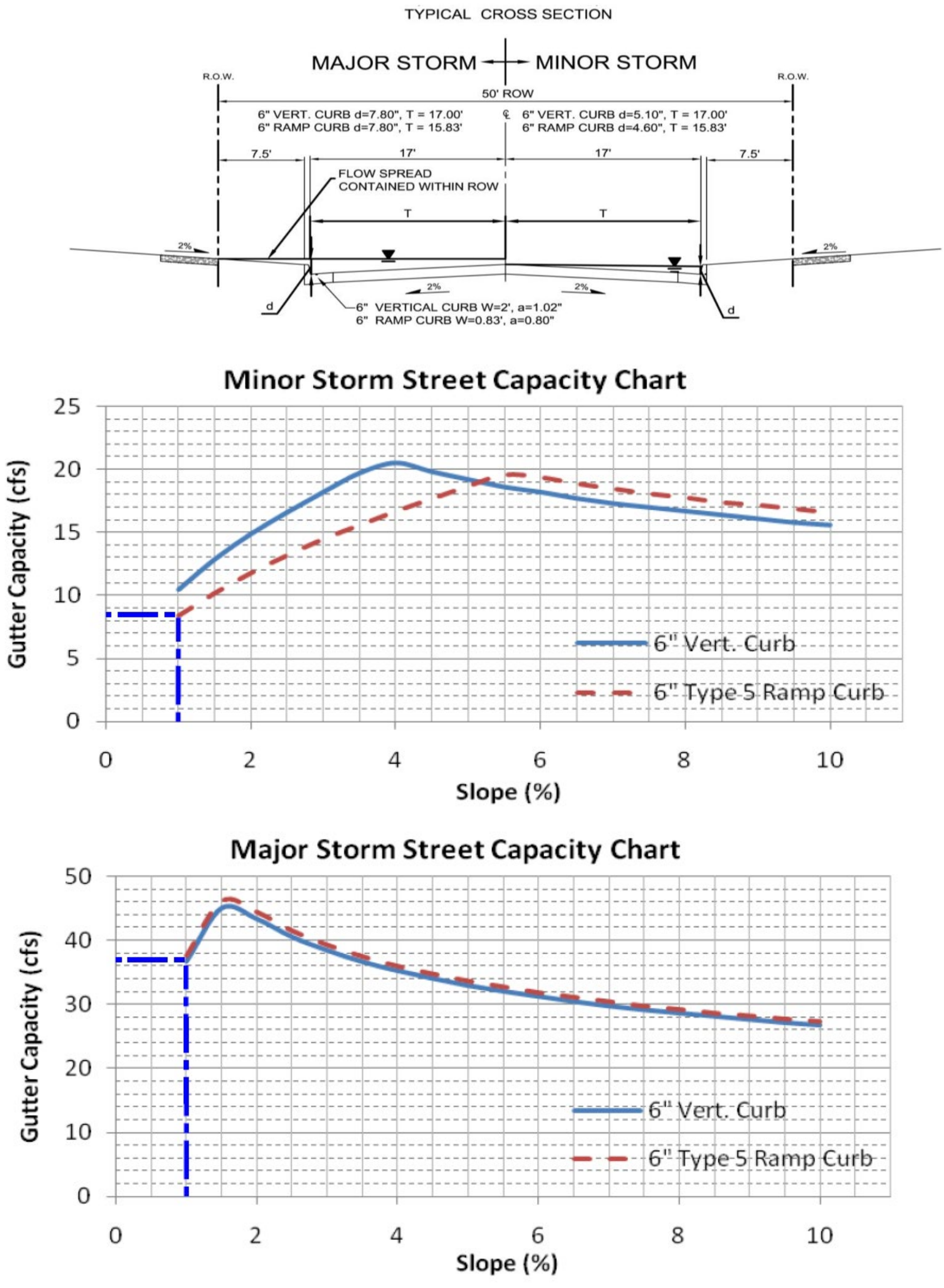
The width of the typical section for streets within Filing No. 4 will be 35 feet from back of curb to back of curb. Curb heights will be 6-inch. These streets will generally utilize EPC Optional Type C curb and gutter with EPC Type A curb and gutter used for the curb radii through intersections. The following table lists streets and capacities by Design Point:

Table
STREET CAPACITIES
TRAILS AT ASPEN RIDGE FILING NO. 4

Street	Sub-basin	BYPASS SOURCE (Design Point)	Q(5) BYPASS FLOWS RECEIVED (cfs)	Slope %	ROAD CAPACITY MINOR STORM (cfs)	Q(5) TOTAL FLOW	Q(100) BYPASS FLOWS RECEIVED (cfs)	ROAD CAPACITY MAJOR STORM (cfs)	Q(100) TOTAL FLOW (cfs)
SCHOONOVER DR.	J1	N/A	-	1.0%	10.4	10.2	-	41.7	23.5
SCHOONOVER DR.	J2	N/A	-	1.0%	10.4	1.7	-	41.7	3.8
SCHOONOVER DR.	J3	J1	3.4	1.0%	10.4	7.1	13.5	41.7	21.6
SCHOONOVER DR.	J4	J2	-	1.0%	10.4	1.2	0.1	41.7	2.6
WINNER CREEK	L1	N/A	-	2.9%	17.8	4.1	-	44.0	9.2
WINNER CREEK	L2	N/A	-	2.9%	17.8	5.9	-	44.0	13.0
BIG JOHNSON DRIVE	L3	N/A	-	2.5%	16.5	3.0	-	46.0	6.6
BIG JOHNSON DRIVE	L4	N/A	-	2.5%	16.5	3.3	-	46.0	7.6
BLACKMER DR.	L5	N/A	-	3.0%	10.6	0.2	-	45.8	0.5
BLACKMER DR.	L6	N/A	-	3.0%	10.6	0.1	-	45.8	0.2
HAZELTON DR. (Future Filing)	K15	N/A	-	2.4%	16.2	3.0	-	46.5	6.6
HAZELTON DR. (Future Filing)	K16	N/A	-	2.4%	16.2	2.4	-	46.5	5.4
HAZELTON DR. (Future Filing)	K17	K15	-	2.0%	14.8	0.9	1.2	49.1	3.1
HAZELTON DR. (Future Filing)	K18	K16	-	2.0%	14.8	3.5	0.6	49.1	8.4
LOWLINE DR. (Future Filing)	K19	N/A	-	2.0%	14.8	1.8	-	49.1	4.0
LOWLINE DR. (Future Filing)	K20	N/A	-	2.0%	14.8	5.4	-	49.1	11.8
BIG JOHNSON DR.	K21	N/A	-	4.0%	20.0	0.9	-	39.9	2.0
BIG JOHNSON DR.	K22	N/A	-	4.0%	20.0	3.7	-	39.9	9.2

Nomograph 7-7 from the DCM is shown below:

Figure 7-7. Street Capacity Charts Residential (Detached Sidewalk)



Notes:

- EPC Optional Type C curb and gutter was used for all streets.
- The nomograph (Figure 7-7) above was used to calculate capacities for the EPC Type C (Local/Residential) streets within the project area. Compared to requirements in the El Paso DCM this nomograph is slightly more conservative for the major storm (7.8-inch depth versus 12-inch depth in Table 6-1 of the El Paso County DCM) and identical for the minor/initial storm.

B. Inlet Capacity

In accordance with the DCM, this project will use Type R inlets. On-grade inlet capacities were determined utilizing UD-Inlet. Sump inlet capacities were determined utilizing DCM Nomograph 8-11 shown below. The following Table 6.2 lists inlets by design point and corresponding capacity. Table 6.3 describes overflow routing for each sump inlet.

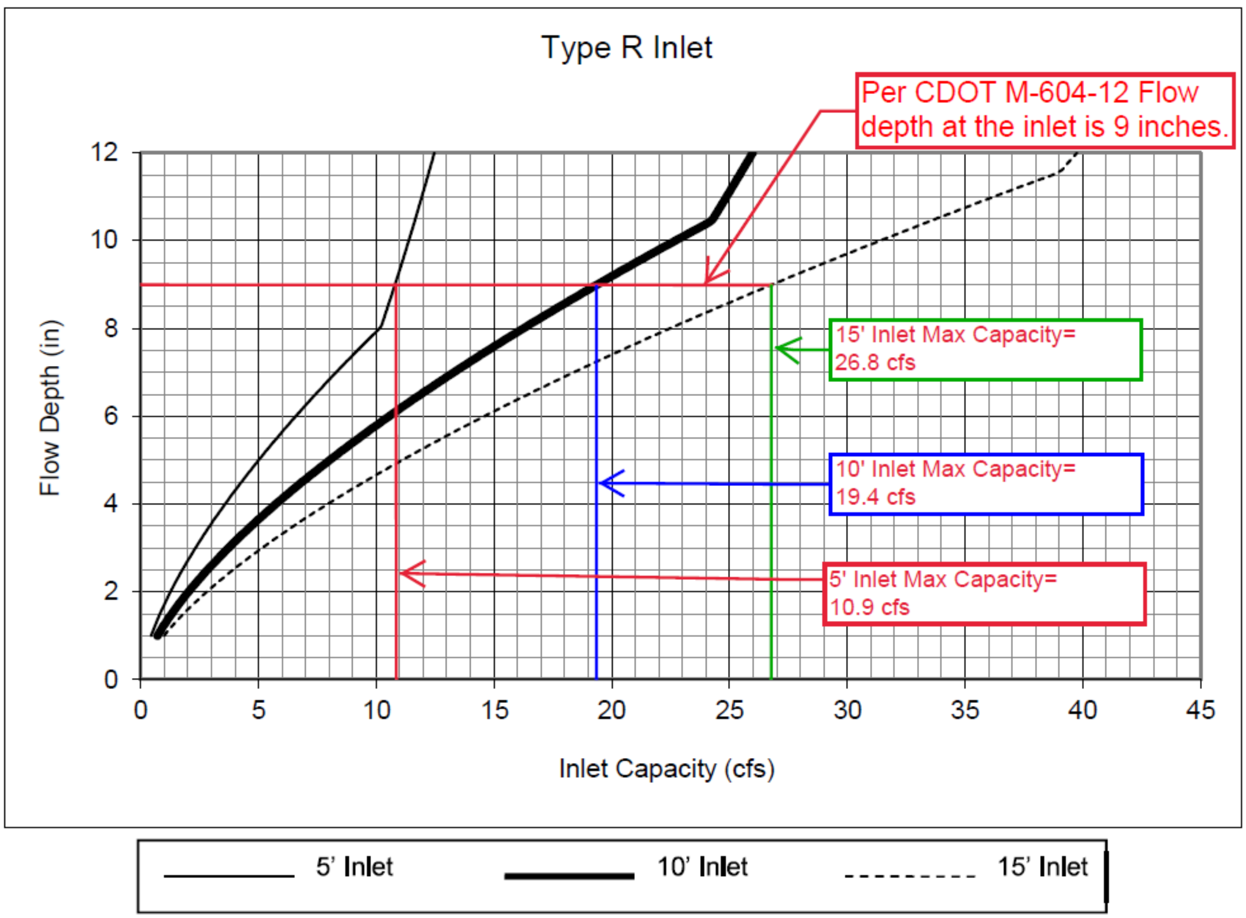


Figure 2-Inlet Capacity - Sump Conditions (DCM Figure 8-11)

Table 6.2 PROPOSED INLET SUMMARY												
TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6)												
DESIGN POINT (#-Letter) or SUB-BASIN (Letter#)	SUB-BASINS	TOTAL AREA (AC)	INLET			Q(5) BYPASS FLOWS (cfs)	Q(5) TOTAL INFLOW	Q5 INLET CAPACTIY	Q(100) BYPASS FLOWS (cfs)	Q(100) TOTAL INFLOW (cfs)	MAX INLET CAPACITY	NOTES:
			SIZE (Ft.)	TYPE	CONDITION							
5-L	L1, L2 BYPASS	2.23	10	R	SUMP	-	4.13	4.1	-	11.73	19.3	L1 & L4 are paired 10' inlets
3-L	L3	1.43	10	R	AT-GRADE	-	2.98	3.0	1.2	6.57	5.4	
5-L	L4	1.70	10	R	SUMP	-	3.30	3.3	-	8.80	19.3	L1 & L4 are paired 10' inlets
L2	L2	2.91	15	R	AT-GRADE	-	5.90	5.9	2.5	12.99	10.5	
L5	L5	0.10	5	R	AT-GRADE	-	0.23	0.2	-	0.50	0.5	
L6	L6	0.05	5	R	AT-GRADE	-	0.11	0.1	-	0.24	0.2	
1-J	J1	5.89	10	R	AT-GRADE	3.4	10.21	6.8	13.5	23.54	10.0	
2-J	J2	0.90	10	R	AT-GRADE	-	1.72	1.7	0.1	3.78	3.7	
3-J	J3	1.81	10	R	SUMP	-	7.09	7.1	-	21.64	19.3	Bypass from J1 Q100 surcharge equalizes to 4-J
4-J	J4	0.56	10	R	SUMP	-	1.16	1.2	-	2.63	19.3	Bypass from J2
15-K	K15	1.65	10	R	AT-GRADE	-	2.99	3.0	1.2	6.59	5.4	Future Filing
16-K	K16	1.20	10	R	AT-GRADE	-	2.44	2.4	0.6	5.37	4.8	Future Filing
17-K	K17	0.41	5	R	SUMP	-	0.87	0.9	-	3.10	11	Road Construction in Future Filing
18-K	K18	1.90	5	R	SUMP	-	3.54	3.5	-	8.37	11	Road Construction in Future Filing
19-K	K19	0.93	10	R	SUMP	-	1.82	1.8	-	4.02	11	Road Construction in Future Filing
20-K	K20	2.78	10	R	SUMP	-	5.35	7.2	-	11.79	19.3	Road Construction in Future Filing
21-K	K21	0.44	10	R	AT-GRADE	-	0.93	0.9	-	2.04	2.0	Big Johnson Dr.
22-K	K22	2.18	2 X 10	R	AT-GRADE	-	3.67	3.7	-	9.23	9.2	Big Johnson Dr.

Table 6.3 Overflow Routing Trails at Aspen Ridge, Filing No. 4	
Inlet	*Overflow Routing Under Inlet Blockage Conditions*
5-L	In case of blockage of this inlet flows will surcharge the curb and gutter and flow directly into the NE Detention pond.
3-J	In case of blockage flows will surcharge the crown of the road and enter inlet 4-J. If both inlets are blocked flows will back up the curb and gutter to Big Johnson Drive and continue downstream along Big Johnson Drive to the next inlet.
4-J	In case of blockage flows will surcharge the crown of the road and enter inlet 3-J. If both inlets are blocked flows will back up the curb and gutter to Big Johnson Drive and continue downstream along Big Johnson Drive to the next inlet.
17-K	In case of blockage flows will continue up the curb and gutter to and along Big Johnson Drive until reaching the next downstream inlet.
18-K	In case of blockage flows will continue up the curb and gutter to and along Big Johnson Drive until reaching the next downstream inlet.
19-K	In case of blockage flows will continue up the curb and gutter to and along Big Johnson Drive until reaching the next downstream inlet.
20-K	In case of blockage flows will continue up the curb and gutter to and along Big Johnson Drive until reaching the next downstream inlet.

C. Storm Sewer Capacities

Storm sewer capacities and HGL's were analyzed in StormCAD. Summary tables and HGL profiles for the Q5 and Q100 events can be found in Appendix A.

D. Detention

Summary information for the East Pond is listed below. Supporting UD-Detention spreadsheets and SWMM analysis for the East Pond can be found in Appendix A. The East and West Ponds will be privately owned and maintained by the Waterview II Metropolitan District.

Table 6.5 Pond Summary Table										
Major Basin	**Pond ID**	**Analysis Method**	**Contributing Basins**	**Approximate Detention Volumes**			**EX**	**Proposed**	**EX**	**Proposed**
				WQCV	**EURV**	**Q100**	**5 Year**	**5 Year**	**100 Year**	**100 Year**
				Ac.-Ft.	**Ac.-Ft.**	**Ac.-Ft.**	**(CFS)**	**(CFS)**	**(CFS)**	**(CFS)**
West Fork Jimmy Camp Creek	East Pond	UD-Detention	OS-1, A, B, C, D, E, F, G, J, K, I, H, M, & OS-East Side	**F6**: 2.087 **FB**: 4.833	5.835 6.581	17.083 18.001	22.3	**6.7** **6.0**	144.6	**120.0** **139.6**
Marksheffel Tributary to Jimmy Camp Creek	Northeast Pond	UD-Detention	L1-L7	.162	.505	1.057	0.2	**0.7**	11.2	**7.9**

Trails at Aspen Ridge, Filing No. 4 = **F6**, Trails at Aspen Ridge, Full Buildout = **FB**

Emergency Overflows

Table 6.6 Emergency Overflow Weirs		
Major Basin	**Pond ID**	**Description of Emergency Overflow Weir**
West Fork - Jimmy Camp Creek	East Pond	The emergency overflow weir for this pond will release emergency overflows to a proposed swale along the edge of the development boundary and direct the flows south to an existing swale flowing to the southeast. Flows will then follow historic patterns.
Marksheffel Tributary to Jimmy Camp Cree	Northeast Pond	The emergency overflow weir for this pond will release emergency overflows to the existing Bradley Road ditch running along the north side of the proposed development. From this point flows will follow historic paths.

Outfall Analysis

East Pond

The outfall for the East Pond was analyzed in ***MDDP-Matrix*** to confirm that the receiving swale should remain stable after construction of the pond. Hydraflow Express was utilized to check the velocity of the anticipated Full Buildout Q100 Discharge and calculated a velocity in the 48" outfall pipe of 12.9 feet per second. A second Hydraflow calculation was performed at the narrowest point in the swale receiving the discharge. The results of this calculation indicated that the anticipated velocity of a Q100 discharge from the pond is around 3.7 feet per second which is well below the maximum 100-year velocity and barely above the maximum low flow velocity indicated for erosive soils in Table 12-3 (shown on the following page) of the DCM regarding Hydraulic Design Criteria for natural unlined channels. Additionally, the outfall will discharge to a rip rap lined low tailwater basin designed in accordance with UDFCD criteria.

Table 12-3. Hydraulic Design Criteria for Natural Unlined Channels

Design Parameter	Erosive Soils or Poor Vegetation	Erosion Resistant Soils and Vegetation
Maximum Low-flow Velocity (ft/sec)	3.5 ft/sec	5.0 ft/sec
Maximum 100-year Velocity (ft/sec)	5.0 ft/sec	7.0 ft/sec
Froude No., Low-flow	0.5	0.7
Froude No., 100-year	0.6	0.8
Maximum Tractive Force, 100-year	0.60 lb/sf	1.0 lb/sf

[1] Velocities, Froude numbers and tractive force values listed are average values for the cross section.
[2] "Erosion resistant" soils are those with 30% or greater clay content. Soils with less than 30% clay content shall be considered "erosive soils."

The Web Soil Survey for the site indicates that the Soils for the receiving swale are are classified as Stoneham sandy loam which is likely an erosive soil.

After receiving the East Pond Discharge, the existing swale will convey the stormwater to an existing detention feature on an adjacent property. According to the West Fork – Jimmy Camp Creek DBPS (See DPBS plan Sheet 6 in Appendix C of ***MDDP-Matrix***) this existing detention feature is expected to receive up to 380 cfs for a Q100 event. The tributary drainage area treated by the East Pond makes up approximately 70 percent of the area tributary to the existing offsite pond. As the anticipated discharge from the East Pond is less than half (Filing No. 4: 120.0 cfs, Full Buildout: 139.6 cfs) of the the flow listed in the DBPS, the existing detention feature should not be adversely affected.

Northeast Pond

Swale capacity calculations for the Bradley Road Ditch receiving the outfall of the Northeast detention pond indicate an anticipated Q100 velocity of 3.0 ft/s for the combined detention discharge and upstream Bradley Road flows. This velocity is considered stable for erosive soils, therefore, this road ditch should be considered a suitable outfall location nor should the ditch and downstream areas be adversely affected by the NE Pond discharge.

SWMM Analysis: West Fork – Jimmy Camp Creek

Please note that the ***MDDPA-Matrix*** report analyzed the full buildout of the area tributary to the East Pond using pond inflow hydrographs generated in SWMM and input to UD-Detention because full build out of the basin will include detention ponds for the commercial areas along Bradley Road in series with the East Pond. However, as these commercial areas are not anticipated to be developed prior to Trails at Aspen Ridge Filing No. 4, analysis of the East Pond for this filing utilized only the UD-Detention spreadsheet and considered all the upstream areas as undeveloped in order to confirm that the East Pond outlet structure for Filing No. 4 will conform to detention requirements in the DCM.

East Pond Phasing:
The East Pond was constructed as part of Trails at Aspen Ridge Filing No. 1. The pond was built to the size required for full development of the upstream basin, so expansion of the pond volume is not required for this development. (This volume does **not** include developed flows from the commercial areas or OS-East Side. These areas will be required to construct full spectrum detention when developed.) The Filing No. 1 orifice plate for the East Pond outlet structure has been evaluated and found ***adequate*** to discharge the combined Filing No. 1, Filing No. 2, Filing No. 3 and Filing No. 4 developed flows in compliance with DCM Criteria. Future filings will require additional evaluations and, possibly, redesigns of the orifice plate to ensure compliance with the DCM and ***MDDPA-Matrix*** criteria.

IX. Environmental Evaluations

A. WETLAND IMPACTS

There are no designated wetland or riparian areas on site, and no anticipated impacts.

B. STORMWATER QUALITY

All on-site detention facilities shall be designed to accommodate water quality requirements. As the development of each parcel progresses, the detention guidelines outlined in this report are to be upheld. Per Chapter 4, Section 4.1, of the El Paso County DCM, Volume 2, the DCM requires a Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainageways, and implementing long-term source controls.

Step 1: **Employ Runoff Reduction Practices**

- Site specific landscaping will be done on each lot to decrease the connectivity of impervious areas. Grass lined swales will be used where possible to allow infiltration.

Step 2: **Stabilize Drainageways.**

- The site is in the West Fork – Jimmy Camp Creek and Marksheffel tributary to Jimmy Camp Creek basins. Drainage fees, to be paid by the relevant Trails at Aspen Ridge (Waterview East) developers at the time of platting, will help fund future channel improvements. Specific information on future improvements to the Jimmy Camp Creek channel was unavailable for this report.

Step 3: **Provide Water Quality Capture Volume**

- The East Pond and Northeast Pond both meet the DCM standards for the release rates of Full Spectrum Detention Ponds for Water Quality Capture Volumes.

Step 4: **Consider Need for Industrial and Commercial BMPs**

- There are no commercial or industrial components of this development, therefore no BMPs of this nature are required. The Full Spectrum Detention BMP is provided for the proposed development by the East and Northeast Ponds.

C. PERMITTING REQUIREMENTS

No additional permitting requirements are expected at this time.

X. Erosion Control Plan

A grading and erosion control plan (GEC) for Trails at Aspen Ridge Filing No. 4 will be completed. The GEC incorporates straw wattles, straw bale check dams, silt fence, vehicle tracking control, inlet & outlet control, sedimentation basins and other best management practices (BMPs) identified in the DCM Volume 2. Please refer to the GEC for phasing and procedural information for adaptations between the Filing No. 4 GEC and the overall GEC.

XI. Drainage Fees

Impervious Area Calculations

Land Use Type	% Impervious	Area (Acres)	Impervious Acres
West Fork Jimmy Camp Creek			
Residential (1/8 acre or less)	65%	7.518	4.887
Park	7%	0.634	0.044
	Total	8.152	4.931

Marksheffel Tributary to Jimmy Camp Creek			
Residential (1/8 acre or less)	65%	7.831	5.090
Park/Detention/Open Space	7%	1.919	0.134
	Total	9.749	5.224

TRAILS AT ASPEN RIDGE FILING NO. 4 2021 Drainage and Bridge Fees						
	Impervious Area (ac.)	Fee/ Imp. Acre	Fee Due	Reimbursable Const. Costs	Fee Due at Platting	Drainage Fee Credit
Marksheffel Tributary to Jimmy Camp Creek						
Drainage Fee	5.224	$19,752.00	$103,188.66	$0.00	$103,188.66	$0.00
Bridge Fee	5.224	$2,551.00	$13,326.97	$0.00	$13,326.97	$0.00
Surety Fee	5.224	$7,285.00	$38,056.84	$0.00	$38,056.84	$0.00
Sub-Total					$154,572.47	
West Fork Jimmy Camp Creek						
Drainage Fee	4.931	$13,524.00	$66,685.51	$0.00	$66,685.51	$0.00
Bridge Fee	4.931	$4,001.00	$19,728.54	$0.00	$19,728.54	$0.00
Surety Fee	4.931	$7,285.00	$35,922.34	$0.00	$35,922.34	$0.00
Sub-Total					$122,336.38	
Overall Total					***$276,908.85***	

Delete surety fee for West Fork Jimmy Camp Creek. Only needed for Jimmy Camp Creek .

XII. Construction Cost Opinion

Engineer's Estimate of Probable Construction Costs				
Trails at Aspen Ridge Filing No. 4				
Public Non-Reimbursable				
Item	**Unit**	**Quantity**	**Unit Cost**	**Extension**
18" RCP	LF	404	$67.00	$27,068.00
24" RCP	LF	258	$81.00	$20,898.00
30" RCP	LF	873	$100.00	$87,300.00
36" RCP	LF	160	$124.00	$19,840.00
18" FES	EA	1	$402.00	$402.00
TYPE I MANHOLE	EA	0	$12,034.00	$0.00
TYPE II MANHOLE	EA	9	$6,619.00	$59,571.00
5' TYPE R INLET	EA	2	$5,736.00	$11,472.00
10' TYPE R INLET	EA	7	$7,894.00	$55,258.00
15' TYPE R INLET	EA	1	$10,265.00	$10,265.00
NE DETENTION/WQ POND (Private: Waterview II Metro Dist.)	EA	1	$85,000.00	$85,000.00
		Sub Total		$377,074.00
		10% Contingency		$37,707.40
		TOTAL:		$414,781.40

Since the engineer has no control over the cost of labor, materials, equipment or services furnished by others, or over the contractor's method of determining prices, or over the competitive bidding or market conditions, the opinion of probable construction costs provided herein are made on the basis of the engineer's experience and qualifications and represents the best judgment as an experienced and qualified professional familiar with the construction industry. The engineer cannot, and does not guarantee that proposals, bid or actual construction costs will not vary from the opinions of probable cost.

Please note that some inlets, manholes, and pipes described in this report will be constructed under future filings and were not included in the above Construction Cost Estimate. These items are located between Filings No. 2 and No. 4.

XIII. Summary

The above report has demonstrated that the proposed development will comply with the governing DCM, ECM, previous drainage reports, and the El Paso County MS4 permit. No adverse effect on downstream infrastructure is anticipated. Therefore, we recommend approval of the proposed development.

XIV. References

1. ***El Paso County Drainage Criteria Manual, Volume 1 & 2***, El Paso County, May 2014
2. ***El Paso County Engineering Criteria Manual,*** El Paso County, Rev. December 2016
3. ***Web Soil Survey of El Paso County Area, Colorado. Unites States Department of Agriculture Soil Conservation Service***.
4. ***Flood Insurance Rate Maps for El Paso County, Colorado and Incorporated Areas, Panel 768 of 1300, Federal Emergency Management Agency***, Effective Date December 7, 2018.
5. ***Urban Storm Drainage Criteria Manual, Vol. 1-3*** by Urban Drainage and Flood Control District (UDFCD), January 2016
6. ***West Fork Jimmy Camp Creek Drainage Basin Planning Study*** by Kiowa Engineering, revised October 2003
7. ***Jimmy Camp Creek Drainage Basin Planning Study, Development of Alternatives & Design of Selected Plan, Report*** by Kiowa Engineering, March 2015
8. **Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study,** by Kiowa Engineering, September 1991.
9. **"Amendment to Waterview Master Drainage Development Plan"**, completed by Springs Engineering, dated July 2014 *(MDDP-2014)*
10. **"Master Drainage Development Plan Amendment for Waterview East & Preliminary Drainage Plan for Trails at Aspen Ridge",** Completed by Matrix Design Group, Dated August 2019 (MDDPA-Matrix)
11. ***"Final Drainage Report for Trails at Aspen Ridge Filing No. 1",*** completed by Matrix Design Group, Dated January 2020. (FDR-F1)
12. ***"Final Drainage Report for Trails at Aspen Ridge Filing No. 2",*** completed by Matrix Design Group, Dated March 2021. (FDR-F2)
13. ***"Final Drainage Report for Trails at Aspen Ridge Filing No. 3",*** completed by Matrix Design Group, Dated March 2021. (FDR-F3) (Approval Pending)
14. **"PDR Amendment for Trails at Aspen Ridge",** completed by Matrix Design Group, Dated April 2021. (PDRA-Matrix) (Approval Pending)

XV. Appendices

Appendix A

Hydrologic and Hydraulic Calculations

Project Name:	TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6)
Project Location:	EL PASO COUNTY
Designer	JTS
Notes:	Existing Condition

Average Channel Velocity	5	ft/s	(If specific channel vel is used, this will be ignored)
Average Slope for Initial Flow	0.04	ft/ft	(If Elevations are used, this will be ignored)

Channel Flow Type Key

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

		Area		Rational 'C' Values								Flow Lengths				Initial Flow		Channel Flow				Tc	Rainfall Intensity & Rational Flow Rate				SWMM Values	
Major Basin / Sub-basin				Surface Type 2 (Impervious)			Surface Type 3 (Undeveloped)			Composite		Initial	True Initial	Channel	True Channel	Average	Initial	Average (%)	Channel Flow Type (See Key above)	Velocity	Channel	Total	i5	Q5	i100	Q100	Q5	Q100
	Comments	sf	acres	C5	C100	Area (SF)	C5	C100	Area	C5	C100	ft	Length ft	ft	Length ft	Slope	Tc (min)	Slope	Ground Type	(ft/s)	Tc (min)	(min)	in/hr	cfs	in/hr	cfs	cfs	cfs
West Fork Jimmy Camp Creek / OS - 1	***- The most northwestern portion of this basin (7.268 Acres) outside of the proposed Trails at Aspen Ridge development was rerouted out of the Big Johnson Reservoir basin by CDOT construction of Powers Boulevard and Bradley Road. Future development of the rerouted area will require routing the flows back to the Big Johnson Reservoir to return the area to compliance with the relevant DBPS studies.***	853,953.7	19.60	0.90	0.96	42,031.0	0.09	0.36	811,922.7	0.13	0.39	621.00	300.00	2146.00	2467.00	0.106	19.79	2.470	5.000	1.5	26.5	46.3	1.9	**4.8**	3.1	**24.1**	**11.8**	**47.4**
West Fork Jimmy Camp Creek / WF-1	***- The small area just outside the east boundary of Trails at Aspen Ridge will be kept off of the proposed project by raising the elevation of the proposed trail along this side of the development.***	5,187,332.2	119.08	0.90	0.96		0.09	0.36	5,187,332.2	0.09	0.36	530.00	300.00	3811.00	4041.00	0.089	20.22	2.940	5.000	1.7	39.5	59.8	1.6	**17.1**	2.7	**115.2**	**21.4**	**97.6**
West Fork Jimmy Camp Creek / WF-2	***Located at south end of study area.***	921,440.7	21.15	0.90	0.96		0.09	0.36	921,440.7	0.09	0.36	300.00	300.00	1014.00	1014.00	0.080	15.74	6.114	5.000	2.5	6.8	22.6	2.8	**5.4**	4.8	**36.5**	**5.5**	**31.1**
Marksheffel Tributary to Jimmy Camp Creek / MKT-1	***Located at northeast corner of Trails at Aspen Ridge PUD***	314,083.1	7.21	0.90	0.96		0.09	0.36	314,083.1	0.09	0.36	300.00	300.00	1125.00	1125.00	0.056	17.74	3.000	5.000	1.7	10.8	28.6	2.5	**1.6**	4.2	**10.9**		
EXISTING CONDITIONS - DESIGN POINTS	***INCLUDED SUB-BASINS***																											
OS-1	***OS-1 (Note: 7.3 Acres diverted by CDOT from Big Johnson)***	853,953.7	19.60	0.90	0.96	42,031.0	0.09	0.36	811,922.7	0.13	0.39	621.00	300.00	2146.00	2467.00	0.106	19.79	2.470	5.000	1.5	26.5	46.3	1.9	**4.8**	3.1	**24.1**	**11.8**	**47.4**
WF-1 (SWMM WF-East)	***WF-1 & OS-1***	6,041,285.9	138.69	0.90	0.96	42,031.0	0.09	0.36	5,999,254.9	0.10	0.36	621.00	300.00	5957.00	6278.00	0.106	20.49	2.771	5.000	1.6	63.7	84.2	1.3	**16.9**	2.1	**108.1**	**33.2**	**139.1**
WF-2	***WF-2***	921,440.7	21.15	0.90	0.96	0.0	0.09	0.36	921,440.7	0.09	0.36	300.00	300.00	1014.00	1014.00	0.080	15.74	6.114	5.000	2.5	6.8	22.6	2.8	**5.4**	4.8	**36.5**	**5.5**	**31.1**
TO WEST FORK JIMMY CAMP CREEK	***WF-1, WF-2, & OS-1 (Basins are parallel so this is a sum of WF-1 & WF-2.)***	6,962,726.5	159.84	0.90	0.96	42,031.0	0.09	0.36	6,920,695.5	0.09	0.36		0.00		0.00		#DIV/0!		5.000					**22.3**		**144.6**	**37.0**	**170.0**
MKT-1 TO MARKSHEFFEL TRIBUTARY TO JIMMY CAMP CREEK	***MKT-1***	314,083.1	7.21	0.90	0.96	0.0	0.09	0.36	314,083.1	0.09	0.36	300.00	300.00	1125.00	1125.00	0.056	17.74	3.000	5.000	1.7	10.8	28.6	2.5	**1.6**	4.2	**10.9**		

Note: -SWMM values are listed for the West Fork Jimmy Camp Creek Basin due to the required analysis of pond in series for that basin. SWMM Analysis can be found in the approved PDR for Trails at Aspen Ridge

Rational Method - Proposed Conditions

Project Name:	TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6)
Project Location:	EL PASO COUNTY
Designer	JTS
Notes:	Proposed Condition

Average Channel Velocity	4.00	ft/s	(If specific channel vel is used, this will be ignored)
Average Slope for Initial Flow	0.04	ft/ft	(If Elevations are used, this will be ignored)

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

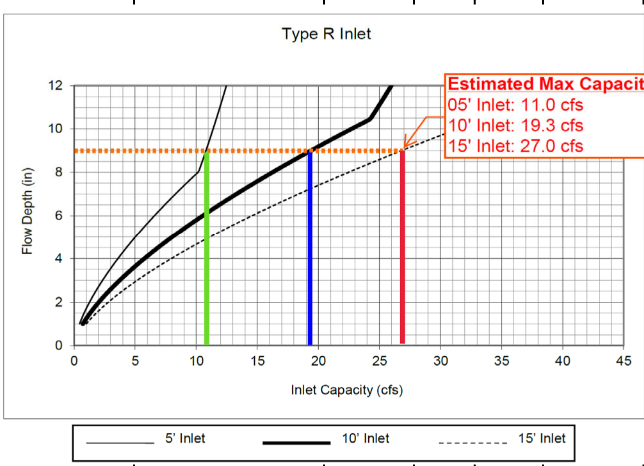
Sub-basin	Comments	Area		Rational 'C' Values																	
				Surface Type 1 Commercial Areas (95% Impervious)			Surface Type 2 Residential (1/8 or less) (65% Impervious)			Surface Type 3 Streets - Paved (100% Impervious)			Surface Type 4 Neighborhoods/Multi-Family (70% Impervious)			Surface Type 5 Parks and Cemetaries (7% Impervious)			Surface Type 6 Undeveloped-Historic Flow Analysis (2% Impervious)		
		sf	acres	C5	C100	Area	C5	C100	Area (SF)	C5	C100	Area (SF)	C5	C100	Area	C5	C100	Area	C5	C100	Area
J1	***WEST FORK JCC***	256681	5.89	0.82	0.89		0.45	0.59	231803.00	0.90	0.96		0.53	0.68		0.19	0.52	24878.00	0.09	0.36	
J2	***WEST FORK JCC***	39240	0.90	0.82	0.89		0.45	0.59	39240.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
J3	***WEST FORK JCC***	78909	1.81	0.82	0.89		0.45	0.59	78909.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
J4	***WEST FORK JCC***	24208	0.56	0.82	0.89		0.45	0.59	24208.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
L1	***MARKSHEFFEL TRIB TO JCC***	97109	2.23	0.82	0.89		0.45	0.59	93679.00	0.90	0.96		0.53	0.68		0.19	0.52	3430.00	0.09	0.36	
L2	***MARKSHEFFEL TRIB TO JCC***	126973	2.91	0.82	0.89		0.45	0.59	126973.30	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
L3	***MARKSHEFFEL TRIB TO JCC***	62303	1.43	0.82	0.89		0.45	0.59	62302.80	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
L4	***MARKSHEFFEL TRIB TO JCC***	73882	1.70	0.82	0.89		0.45	0.59	66260.50	0.90	0.96		0.53	0.68		0.19	0.52	7621.00	0.09	0.36	
L5	***MARKSHEFFEL TRIB TO JCC***	4306	0.10	0.82	0.89		0.45	0.59	4305.60	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
L6	***MARKSHEFFEL TRIB TO JCC***	2039	0.05	0.82	0.89		0.45	0.59	2039.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
L7	***MARKSHEFFEL TRIB TO JCC***	29562	0.68	0.82	0.89		0.45	0.59		0.90	0.96		0.53	0.68		0.19	0.52	29561.80	0.09	0.36	
L8	***MARKSHEFFEL TRIB TO JCC***	8837	0.20	0.82	0.89		0.45	0.59		0.90	0.96		0.53	0.68		0.19	0.52	8837.30	0.09	0.36	
K15	***WFJCC, FUTURE FILING***	72066	1.65	0.82	0.89		0.45	0.59	72066.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K16	***WFJCC, FUTURE FILING***	52256	1.20	0.82	0.89		0.45	0.59	52255.80	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K17	***WFJCC, FUTURE FILING***	17888	0.41	0.82	0.89		0.45	0.59	17887.90	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K18	***WFJCC, FUTURE FILING***	82852	1.90	0.82	0.89		0.45	0.59	82852.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K19	***WFJCC, FUTURE FILING***	40516	0.93	0.82	0.89		0.45	0.59	40516.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K20	***WFJCC, FUTURE FILING***	121070	2.78	0.82	0.89		0.45	0.59	121070.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K21	***BIG JOHNSON ROAD, WFJCC***	19297	0.44	0.82	0.89		0.45	0.59	19297.00	0.90	0.96		0.53	0.68		0.19	0.52		0.09	0.36	
K22	***BIG JOHNSON ROAD, WFJCC***	95154	2.18	0.82	0.89		0.45	0.59	70375.00	0.90	0.96		0.53	0.68		0.19	0.52	24779.00	0.09	0.36	
DESIGN POINTS																					
SUB-BASIN L5	***SUB-BASIN L5***	4306	0.10	0.82	0.89	0	0.45	0.59	4306	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
SUB-BASIN L6	***SUB-BASIN L6***	2039	0.05	0.82	0.89	0	0.45	0.59	2039	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
1-L	***SUB-BASINS L5 & L6***	6345	0.15	0.82	0.89	0	0.45	0.59	6345	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
SUB-BASIN L2	***SUB-BASIN L2***	126973	2.91	0.82	0.89	0	0.45	0.59	126973	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
2-L	***SUB-BASINS L2, L5 & L6***	133318	3.06	0.82	0.89	0	0.45	0.59	133318	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
3-L	***SUB-BASIN L3***	62303	1.43	0.82	0.89	0	0.45	0.59	62303	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
4-L	***SUB-BASINS L2, L3, L5 & L6***	195621	4.49	0.82	0.89	0	0.45	0.59	195621	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
5-L	***SUB-BASINS L1-L6***	366611	8.42	0.82	0.89	0	0.45	0.59	355560	0.90	0.96	0	0.53	0.68	0	0.19	0.52	11051	0.09	0.36	0
6-L	***NE POND (SUB-BASINS L1-L7)***	396173	9.09	0.82	0.89	0	0.45	0.59	355560	0.90	0.96	0	0.53	0.68	0	0.19	0.52	40613	0.09	0.36	0
7-L	***NE POND DISCHARGE***	396173	9.09	0.82	0.89	0	0.45	0.59		0.90	0.96	0	0.53	0.68	0	0.19	0.52		0.09	0.36	396173
8-L	***SITE DISCHARGE***	405010	9.30	0.82	0.89	0	0.45	0.59	0	0.90	0.96	0	0.53	0.68	0	0.19	0.52	8837	0.09	0.36	396173
1-J	***SUB-BASIN J1***	256681	5.89	0.82	0.89	0	0.45	0.59	231803	0.90	0.96	0	0.53	0.68	0	0.19	0.52	24878	0.09	0.36	0
2-J	***SUB-BASIN J2***	39240	0.90	0.82	0.89	0	0.45	0.59	39240	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
1-2-J	***SUB-BASINS J1 & J2***	295921	6.79	0.82	0.89	0	0.45	0.59	271043	0.90	0.96	0	0.53	0.68	0	0.19	0.52	24878	0.09	0.36	0
3-J	***SUB-BASIN J3***	78909	1.81	0.82	0.89	0	0.45	0.59	78909	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
4-J	***SUB-BASIN J4***	24208	0.56	0.82	0.89	0	0.45	0.59	24208	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
1-4-J	***SUB-BASINS J1 TO J4***	399038	9.16	0.82	0.89	0	0.45	0.59	374160	0.90	0.96	0	0.53	0.68	0	0.19	0.52	24878	0.09	0.36	0
15-K	***SUB-BASIN K15***	72066	1.65	0.82	0.89	0	0.45	0.59	72066	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
16-K	***SUB-BASIN K16***	52256	1.20	0.82	0.89	0	0.45	0.59	52256	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
15-16-K	***SUB-BASINS K15 & K16***	124322	2.85	0.82	0.89	0	0.45	0.59	124322	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
17-K	***SUB-BASIN K17***	17888	0.41	0.82	0.89	0	0.45	0.59	17888	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
18-K	***SUB-BASIN K18***	82852	1.90	0.82	0.89	0	0.45	0.59	82852	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
15-18-K	***SUB-BASINS K15 & K18***	225062	5.17	0.82	0.89	0	0.45	0.59	225062	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
19-K	***SUB-BASIN K19***	40516	0.93	0.82	0.89	0	0.45	0.59	40516	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
20-K	***SUB-BASIN K20***	121070	2.78	0.82	0.89	0	0.45	0.59	121070	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
19-20-K	***SUB-BASINS K19 & K20***	161586	3.71	0.82	0.89	0	0.45	0.59	161586	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
21-K	***SUB-BASIN K21***	19297	0.44	0.82	0.89	0	0.45	0.59	19297	0.90	0.96	0	0.53	0.68	0	0.19	0.52	0	0.09	0.36	0
22-K	***SUB-BASIN K22***	95154	2.18	0.82	0.89	0	0.45	0.59	70375	0.90	0.96	0	0.53	0.68	0	0.19	0.52	24779	0.09	0.36	0
5-J	***SUB-BASINS J1-J4, K19 & K20***	560624	12.87	0.82	0.89	0	0.45	0.59	535746	0.90	0.96	0	0.53	0.68	0	0.19	0.52	24878	0.09	0.36	0
6-J	***SUB-BASINS J1-J4 & K15-K20***	785686	18.04	0.82	0.89	0	0.45	0.59	760808	0.90	0.96	0	0.53	0.68	0	0.19	0.52	24878	0.09	0.36	0
7-J	***SUB-BASINS J1-J4 & K15-K22***	900137	20.66	0.82	0.89	0	0.45	0.59	850480	0.90	0.96	0	0.53	0.68	0	0.19	0.52	49657	0.09	0.36	0

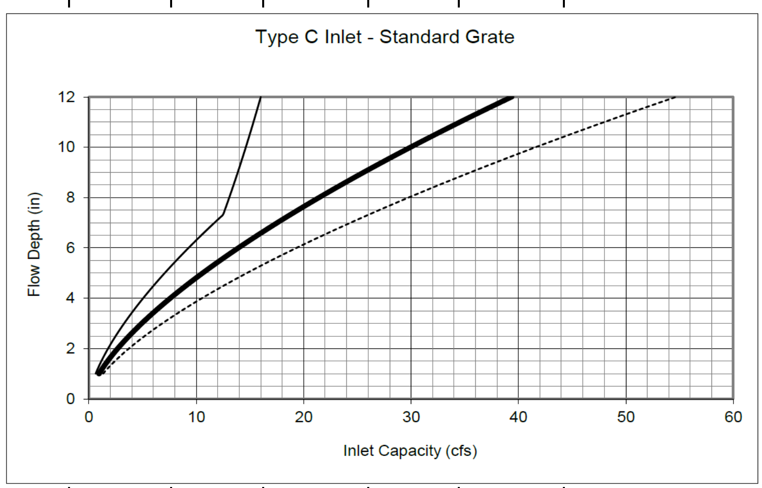
Sub-basin	Composite		Percent Impervious	Flow Lengths				Average (decimal)	Initial		Channel Flow Type (See Key above)	Velocity	Channel	Tc Total	Rainfall Intensity & Rational Flow Rate			
				Initial	True Initial	Channel	True Channel			Average (%)					i5	Q5	i100	Q100
	C5	C100		ft	Length ft	ft	Length ft	Slope	Tc (min)	Slope	Ground Type	(ft/s)	Tc (min)	(min)	in/hr	cfs	in/hr	cfs
J1	0.42	0.58	59.38	50	50	642	642	0.05	5.03	1.00	7	2.00	5.35	10.37	4.05	**10.2**	6.80	**23.5**
J2	0.45	0.59	65.00	50	50	548	548	0.05	4.84	1.00	7	2.00	4.57	9.40	4.20	**1.7**	7.05	**3.8**
J3	0.45	0.59	65.00	50	50	360	360	0.05	4.84	1.00	7	2.00	3.00	7.83	4.48	**3.7**	7.52	**8.1**
J4	0.45	0.59	65.00	50	50	284	284	0.05	4.84	1.00	7	2.00	2.37	7.20	4.60	**1.2**	7.73	**2.6**
L1	0.44	0.59	62.95	50	50	957	957	0.05	4.91	2.90	7	3.41	4.68	9.58	4.17	**4.1**	7.00	**9.2**
L2	0.45	0.59	65.00	50	50	631	631	0.05	4.84	2.90	7	3.41	3.09	7.92	4.46	**5.9**	7.49	**13.0**
L3	0.45	0.59	65.00	50	50	451	451	0.05	4.84	2.50	7	3.16	2.38	7.21	4.60	**3.0**	7.73	**6.6**
L4	0.42	0.58	59.02	50	50	451	451	0.05	5.04	2.50	7	3.16	2.38	7.41	4.56	**3.3**	7.66	**7.6**
L5	0.45	0.59	65.00	15	15	73	73	0.05	2.65	3.00	7	3.46	0.35	5.00	5.10	**0.2**	8.58	**0.5**
L6	0.45	0.59	65.00	15	15	73	73	0.05	2.65	3.00	7	3.46	0.35	5.00	5.10	**0.1**	8.58	**0.2**
L7	0.19	0.52	7.00	20	20	193	193	0.05	4.28	0.50	4	0.49	6.50	10.78	3.98	**0.5**	6.69	**2.4**
L8	0.19	0.52	7.00	10	10	221	221	0.05	3.03	3.00	4	1.21	3.04	6.06	4.85	**0.2**	8.14	**0.9**
K15	0.45	0.59	65.00	100	100	730	730	0.05	6.84	2.40	7	3.10	3.93	10.76	3.99	**3.0**	6.70	**6.6**
K16	0.45	0.59	65.00	50	50	558	558	0.05	4.84	2.40	7	3.10	3.00	7.83	4.48	**2.4**	7.52	**5.4**
K17	0.45	0.59	65.00	50	50	352	352	0.05	4.84	2.00	7	2.83	2.07	6.91	4.66	**0.9**	7.83	**1.9**
K18	0.45	0.59	65.00	100	100	533	533	0.05	6.84	2.00	7	2.83	3.14	9.98	4.11	**3.5**	6.90	**7.8**
K19	0.45	0.59	65.00	50	50	649	649	0.05	4.84	2.00	7	2.83	3.82	8.66	4.32	**1.8**	7.26	**4.0**
K20	0.45	0.59	65.00	50	50	725	725	0.05	4.84	2.00	7	2.83	4.27	9.11	4.25	**5.4**	7.13	**11.8**
K21	0.45	0.59	65.00	50	50	564	564	0.05	4.84	4.00	7	4.00	2.35	7.18	4.60	**0.9**	7.74	**2.0**
K22	0.38	0.57	49.90	50	50	742	742	0.05	5.34	4.00	7	4.00	3.09	8.43	4.37	**3.7**	7.33	**9.2**
DESIGN POINTS																		
SUB-BASIN L5	0.45	0.59	65.00	15	15	73	73	0.05	2.65	3.0	7	3.46	0.35	5.00	5.10	**0.2**	8.58	**0.5**
SUB-BASIN L6	0.45	0.59	65.00	15	15	73	73	0.05	2.65	3.0	7	3.46	0.35	5.00	5.10	**0.1**	8.58	**0.2**
1-L	0.45	0.59	65.00	15	15	73	73	0.05	2.65	3.0	7	3.46	0.35	5.00	5.10	**0.3**	8.58	**0.7**
SUB-BASIN L2	0.45	0.59	65.00	50	50	631	631	0.05	4.84	2.9	7	3.41	3.09	7.92	4.46	**5.9**	7.49	**13.0**
2-L	0.45	0.59	65.00	50	50	631	631	0.05	4.84	2.9	7	3.41	3.09	7.92	4.46	**6.2**	7.49	**13.6**
3-L	0.45	0.59	65.00	50	50	451	451	0.05	4.84	2.5	7	3.16	2.38	7.21	4.60	**3.0**	7.73	**6.6**
4-L	0.45	0.59	65.00	50	50	631	631	0.05	4.84	2.9	7	3.41	3.09	7.92	4.46	**9.1**	7.49	**20.0**
5-L	0.44	0.59	63.25	50	50	957	957	0.05	4.90	2.9	7	3.41	4.68	9.57	4.17	**15.6**	7.01	**34.9**
6-L	0.42	0.58	59.05	50	50	1150	1150	0.05	5.04	2.9	7	3.41	5.63	10.66	4.00	**15.5**	6.72	**35.9**
7-L	0.09	0.36	2.00	50	50	1150	1150	0.05	7.52	2.9	2	0.43	45.02	52.53	1.72	**0.2**	2.90	**7.9**
8-L	0.09	0.36	2.11	50	50	1150	1150	0.05	7.50	2.9	4	1.19	16.08	23.58	2.77	**0.4**	4.65	**8.8**
1-J	0.42	0.58	59.38	50	50	642	642	0.05	5.03	1.0	7	2.00	5.35	10.37	4.05	**10.2**	6.80	**23.5**
2-J	0.45	0.59	65.00	50	50	548	548	0.05	4.84	1.0	7	2.00	4.57	9.40	4.20	**1.7**	7.05	**3.8**
1-2-J	0.43	0.58	60.12	50	50	642	642	0.05	5.00	1.0	7	2.00	5.35	10.35	4.05	**11.9**	6.80	**27.2**
3-J	0.45	0.59	65.00	50	50	360	360	0.05	4.84	1.0	7	2.00	3.00	7.83	4.48	**3.7**	7.52	**8.1**
4-J	0.45	0.59	65.00	50	50	284	284	0.05	4.84	1.0	7	2.00	2.37	7.20	4.60	**1.2**	7.73	**2.6**
1-4-J	0.43	0.59	61.38	50	50	1002	1002	0.05	4.96	1.0	7	2.00	8.35	13.30	3.65	**14.6**	6.14	**33.2**
15-K	0.45	0.59	65.00	100	100	730	730	0.05	6.84	2.40	7	3.10	3.93	10.76	3.99	**3.0**	6.70	**6.6**
16-K	0.45	0.59	65.00	50	50	558	558	0.05	4.84	2.40	7	3.10	3.00	7.83	4.48	**2.4**	7.52	**5.4**
15-16-K	0.45	0.59	65.00	50	50	558	558	0.05	4.84	2.40	7	3.10	3.00	7.83	4.48	**5.8**	7.52	**12.8**
17-K	0.45	0.59	65.00	50	50	352	352	0.05	4.84	2.00	7	2.83	2.07	6.91	4.66	**0.9**	7.83	**1.9**
18-K	0.45	0.59	65.00	100	100	533	533	0.05	6.84	2.00	7	2.83	3.14	9.98	4.11	**3.5**	6.90	**7.8**
15-18-K	0.45	0.59	65.00	50	50	558	558	0.05	4.84	2.40	7	3.10	3.00	7.83	4.48	**10.5**	7.52	**23.1**
19-K	0.45	0.59	65.00	50	50	649	649	0.05	4.84	2.0	7	2.83	3.82	8.66	4.32	**1.8**	7.26	**4.0**
20-K	0.45	0.59	65.00	50	50	725	725	0.05	4.84	2.0	7	2.83	4.27	9.11	4.25	**5.4**	7.13	**11.8**
19-20-K	0.45	0.59	65.00	50	50	725	725	0.05	4.84	2.00	7	2.83	4.27	9.11	4.25	**7.1**	7.13	**15.7**
21-K	0.45	0.59	65.00	50	50	564	564	0.05	4.84	4.0	7	4.00	2.35	7.18	4.60	**0.9**	7.74	**2.0**
22-K	0.38	0.57	49.90	50	50	742	742	0.05	5.34	4.0	7	4.00	3.09	8.43	4.37	**3.7**	7.33	**9.2**
5-J	0.44	0.59	62.43	50	50	1727	1727	0.05	4.92	3.80	7	3.90	7.38	12.30	3.78	**21.5**	6.34	**48.3**
6-J	0.44	0.59	63.16	100	100	2285	2285	0.05	6.93	4.00	7	4.00	9.52	16.44	3.32	**26.6**	5.57	**59.6**
7-J	0.44	0.59	61.80	100	100	2285	2285	0.05	6.99	4.00	7	4.00	9.52	16.51	3.31	**30.0**	5.56	**67.9**

PROPOSED INLET SUMMARY

TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6)

DESIGN POINT (#-Letter) or SUB-BASIN (Letter#)	SUB-BASINS	TOTAL AREA (AC)	INLET SIZE (Ft.)	INLET TYPE	INLET CONDITION	Q(5) BYPASS FLOWS (cfs)	Q(5) TOTAL INFLOW	Q5 INLET CAPACTIY	Q(100) BYPASS FLOWS (cfs)	Q(100) TOTAL INFLOW (cfs)	MAX INLET CAPACITY	NOTES:
L1	L1, L2 BYPASS	2.23	10	R	SUMP	0.0	4.13	4.1	0.0	11.73	19.3	L1 & L4 are paired 10' inlets
3-L	L3	1.43	10	R	AT-GRADE	0.0	2.98	3.0	1.2	6.57	5.4	
L4	L4	1.70	10	R	SUMP	0.0	3.30	3.3	0.0	8.80	19.3	L1 & L4 are paired 10' inlets
L2	L2	2.91	15	R	AT-GRADE	0.0	5.90	5.9	2.5	12.99	10.5	
L5	L5	0.10	5	R	AT-GRADE	0.0	0.23	0.2	0.0	0.50	0.5	
L6	L6	0.05	5	R	AT-GRADE	0.0	0.11	0.1	0.0	0.24	0.2	
1-J	J1	5.89	10	R	AT-GRADE	3.4	10.21	6.8	13.5	23.54	10.0	
2-J	J2	0.90	10	R	AT-GRADE	0.0	1.72	1.7	0.1	3.78	3.7	
3-J	J3	1.81	10	R	SUMP	0.0	7.09	7.1	0.0	21.64	19.3	Bypass from J1 Q100 surcharge equalizes to 4-J
4-J	J4	0.56	10	R	SUMP	0.0	1.16	1.2	0.0	2.63	19.3	Bypass from J2
15-K	K15	1.65	10	R	AT-GRADE	0.0	2.99	3.0	1.2	6.59	5.4	
16-K	K16	1.20	10	R	AT-GRADE	0.0	2.44	2.4	0.6	5.37	4.8	
17-K	K17	0.41	5	R	SUMP	0.0	0.87	0.9	0.0	3.10	11	
18-K	K18	1.90	5	R	SUMP	0.0	3.54	3.5	0.0	8.37	11	
19-K	K19	0.93	10	R	SUMP	0.0	1.82	1.8	0.0	4.02	11	
20-K	K20	2.78	10	R	SUMP	0.0	5.35	7.2	0.0	11.79	19.3	
21-K	K21	0.44	10	R	AT-GRADE	0.0	0.93	0.9	0.0	2.04	2.0	
22-K	K22	2.18	2 X 10	R	AT-GRADE	0.0	3.67	3.7	0.0	9.23	9.2	



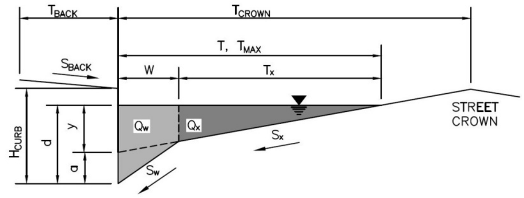


ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

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

Trails at Aspen Ridge Filing No. 4

INLET L2 - Winner Creek



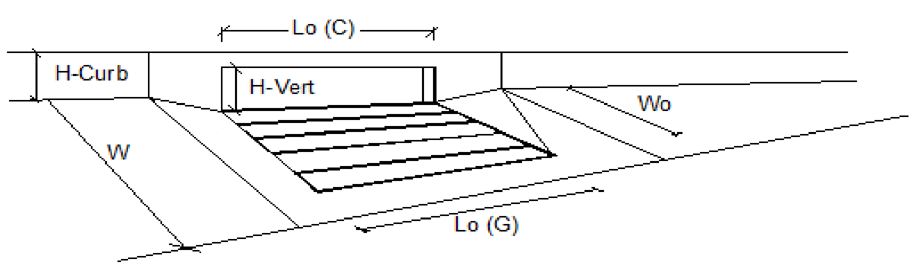
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.029		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**17.8**	**44.0**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



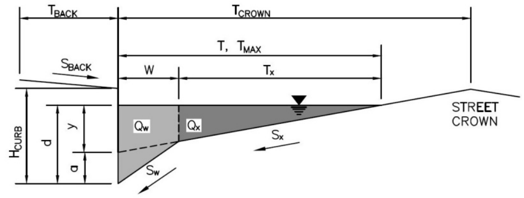
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.9**	**10.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**81**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

INLET 3-L - Big Johnson Drive



Gutter Geometry (Enter data in the blue cells)

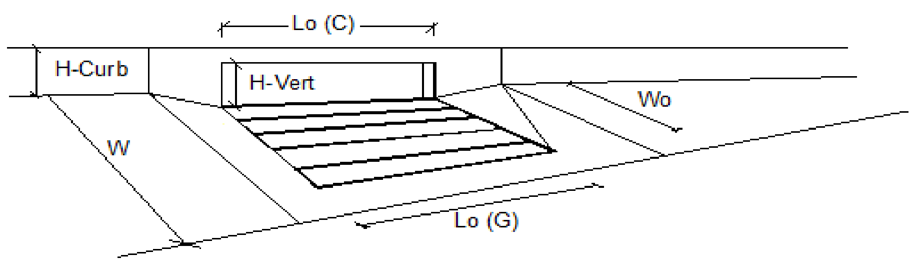
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.025		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**16.5**	**46.0**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input) CDOT Type R Curb Opening

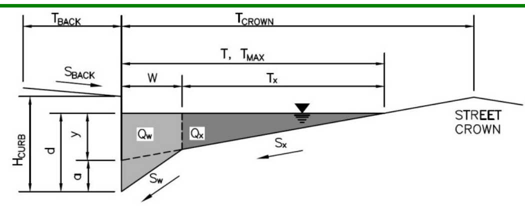
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.0**	**5.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**82**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

INLET L5 - Blackmer Drive



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	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} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.50	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 =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

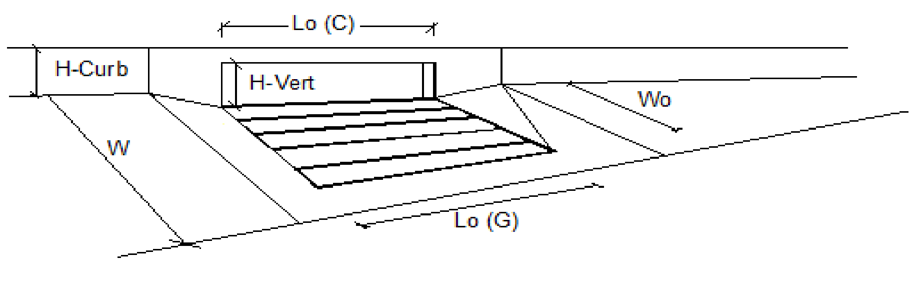
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**10.6**	**45.8**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

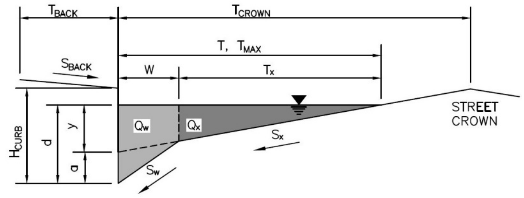
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.2**	**0.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

INLET L6 - Blackmer Drive



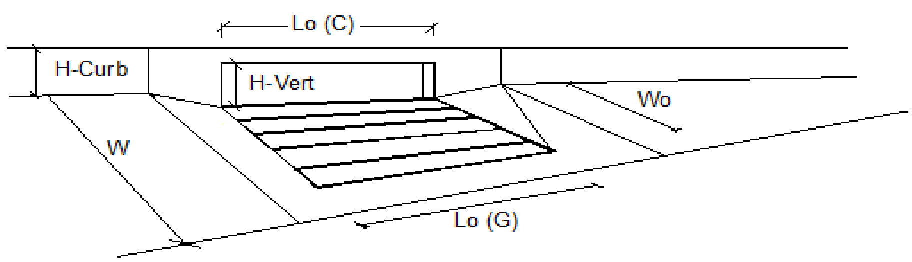
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.50		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 =	0.053		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**15.6**	**32.9**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



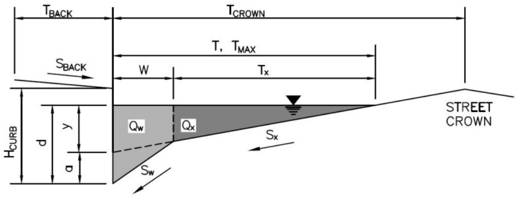
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.1**	**0.2**	**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)

Trails at Aspen Ridge Filing No. 4

INLET 1-J - Schoonover Dr.



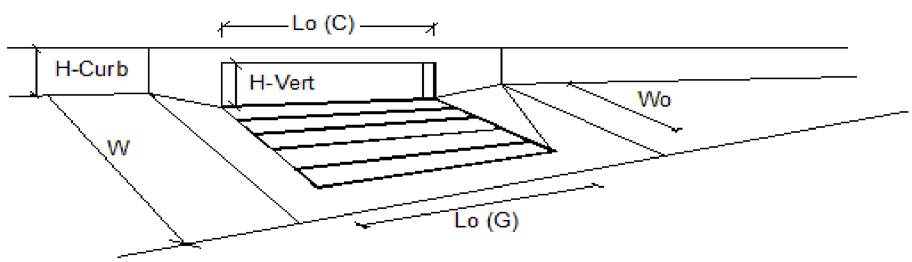
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**10.4**	**41.7**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



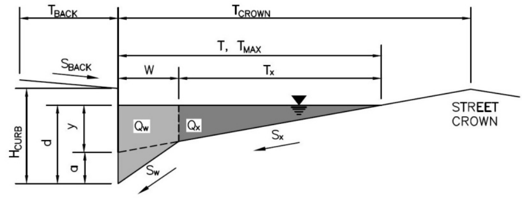
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**6.8**	**10.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**3.4**	**13.5**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**66**	**42**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

INLET 2-J - Schoonover Dr.



Gutter Geometry (Enter data in the blue cells)

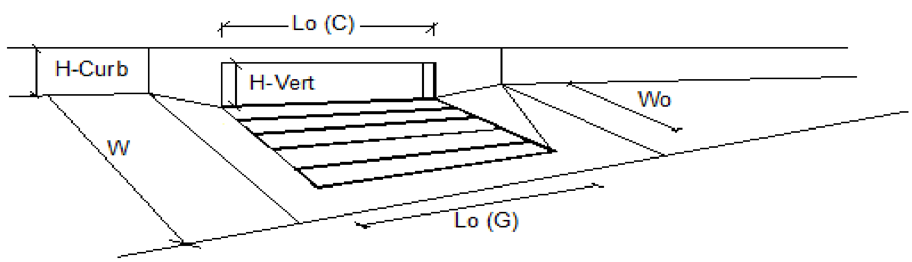
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**10.4**	**41.7**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.7**	**3.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**98**	**%**

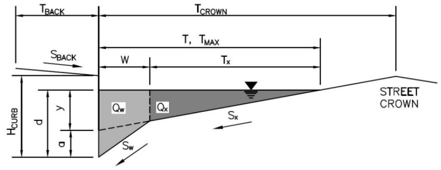
Version 4.05 Released March 2017

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

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

Project: Trails at Aspen Ridge Filing No. 4

Inlet ID: Schoonover Dr. UPHILL OF INLET 3-J



Gutter Geometry (Enter data in the blue cells)

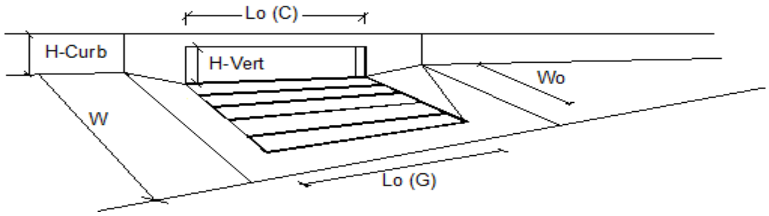
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**10.4**	**41.7**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



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

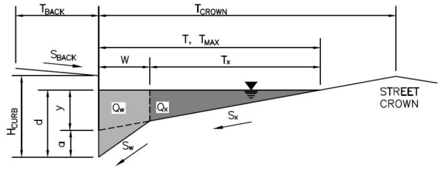
Version 4.05 Released March 2017

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

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

Project: Trails at Aspen Ridge Filing No. 4

Inlet ID: Schoonover Dr. UPHILL OF INLET 4-J



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		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} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

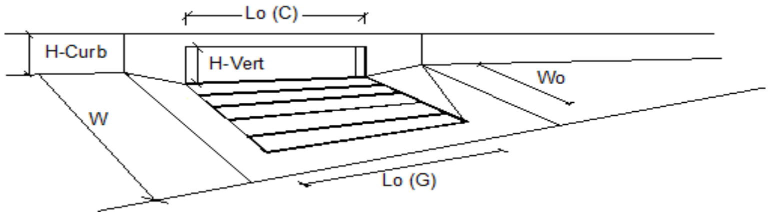
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**10.4**	**41.7**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



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

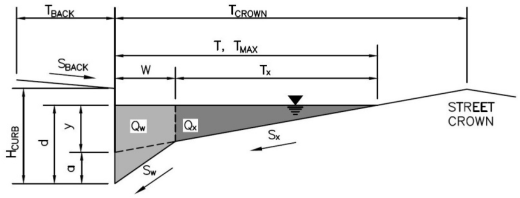
		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**			**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**			**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**			**%**

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

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

Trails at Aspen Ridge Filing No. 4

Future Filing - Hazelton Drive - INLET 15-K



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	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} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.024	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

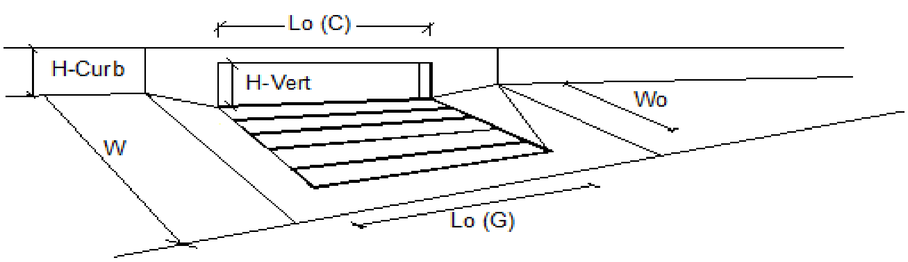
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**16.2**	**46.5**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



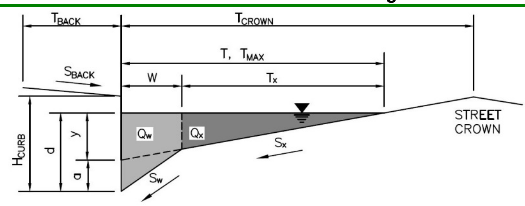
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**3.0**	**5.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**82**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

Future Filing - Hazelton Dr. INLET 16-K



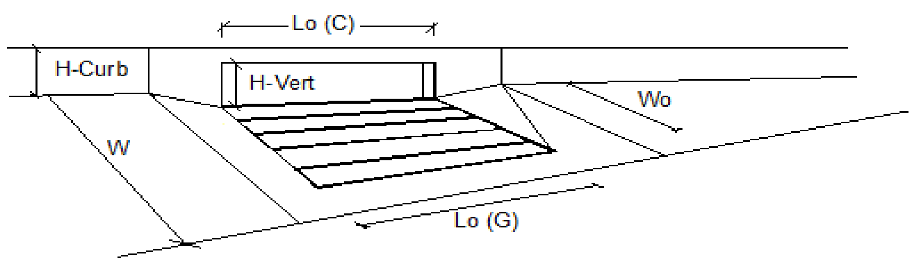
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.024		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**16.2**	**46.5**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



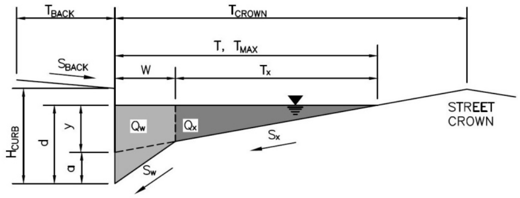
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.4**	**4.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**89**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

Hazelton Dr (Road Capacity only) K17-20



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	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} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**14.8**	**49.1**	**cfs**

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

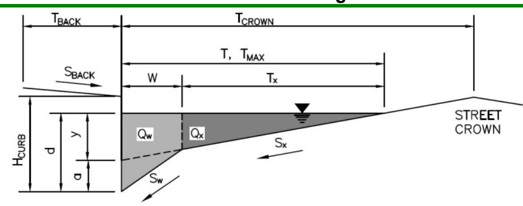
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

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

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

Trails at Aspen Ridge Filing No. 4

Big Johnson Drive - INLET 21-K



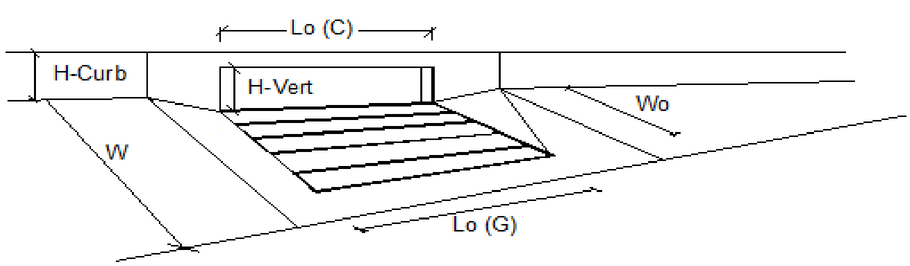
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**20.0**	**39.9**	**cfs**

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 ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



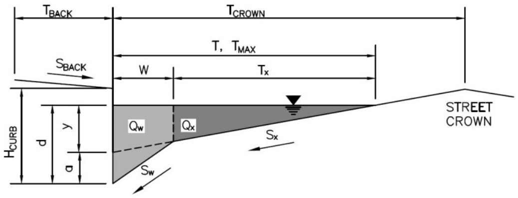
Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.9**	**2.0**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**

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

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

Trails at Aspen Ridge Filing No. 4

Big Johnson Drive INLET 22-Ka and 22-Kb



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.0	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} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.013	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.2	8.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

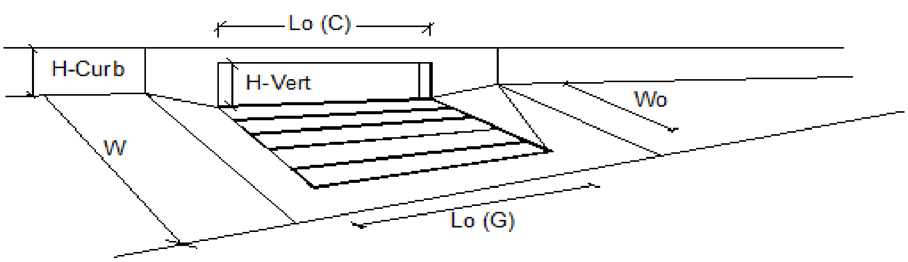
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**20.0**	**39.9**	**cfs**

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'

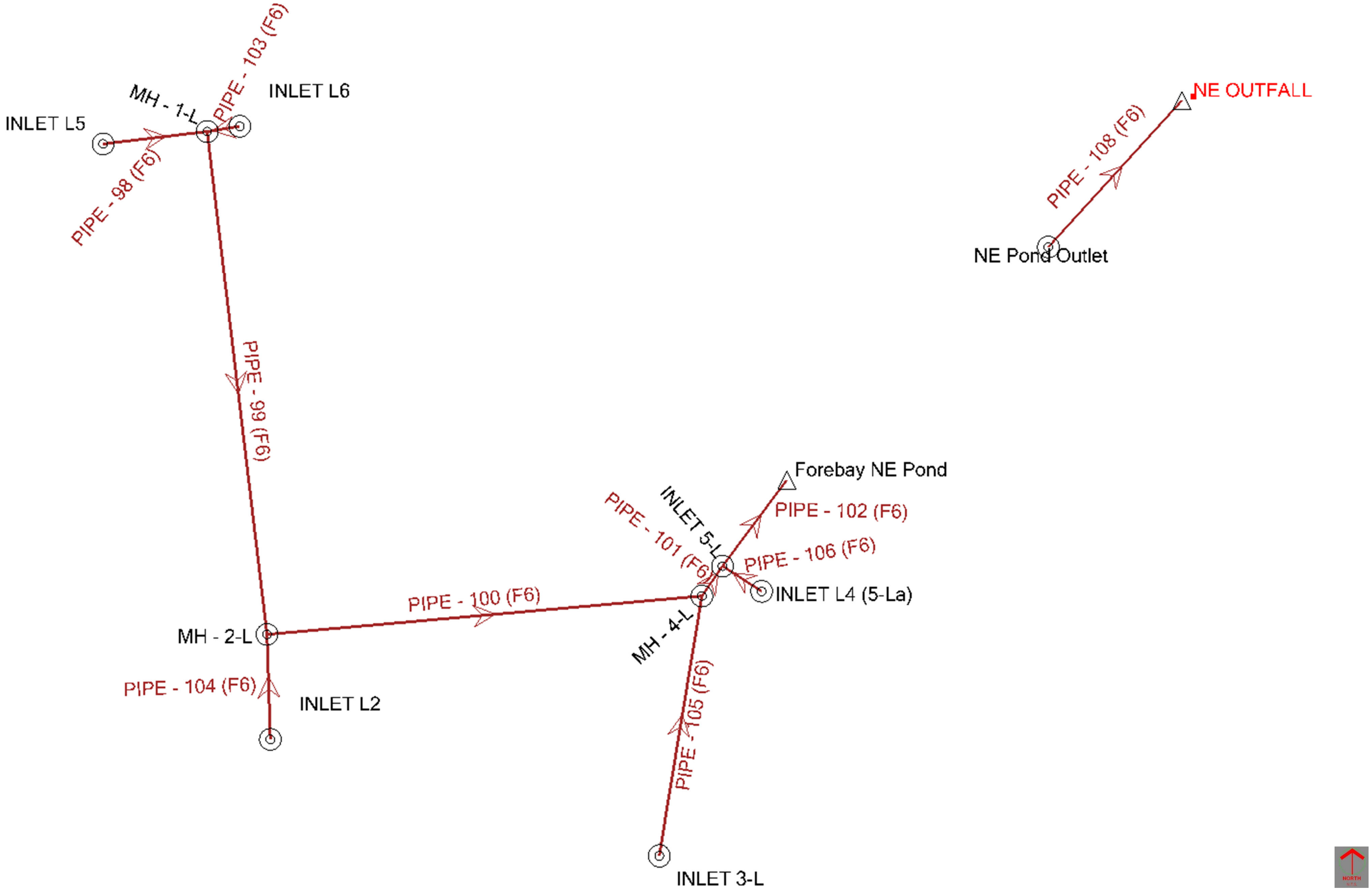
INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

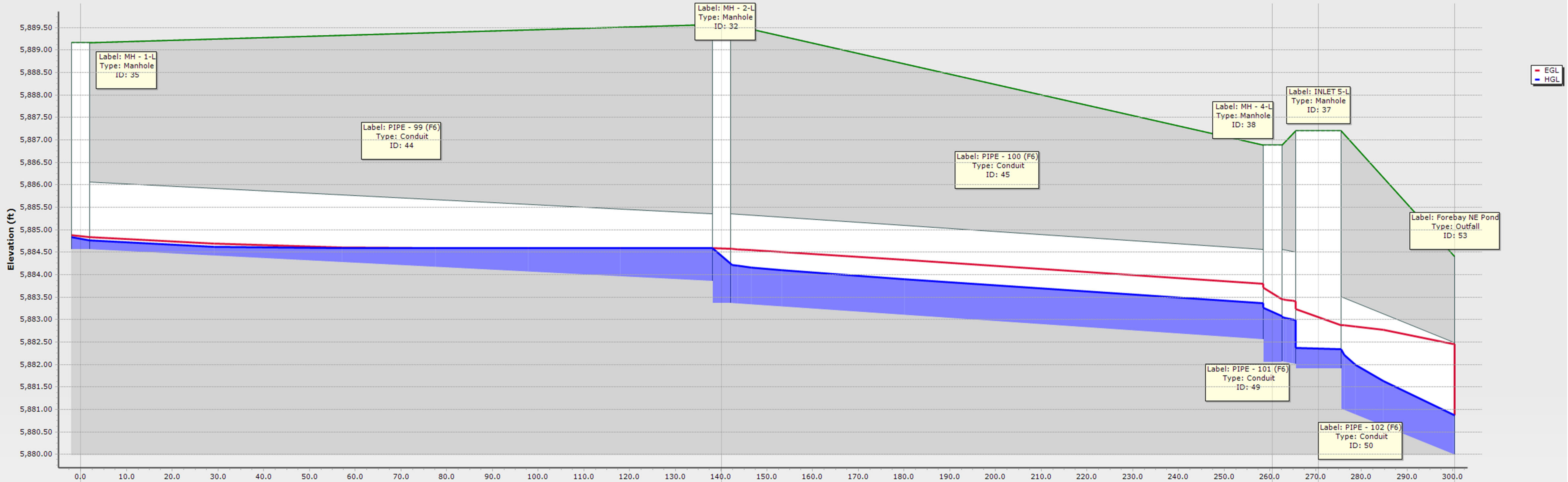
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.7**	**9.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**100**	**%**



STORMCAD LAYOUT-TAR F4 (INTERNAL F6) DEVELOPMENT

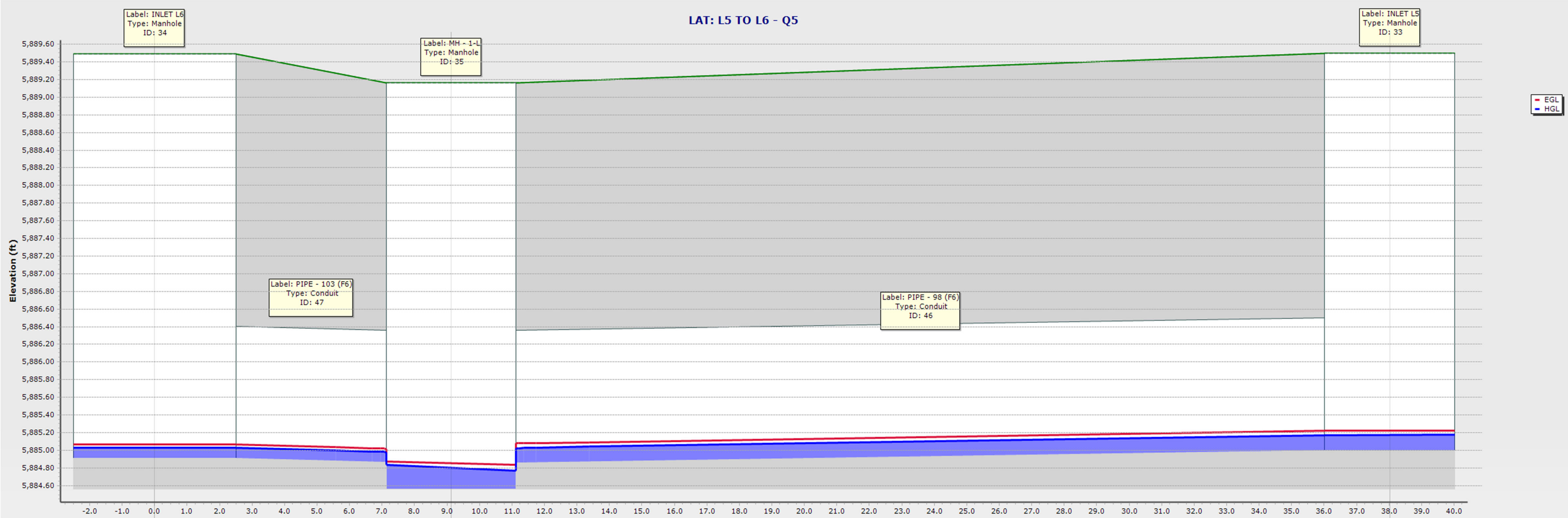
Marksheffel Tributary to Jimmy Camp Creek

1-L TO NE POND - Q5

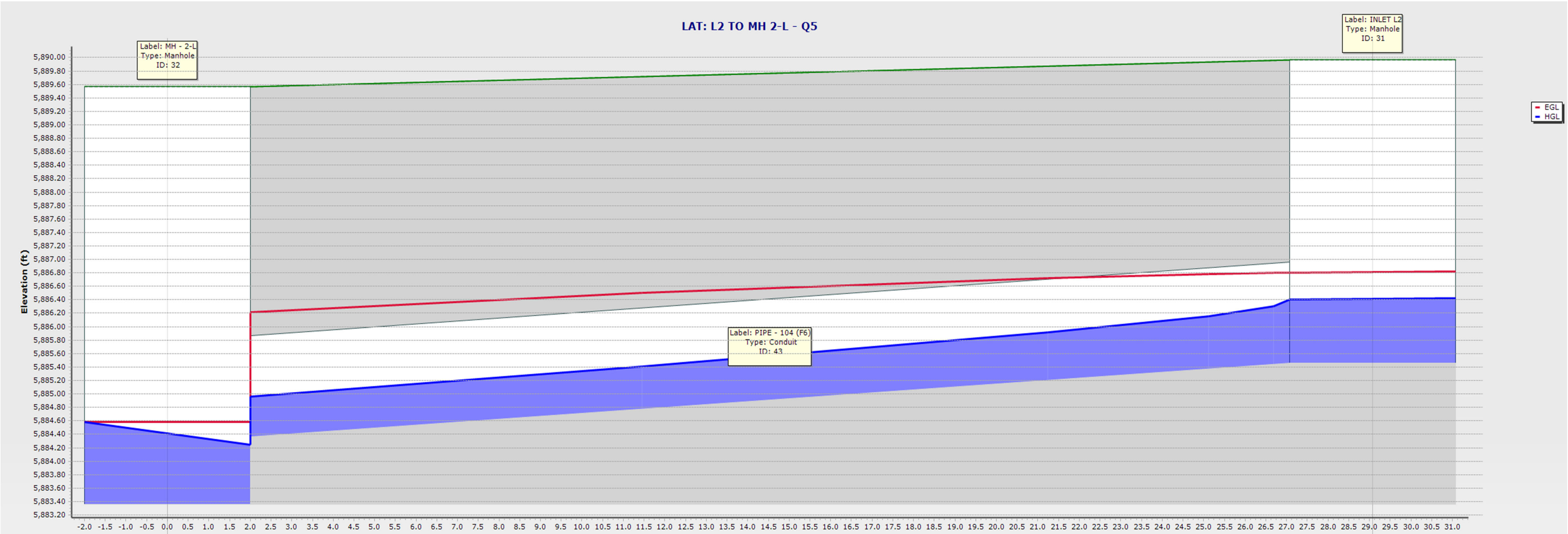


ID\Label	44 \ PIPE - 99 (F6)	45 \ PIPE - 100 (F6)	49 \ PIPE - 101 (F6)	50 \ PIPE - 102 (F6)
Link Length (ft)	140.1	120.5	10.0	29.8
Rise (in)\Material	18.0 \ Concrete	24.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete
Flow (cfs)	0.30	6.20	9.20	15.60
Slope (ft/ft)	0.005	0.007	0.005	0.034

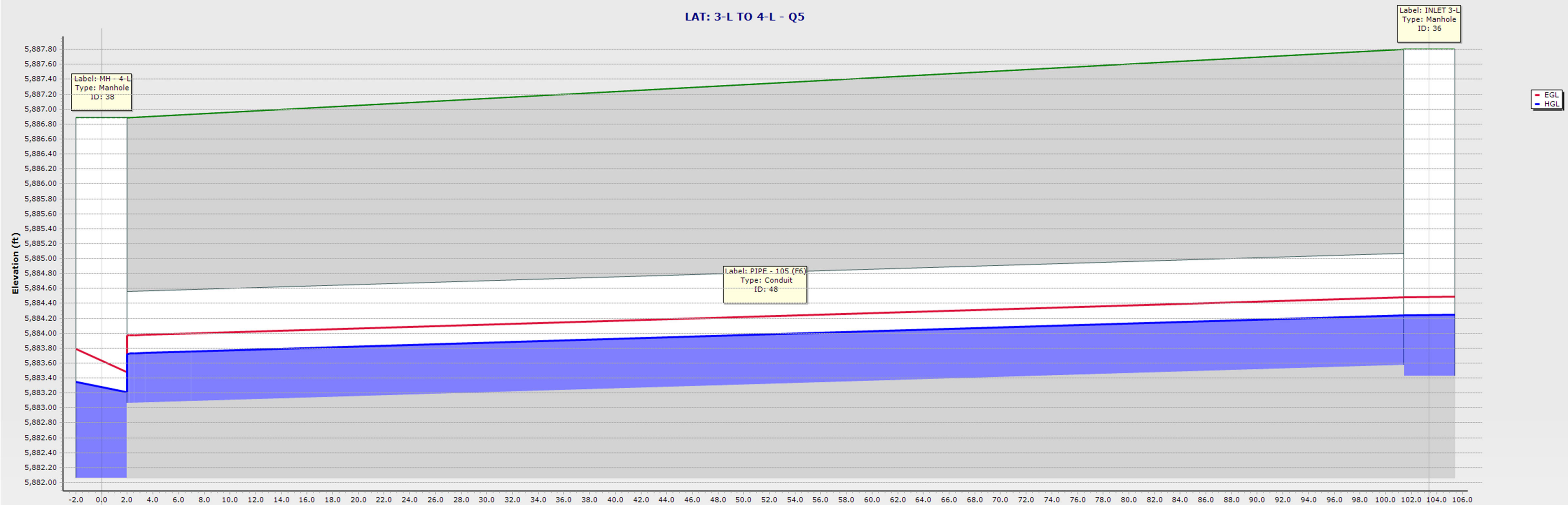
ID\Label	35 \ MH - 1-L	32 \ MH - 2-L	38 \ MH - 4-L	37 \ INLET 5-L	53 \ Forebay NE Pond
Ground (ft)	5889.17	5889.57	5886.89	5887.20	5884.41
Invert (ft)	5884.56	5883.36	5882.06	5881.91	5879.99
Station (ft)	0.0	140.1	260.6	270.6	300.4



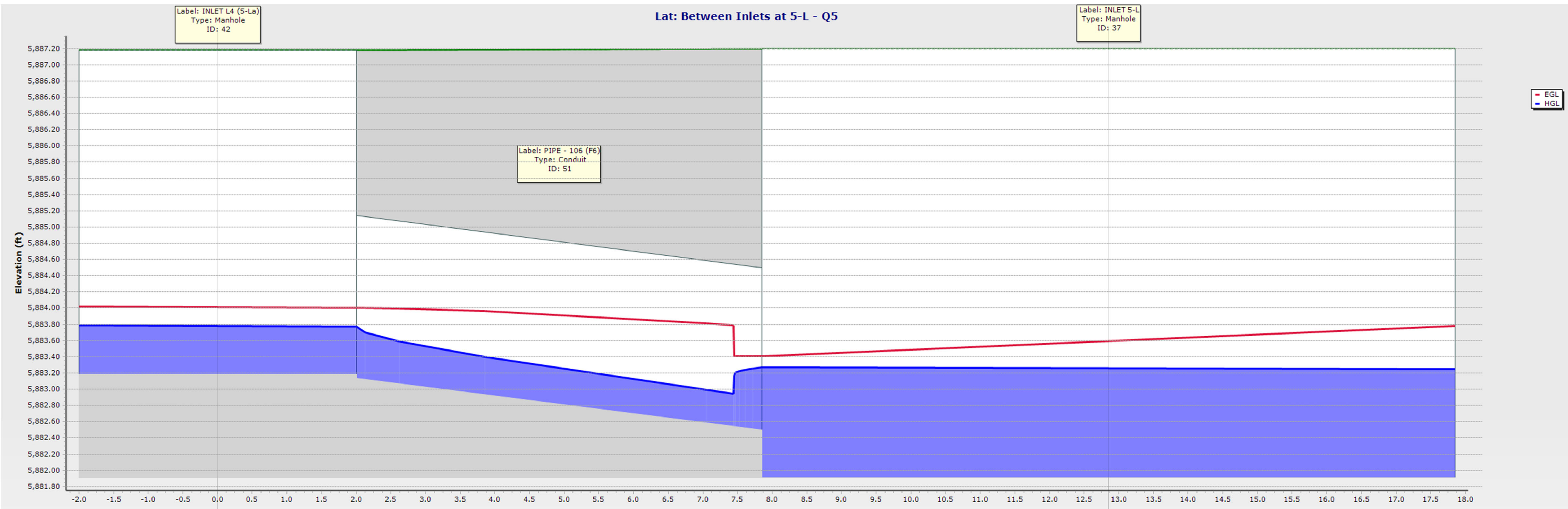
ID\Label		47 \ PIPE - 103 (F6)		46 \ PIPE - 98 (F6)	
Link Length (ft)		9.1		28.9	
Rise (in)\Material		18.0 \ Concrete		18.0 \ Concrete	
Flow (cfs)		0.10		0.20	
Slope (ft/ft)		0.005		0.005	
ID\Label	34 \ INLET L6		35 \ MH - 1-L		33 \ INLET L5
Ground (ft)	5889.49		5889.17		5889.50
Invert (ft)	5884.91		5884.56		5885.00
Station (ft)	0.0		9.1		38.0



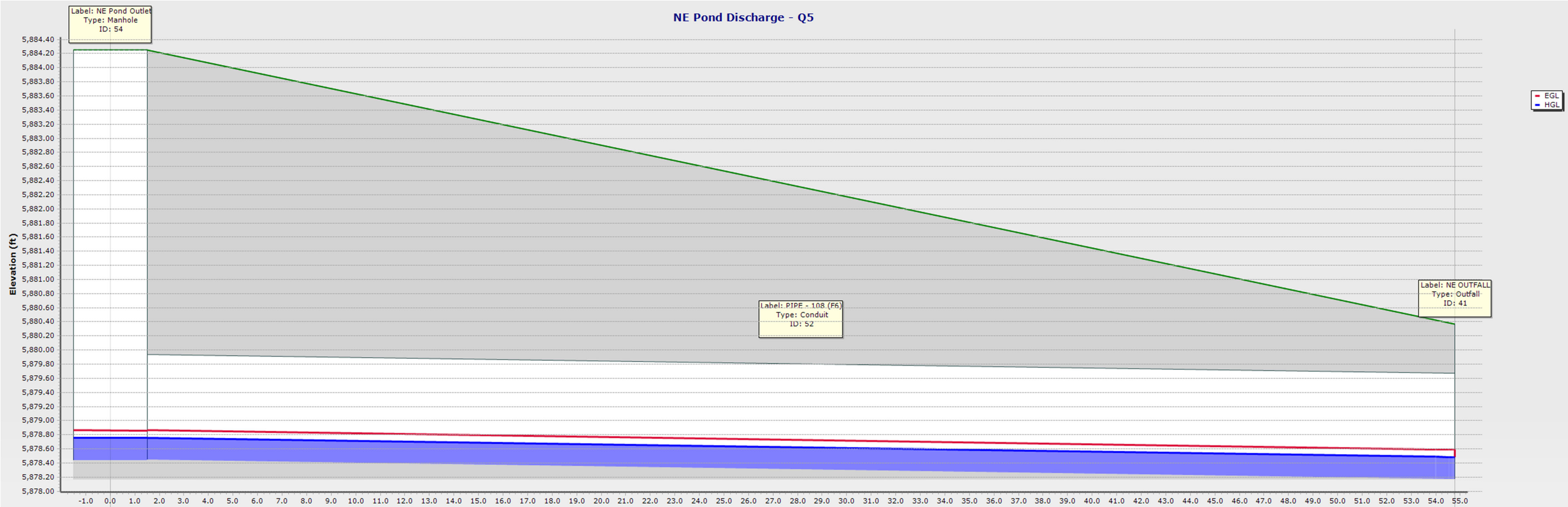
ID\Label		43 \ PIPE - 104 (F6)	
Link Length (ft)		29.1	
Rise (in)\Material		18.0 \ Concrete	
Flow (cfs)		5.90	
Slope (ft/ft)		0.038	
ID\Label	32 \ MH - 2-L		31 \ INLET L2
Ground (ft)	5889.57		5889.96
Invert (ft)	5883.36		5885.46
Station (ft)	0.0		29.1



ID\Label	48 \ PIPE - 105 (F6)	
Link Length (ft)	103.4	
Rise (in)\Material	18.0 \ Concrete	
Flow (cfs)	3.00	
Slope (ft/ft)	0.005	
ID\Label	38 \ MH - 4-L	36 \ INLET 3-L
Ground (ft)	5886.89	5887.80
Invert (ft)	5882.06	5883.43
Station (ft)	0.0	103.4



ID\Label		51 \ PIPE - 106 (F6)	
Link Length (ft)		12.9	
Rise (in)\Material		24.0 \ Concrete	
Flow (cfs)		3.30	
Slope (ft/ft)		0.050	
ID\Label	42 \ INLET L4 (5-La)		37 \ INLET 5-L
Ground (ft)	5887.18		5887.20
Invert (ft)	5883.18		5881.91
Station (ft)	0.0		12.9



ID\Label		52 \ PIPE - 108 (F6)	
Link Length (ft)		54.8	
Rise (in)\Material		18.0 \ Concrete	
Flow (cfs)		0.70	
Slope (ft/ft)		0.005	
ID\Label	54 \ NE Pond Outlet		41 \ NE OUTFALL
Ground (ft)	5884.25		5880.36
Invert (ft)	5878.44		5878.17
Station (ft)	0.0		54.8

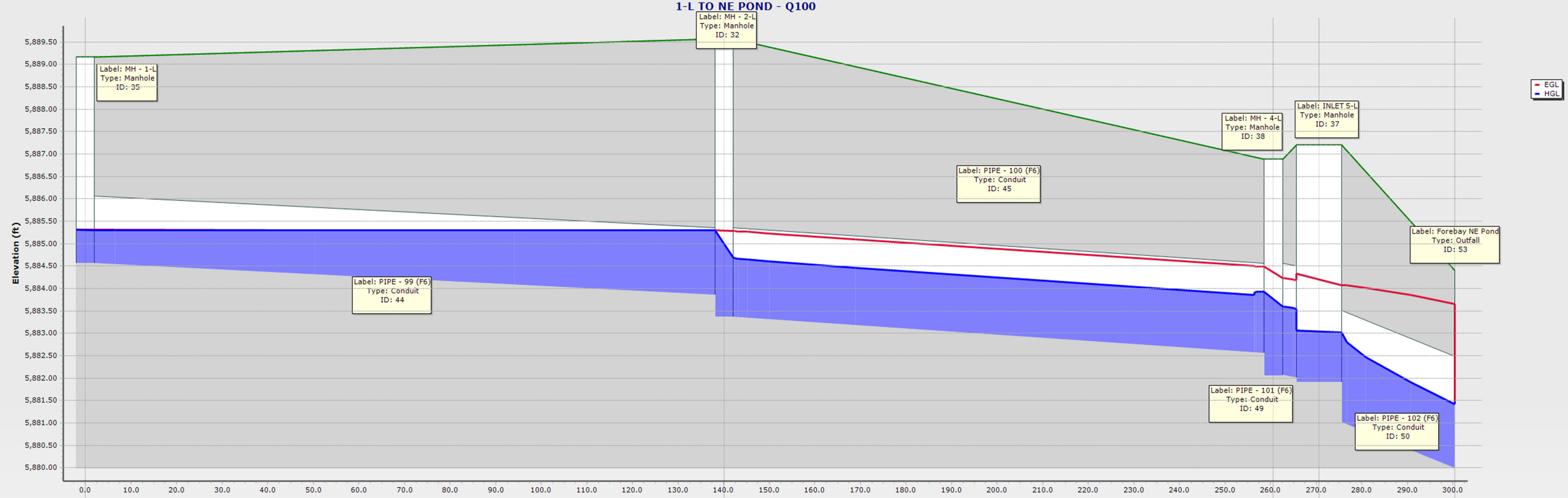
Pipe Report (5yr)

	ID	Label	Start Node	Invert (Start) (ft)	Invert (Stop) (ft)	Stop Node	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Depth (Normal) / Rise (%)
46: PIPE - 98 (F6)	46	PIPE - 98 (F6)	INLET L5	5,885.00	5,884.86	MH - 1-L	28.9	0.005	18.0	0.013	0.20	1.82	7.43	2.7	11.3
44: PIPE - 99 (F6)	44	PIPE - 99 (F6)	MH - 1-L	5,884.56	5,883.86	MH - 2-L	140.1	0.005	18.0	0.013	0.30	2.06	7.43	4.0	13.7
45: PIPE - 100 (F6)	45	PIPE - 100 (F6)	MH - 2-L	5,883.36	5,882.56	MH - 4-L	120.5	0.007	24.0	0.013	6.20	5.29	18.43	33.6	40.0
49: PIPE - 101 (F6)	49	PIPE - 101 (F6)	MH - 4-L	5,882.06	5,882.01	INLET 5-L	10.0	0.005	30.0	0.013	9.20	5.24	29.00	31.7	38.7
50: PIPE - 102 (F6)	50	PIPE - 102 (F6)	INLET 5-L	5,881.01	5,879.99	Forebay NE Pond	29.8	0.034	30.0	0.013	15.60	12.17	75.94	20.5	30.8
47: PIPE - 103 (F6)	47	PIPE - 103 (F6)	INLET L6	5,884.91	5,884.86	MH - 1-L	9.1	0.005	18.0	0.013	0.10	1.48	7.43	1.3	8.1
43: PIPE - 104 (F6)	43	PIPE - 104 (F6)	INLET L2	5,885.46	5,884.36	MH - 2-L	29.1	0.038	18.0	0.013	5.90	10.00	20.43	28.9	36.8
48: PIPE - 105 (F6)	48	PIPE - 105 (F6)	INLET 3-L	5,883.57	5,883.06	MH - 4-L	103.4	0.005	18.0	0.013	3.00	3.95	7.36	40.8	44.5
51: PIPE - 106 (F6)	51	PIPE - 106 (F6)	INLET L4 (5-La)	5,883.14	5,882.50	INLET 5-L	12.9	0.050	24.0	0.013	3.30	9.07	50.48	6.5	17.3
52: PIPE - 108 (F6)	52	PIPE - 108 (F6)	NE Pond Outlet	5,878.44	5,878.17	NE OUTFALL	54.8	0.005	18.0	0.013	0.70	2.63	7.37	9.5	20.8

Manhole Report (5yr)

	ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Depth (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)	Flow (Total Out) (cfs)
31: INLET L2	31	INLET L2	5,889.96	5,889.96	0.94	5,886.42	5,886.40	Standard	0.050	5.90
32: MH - 2-L	32	MH - 2-L	5,889.57	5,889.57	0.88	5,884.59	5,884.24	Standard	1.020	6.20
33: INLET L5	33	INLET L5	5,889.50	5,889.50	0.17	5,885.17	5,885.17	Standard	0.050	0.20
34: INLET L6	34	INLET L6	5,889.49	5,889.49	0.12	5,885.03	5,885.03	Standard	0.050	0.10
35: MH - 1-L	35	MH - 1-L	5,889.17	5,889.17	0.21	5,884.83	5,884.77	Standard	1.020	0.30
36: INLET 3-L	36	INLET 3-L	5,887.80	5,887.80	0.81	5,884.25	5,884.24	Standard	0.050	3.00
37: INLET 5-L	37	INLET 5-L	5,887.20	5,887.20	0.43	5,882.37	5,882.34	Standard	0.050	15.60
38: MH - 4-L	38	MH - 4-L	5,886.89	5,886.89	1.01	5,883.27	5,883.07	Standard	0.520	9.20
42: INLET L4 (5-La)	42	INLET L4 (5-La)	5,887.18	5,887.18	0.60	5,883.79	5,883.77	Standard	0.050	3.30
54: NE Pond Outlet	54	NE Pond Outlet	5,884.25	5,884.25	0.31	5,878.76	5,878.75	Standard	0.050	0.70

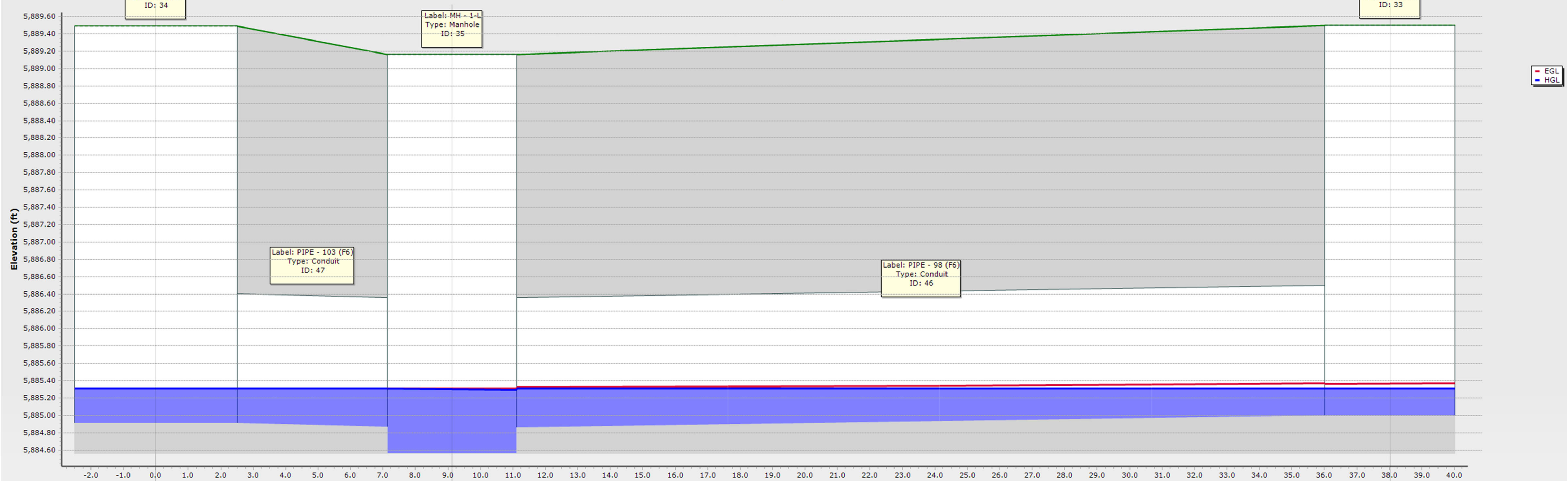
1-L TO NE POND - Q100



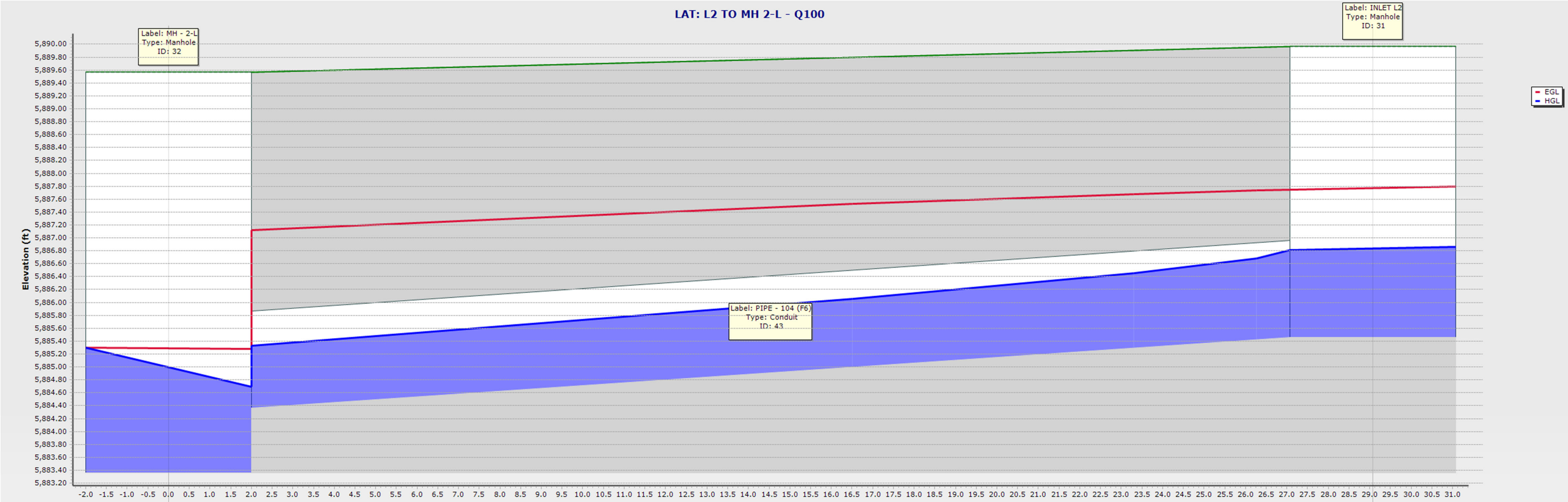
ID\Label	44 \ PIPE - 99 (F6)	45 \ PIPE - 100 (F6)	49 \ PIPE - 101 (F6)	50 \ PIPE - 102 (F6)
Link Length (ft)	140.1	120.5	10.0	29.8
Rise (in)\Material	18.0 \ Concrete	24.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete
Flow (cfs)	0.70	13.70	20.30	34.90
Slope (ft/ft)	0.005	0.007	0.005	0.034

ID\Label	35 \ MH - 1-L	32 \ MH - 2-L	38 \ MH - 4-L	37 \ INLET 5-L	53 \ Forebay NE Pond
Ground (ft)	5889.17	5889.57	5886.89	5887.20	5884.41
Invert (ft)	5884.56	5883.36	5882.06	5881.91	5881.47
Station (ft)	0.0	140.1	260.6	270.6	300.4

LAT: L5 TO L6 - Q100

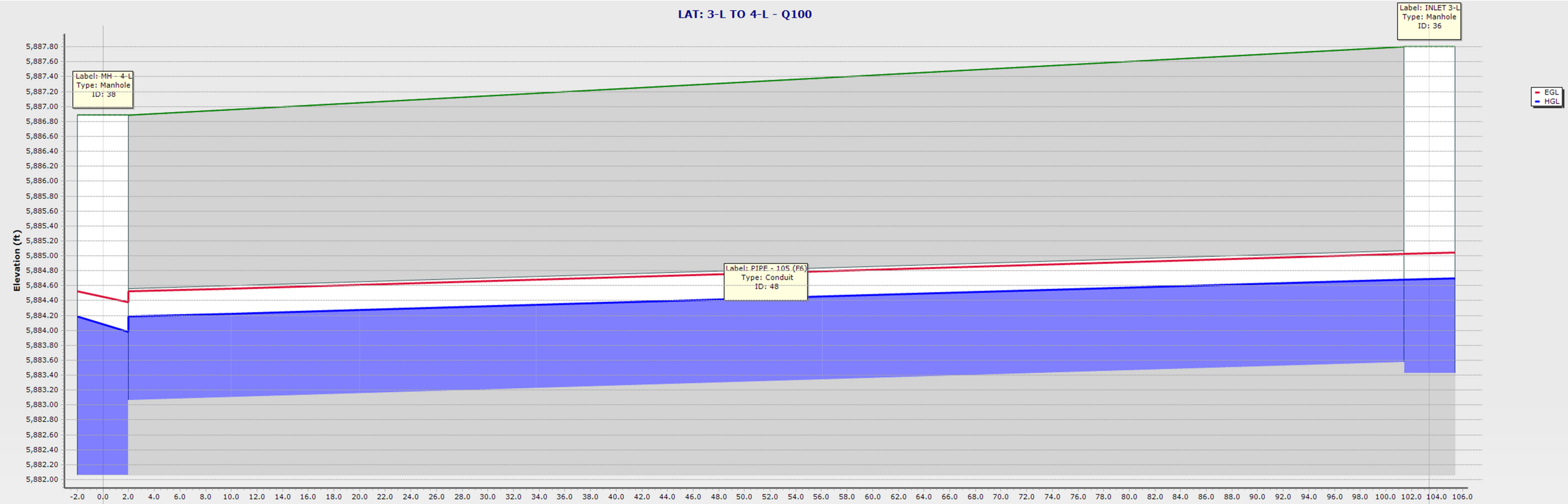


ID\Label		47 \ PIPE - 103 (F6)		46 \ PIPE - 98 (F6)	
Link Length (ft)		9.1		28.9	
Rise (in)\Material		18.0 \ Concrete		18.0 \ Concrete	
Flow (cfs)		0.20		0.50	
Slope (ft/ft)		0.005		0.005	
ID\Label	34 \ INLET L6		35 \ MH - 1-L		33 \ INLET L5
Ground (ft)	5889.49		5889.17		5889.50
Invert (ft)	5884.91		5884.56		5885.00
Station (ft)	0.0		9.1		38.0

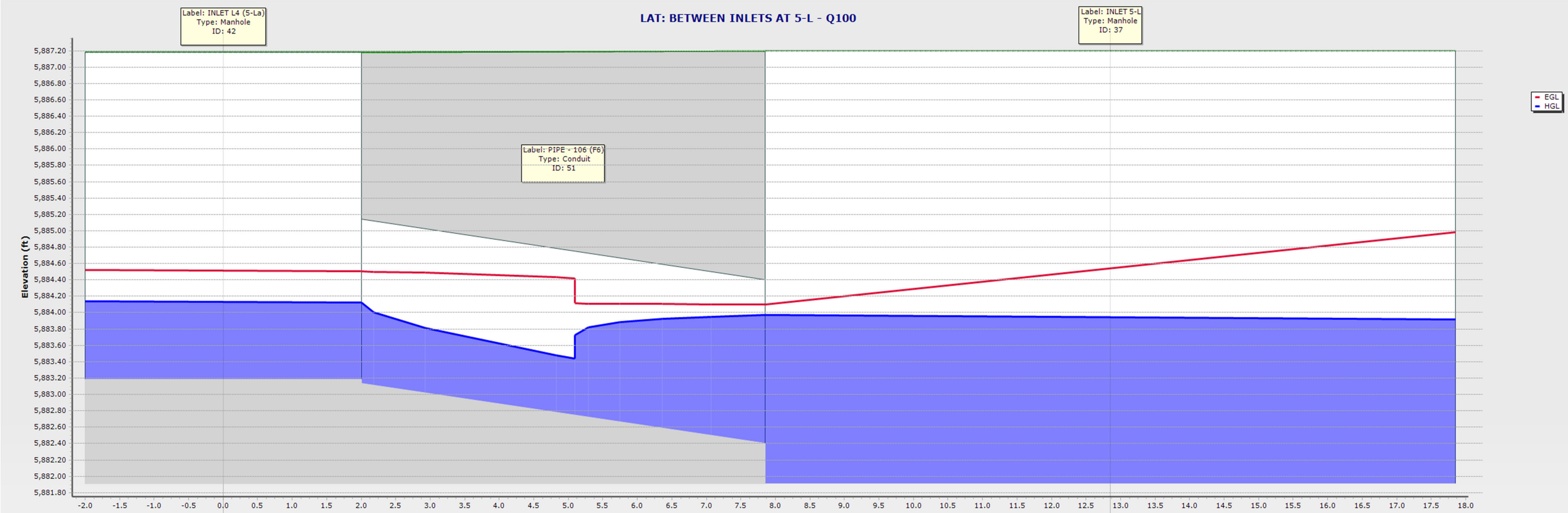


ID\Label	43 \ PIPE - 104 (F6)	
Link Length (ft)	29.1	
Rise (in)\Material	18.0 \ Concrete	
Flow (cfs)	13.00	
Slope (ft/ft)	0.038	
ID\Label	32 \ MH - 2-L	31 \ INLET L2
Ground (ft)	5889.57	5889.96
Invert (ft)	5883.36	5885.46
Station (ft)	0.0	29.1

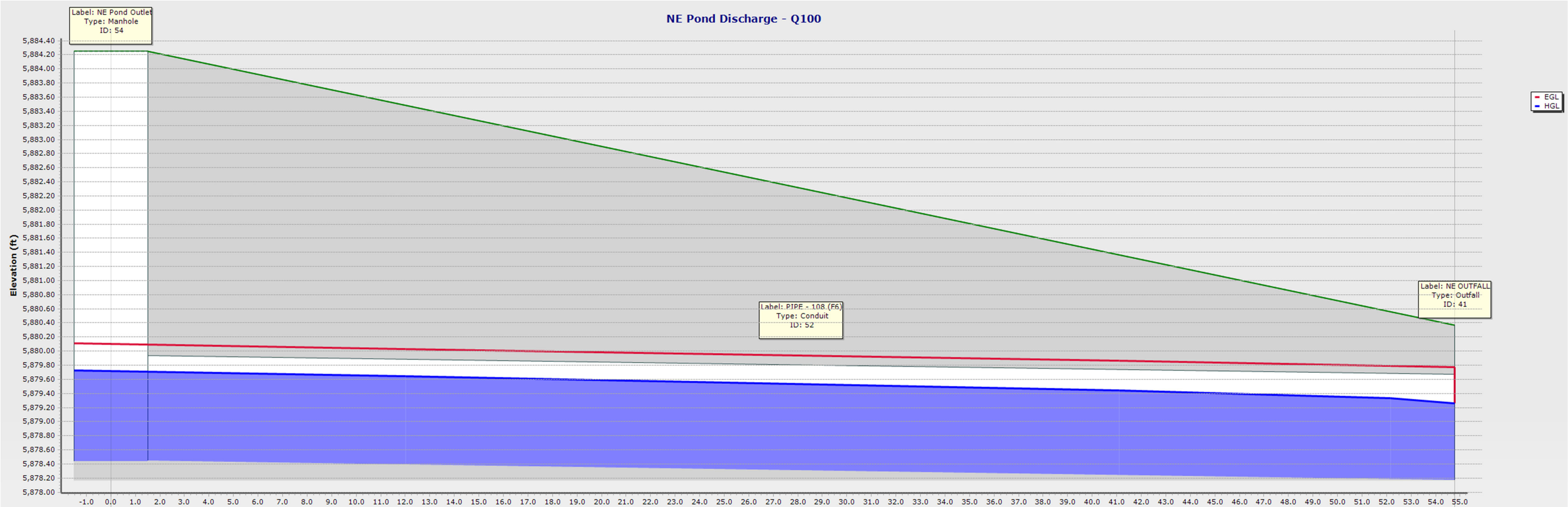
LAT: 3-L TO 4-L - Q100



ID\Label	48 \ PIPE - 105 (F6)	
Link Length (ft)	103.4	
Rise (in)\Material	18.0 \ Concrete	
Flow (cfs)	6.60	
Slope (ft/ft)	0.005	
ID\Label	38 \ MH - 4-L	36 \ INLET 3-L
Ground (ft)	5886.89	5887.80
Invert (ft)	5882.06	5883.43
Station (ft)	0.0	103.4



ID\Label	51 \ PIPE - 106 (F6)	
Link Length (ft)	12.9	
Rise (in)\Material	24.0 \ Concrete	
Flow (cfs)	7.60	
Slope (ft/ft)	0.058	
ID\Label	42 \ INLET L4 (5-La)	37 \ INLET 5-L
Ground (ft)	5887.18	5887.20
Invert (ft)	5883.18	5881.91
Station (ft)	0.0	12.9



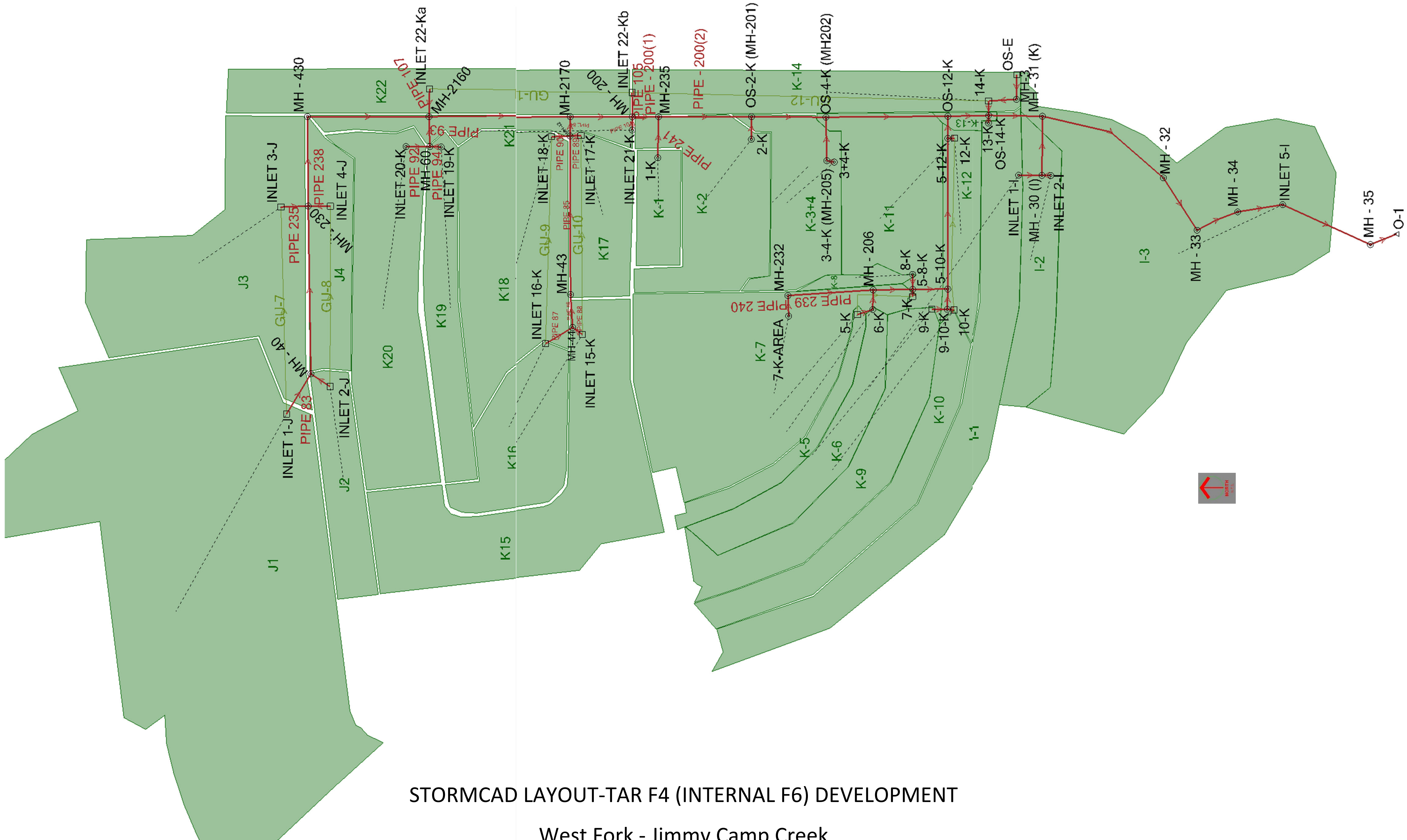
ID\Label		52 \ PIPE - 108 (F6)	
Link Length (ft)		54.8	
Rise (in)\Material		18.0 \ Concrete	
Flow (cfs)		7.90	
Slope (ft/ft)		0.005	
ID\Label	54 \ NE Pond Outlet		41 \ NE OUTFALL
Ground (ft)	5884.25		5880.36
Invert (ft)	5878.44		5878.17
Station (ft)	0.0		54.8

Pipe Report (100yr)

	ID	Label	Start Node	Invert (Start) (ft)	Invert (Stop) (ft)	Stop Node	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Depth (Normal) / Rise (%)
46: PIPE - 98 (F6)	46	PIPE - 98 (F6)	INLET L5	5,885.00	5,884.86	MH - 1-L	28.9	0.005	18.0	0.013	0.50	2.39	7.43	6.7	17.6
44: PIPE - 99 (F6)	44	PIPE - 99 (F6)	MH - 1-L	5,884.56	5,883.86	MH - 2-L	140.1	0.005	18.0	0.013	0.70	2.64	7.43	9.4	20.7
45: PIPE - 100 (F6)	45	PIPE - 100 (F6)	MH - 2-L	5,883.36	5,882.56	MH - 4-L	120.5	0.007	24.0	0.013	13.70	6.43	18.43	74.3	64.2
49: PIPE - 101 (F6)	49	PIPE - 101 (F6)	MH - 4-L	5,882.06	5,882.01	INLET 5-L	10.0	0.005	30.0	0.013	20.30	6.39	29.00	70.0	61.7
50: PIPE - 102 (F6)	50	PIPE - 102 (F6)	INLET 5-L	5,881.01	5,879.99	Forebay NE...	29.8	0.034	30.0	0.013	34.90	15.15	75.94	46.0	47.6
47: PIPE - 103 (F6)	47	PIPE - 103 (F6)	INLET L6	5,884.91	5,884.86	MH - 1-L	9.1	0.005	18.0	0.013	0.20	1.82	7.43	2.7	11.3
43: PIPE - 104 (F6)	43	PIPE - 104 (F6)	INLET L2	5,885.46	5,884.36	MH - 2-L	29.1	0.038	18.0	0.013	13.00	12.25	20.43	63.6	57.9
48: PIPE - 105 (F6)	48	PIPE - 105 (F6)	INLET 3-L	5,883.57	5,883.06	MH - 4-L	103.4	0.005	18.0	0.013	6.60	4.71	7.36	89.7	74.0
51: PIPE - 106 (F6)	51	PIPE - 106 (F6)	INLET L4 (5-La)	5,883.14	5,882.40	INLET 5-L	12.9	0.058	24.0	0.013	7.60	12.18	54.28	14.0	25.3
52: PIPE - 108 (F6)	52	PIPE - 108 (F6)	NE Pond Outlet	5,878.44	5,878.17	NE OUTFALL	54.8	0.005	18.0	0.013	7.90	4.67	7.37	107.1	91.3

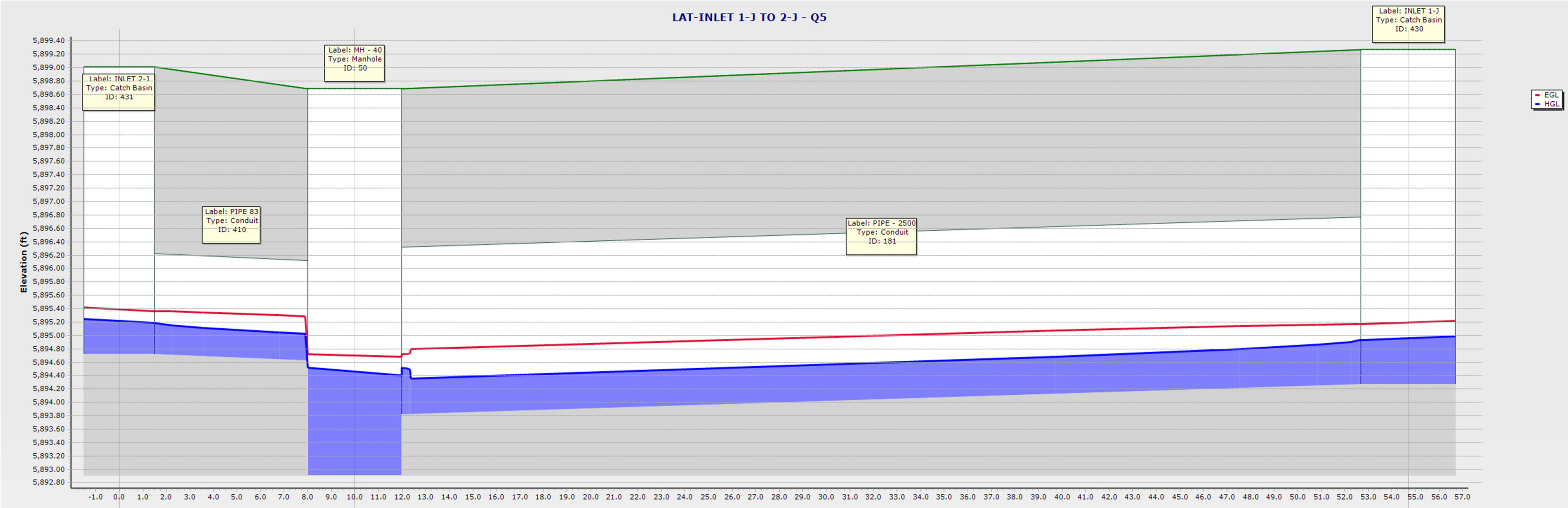
Manhole Report (100yr)

	ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Depth (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)	Flow (Total Out) (cfs)
31: INLET L2	31	INLET L2	5,889.96	5,889.96	1.35	5,886.86	5,886.81	Standard	0.050	13.00
32: MH - 2-L	32	MH - 2-L	5,889.57	5,889.57	1.33	5,885.30	5,884.69	Standard	1.020	13.70
33: INLET L5	33	INLET L5	5,889.50	5,889.50	0.31	5,885.31	5,885.31	Standard	0.050	0.50
34: INLET L6	34	INLET L6	5,889.49	5,889.49	0.40	5,885.31	5,885.31	Standard	0.050	0.20
35: MH - 1-L	35	MH - 1-L	5,889.17	5,889.17	0.74	5,885.31	5,885.30	Standard	1.020	0.70
36: INLET 3-L	36	INLET 3-L	5,887.80	5,887.80	1.25	5,884.70	5,884.68	Standard	0.050	6.60
37: INLET 5-L	37	INLET 5-L	5,887.20	5,887.20	1.11	5,883.07	5,883.02	Standard	0.050	34.90
38: MH - 4-L	38	MH - 4-L	5,886.89	5,886.89	1.54	5,883.93	5,883.60	Standard	0.520	20.30
42: INLET L4 (5-La)	42	INLET L4 (5-La)	5,887.18	5,887.18	0.94	5,884.14	5,884.12	Standard	0.050	7.60
54: NE Pond Outlet	54	NE Pond Outlet	5,884.25	5,884.25	1.27	5,879.73	5,879.71	Standard	0.050	7.90

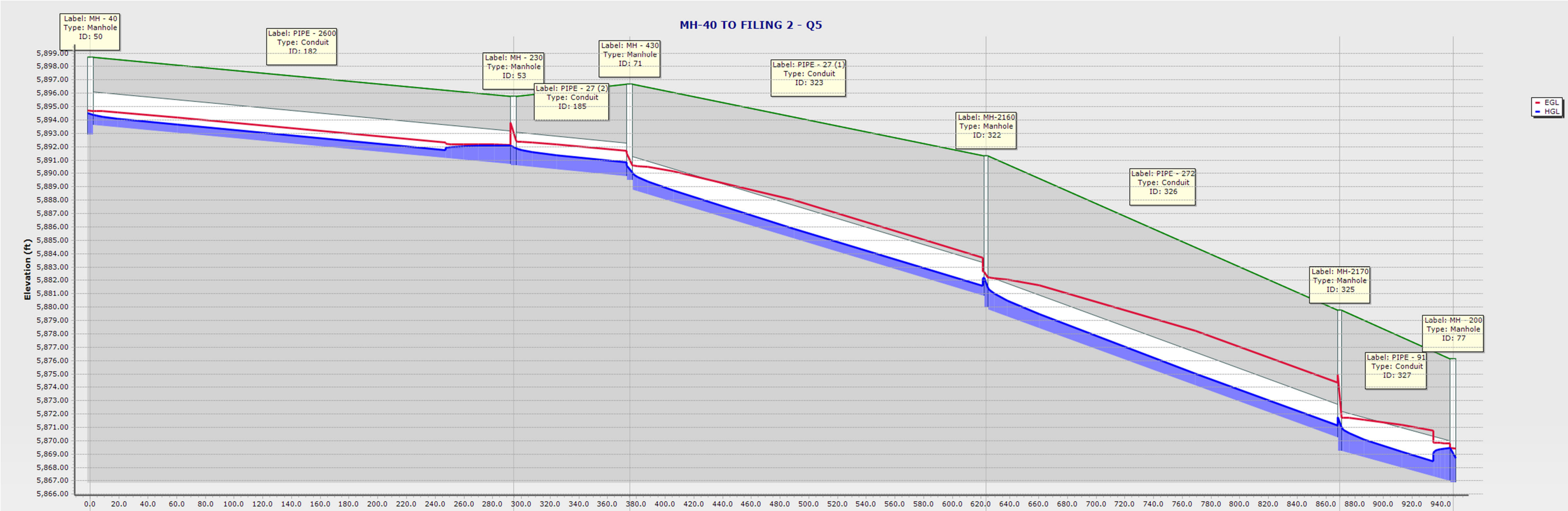


STORMCAD LAYOUT-TAR F4 (INTERNAL F6) DEVELOPMENT

West Fork - Jimmy Camp Creek

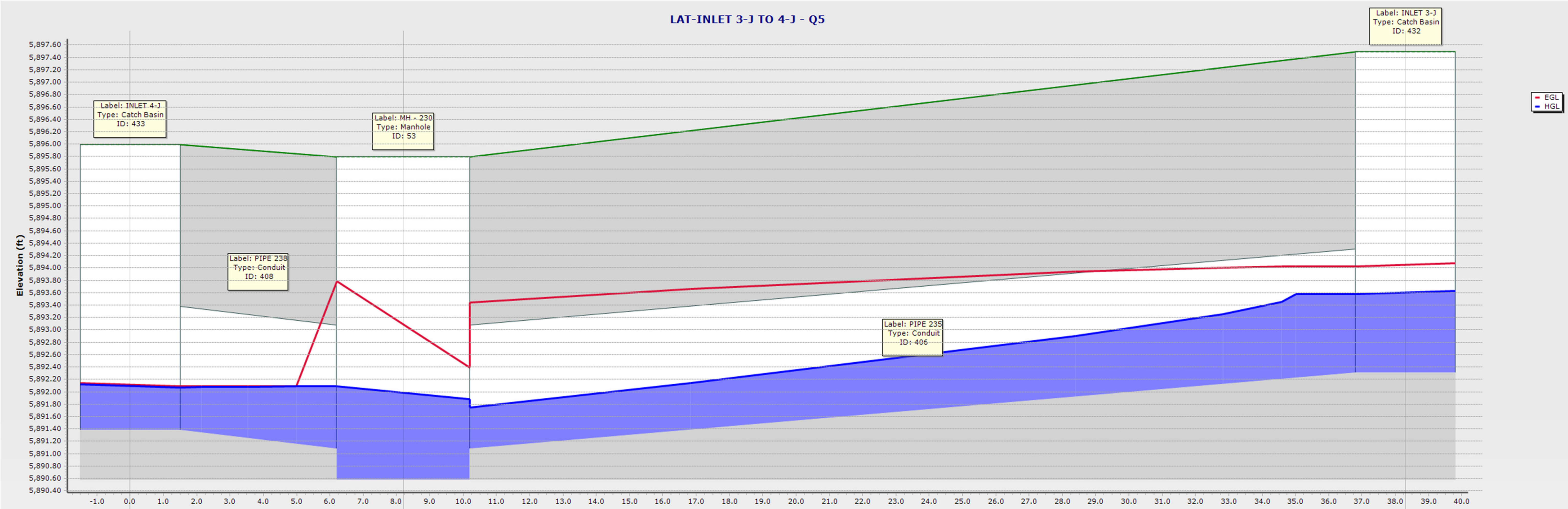


ID\Label		410 \ PIPE 83		181 \ PIPE - 2500	
Link Length (ft)		10.0		44.7	
Rise (in)\Material		18.0 \ Concrete		30.0 \ Concrete	
Flow (cfs)		1.59		4.08	
Slope (ft/ft)		0.010		0.010	
ID\Label	431 \ INLET 2-J		50 \ MH - 40		430 \ INLET 1-J
Ground (ft)	5899.01		5898.69		5899.27
Invert (ft)	5894.72		5892.91		5894.27
Station (ft)	0.0		10.0		54.7

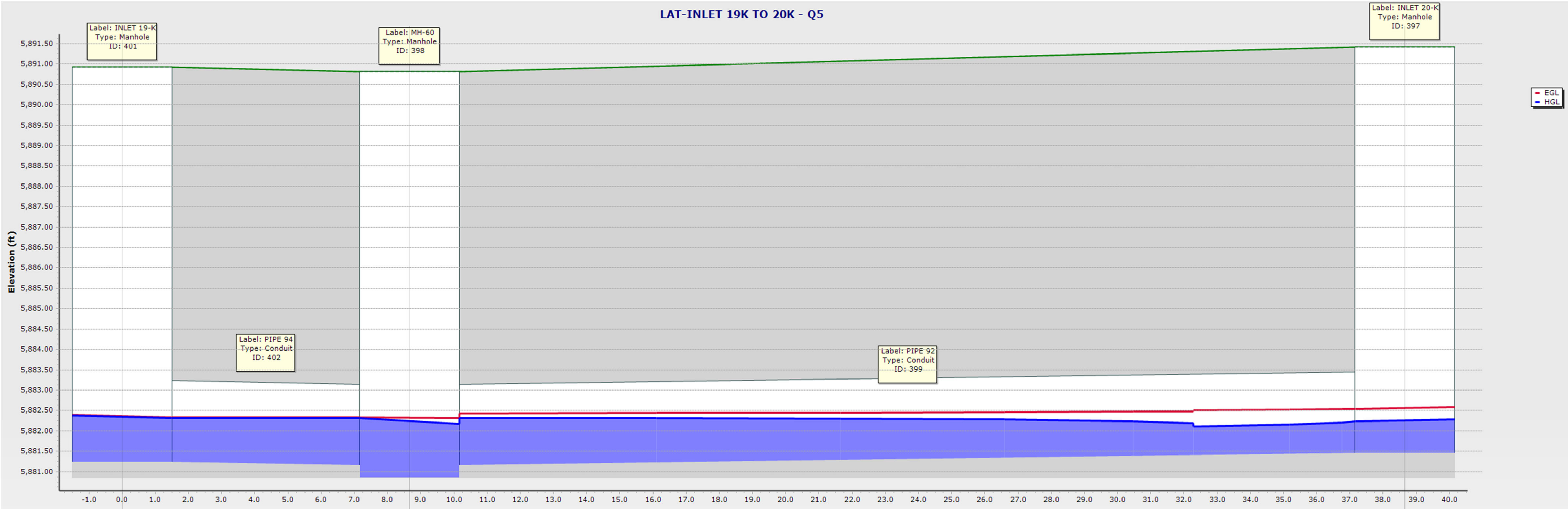


ID\Label	182 \ PIPE - 2600	185 \ PIPE - 27 (2)	323 \ PIPE - 27 (1)	326 \ PIPE - 272	327 \ PIPE - 91
Link Length (ft)	294.5	80.8	248.0	246.2	78.8
Rise (in)\Material	30.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete	36.0 \ Concrete
Flow (cfs)	5.60	14.83	14.74	23.79	30.21
Slope (ft/ft)	0.010	0.010	0.032	0.039	0.028

ID\Label	50 \ MH - 40	53 \ MH - 230	71 \ MH - 430	322 \ MH-2160	325 \ MH-2170	77 \ MH - 200
Ground (ft)	5898.69	5895.79	5896.70	5891.30	5879.76	5876.11
Invert (ft)	5892.91	5890.58	5889.47	5879.94	5869.21	5866.88
Station (ft)	0.0	294.5	375.3	623.3	869.5	948.3



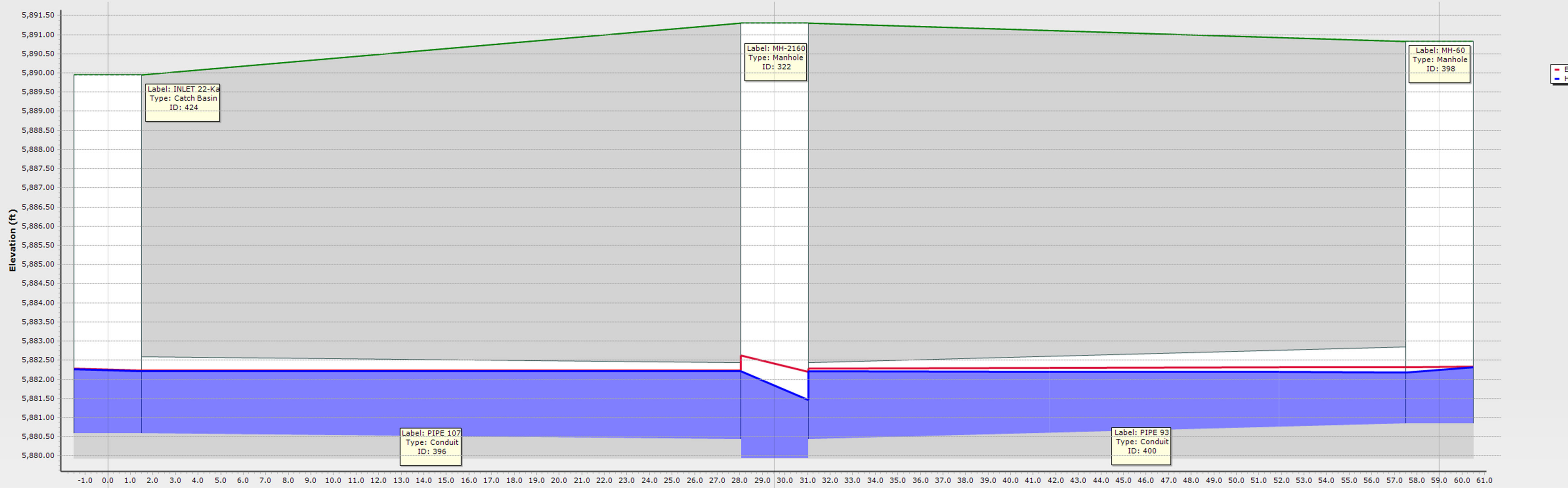
ID\Label		408 \ PIPE 238		406 \ PIPE 235	
Link Length (ft)		8.2		30.1	
Rise (in)\Material		24.0 \ Concrete		24.0 \ Concrete	
Flow (cfs)		1.15		9.51	
Slope (ft/ft)		0.037		0.041	
ID\Label	433 \ INLET 4-J		53 \ MH - 230		432 \ INLET 3-J
Ground (ft)	5895.99		5895.79		5897.49
Invert (ft)	5891.38		5890.58		5892.31
Station (ft)	0.0		8.2		38.3



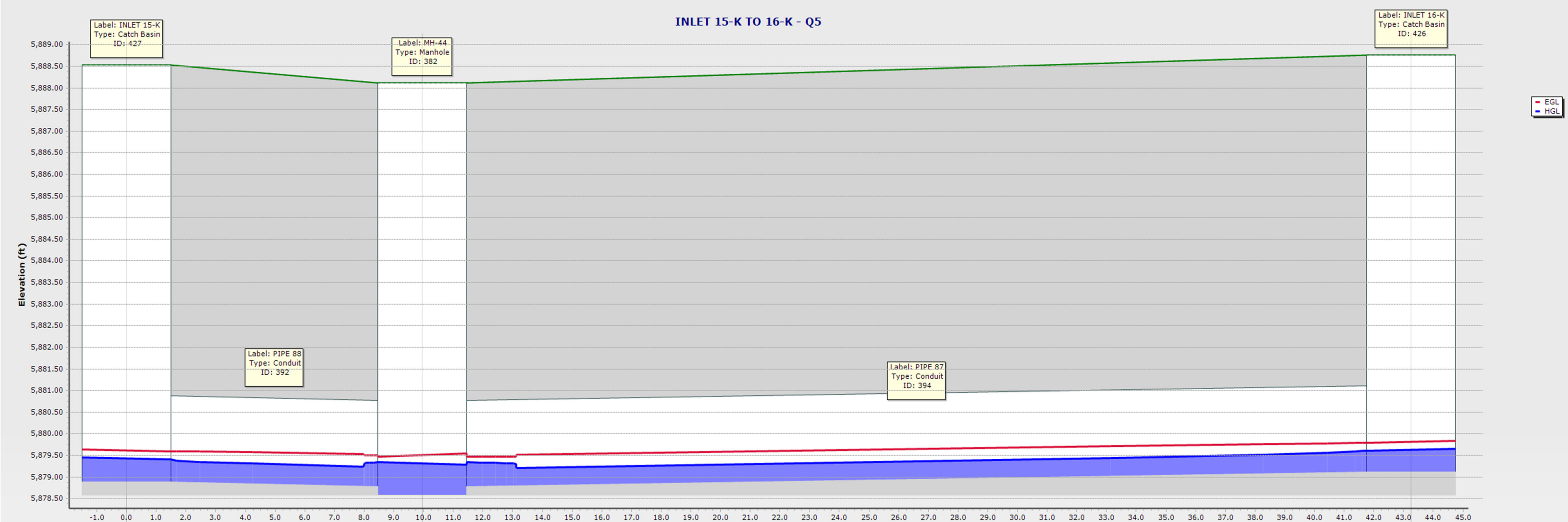
ID\Label	402 \ PIPE 94	399 \ PIPE 92
Link Length (ft)	8.7	30.0
Rise (in)\Material	24.0 \ Concrete	24.0 \ Concrete
Flow (cfs)	1.76	5.02
Slope (ft/ft)	0.010	0.010

ID\Label	401 \ INLET 19-K	398 \ MH-60	397 \ INLET 20-K
Ground (ft)	5890.93	5890.82	5891.42
Invert (ft)	5881.24	5880.85	5881.45
Station (ft)	0.0	8.7	38.7

INLET 22-Ka TO MH-60 - Q5

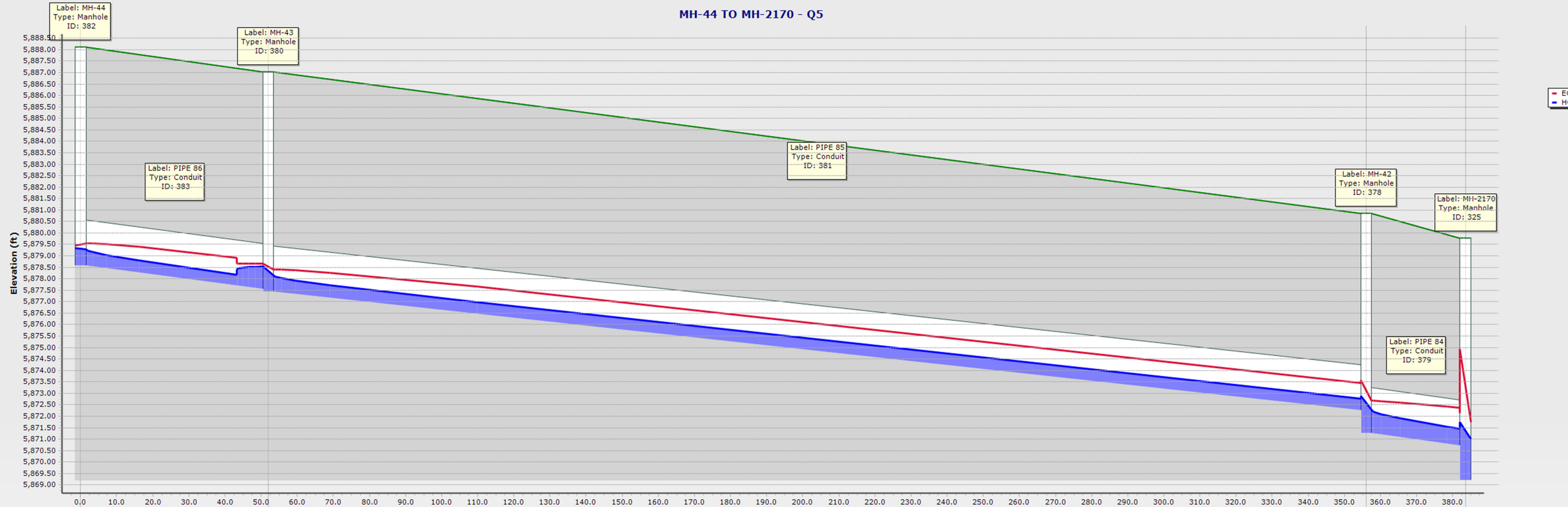


ID\Label		396 \ PIPE 107		400 \ PIPE 93	
Link Length (ft)		29.5		29.5	
Rise (in)\Material		24.0 \ Concrete		24.0 \ Concrete	
Flow (cfs)		3.32		6.68	
Slope (ft/ft)		0.005		0.014	
ID\Label	424 \ INLET 22-Ka		322 \ MH-2160		398 \ MH-60
Ground (ft)	5889.95		5891.30		5890.82
Invert (ft)	5880.59		5879.94		5880.85
Station (ft)	0.0		29.5		59.0



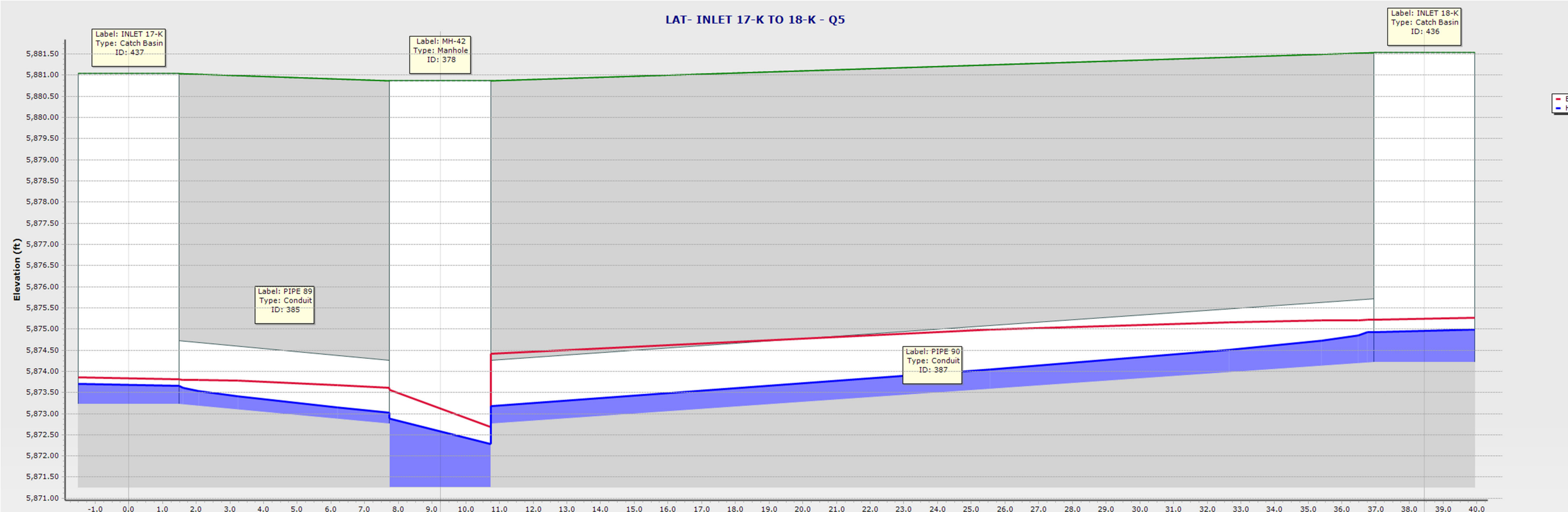
ID\Label		392 \ PIPE 88		394 \ PIPE 87	
Link Length (ft)		10.0		33.3	
Rise (in)\Material		24.0 \ Concrete		24.0 \ Concrete	
Flow (cfs)		2.29		2.08	
Slope (ft/ft)		0.010		0.010	
ID\Label	427 \ INLET 15-K		382 \ MH-44		426 \ INLET 16-K
Ground (ft)	5888.53		5888.11		5888.76
Invert (ft)	5878.88		5878.58		5879.11
Station (ft)	0.0		10.0		43.2

MH-44 TO MH-2170 - Q5



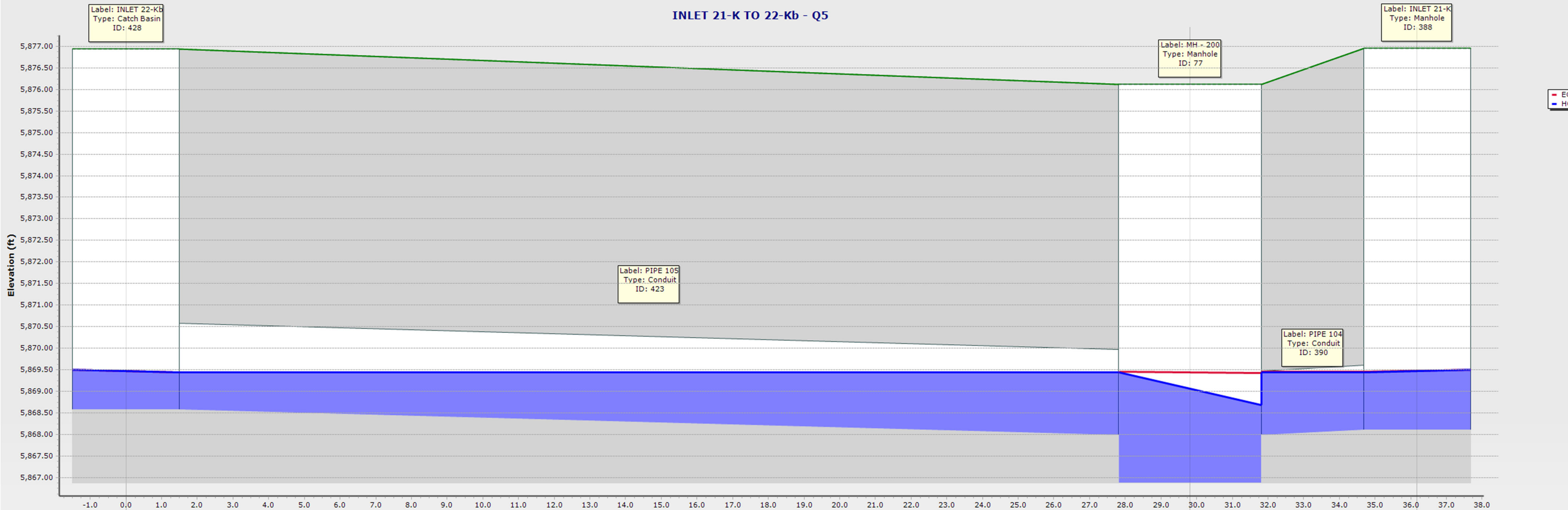
ID\Label	383 \ PIPE 86	381 \ PIPE 85	379 \ PIPE 84
Link Length (ft)	52.0	304.0	27.5
Rise (in)\Material	24.0 \ Concrete	24.0 \ Concrete	24.0 \ Concrete
Flow (cfs)	4.11	4.09	8.18
Slope (ft/ft)	0.020	0.017	0.020

ID\Label	382 \ MH-44	380 \ MH-43	378 \ MH-42	325 \ MH-2170
Ground (ft)	5888.11	5887.04	5880.86	5879.76
Invert (ft)	5878.58	5877.44	5871.26	5869.21
Station (ft)	0.0	52.0	356.0	383.5

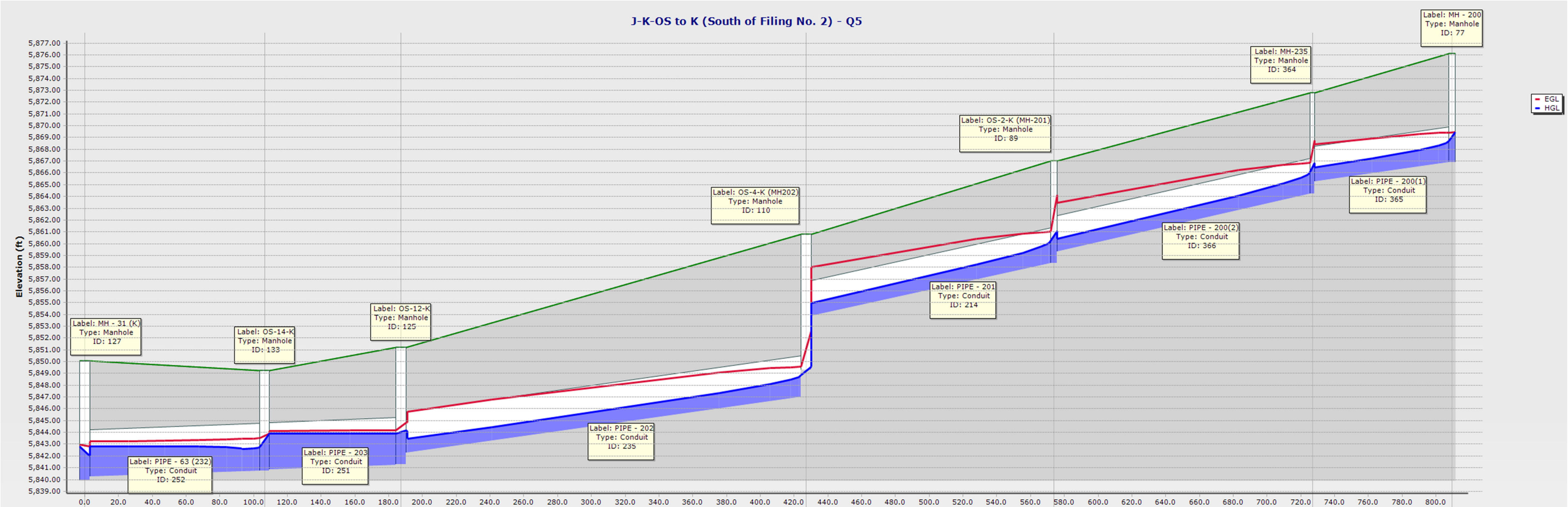


ID\Label		385 \ PIPE 89		387 \ PIPE 90	
Link Length (ft)		9.2		29.2	
Rise (in)\Material		18.0 \ Concrete		18.0 \ Concrete	
Flow (cfs)		1.32		3.58	
Slope (ft/ft)		0.050		0.050	
ID\Label	437 \ INLET 17-K		378 \ MH-42		436 \ INLET 18-K
Ground (ft)	5881.04		5880.86		5881.53
Invert (ft)	5873.22		5871.26		5874.21
Station (ft)	0.0		9.2		38.4

INLET 21-K TO 22-Kb - Q5



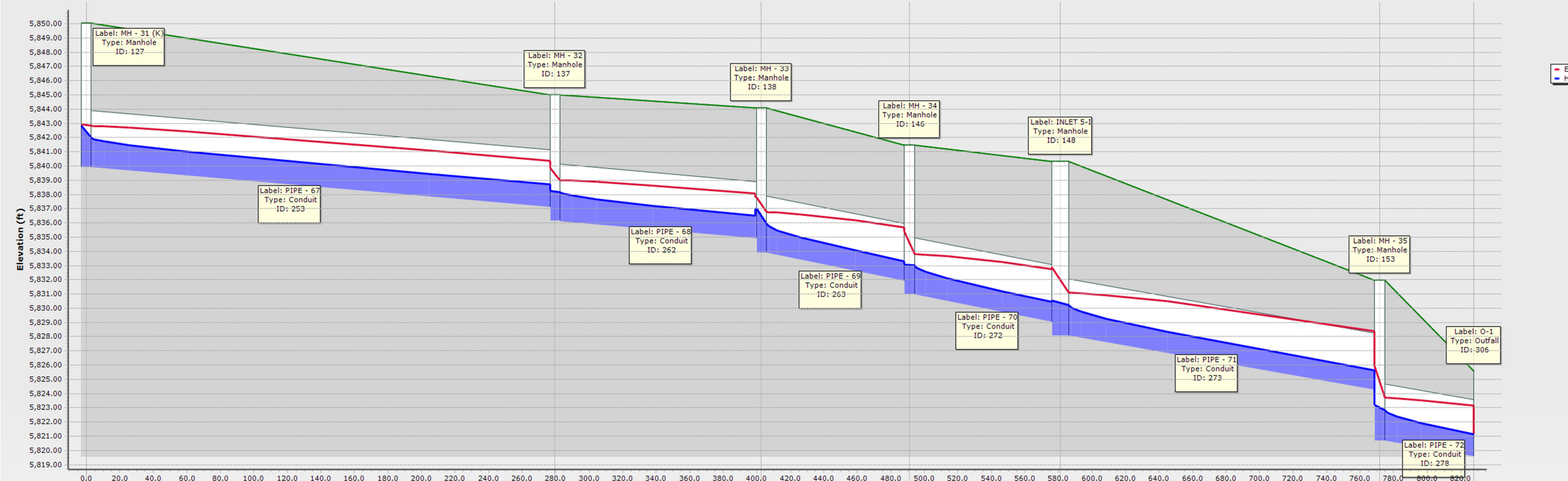
ID\Label		423 \ PIPE 105		390 \ PIPE 104	
Link Length (ft)		29.8		6.4	
Rise (in)\Material		24.0 \ Concrete		18.0 \ Concrete	
Flow (cfs)		0.00		0.87	
Slope (ft/ft)		0.020		0.020	
ID\Label	428 \ INLET 22-Kb		77 \ MH - 200		388 \ INLET 21-K
Ground (ft)	5876.93		5876.11		5876.95
Invert (ft)	5868.58		5866.88		5868.11
Station (ft)	0.0		29.8		36.2



ID\Label	252 \ PIPE - 63 (232)	251 \ PIPE - 203	235 \ PIPE - 202	214 \ PIPE - 201	366 \ PIPE - 200(2)	365 \ PIPE - 200(1)
Link Length (ft)	106.5	80.9	239.8	146.6	153.0	82.6
Rise (in)\Material	48.0 \ Concrete	48.0 \ Concrete	42.0 \ Concrete	36.0 \ Concrete	36.0 \ Concrete	36.0 \ Concrete
Flow (cfs)	43.57	36.89	35.19	33.32	31.46	30.80
Slope (ft/ft)	0.005	0.005	0.020	0.031	0.032	0.020

ID\Label	127 \ MH - 31 (K)	133 \ OS-14-K	125 \ OS-12-K	110 \ OS-4-K (MH202)	89 \ OS-2-K (MH-201)	364 \ MH-235	77 \ MH - 200
Ground (ft)	5850.04	5849.24	5851.22	5860.81	5867.01	5872.77	5876.11
Invert (ft)	5839.92	5840.75	5841.26	5849.30	5858.35	5864.24	5866.88
Station (ft)	0.0	106.5	187.4	427.2	573.8	726.8	809.4

MH K to East Pond - Q5



ID\Label	253 \ PIPE - 67	262 \ PIPE - 68	263 \ PIPE - 69	272 \ PIPE - 70	273 \ PIPE - 71	278 \ PIPE - 72
Link Length (ft)	279.6	123.1	88.3	90.1	190.5	56.1
Rise (in)\Material	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete
Flow (cfs)	48.00	47.59	47.41	47.32	52.00	51.77
Slope (ft/ft)	0.010	0.010	0.022	0.021	0.020	0.020

ID\Label	127 \ MH - 31 (K)	137 \ MH - 32	138 \ MH - 33	146 \ MH - 34	148 \ INLET 5-I	153 \ MH - 35	306 \ O-1
Ground (ft)	5850.04	5845.00	5844.06	5841.45	5840.33	5831.98	5825.60
Invert (ft)	5839.92	5836.12	5833.88	5830.94	5828.05	5820.68	5819.58
Station (ft)	0.0	279.6	402.8	491.0	581.2	771.7	827.7

Pipe Report (5yr)

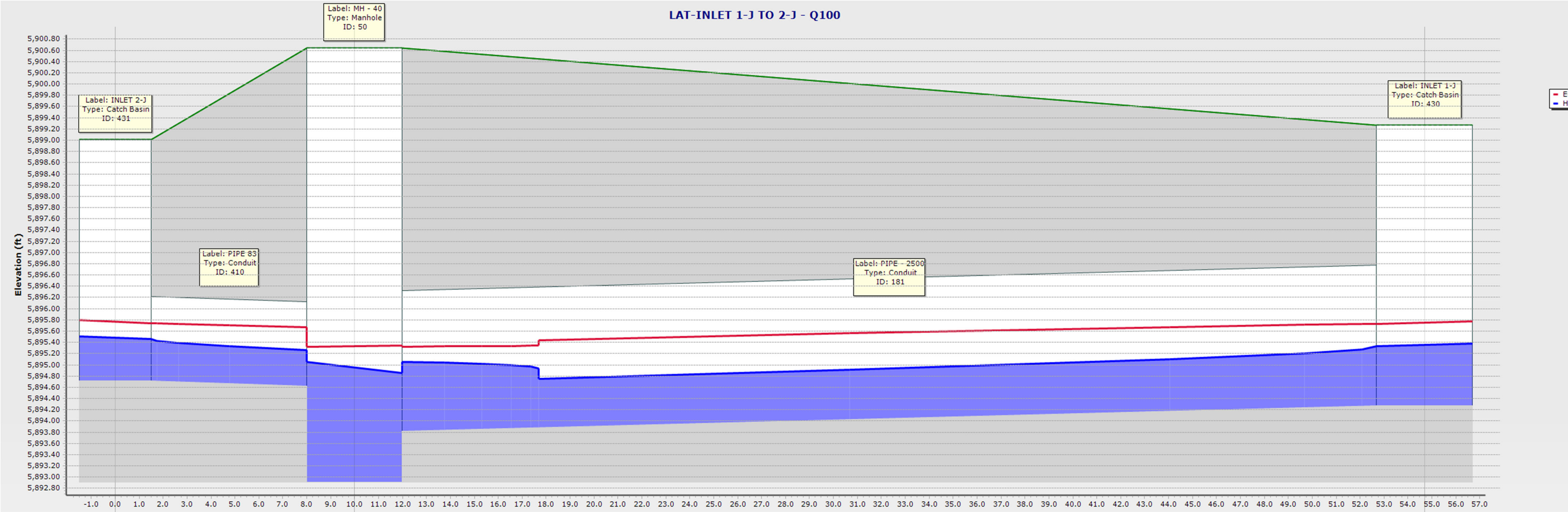
	Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Notes	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Depth (Normal) / Rise (%)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
326: PIPE - 272	PIPE - 272	MH-2160	MH-2170	246.2	30.0	30" RCP	0.013	23.79	80.95	29.4	37.1	14.33	5,879.80	5,870.21	0.039	5,881.46	5,871.14
214: PIPE - 201	PIPE - 201	OS-2-K (MH-201)	OS-4-K (MH202)	146.6	36.0	36" RCP	0.013	33.32	116.84	28.5	36.5	14.25	5,858.35	5,853.85	0.031	5,860.22	5,854.96
366: PIPE - 200(2)	PIPE - 200(2)	MH-235	OS-2-K (MH-201)	153.0	36.0	36" RCP	0.013	31.46	119.23	26.4	35.1	14.23	5,864.24	5,859.35	0.032	5,866.06	5,860.41
263: PIPE - 69	PIPE - 69	MH - 33	MH - 34	88.3	48.0	48" RCP	0.013	47.41	213.02	22.3	32.1	13.64	5,833.88	5,831.94	0.022	5,835.95	5,833.32
273: PIPE - 71	PIPE - 71	INLET 5-I	MH - 35	190.5	48.0	48" RCP	0.013	52.00	203.11	25.6	34.5	13.52	5,828.05	5,824.24	0.020	5,830.22	5,825.64
327: PIPE - 91	PIPE - 91	MH-2170	MH - 200	78.8	36.0	36" RCP	0.013	30.21	112.17	26.9	35.4	13.47	5,869.21	5,866.98	0.028	5,870.99	5,869.45
278: PIPE - 72	PIPE - 72	MH - 35	O-1	56.1	48.0	48" RCP	0.013	51.77	201.16	25.7	34.6	13.41	5,820.68	5,819.58	0.020	5,822.84	5,821.14
272: PIPE - 70	PIPE - 70	MH - 34	INLET 5-I	90.1	48.0	48" RCP	0.013	47.32	208.12	22.7	32.4	13.41	5,830.94	5,829.05	0.021	5,833.00	5,830.44
406: PIPE 235	PIPE 235	INLET 3-J	MH - 230	28.1	24.0	24" RCP	0.013	9.51	50.50	18.8	29.4	12.34	5,892.48	5,891.08	0.050	5,893.58	5,891.74
235: PIPE - 202	PIPE - 202	OS-4-K (MH202)	OS-12-K	239.8	42.0	42" RCP	0.013	35.19	141.73	24.8	34.0	12.22	5,847.00	5,842.24	0.020	5,848.84	5,844.18
365: PIPE - 200(1)	PIPE - 200(1)	MH - 200	MH-235	82.6	36.0	36" RCP	0.013	30.80	93.98	32.8	39.4	11.90	5,866.88	5,865.24	0.020	5,868.68	5,866.48
230: PIPE - 208	PIPE - 208	OS-4-K (MH202)	3-4-K (MH-205)	22.0	18.0	18" RCP	0.013	2.92	34.18	8.5	19.8	11.81	5,855.35	5,857.68	-0.106	5,858.33	5,855.67
323: PIPE - 27 (1)	PIPE - 27 (1)	MH - 430	MH-2160	248.0	30.0	30" RCP	0.013	14.74	73.52	20.0	30.4	11.70	5,888.77	5,880.80	0.032	5,890.06	5,882.21
231: PIPE - 217	PIPE - 217	5-10-K	9-10-K	40.0	18.0	18" RCP	0.013	3.77	26.53	14.2	25.5	10.63	5,854.51	5,857.06	-0.064	5,857.80	5,855.34
248: PIPE - 220	PIPE - 220	5-12-K	12-K	8.5	18.0	18" RCP	0.013	3.78	25.77	14.7	25.9	10.42	5,845.50	5,846.01	-0.060	5,846.75	5,845.98
253: PIPE - 67	PIPE - 67	MH - 31 (K)	MH - 32	279.6	48.0	48" RCP	0.013	48.00	143.63	33.4	39.8	10.29	5,839.92	5,837.12	0.010	5,841.99	5,838.71
262: PIPE - 68	PIPE - 68	MH - 32	MH - 33	123.1	48.0	48" RCP	0.013	47.59	143.63	33.1	39.6	10.26	5,836.12	5,834.89	0.010	5,838.18	5,837.02
238: PIPE - 218	PIPE - 218	5-12-K	5-10-K	271.8	24.0	24" RCP	0.013	7.23	41.19	17.6	28.4	9.86	5,845.00	5,854.01	-0.033	5,854.96	5,845.57
387: PIPE 90	PIPE 90	INLET 18-K	MH-42	29.0	18.0	18" RCP	0.013	3.58	23.49	15.2	26.4	9.61	5,874.21	5,872.76	0.050	5,874.93	5,873.18
254: PIPE - 64	PIPE - 64	MH - 31 (K)	MH - 30 (I)	118.8	24.0	24" RCP	0.013	7.08	35.83	19.8	30.1	8.87	5,841.32	5,844.30	-0.025	5,845.24	5,842.84
223: PIPE - 211	PIPE - 211	5-8-K	MH - 206	80.2	18.0	18" RCP	0.013	4.43	19.24	23.0	32.6	8.85	5,856.55	5,859.24	-0.034	5,860.05	5,857.04
379: PIPE 84	PIPE 84	MH-42	MH-2170	27.5	24.0	24" RCP	0.013	8.18	31.97	25.6	34.5	8.51	5,871.26	5,870.71	0.020	5,872.28	5,871.75
250: PIPE - 221	PIPE - 221	OS-12-K	5-12-K	69.8	36.0	36" RCP	0.013	9.64	89.60	10.8	22.1	8.28	5,842.74	5,844.00	-0.018	5,844.98	5,844.18
256: PIPE - 223	PIPE - 223	OS-14-K	14-K	28.5	18.0	18" RCP	0.013	8.11	13.49	60.1	55.9	7.98	5,843.34	5,843.81	-0.016	5,844.91	5,844.22
252: PIPE - 63 (232)	PIPE - 63 (232)	OS-14-K	MH - 31 (K)	106.5	48.0	48" RCP	0.013	43.57	101.57	42.9	45.8	7.77	5,840.75	5,840.22	0.005	5,842.73	5,842.84
185: PIPE - 27 (2)	PIPE - 27 (2)	MH - 230	MH - 430	80.8	30.0	30" RCP	0.013	14.83	41.06	36.1	41.5	7.69	5,890.58	5,889.77	0.010	5,891.88	5,890.82
251: PIPE - 203	PIPE - 203	OS-12-K	OS-14-K	80.9	48.0	48" RCP	0.013	36.89	101.00	36.5	41.8	7.41	5,841.24	5,840.84	0.005	5,843.91	5,843.90
234: PIPE - 214	PIPE - 214	5-10-K	5-8-K	69.0	18.0	18" RCP	0.013	4.67	14.64	31.9	38.8	7.36	5,854.51	5,855.85	-0.019	5,856.68	5,855.34
385: PIPE 89	PIPE 89	INLET 17-K	MH-42	9.2	18.0	18" RCP	0.013	1.32	23.44	5.6	16.1	7.17	5,873.22	5,872.76	0.050	5,873.65	5,873.03
400: PIPE 93	PIPE 93	MH-60	MH-2160	29.5	24.0	24" RCP	0.013	6.68	26.69	25.0	34.1	7.06	5,880.85	5,880.44	0.014	5,882.18	5,882.21
383: PIPE 86	PIPE 86	MH-44	MH-43	52.0	24.0	24" RCP	0.013	4.11	31.99	12.8	24.2	7.00	5,878.58	5,877.54	0.020	5,879.29	5,878.55
361: PIPE 240	PIPE 240	7-K-AREA	MH-232	17.1	18.0	18" RCP	0.013	2.48	17.41	14.2	25.5	6.98	5,864.11	5,863.64	0.027	5,864.71	5,864.05
354: 233	233	OS-E	MH-3	123.0	18.0	18" RCP	0.013	3.40	14.85	22.9	32.5	6.82	5,847.22	5,844.76	0.020	5,847.92	5,845.52
362: PIPE 239	PIPE 239	MH-232	MH - 206	155.0	18.0	18" RCP	0.013	2.48	16.45	15.1	26.2	6.70	5,863.34	5,859.54	0.025	5,863.94	5,860.38
222: PIPE - 210	PIPE - 210	MH - 206	6-K	60.2	18.0	18" RCP	0.013	3.23	14.51	22.3	32.1	6.61	5,859.54	5,860.69	-0.019	5,861.38	5,860.38
381: PIPE 85	PIPE 85	MH-43	MH-42	304.0	24.0	24" RCP	0.013	4.09	29.53	13.9	25.1	6.61	5,877.44	5,872.26	0.017	5,878.15	5,872.76
229: PIPE - 216	PIPE - 216	9-10-K	10-K	9.1	18.0	18" RCP	0.013	1.95	17.73	11.0	22.4	6.59	5,857.36	5,857.62	-0.028	5,858.15	5,858.24
408: PIPE 238	PIPE 238	INLET 4-J	MH - 230	6.1	24.0	24" RCP	0.013	1.15	50.25	2.3	10.4	6.59	5,891.38	5,891.08	0.049	5,892.07	5,892.08
215: PIPE - 205	PIPE - 205	OS-2-K (MH-201)	2-K	49.9	18.0	18" RCP	0.013	2.13	16.23	13.2	24.5	6.36	5,860.85	5,862.04	-0.024	5,862.59	5,861.22
258: PIPE - 65	PIPE - 65	MH - 30 (I)	INLET 1-I	46.2	18.0	18" RCP	0.013	5.25	10.48	50.1	50.1	5.94	5,844.80	5,845.26	-0.010	5,846.14	5,845.80
182: PIPE - 2600	PIPE - 2600	MH - 40	MH - 230	294.5	30.0	30" RCP	0.013	5.60	40.98	13.7	25.0	5.84	5,893.62	5,890.68	0.010	5,894.40	5,892.08
399: PIPE 92	PIPE 92	INLET 20-K	MH-60	30.0	24.0	24" RCP	0.013	5.02	22.62	22.2	32.0	5.79	5,881.45	5,881.15	0.010	5,882.24	5,882.32
221: PIPE - 209	PIPE - 209	6-K	5-K	33.2	18.0	18" RCP	0.013	1.83	14.47	12.6	24.0	5.60	5,860.99	5,861.62	-0.019	5,862.13	5,861.35
181: PIPE - 2500	PIPE - 2500	INLET 1-J	MH - 40	44.6	30.0	30" RCP	0.013	4.08	41.20	9.9	21.3	5.35	5,894.27	5,893.82	0.010	5,894.93	5,894.52
355: 234	234	MH-3	14-K	34.9	18.0	18" RCP	0.013	3.40	10.52	32.3	39.1	5.31	5,844.46	5,844.11	0.010	5,845.16	5,844.96
259: PIPE - 66	PIPE - 66	MH - 30 (I)	INLET 2-I	10.2	18.0	18" RCP	0.013	2.27	10.41	21.8	31.7	4.71	5,844.80	5,844.90	-0.010	5,845.79	5,845.80
392: PIPE 88	PIPE 88	INLET 15-K	MH-44	10.0	24.0	24" RCP	0.013	2.29	22.68	10.1	21.5	4.63	5,878.88	5,878.78	0.010	5,879.41	5,879.34
390: PIPE 104	PIPE 104	INLET 21-K	MH - 200	6.4	18.0	18" RCP	0.013	0.87	15.02	5.8	16.4	4.63	5,868.11	5,867.98	0.020	5,869.45	5,869.45
394: PIPE 87	PIPE 87	INLET 16-K	MH-44	33.1	24.0	24" RCP	0.013	2.08	22.58	9.2	20.5	4.48	5,879.11	5,878.78	0.010	5,879.61	5,879.34
402: PIPE 94	PIPE 94	INLET 19-K	MH-60	8.7	24.0	24" RCP	0.013	1.76	23.06	7.6	18.7	4.34	5,881.24	5,881.15	0.010	5,882.32	5,882.32
410: PIPE 83	PIPE 83	INLET 2-J	MH - 40	9.8	18.0	18" RCP	0.013	1.59	10.59	15.0	26.2	4.31	5,894.72	5,894.62	0.010	5,895.19	5,895.03
396: PIPE 107	PIPE 107	INLET 22-Ka	MH-2160	29.5	24.0	24" RCP	0.013	3.32	16.12	20.6	30.8	4.04	5,880.59	5,880.44	0.005	5,882.21	5,882.21
226: PIPE - 207	PIPE - 207	3-4-K (MH-205)	3+4-K	7.3	18.0	18" RCP	0.013	2.92	6.74	43.4	46.0	3.68	5,857.98	5,858.01	-0.004	5,858.72	5,858.70
228: PIPE - 215	PIPE - 215	9-10-K	9-K	30.7	18.0	18" RCP	0.013	1.94	7.34	26.5	35.1	3.51	5,857.36	5,857.51	-0.005	5,858.25	5,858.24
368: PIPE 241	PIPE 241	1-K	MH-235	22.8	18.0	18" RCP	0.013	0.78	10.55	7.3	18.3	3.49	5,866.07	5,865.84	0.010	5,866.84	5,866.84
255: PIPE - 222	PIPE - 222	OS-14-K	13-K	8.2	18.0	18" RCP	0.013	0.34	9.00	3.8	13.3	2.45	5,843.34	5,843.40	-0.007	5,843.90	5,843.90
232: PIPE - 213	PIPE - 213	5-8-K	8-K	29.4	18.0	18" RCP	0.013	0.46	7.51	6.2	16.8	2.36	5,856.55	5,856.70	-0.005	5,857.19	5,857.19
233: PIPE - 212	PIPE - 212	5-8-K	7-K	7.3	18.0	18" RCP	0.013	0.04	10.27	0.4	4.5	1.40	5,856.55	5,856.62	-0.010	5,857.19	5,857.19
423: PIPE 105	PIPE 105	INLET 22-Kb	MH - 200	29.8	24.0	24" RCP	0.013	0.00	32.09	0.0	(N/A)	0.00	5,868.58	5,867.98	0.020	5,869.45	5,869.45

Inlet Report (5yr)

	ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Headloss Method	Headloss Coefficient (Standard)	Hydraulic Grade Line (In) (ft)	Inlet Type	Flow (Total Out) (cfs)
330: 12-K	330	12-K	5,851.33	5,851.33	5,846.16	Standard	0.050	5,846.80	Full Capture	3.78
331: 5-K	331	5-K	5,864.76	5,864.76	5,861.28	Standard	0.050	5,862.18	Percent Capture	1.83
332: 7-K	332	7-K	5,861.19	5,861.19	5,856.62	Standard	0.050	5,857.24	Percent Capture	0.04
333: 9-K	333	9-K	5,862.03	5,862.03	5,857.51	Standard	0.050	5,858.30	Percent Capture	1.94
334: 10-K	334	10-K	5,861.98	5,861.98	5,857.48	Standard	0.050	5,858.20	Percent Capture	1.95
352: OS-E	352	OS-E	5,854.52	5,854.52	5,847.22	Standard	0.050	5,847.97	Full Capture	3.40
424: INLET 22-Ka	424	INLET 22-Ka	5,889.95	5,889.95	5,880.59	Standard	0.050	5,882.26	Full Capture	3.32
426: INLET 16-K	426	INLET 16-K	5,888.76	5,888.76	5,879.11	Standard	0.050	5,879.66	Percent Capture	2.08
427: INLET 15-K	427	INLET 15-K	5,888.53	5,888.53	5,878.88	Standard	0.050	5,879.46	Percent Capture	2.29
428: INLET 22-Kb	428	INLET 22-Kb	5,876.93	5,876.93	5,868.58	Standard	0.050	5,869.50	Percent Capture	0.00
430: INLET 1-J	430	INLET 1-J	5,899.27	5,899.27	5,894.27	Standard	0.050	5,894.98	Percent Capture	4.08
431: INLET 2-J	431	INLET 2-J	5,899.01	5,899.01	5,894.72	Standard	0.050	5,895.24	Percent Capture	1.59
432: INLET 3-J	432	INLET 3-J	5,897.49	5,897.49	5,892.48	Standard	0.050	5,893.63	Percent Capture	9.51
433: INLET 4-J	433	INLET 4-J	5,895.99	5,895.99	5,891.38	Standard	0.050	5,892.12	Percent Capture	1.15
436: INLET 18-K	436	INLET 18-K	5,881.53	5,881.53	5,874.21	Standard	0.050	5,874.98	Percent Capture	3.58
437: INLET 17-K	437	INLET 17-K	5,881.04	5,881.04	5,873.22	Standard	0.050	5,873.70	Percent Capture	1.32
441: 14-K	441	14-K	5,849.56	5,849.56	5,843.81	Standard	0.050	5,844.96	Percent Capture	8.11

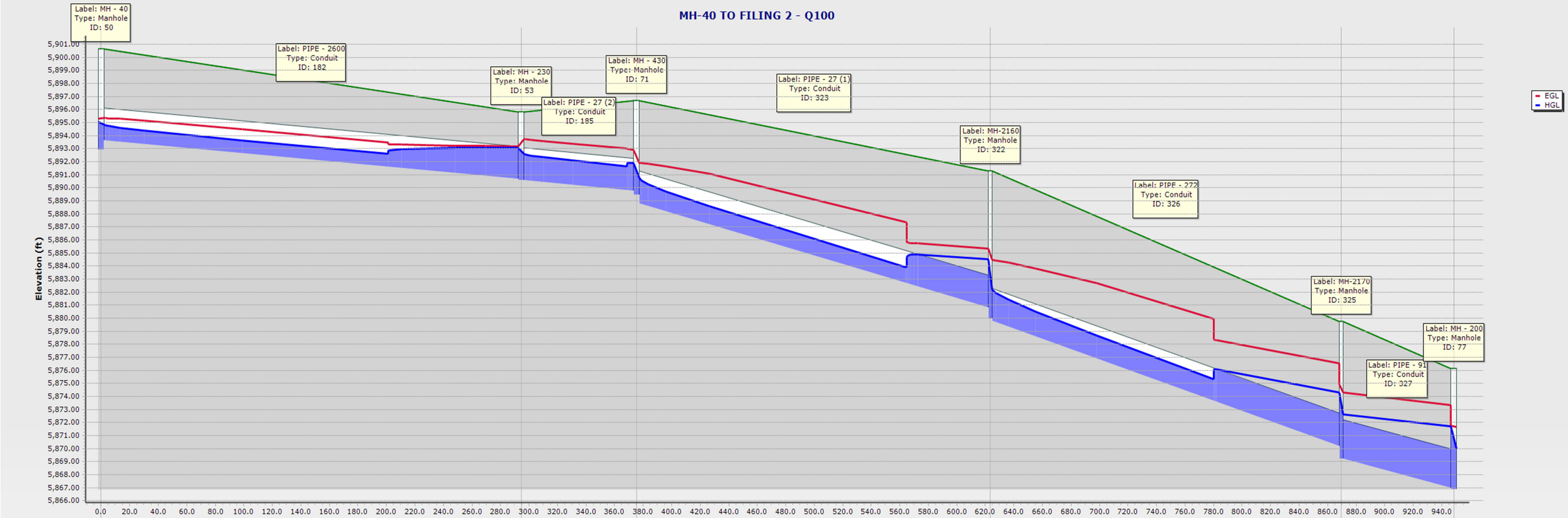
Manhole Report (5yr)

	ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Depth (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)
367: 1-K	367	1-K	5,869.63	5,869.63	5,866.07	0.78	0.77	5,866.89	5,866.84	Standard	0.050
90: 2-K	90	2-K	5,866.95	5,866.95	5,862.06	2.13	0.53	5,862.64	5,862.59	Standard	0.050
101: 3+4-K	101	3+4-K	5,862.06	5,862.06	5,857.87	2.92	0.85	5,858.77	5,858.72	Standard	0.050
105: 3-4-K (MH-205)	105	3-4-K (MH-205)	5,861.67	5,861.67	5,857.54	2.92	0.79	5,858.70	5,858.33	Standard	1.520
112: 5-10-K	112	5-10-K	5,860.21	5,860.21	5,854.01	7.23	0.95	5,855.34	5,854.96	Standard	1.020
126: 5-12-K	126	5-12-K	5,850.65	5,850.65	5,844.15	9.64	0.83	5,845.52	5,844.98	Standard	1.520
109: 5-8-K	109	5-8-K	5,860.85	5,860.85	5,855.90	4.67	0.78	5,857.19	5,856.68	Standard	1.520
95: 6-K	95	6-K	5,864.76	5,864.76	5,860.63	3.23	0.75	5,861.42	5,861.38	Standard	0.050
360: 7-K-AREA	360	7-K-AREA	5,868.00	5,868.00	5,864.11	2.48	0.60	5,864.76	5,864.71	Standard	0.050
107: 8-K	107	8-K	5,861.19	5,861.19	5,856.70	0.46	0.49	5,857.24	5,857.19	Standard	0.050
106: 9-10-K	106	9-10-K	5,861.60	5,861.60	5,857.06	3.77	0.74	5,858.24	5,857.80	Standard	1.520
128: 13-K	128	13-K	5,849.57	5,849.57	5,843.40	0.34	0.50	5,843.95	5,843.90	Standard	0.000
131: INLET 1-I	131	INLET 1-I	5,849.31	5,849.31	5,845.20	5.25	0.94	5,846.19	5,846.14	Standard	0.050
132: INLET 2-I	132	INLET 2-I	5,849.31	5,849.31	5,844.87	2.27	0.92	5,845.84	5,845.79	Standard	0.050
148: INLET 5-I	148	INLET 5-I	5,840.33	5,840.33	5,828.05	52.00	2.17	5,830.57	5,830.22	Standard	0.400
401: INLET 19-K	401	INLET 19-K	5,890.93	5,890.93	5,881.24	1.76	1.08	5,882.37	5,882.32	Standard	0.050
397: INLET 20-K	397	INLET 20-K	5,891.42	5,891.42	5,881.45	5.02	0.79	5,882.29	5,882.24	Standard	0.050
388: INLET 21-K	388	INLET 21-K	5,876.95	5,876.95	5,868.11	0.87	1.34	5,869.50	5,869.45	Standard	0.050
134: MH - 30 (I)	134	MH - 30 (I)	5,849.07	5,849.07	5,844.30	7.08	0.94	5,845.80	5,845.24	Standard	1.520
127: MH - 31 (K)	127	MH - 31 (K)	5,850.04	5,850.04	5,839.92	48.00	2.08	5,842.84	5,841.99	Standard	1.020
137: MH - 32	137	MH - 32	5,845.00	5,845.00	5,836.12	47.59	2.07	5,838.23	5,838.18	Standard	0.050
138: MH - 33	138	MH - 33	5,844.06	5,844.06	5,833.88	47.41	2.06	5,837.02	5,835.95	Standard	1.320
146: MH - 34	146	MH - 34	5,841.45	5,841.45	5,830.94	47.32	2.06	5,833.05	5,833.00	Standard	0.050
153: MH - 35	153	MH - 35	5,831.98	5,831.98	5,820.68	51.77	2.16	5,823.19	5,822.84	Standard	0.400
50: MH - 40	50	MH - 40	5,900.64	5,900.64	5,892.91	5.60	1.49	5,894.52	5,894.40	Standard	0.400
77: MH - 200	77	MH - 200	5,876.11	5,876.11	5,866.88	30.80	1.80	5,869.45	5,868.68	Standard	1.020
98: MH - 206	98	MH - 206	5,863.81	5,863.81	5,859.24	4.43	0.81	5,860.38	5,860.05	Standard	1.020
53: MH - 230	53	MH - 230	5,895.79	5,895.79	5,890.58	14.83	1.30	5,892.08	5,891.88	Standard	0.400
71: MH - 430	71	MH - 430	5,896.70	5,896.70	5,889.47	14.74	0.59	5,890.59	5,890.06	Standard	1.020
353: MH-3	353	MH-3	5,849.69	5,849.69	5,844.46	3.40	0.70	5,845.52	5,845.16	Standard	1.322
378: MH-42	378	MH-42	5,880.86	5,880.86	5,871.26	8.18	1.02	5,872.89	5,872.28	Standard	1.520
380: MH-43	380	MH-43	5,887.04	5,887.04	5,877.44	4.09	0.71	5,878.55	5,878.15	Standard	1.520
382: MH-44	382	MH-44	5,888.11	5,888.11	5,878.58	4.11	0.71	5,879.34	5,879.29	Standard	0.100
398: MH-60	398	MH-60	5,890.82	5,890.82	5,880.85	6.68	1.33	5,882.32	5,882.18	Standard	1.020
359: MH-232	359	MH-232	5,869.25	5,869.25	5,863.34	2.48	0.60	5,864.23	5,863.94	Standard	1.320
364: MH-235	364	MH-235	5,872.77	5,872.77	5,864.24	31.46	1.82	5,866.84	5,866.06	Standard	1.020
322: MH-2160	322	MH-2160	5,891.30	5,891.30	5,879.94	23.79	1.52	5,882.21	5,881.46	Standard	1.020
325: MH-2170	325	MH-2170	5,879.76	5,879.76	5,869.21	30.21	1.78	5,871.75	5,870.99	Standard	1.020
89: OS-2-K (MH-201)	89	OS-2-K (MH-201)	5,867.01	5,867.01	5,858.35	33.32	1.87	5,861.04	5,860.22	Standard	1.020
110: OS-4-K (MH202)	110	OS-4-K (MH202)	5,860.81	5,860.81	5,849.30	35.19	-0.46	5,849.59	5,848.84	Standard	1.020
125: OS-12-K	125	OS-12-K	5,851.22	5,851.22	5,841.26	36.89	2.65	5,844.18	5,843.91	Standard	1.020
133: OS-14-K	133	OS-14-K	5,849.24	5,849.24	5,840.75	43.57	1.98	5,843.90	5,842.73	Standard	1.520



ID\Label		410 \ PIPE 83	181 \ PIPE - 2500
Link Length (ft)		10.0	44.7
Rise (in)\Material		18.0 \ Concrete	30.0 \ Concrete
Flow (cfs)		3.71	10.04
Slope (ft/ft)		0.010	0.010

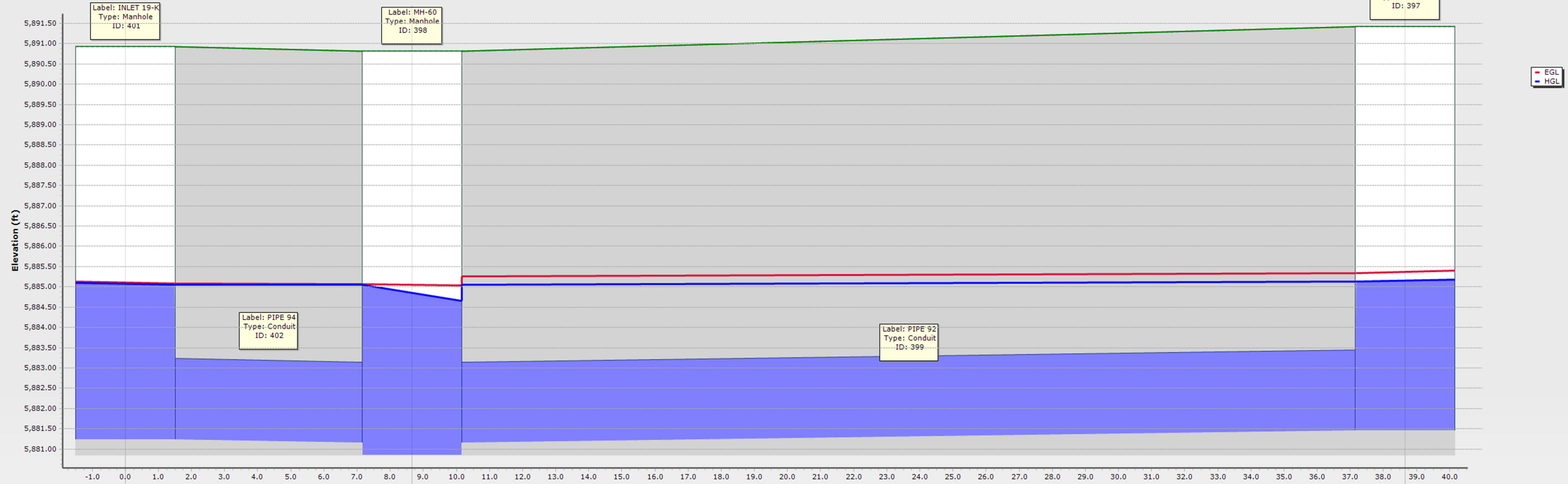
ID\Label	431 \ INLET 2-J	50 \ MH - 40	430 \ INLET 1-J
Ground (ft)	5899.01	5900.64	5899.27
Invert (ft)	5894.72	5892.91	5894.27
Station (ft)	0.0	10.0	54.7



ID\Label	182 \ PIPE - 2600	185 \ PIPE - 27 (2)	323 \ PIPE - 27 (1)	326 \ PIPE - 272	327 \ PIPE - 91
Link Length (ft)	294.5	80.8	248.0	246.2	78.8
Rise (in)\Material	30.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete	30.0 \ Concrete	36.0 \ Concrete
Flow (cfs)	13.58	36.02	35.85	58.61	72.58
Slope (ft/ft)	0.010	0.010	0.032	0.039	0.028

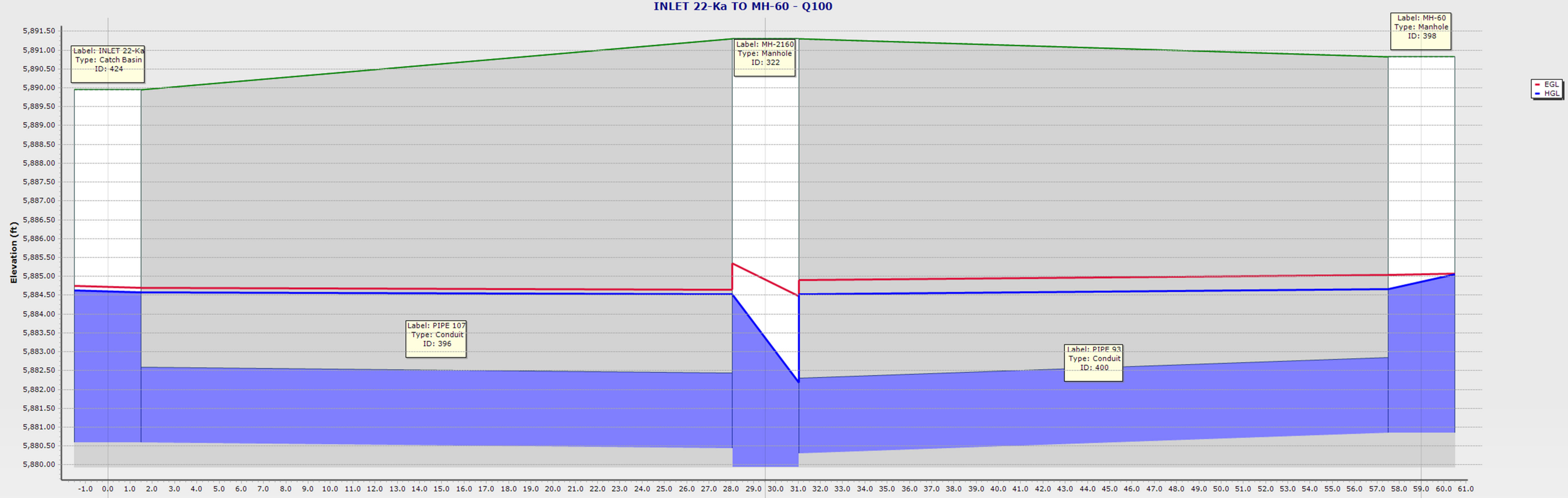
ID\Label	50 \ MH - 40	53 \ MH - 230	71 \ MH - 430	322 \ MH-2160	325 \ MH-2170	77 \ MH - 200
Ground (ft)	5900.64	5895.79	5896.70	5891.30	5879.76	5876.11
Invert (ft)	5892.91	5890.58	5889.47	5879.94	5869.21	5866.88
Station (ft)	0.0	294.5	375.3	623.3	869.5	948.3

LAT-INLET 19K TO 20K - Q100



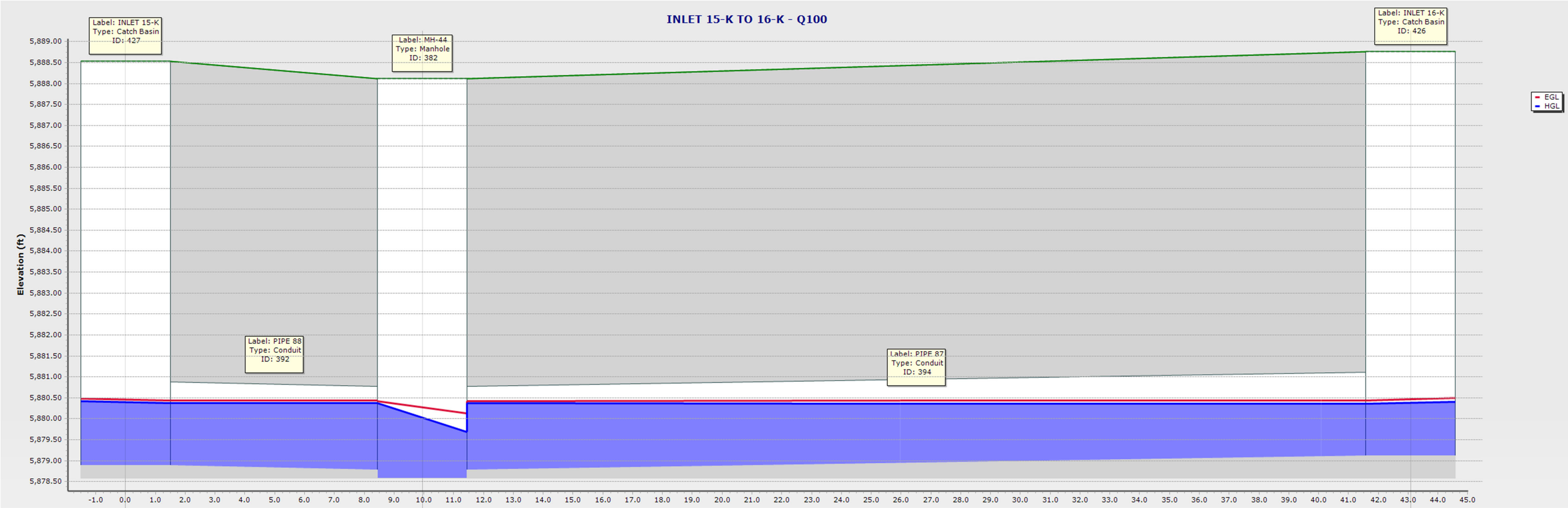
ID\Label		402 \ PIPE 94		399 \ PIPE 92	
Link Length (ft)		8.7		30.0	
Rise (in)\Material		24.0 \ Concrete		24.0 \ Concrete	
Flow (cfs)		4.10		11.72	
Slope (ft/ft)		0.010		0.010	
ID\Label	401 \ INLET 19-K		398 \ MH-60		397 \ INLET 20-K
Ground (ft)	5890.93		5890.82		5891.42
Invert (ft)	5881.24		5880.85		5881.45
Station (ft)	0.0		8.7		38.7

INLET 22-Ka TO MH-60 - Q100



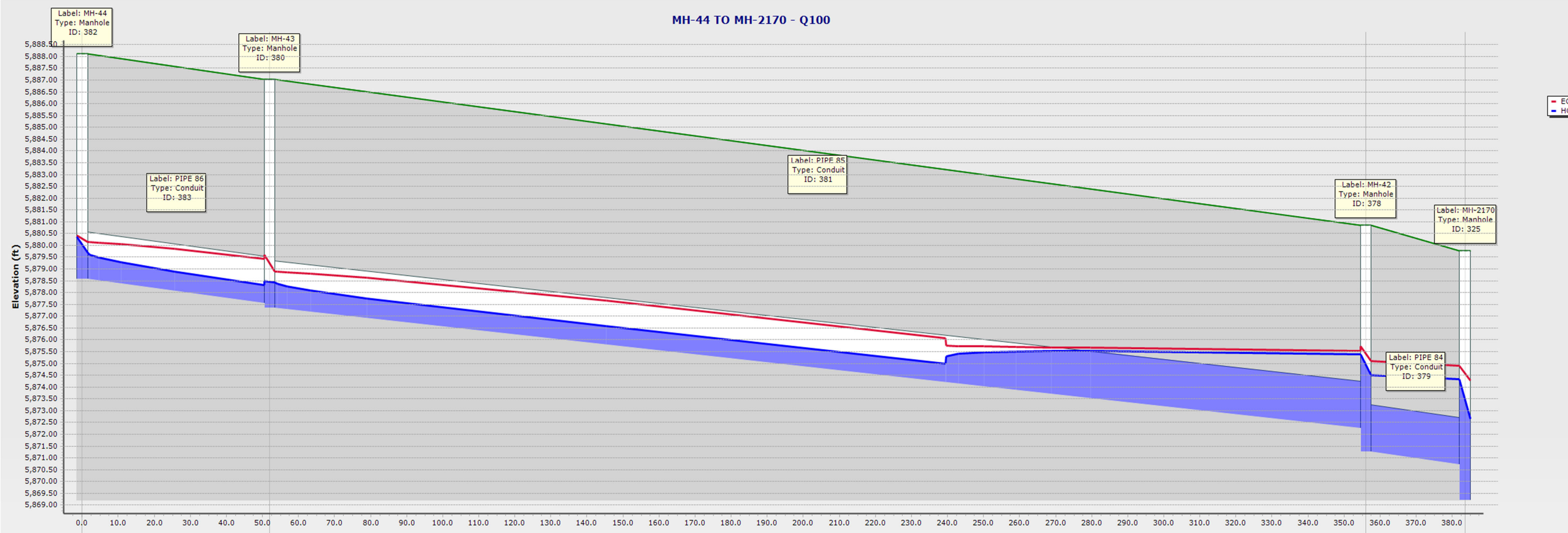
ID\Label		396 \ PIPE 107	400 \ PIPE 93
Link Length (ft)		29.5	29.5
Rise (in)\Material		24.0 \ Concrete	24.0 \ Concrete
Flow (cfs)		9.17	15.56
Slope (ft/ft)		0.005	0.019

ID\Label	424 \ INLET 22-Ka	322 \ MH-2160	398 \ MH-60
Ground (ft)	5889.95	5891.30	5890.82
Invert (ft)	5880.59	5879.94	5880.85
Station (ft)	0.0	29.5	59.0



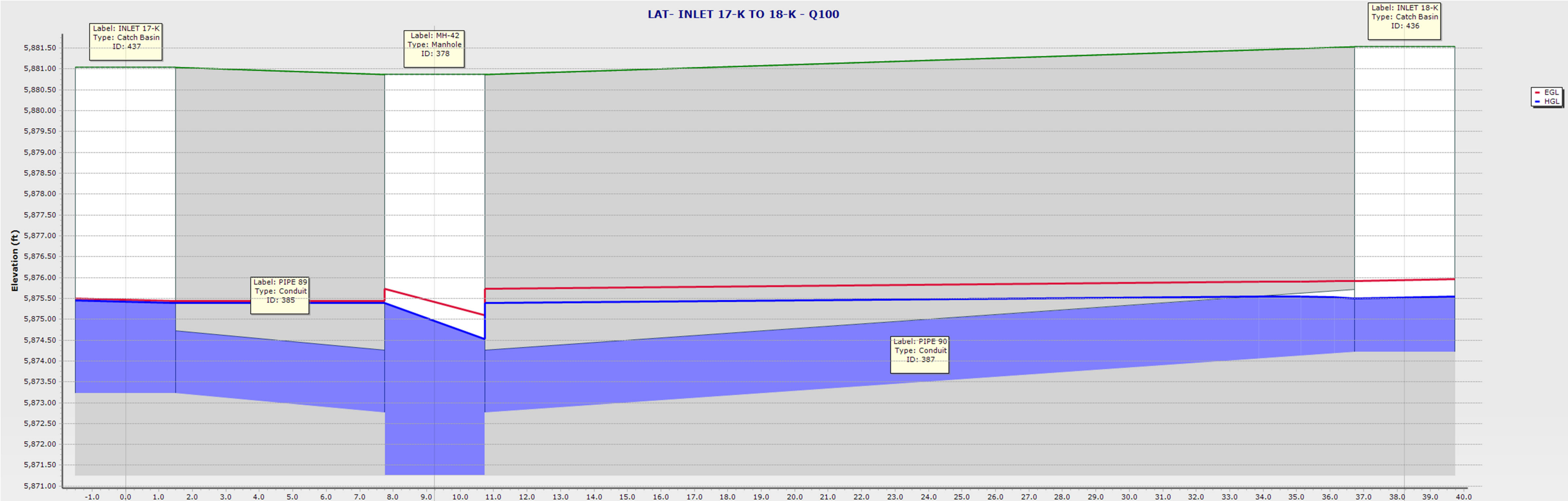
ID\Label	392 \ PIPE 88	394 \ PIPE 87	
Link Length (ft)	10.0	33.1	
Rise (in)\Material	24.0 \ Concrete	24.0 \ Concrete	
Flow (cfs)	5.35	4.85	
Slope (ft/ft)	0.010	0.010	

ID\Label	427 \ INLET 15-K	382 \ MH-44	426 \ INLET 16-K
Ground (ft)	5888.53	5888.11	5888.76
Invert (ft)	5878.88	5878.58	5879.11
Station (ft)	0.0	10.0	43.1



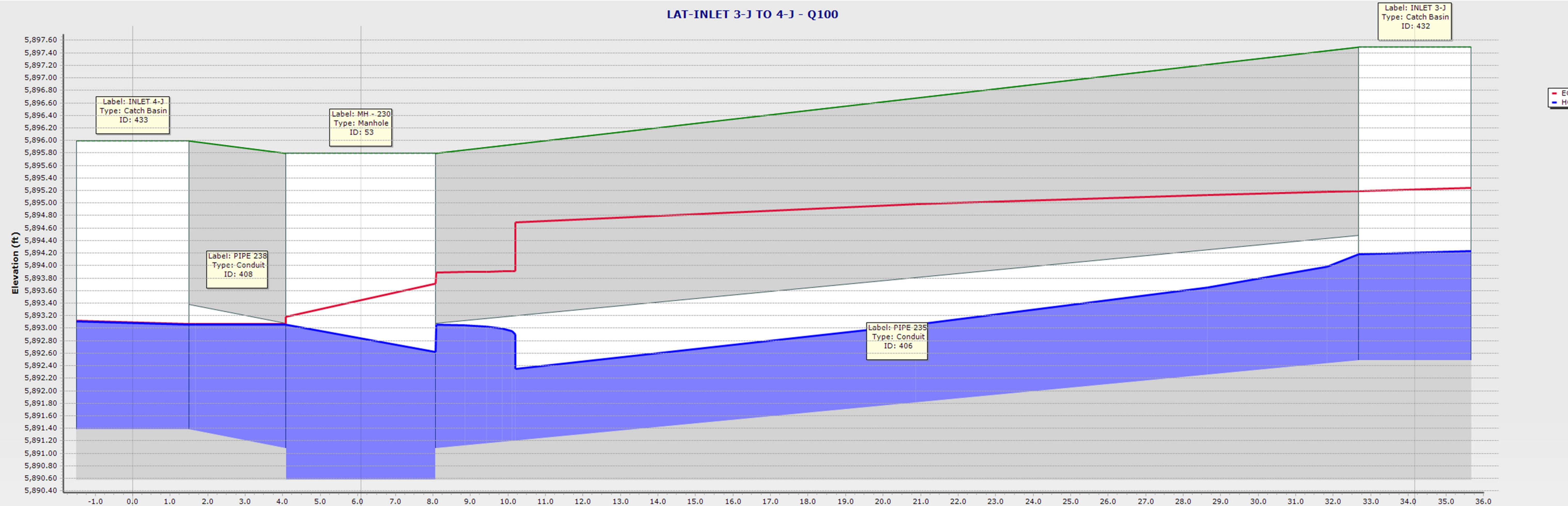
ID\Label	383 \ PIPE 86	381 \ PIPE 85	379 \ PIPE 84
Link Length (ft)	52.0	304.0	27.5
Rise (in)\Material	24.0 \ Concrete	24.0 \ Concrete	24.0 \ Concrete
Flow (cfs)	9.59	9.56	19.06
Slope (ft/ft)	0.020	0.017	0.020

ID\Label	382 \ MH-44	380 \ MH-43	378 \ MH-42	325 \ MH-2170
Ground (ft)	5888.11	5887.04	5880.86	5879.76
Invert (ft)	5878.58	5877.34	5871.26	5869.21
Station (ft)	0.0	52.0	356.0	383.5



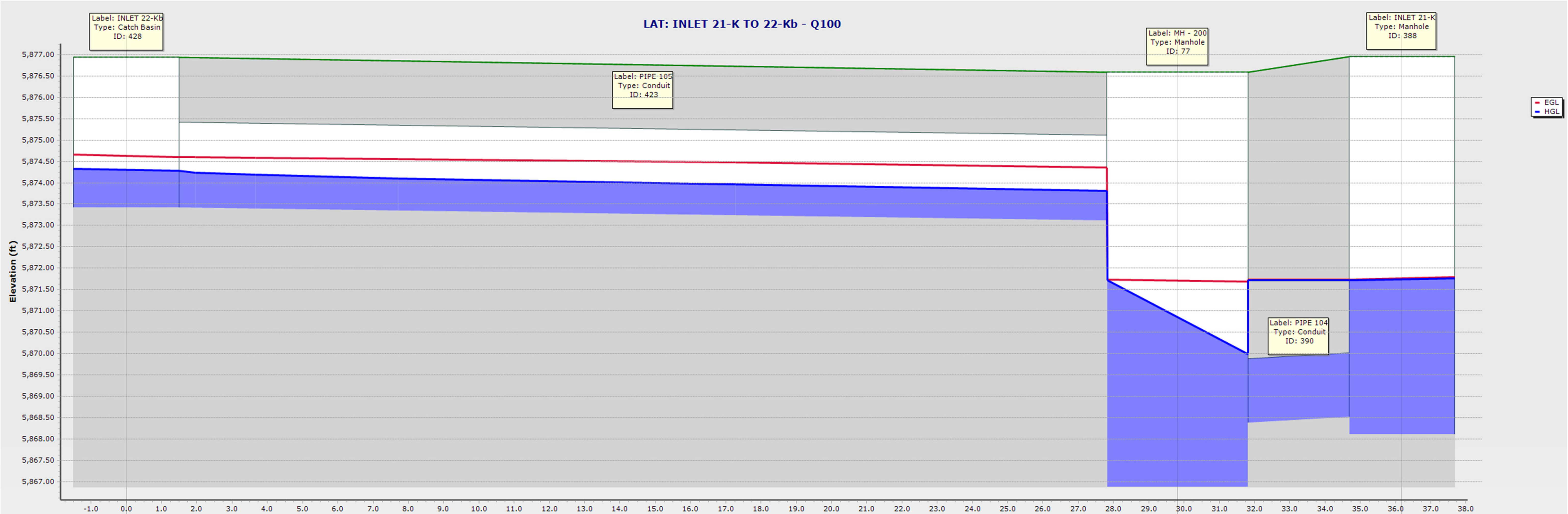
ID\Label		385 \ PIPE 89		387 \ PIPE 90	
Link Length (ft)		9.2		29.0	
Rise (in)\Material		18.0 \ Concrete		18.0 \ Concrete	
Flow (cfs)		3.09		8.36	
Slope (ft/ft)		0.050		0.050	
ID\Label	437 \ INLET 17-K		378 \ MH-42		436 \ INLET 18-K
Ground (ft)	5881.04		5880.86		5881.53
Invert (ft)	5873.22		5871.26		5874.21
Station (ft)	0.0		9.2		38.2

LAT-INLET 3-J TO 4-J - Q100



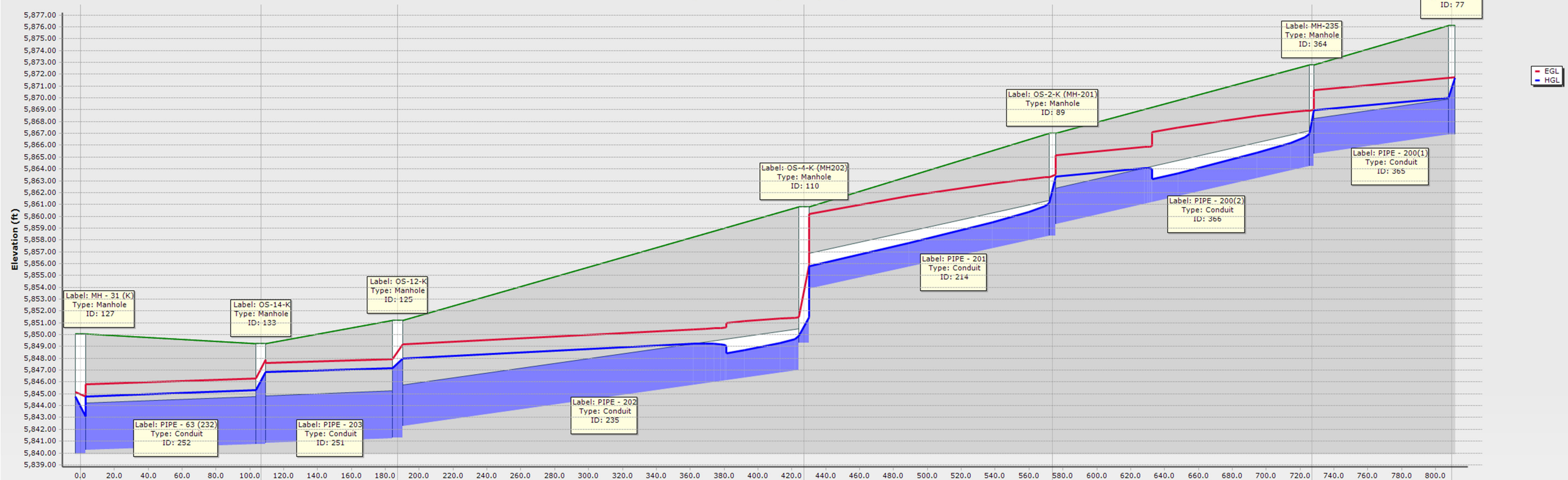
ID\Label	408 \ PIPE 238	406 \ PIPE 235
Link Length (ft)	6.1	28.1
Rise (in)\Material	24.0 \ Concrete	24.0 \ Concrete
Flow (cfs)	2.68	22.94
Slope (ft/ft)	0.049	0.050

ID\Label	433 \ INLET 4-J	53 \ MH - 230	432 \ INLET 3-J
Ground (ft)	5895.99	5895.79	5897.49
Invert (ft)	5891.38	5890.58	5892.48
Station (ft)	0.0	6.1	34.2



ID\Label		423 \ PIPE 105		390 \ PIPE 104	
Link Length (ft)		29.8		6.4	
Rise (in)\Material		24.0 \ Concrete		18.0 \ Concrete	
Flow (cfs)		5.89		2.04	
Slope (ft/ft)		0.010		0.022	
ID\Label	428 \ INLET 22-Kb		77 \ MH - 200		388 \ INLET 21-K
Ground (ft)	5876.93		5876.58		5876.95
Invert (ft)	5873.42		5866.88		5868.11
Station (ft)	0.0		29.8		36.2

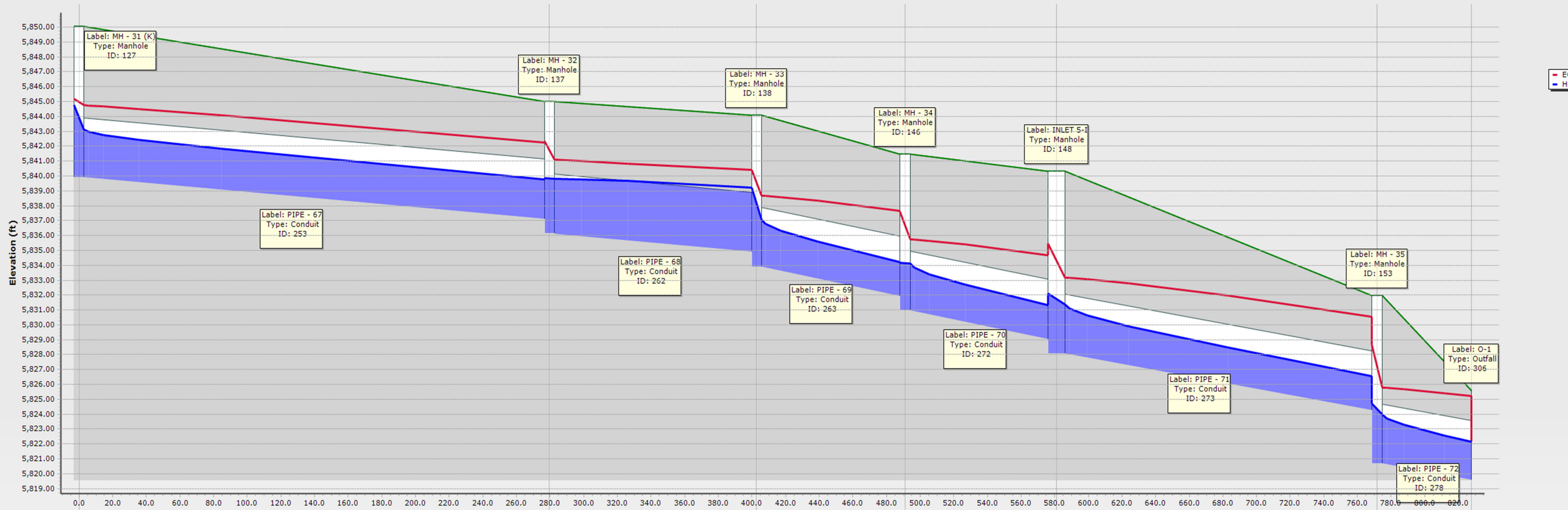
J-K-OS to K (South of Filing No. 2) - Q100



ID\Label	252 \ PIPE - 63 (232)	251 \ PIPE - 203	235 \ PIPE - 202	214 \ PIPE - 201	366 \ PIPE - 200(2)	365 \ PIPE - 200(1)
Link Length (ft)	106.5	80.9	239.8	146.6	153.0	82.6
Rise (in)\Material	48.0 \ Concrete	48.0 \ Concrete	42.0 \ Concrete	36.0 \ Concrete	36.0 \ Concrete	36.0 \ Concrete
Flow (cfs)	100.90	89.91	85.41	81.17	75.89	73.87
Slope (ft/ft)	0.005	0.005	0.020	0.031	0.032	0.020

ID\Label	127 \ MH - 31 (K)	133 \ OS-14-K	125 \ OS-12-K	110 \ OS-4-K (MH202)	89 \ OS-2-K (MH-201)	364 \ MH-235	77 \ MH - 200
Ground (ft)	5850.04	5849.24	5851.22	5860.81	5867.01	5872.77	5876.11
Invert (ft)	5839.92	5840.75	5841.26	5849.30	5858.35	5864.24	5866.88
Station (ft)	0.0	106.5	187.4	427.2	573.8	726.8	809.4

MH-K to East Pond - Q100



ID\Label	253 \ PIPE - 67	262 \ PIPE - 68	263 \ PIPE - 69	272 \ PIPE - 70	273 \ PIPE - 71	278 \ PIPE - 72
Link Length (ft)	279.6	123.1	88.3	90.1	190.5	56.1
Rise (in)\Material	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete	48.0 \ Concrete
Flow (cfs)	110.58	109.77	109.42	109.24	120.25	119.81
Slope (ft/ft)	0.010	0.010	0.022	0.021	0.020	0.020

ID\Label	127 \ MH - 31 (K)	137 \ MH - 32	138 \ MH - 33	146 \ MH - 34	148 \ INLET 5-I	153 \ MH - 35	306 \ O-1
Ground (ft)	5850.04	5845.00	5844.06	5841.45	5840.33	5831.98	5825.60
Invert (ft)	5839.92	5836.12	5833.88	5830.94	5828.05	5820.68	5819.58
Station (ft)	0.0	279.6	402.8	491.0	581.2	771.7	827.7

Pipe Report (100yr)

	ID	Label	Start Node	Invert (Start) (ft)	Invert (Stop) (ft)	Stop Node	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Depth (Normal) / Rise (%)
354: 233	354	233	OS-E	5,847.22	5,844.76	MH-3	123.0	0.020	18.0	0.013	3.40	6.82	14.85	22.9	32.5
355: 234	355	234	MH-3	5,844.46	5,844.11	14-K	34.9	0.010	18.0	0.013	3.40	1.92	10.52	32.3	39.1
323: PIPE - 27	323	PIPE - 27 (1)	MH - 430	5,888.77	5,880.80	MH-2160	248.0	0.032	30.0	0.013	35.85	14.88	73.52	48.8	49.3
185: PIPE - 27	185	PIPE - 27 (2)	MH - 230	5,890.58	5,889.77	MH - 430	80.8	0.010	30.0	0.013	36.02	9.43	41.06	87.7	72.6
252: PIPE - 63	252	PIPE - 63 (232)	OS-14-K	5,840.75	5,840.22	MH - 31 (K)	106.5	0.005	48.0	0.013	100.90	8.03	101.57	99.3	81.4
254: PIPE - 64	254	PIPE - 64	MH - 31 (K)	5,841.32	5,844.30	MH - 30 (I)	118.8	-0.025	24.0	0.013	15.50	10.99	35.83	43.3	46.0
258: PIPE - 65	258	PIPE - 65	MH - 30 (I)	5,844.80	5,845.26	INLET 1-I	46.2	-0.010	18.0	0.013	12.26	6.94	10.48	117.0	(N/A)
259: PIPE - 66	259	PIPE - 66	MH - 30 (I)	5,844.80	5,844.90	INLET 2-I	10.2	-0.010	18.0	0.013	4.05	2.29	10.41	38.9	43.3
253: PIPE - 67	253	PIPE - 67	MH - 31 (K)	5,839.92	5,837.12	MH - 32	279.6	0.010	48.0	0.013	110.58	12.61	143.63	77.0	65.8
262: PIPE - 68	262	PIPE - 68	MH - 32	5,836.12	5,834.89	MH - 33	123.1	0.010	48.0	0.013	109.77	12.59	143.63	76.4	65.5
263: PIPE - 69	263	PIPE - 69	MH - 33	5,833.88	5,831.94	MH - 34	88.3	0.022	48.0	0.013	109.42	17.06	213.02	51.4	50.8
272: PIPE - 70	272	PIPE - 70	MH - 34	5,830.94	5,829.05	INLET 5-I	90.1	0.021	48.0	0.013	109.24	16.76	208.12	52.5	51.5
273: PIPE - 71	273	PIPE - 71	INLET 5-I	5,828.05	5,824.24	MH - 35	190.5	0.020	48.0	0.013	120.25	16.84	203.11	59.2	55.4
278: PIPE - 72	278	PIPE - 72	MH - 35	5,820.68	5,819.58	O-1	56.1	0.020	48.0	0.013	119.81	16.70	201.16	59.6	55.6
327: PIPE - 91	327	PIPE - 91	MH-2170	5,869.21	5,866.98	MH - 200	78.8	0.028	36.0	0.013	68.67	9.72	112.17	61.2	56.5
365: PIPE - 20	365	PIPE - 200(1)	MH - 200	5,866.88	5,864.44	MH-235	82.6	0.030	36.0	0.013	73.86	10.45	114.63	64.4	58.4
366: PIPE - 20	366	PIPE - 200(2)	MH-235	5,864.24	5,859.35	OS-2-K (MH...	153.0	0.032	36.0	0.013	75.88	17.87	119.23	63.6	57.9
214: PIPE - 20	214	PIPE - 201	OS-2-K (MH-201)	5,858.35	5,853.85	OS-4-K (MH...	146.6	0.031	36.0	0.013	81.16	17.85	116.84	69.5	61.3
235: PIPE - 20	235	PIPE - 202	OS-4-K (MH202)	5,847.00	5,842.24	OS-12-K	239.8	0.020	42.0	0.013	85.39	15.41	141.73	60.2	56.0
251: PIPE - 20	251	PIPE - 203	OS-12-K	5,841.24	5,840.84	OS-14-K	80.9	0.005	48.0	0.013	89.91	7.15	101.00	89.0	73.5
215: PIPE - 20	215	PIPE - 205	OS-2-K (MH-201)	5,860.85	5,862.04	2-K	49.9	-0.024	18.0	0.013	5.90	8.46	16.23	36.4	41.7
226: PIPE - 20	226	PIPE - 207	3-4-K (MH-205)	5,857.98	5,858.01	3+4-K	7.3	-0.004	18.0	0.013	6.59	4.35	6.74	97.7	80.0
230: PIPE - 20	230	PIPE - 208	OS-4-K (MH202)	5,855.35	5,857.68	3-4-K (MH-2...	22.0	-0.106	18.0	0.013	6.58	14.94	34.18	19.2	29.7
221: PIPE - 20	221	PIPE - 209	6-K	5,860.99	5,861.62	5-K	33.2	-0.019	18.0	0.013	4.27	7.13	14.47	29.5	37.2
222: PIPE - 21	222	PIPE - 210	MH - 206	5,859.54	5,860.69	6-K	60.2	-0.019	18.0	0.013	7.55	8.30	14.51	52.0	51.2
223: PIPE - 21	223	PIPE - 211	5-8-K	5,856.55	5,859.24	MH - 206	80.2	-0.034	18.0	0.013	11.46	11.36	19.24	59.6	55.6
233: PIPE - 21	233	PIPE - 212	5-8-K	5,856.55	5,856.62	7-K	7.3	-0.010	18.0	0.013	0.09	0.05	10.27	0.9	6.7
232: PIPE - 21	232	PIPE - 213	5-8-K	5,856.55	5,856.70	8-K	29.4	-0.005	18.0	0.013	0.98	0.55	7.51	13.0	24.3
234: PIPE - 21	234	PIPE - 214	5-10-K	5,854.51	5,855.85	5-8-K	69.0	-0.019	18.0	0.013	11.99	9.24	14.64	81.9	68.8
228: PIPE - 21	228	PIPE - 215	9-10-K	5,857.36	5,857.51	9-K	30.7	-0.005	18.0	0.013	4.54	2.57	7.34	61.8	56.9
229: PIPE - 21	229	PIPE - 216	9-10-K	5,857.36	5,857.62	10-K	9.1	-0.028	18.0	0.013	4.54	8.39	17.73	25.6	34.5
231: PIPE - 21	231	PIPE - 217	5-10-K	5,854.51	5,857.06	9-10-K	40.0	-0.064	18.0	0.013	8.78	13.48	26.53	33.1	39.6
238: PIPE - 21	238	PIPE - 218	5-12-K	5,845.00	5,854.01	5-10-K	271.8	-0.033	24.0	0.013	17.98	12.66	41.19	43.7	46.2
248: PIPE - 22	248	PIPE - 220	5-12-K	5,845.50	5,846.01	12-K	8.5	-0.060	18.0	0.013	8.81	4.99	25.77	34.2	40.3
250: PIPE - 22	250	PIPE - 221	OS-12-K	5,842.74	5,844.00	5-12-K	69.8	-0.018	36.0	0.013	23.66	3.35	89.60	26.4	35.1
255: PIPE - 22	255	PIPE - 222	OS-14-K	5,843.34	5,843.40	13-K	8.2	-0.007	18.0	0.013	0.69	0.39	9.00	7.7	18.8
256: PIPE - 22	256	PIPE - 223	OS-14-K	5,843.34	5,843.81	14-K	28.5	-0.016	18.0	0.013	14.38	8.14	13.49	106.6	90.1
326: PIPE - 27	326	PIPE - 272	MH-2160	5,879.80	5,870.21	MH-2170	246.2	0.039	30.0	0.013	54.33	17.68	80.95	67.1	60.0
181: PIPE - 25	181	PIPE - 2500	INLET 1-J	5,894.27	5,893.82	MH - 40	44.7	0.010	30.0	0.013	10.04	6.92	41.15	24.4	33.6
182: PIPE - 26	182	PIPE - 2600	MH - 40	5,893.62	5,890.68	MH - 230	294.5	0.010	30.0	0.013	13.58	7.50	40.98	33.1	39.6
410: PIPE 83	410	PIPE 83	INLET 2-J	5,894.72	5,894.62	MH - 40	10.0	0.010	18.0	0.013	3.71	5.43	10.51	35.4	41.1
379: PIPE 84	379	PIPE 84	MH-42	5,871.26	5,870.71	MH-2170	27.5	0.020	24.0	0.013	19.06	6.07	31.97	59.6	55.6
381: PIPE 85	381	PIPE 85	MH-43	5,877.34	5,872.26	MH-42	304.0	0.017	24.0	0.013	9.56	8.33	29.24	32.7	39.3
383: PIPE 86	383	PIPE 86	MH-44	5,878.58	5,877.54	MH-43	52.0	0.020	24.0	0.013	9.59	8.90	31.99	30.0	37.5
394: PIPE 87	394	PIPE 87	INLET 16-K	5,879.11	5,878.78	MH-44	33.1	0.010	24.0	0.013	4.85	5.72	22.58	21.5	31.5
392: PIPE 88	392	PIPE 88	INLET 15-K	5,878.88	5,878.78	MH-44	10.0	0.010	24.0	0.013	5.35	5.91	22.68	23.6	33.0
385: PIPE 89	385	PIPE 89	INLET 17-K	5,873.22	5,872.76	MH-42	9.2	0.050	18.0	0.013	3.09	1.75	23.44	13.2	24.5
387: PIPE 90	387	PIPE 90	INLET 18-K	5,874.21	5,872.76	MH-42	29.0	0.050	18.0	0.013	8.36	12.17	23.49	35.6	41.2
399: PIPE 92	399	PIPE 92	INLET 20-K	5,881.45	5,881.15	MH-60	30.0	0.010	24.0	0.013	11.72	3.73	22.62	51.8	51.1
400: PIPE 93	400	PIPE 93	MH-60	5,880.85	5,880.30	MH-2160	29.5	0.019	24.0	0.013	15.56	4.95	30.91	50.3	50.2
402: PIPE 94	402	PIPE 94	INLET 19-K	5,881.24	5,881.15	MH-60	8.7	0.010	24.0	0.013	4.10	1.31	23.06	17.8	28.6
390: PIPE 104	390	PIPE 104	INLET 21-K	5,868.52	5,868.38	MH - 200	6.4	0.022	18.0	0.013	2.04	1.15	15.58	13.1	24.4
423: PIPE 105	423	PIPE 105	INLET 22-Kb	5,873.42	5,873.11	MH - 200	29.8	0.010	24.0	0.013	5.89	6.14	23.06	25.5	34.5
396: PIPE 107	396	PIPE 107	INLET 22-Ka	5,880.59	5,880.44	MH-2160	29.5	0.005	24.0	0.013	4.58	1.46	16.12	28.4	36.5
406: PIPE 235	406	PIPE 235	INLET 3-J	5,892.31	5,891.08	MH - 230	30.1	0.041	24.0	0.013	22.94	14.56	45.70	50.2	50.1
408: PIPE 238	408	PIPE 238	INLET 4-J	5,891.38	5,891.08	MH - 230	8.2	0.037	24.0	0.013	2.68	7.65	43.27	6.2	16.9
362: PIPE 239	362	PIPE 239	MH-232	5,863.34	5,859.54	MH - 206	155.0	0.025	18.0	0.013	6.89	8.89	16.45	41.9	45.2
361: PIPE 240	361	PIPE 240	7-K-AREA	5,864.11	5,863.64	MH-232	17.1	0.027	18.0	0.013	6.90	9.28	17.41	39.6	43.8
368: PIPE 241	368	PIPE 241	1-K	5,866.07	5,865.84	MH-235	22.8	0.010	18.0	0.013	2.33	1.32	10.55	22.1	31.9

Inlet Report (100yr)

	ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Headloss Method	Headloss Coefficient (Standard)	Inlet Type	Capture Efficiency (Calculated) (%)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)
330: 12-K	330	12-K	5,851.33	5,851.33	5,846.16	Standard	0.050	Full Capture	100.0	8.81	5,848.43
331: 5-K	331	5-K	5,864.76	5,864.76	5,861.28	Standard	0.050	Percent Capture	97.7	4.27	5,862.46
332: 7-K	332	7-K	5,861.19	5,861.19	5,856.62	Standard	0.050	Percent Capture	78.9	0.09	5,858.47
333: 9-K	333	9-K	5,862.03	5,862.03	5,857.51	Standard	0.050	Percent Capture	95.8	4.54	5,859.18
334: 10-K	334	10-K	5,861.98	5,861.98	5,857.48	Standard	0.050	Percent Capture	95.8	4.54	5,859.14
352: OS-E	352	OS-E	5,854.52	5,854.52	5,847.22	Standard	0.050	Full Capture	100.0	3.40	5,847.97
424: INLET 22-	424	INLET 22-Ka	5,889.95	5,889.95	5,880.59	Standard	0.050	Percent Capture	50.0	4.58	5,884.25
426: INLET 16-	426	INLET 16-K	5,888.76	5,888.76	5,879.11	Standard	0.050	Percent Capture	89.5	4.85	5,880.41
427: INLET 15-	427	INLET 15-K	5,888.53	5,888.53	5,878.88	Standard	0.050	Percent Capture	81.9	5.35	5,880.42
428: INLET 22-	428	INLET 22-Kb	5,876.93	5,876.93	5,873.42	Standard	0.050	Percent Capture	100.0	5.89	5,874.33
430: INLET 1-J	430	INLET 1-J	5,899.27	5,899.27	5,894.27	Standard	0.050	Percent Capture	42.5	10.04	5,895.38
431: INLET 2-J	431	INLET 2-J	5,899.01	5,899.01	5,894.72	Standard	0.050	Percent Capture	97.9	3.71	5,895.51
432: INLET 3-J	432	INLET 3-J	5,897.49	5,897.49	5,892.31	Standard	0.050	Percent Capture	100.0	22.94	5,894.06
433: INLET 4-J	433	INLET 4-J	5,895.99	5,895.99	5,891.38	Standard	0.050	Percent Capture	100.0	2.68	5,893.10
436: INLET 18-	436	INLET 18-K	5,881.53	5,881.53	5,874.21	Standard	0.050	Percent Capture	100.0	8.36	5,875.38
437: INLET 17-	437	INLET 17-K	5,881.04	5,881.04	5,873.22	Standard	0.050	Percent Capture	100.0	3.09	5,875.17
441: 14-K	441	14-K	5,849.56	5,849.56	5,843.81	Standard	0.050	Percent Capture	100.0	14.38	5,847.42

Manhole Report (100yr)

	ID	Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Depth (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Headloss Coefficient (Standard)	Flow (Total Out) (cfs)
50: MH - 40	50	MH - 40	5,900.64	5,900.64	1.95	5,895.05	5,894.86	Standard	0.400	13.58
53: MH - 230	53	MH - 230	5,895.79	5,895.79	2.04	5,893.06	5,892.62	Standard	0.400	36.02
71: MH - 430	71	MH - 430	5,896.70	5,896.70	1.33	5,891.92	5,890.80	Standard	1.020	35.85
77: MH - 200	77	MH - 200	5,876.58	5,876.58	3.10	5,871.71	5,869.98	Standard	1.020	73.86
89: OS-2-K (MH-201)	89	OS-2-K (MH-201)	5,867.01	5,867.01	2.78	5,863.36	5,861.13	Standard	1.020	81.16
90: 2-K	90	2-K	5,866.95	5,866.95	1.46	5,863.57	5,863.52	Standard	0.050	5.90
95: 6-K	95	6-K	5,864.76	5,864.76	1.12	5,861.80	5,861.75	Standard	0.050	7.55
98: MH - 206	98	MH - 206	5,863.81	5,863.81	1.29	5,861.33	5,860.53	Standard	1.020	11.46
101: 3+4-K	101	3+4-K	5,862.06	5,862.06	1.49	5,859.41	5,859.36	Standard	0.050	6.59
105: 3-4-K (MH-205)	105	3-4-K (MH-205)	5,861.67	5,861.67	1.13	5,859.34	5,858.67	Standard	1.520	6.58
106: 9-10-K	106	9-10-K	5,861.60	5,861.60	1.15	5,859.07	5,858.21	Standard	1.520	8.78
107: 8-K	107	8-K	5,861.19	5,861.19	1.73	5,858.48	5,858.43	Standard	0.050	0.98
109: 5-8-K	109	5-8-K	5,860.85	5,860.85	1.26	5,858.42	5,857.16	Standard	1.520	11.99
110: OS-4-K (MH202)	110	OS-4-K (MH202)	5,860.81	5,860.81	0.58	5,851.49	5,849.88	Standard	1.020	85.39
112: 5-10-K	112	5-10-K	5,860.21	5,860.21	1.53	5,856.31	5,855.54	Standard	1.020	17.98
125: OS-12-K	125	OS-12-K	5,851.22	5,851.22	5.90	5,847.96	5,847.15	Standard	1.020	89.91
126: 5-12-K	126	5-12-K	5,850.65	5,850.65	3.90	5,848.32	5,848.05	Standard	1.520	23.66
127: MH - 31 (K)	127	MH - 31 (K)	5,850.04	5,850.04	3.18	5,844.79	5,843.10	Standard	1.020	110.58
128: 13-K	128	13-K	5,849.57	5,849.57	3.44	5,846.89	5,846.84	Standard	0.050	0.69
131: INLET 1-I	131	INLET 1-I	5,849.31	5,849.31	2.15	5,847.40	5,847.35	Standard	0.050	12.26
132: INLET 2-I	132	INLET 2-I	5,849.31	5,849.31	1.86	5,846.78	5,846.73	Standard	0.050	4.05
133: OS-14-K	133	OS-14-K	5,849.24	5,849.24	4.56	5,846.83	5,845.31	Standard	1.520	100.90
134: MH - 30 (I)	134	MH - 30 (I)	5,849.07	5,849.07	1.42	5,846.72	5,845.72	Standard	1.520	15.50
137: MH - 32	137	MH - 32	5,845.00	5,845.00	3.70	5,839.88	5,839.82	Standard	0.050	109.77
138: MH - 33	138	MH - 33	5,844.06	5,844.06	3.16	5,839.21	5,837.04	Standard	1.320	109.42
146: MH - 34	146	MH - 34	5,841.45	5,841.45	3.16	5,834.18	5,834.10	Standard	0.050	109.24
148: INLET 5-I	148	INLET 5-I	5,840.33	5,840.33	3.30	5,832.08	5,831.35	Standard	0.400	120.25
153: MH - 35	153	MH - 35	5,831.98	5,831.98	3.30	5,824.70	5,823.98	Standard	0.400	119.81
322: MH-2160	322	MH-2160	5,891.30	5,891.30	2.21	5,884.19	5,882.15	Standard	1.020	54.33
325: MH-2170	325	MH-2170	5,879.76	5,879.76	3.34	5,874.05	5,872.55	Standard	1.020	68.67
353: MH-3	353	MH-3	5,849.69	5,849.69	3.00	5,847.53	5,847.46	Standard	1.322	3.40
359: MH-232	359	MH-232	5,869.25	5,869.25	1.02	5,864.96	5,864.36	Standard	1.320	6.89
360: 7-K-AREA	360	7-K-AREA	5,868.00	5,868.00	1.02	5,865.18	5,865.13	Standard	0.050	6.90
364: MH-235	364	MH-235	5,872.77	5,872.77	2.73	5,868.97	5,866.97	Standard	1.020	75.88
367: 1-K	367	1-K	5,869.63	5,869.63	2.91	5,869.03	5,868.98	Standard	0.050	2.33
378: MH-42	378	MH-42	5,880.86	5,880.86	2.98	5,875.11	5,874.24	Standard	1.520	19.06
380: MH-43	380	MH-43	5,887.04	5,887.04	1.11	5,878.50	5,878.45	Standard	0.100	9.56
382: MH-44	382	MH-44	5,888.11	5,888.11	1.11	5,880.37	5,879.69	Standard	1.520	9.59
388: INLET 21-K	388	INLET 21-K	5,876.95	5,876.95	3.61	5,871.77	5,871.72	Standard	0.050	2.04
397: INLET 20-K	397	INLET 20-K	5,891.42	5,891.42	3.35	5,884.85	5,884.80	Standard	0.050	11.72
398: MH-60	398	MH-60	5,890.82	5,890.82	3.48	5,884.72	5,884.33	Standard	1.020	15.56
401: INLET 19-K	401	INLET 19-K	5,890.93	5,890.93	3.48	5,884.77	5,884.72	Standard	0.050	4.10

Design Point	Total Water Quality Control Volume (Cu. Ft.)	Pond Name	Pond Drainage Area (Acres)	Pond Drainage Area Less Pond Footprint (Acres)	Forebay Location	Drainage area tributary to Forebay	Proportion of Total Drainage Area	Proportional WQCV Volume (Cu. Ft.)	Forebay Volume 3% of WQCV (Cu. Ft.)	Q100 to Forebay (cfs)	Forebay Outlet Sizing 2% of Q100 (cfs)	Forebay Slot Sizing (inches)
DP 6-L	7688.859746	Northeast Pond	9.09	8.411372819	Northeast	8.41	1.00	7688.86	231	35.9	0.7	5.0

	WQCV		Pond Footprint	
Single Family EDB Pond	0.177	Acre-Ft	0.68	Acres
Percent of WQCV for Forebay	3%	Between 5 and 20 impervious acres		
Impervious Percentage	59.05%			
	Impervious Acres	5.4	Acres	

Table EDB-4. EDB component criteria

	On-Site EDBs for Watersheds up to 1 Impervious Acre[1]	EDBs with Watersheds between 1 and 2 Impervious Acres[1]	EDBs with Watersheds up to 5 Impervious Acres	EDBs with Watersheds over 5 Impervious Acres	EDBs with Watersheds over 20 Impervious Acres
Forebay Release and Configuration	EDBs should not be used for watersheds with less than 1 impervious acre.	Release 2% of the undetained 100-year peak discharge by way of a wall/notch configuration	Release 2% of the undetained 100-year peak discharge by way of a wall/notch configuration	Release 2% of the undetained 100-year peak discharge by way of a wall/notch configuration	Release 2% of the undetained 100-year peak discharge by way of a wall/notch or berm/pipe[2] configuration
Minimum Forebay Volume		1% of the WQCV	2% of the WQCV	3% of the WQCV	3% of the WQCV
Maximum Forebay Depth		12 inches	18 inches	18 inches	30 inches
Trickle Channel Capacity		≥ the maximum possible forebay outlet capacity	≥ the maximum possible forebay outlet capacity	≥ the maximum possible forebay outlet capacity	≥ the maximum possible forebay outlet capacity
Micropool		Area ≥ 10 ft^2	Area ≥ 10 ft^2	Area ≥ 10 ft^2	Area ≥ 10 ft^2
Initial Surcharge Volume		Depth ≥ 4 inches	Depth ≥ 4 inches	Depth ≥ 4 in. Volume ≥ 0.3% WQCV	Depth ≥ 4 in. Volume ≥ 0.3% WQCV

[1] EDBs are not recommended for sites with less than 2 impervious acres. Consider a sand filter or rain garden.

[2] Round up to the first standard pipe size (minimum 8 inches).

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer:	Jesse Sullivan
Company:	Matrix Design Group
Date:	April 19, 2021
Project:	Trails at Aspen Ridge Filing No. 4 (Internal F6) - Forebay Sizing NE Detention Pond
Location:	El Paso County, Colorado

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 59.05 %

B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$) — i = 0.591

C) Contributing Watershed Area — Area = 9.090 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = ______ in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- (●) Water Quality Capture Volume (WQCV)
- ( ) Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time ($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * \text{Area})$) — V_{DESIGN} = 0.177 ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume ($V_{WQCV\ OTHER} = (d_6*(V_{DESIGN}/0.43))$) — $V_{DESIGN\ OTHER}$ = ______ ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired) — $V_{DESIGN\ USER}$ = ______ ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
- i) Percentage of Watershed consisting of Type A Soils — HSG_A = ______ %
- ii) Percentage of Watershed consisting of Type B Soils — HSG_B = ______ %
- iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = ______ %

J) Excess Urban Runoff Volume (EURV) Design Volume — $EURV_{DESIGN}$ = ______ ac-f t
- For HSG A: $EURV_A = 1.68 * i^{1.28}$
- For HSG B: $EURV_B = 1.36 * i^{1.08}$
- For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired) — $EURV_{DESIGN\ USER}$ = ______ ac-f t

2. Basin Shape: Length to Width Ratio (A basin length to width ratio of at least 2:1 will improve TSS reduction.) — L : W = ______ : 1

3. Basin Side Slopes

A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred) — Z = 4.00 ft / ft

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations: ______

5. Forebay

A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV) — V_{FMIN} = 0.005 ac-ft

B) Actual Forebay Volume — V_F = 0.005 ac-ft

C) Forebay Depth (D_F = 18 inch maximum) — D_F = 18.0 in

D) Forebay Discharge
- i) Undetained 100-year Peak Discharge — Q_{100} = 35.90 cfs
- ii) Forebay Discharge Design Flow ($Q_F = 0.02 * Q_{100}$) — Q_F = 0.72 cfs

E) Forebay Discharge Design

Choose One
- ( ) Berm With Pipe
- (●) Wall with Rect. Notch
- ( ) Wall with V-Notch Weir

Flow too small for berm w/ pipe

F) Discharge Pipe Size (minimum 8-inches) — Calculated D_P = ______ in

G) Rectangular Notch Width — Calculated W_N = 5.0 in

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

Designer: Jesse Sullivan
Company: Matrix Design Group
Date: April 20, 2021
Project: FDR: Trails at Aspen Ridge Filing No. 4 (Internal F6)
Location: El Paso County, CO

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches
***Minor Storm: 1-Hour Rain Depth	5-Year Event	1.50	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event	2.52	
Max Intensity for Optional User Defined Storm	2.51496		

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	L1	L2	L3	L4	L5	L6	L7							
Receiving Pervious Area Soil Type	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Clay Loam	Sandy Loam	Sandy Loam
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	2.230	2.910	1.430	1.700	0.100	0.050	0.680							
Directly Connected Impervious Area (DCIA, acres)	1.404	1.892	0.930	1.003	0.065	0.033	0.048							
Unconnected Impervious Area (UIA, acres)	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Receiving Pervious Area (RPA, acres)	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Separate Pervious Area (SPA, acres)	0.826	1.019	0.501	0.697	0.035	0.018	0.632							
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	C	C	C	C	C	C	C	C	C	C	C	C	C	C
								MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	2.230	2.910	1.430	1.700	0.100	0.050	0.680							
Directly Connected Impervious Area (DCIA, %)	63.0%	65.0%	65.0%	59.0%	65.0%	65.0%	7.0%							
Unconnected Impervious Area (UIA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
Receiving Pervious Area (RPA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
Separate Pervious Area (SPA, %)	37.1%	35.0%	35.0%	41.0%	35.0%	35.0%	93.0%							
A_R (RPA / UIA)	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
I_a Check	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
f / I for WQCV Event:	1.7	1.7	1.7	1.7	1.7	1.7	1.7							
f / I for 5-Year Event:	0.5	0.5	0.5	0.5	0.5	0.5	0.5							
f / I for 100-Year Event:	0.3	0.3	0.3	0.3	0.3	0.3	0.3							
f / I for Optional User Defined Storm CUHP:	0.31	0.31	0.31	0.31	0.31	0.31	0.31							
IRF for WQCV Event:	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
IRF for 5-Year Event:	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
IRF for 100-Year Event:	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
IRF for Optional User Defined Storm CUHP:	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
Total Site Imperviousness: I_{total}	63.0%	65.0%	65.0%	59.0%	65.0%	65.0%	7.0%							
Effective Imperviousness for WQCV Event:	63.0%	65.0%	65.0%	59.0%	65.0%	65.0%	7.0%							
Effective Imperviousness for 5-Year Event:	63.0%	65.0%	65.0%	59.0%	65.0%	65.0%	7.0%							
Effective Imperviousness for 100-Year Event:	63.0%	65.0%	65.0%	59.0%	65.0%	65.0%	7.0%							
Effective Imperviousness for Optional User Defined Storm CUHP:	63.0%	65.0%	65.0%	59.0%	65.0%	65.0%	7.0%							

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							
This line only for 10-Year Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A							
100-Year Event CREDIT**: Reduce Detention By:	0.0%	0.0%	0.0%	0.0%	0.3%	0.6%	0.5%							
User Defined CUHP CREDIT: Reduce Detention By:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%							

Total Site Imperviousness:	**59.0%**
Total Site Effective Imperviousness for WQCV Event:	**59.0%**
Total Site Effective Imperviousness for 5-Year Event:	**59.0%**
Total Site Effective Imperviousness for 100-Year Event:	**59.0%**
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	**59.0%**

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3.

** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.

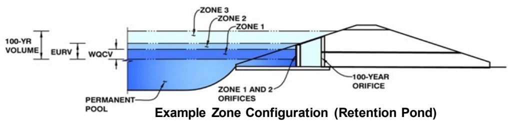
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge - Filing No. 4

Basin ID: Northeast Pond: Marksheffel Tributary to Jimmy Camp Creek: Sub-basin L



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**			
Watershed Area =	9.09	acres		
Watershed Length =	1,058	ft		
Watershed Slope =	0.060	ft/ft		
Watershed Imperviousness =	59.05%	percent		
Percentage Hydrologic Soil Group A =	0.0%	percent		
Percentage Hydrologic Soil Group B =	100.0%	percent		
Percentage Hydrologic Soil Groups C/D =	0.0%	percent		
Desired WQCV Drain Time =	40.0	hours		
Location for 1-hr Rainfall Depths =	User Input			
Water Quality Capture Volume (WQCV) =	0.177	acre-feet	Optional User Override 1-hr Precipitation	
Excess Urban Runoff Volume (EURV) =	0.582	acre-feet		
2-yr Runoff Volume (P1 = 1.19 in.) =	0.477	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.642	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	0.840	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	1.113	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	1.307	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	1.561	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.55 in.) =	2.364	acre-feet	3.55	inches
Approximate 2-yr Detention Volume =	0.446	acre-feet		
Approximate 5-yr Detention Volume =	0.603	acre-feet		
Approximate 10-yr Detention Volume =	0.779	acre-feet		
Approximate 25-yr Detention Volume =	0.844	acre-feet		
Approximate 50-yr Detention Volume =	0.880	acre-feet		
Approximate 100-yr Detention Volume =	0.962	acre-feet		

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.177	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.405	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.381	acre-feet
Total Detention Basin Volume =	0.962	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 = 0.25 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	--	--	--	150	0.003		
5879.01	--	0.33	--	--	--	2,507	0.058	414	0.009
5880	--	1.00	--	--	--	5,513	0.127	3,070	0.070
	--	2.00	--	--	--	6,788	0.156	9,208	0.211
	--	3.00	--	--	--	8,990	0.206	17,165	0.394
	--	4.00	--	--	--	10,035	0.230	26,677	0.612
	--	5.00	--	--	--	11,748	0.270	37,569	0.862
	--	6.00	--	--	--	13,514	0.310	50,200	1.152
	--	7.00	--	--	--	15,331	0.352	64,622	1.484
5887	--	8.00	--	--	--	17,330	0.398	80,952	1.858
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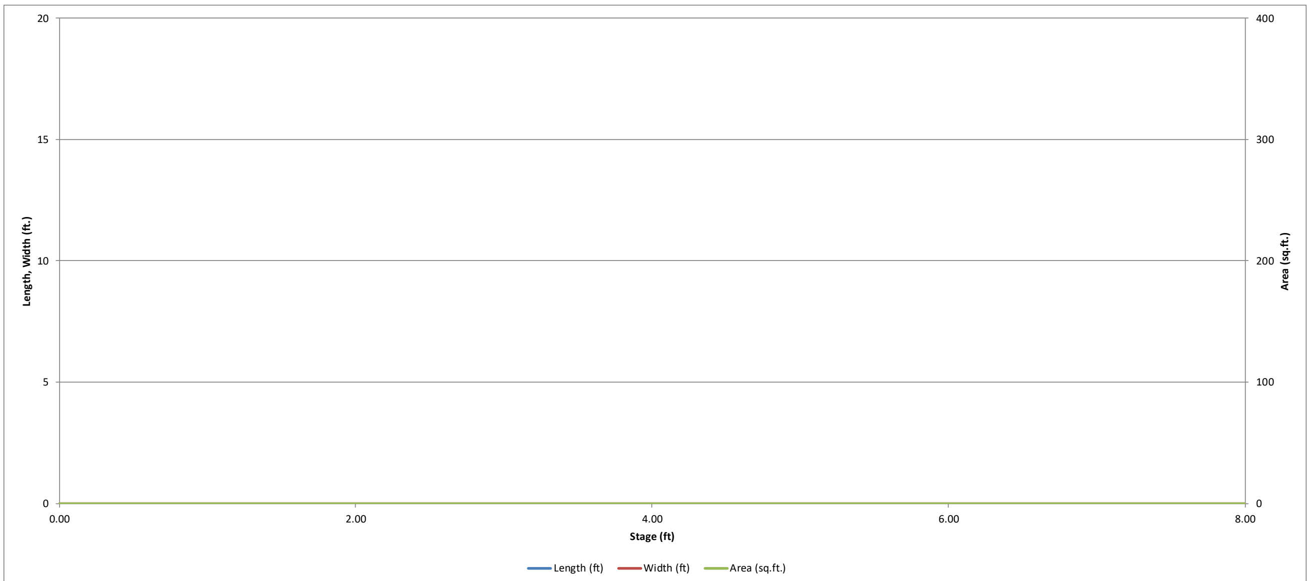
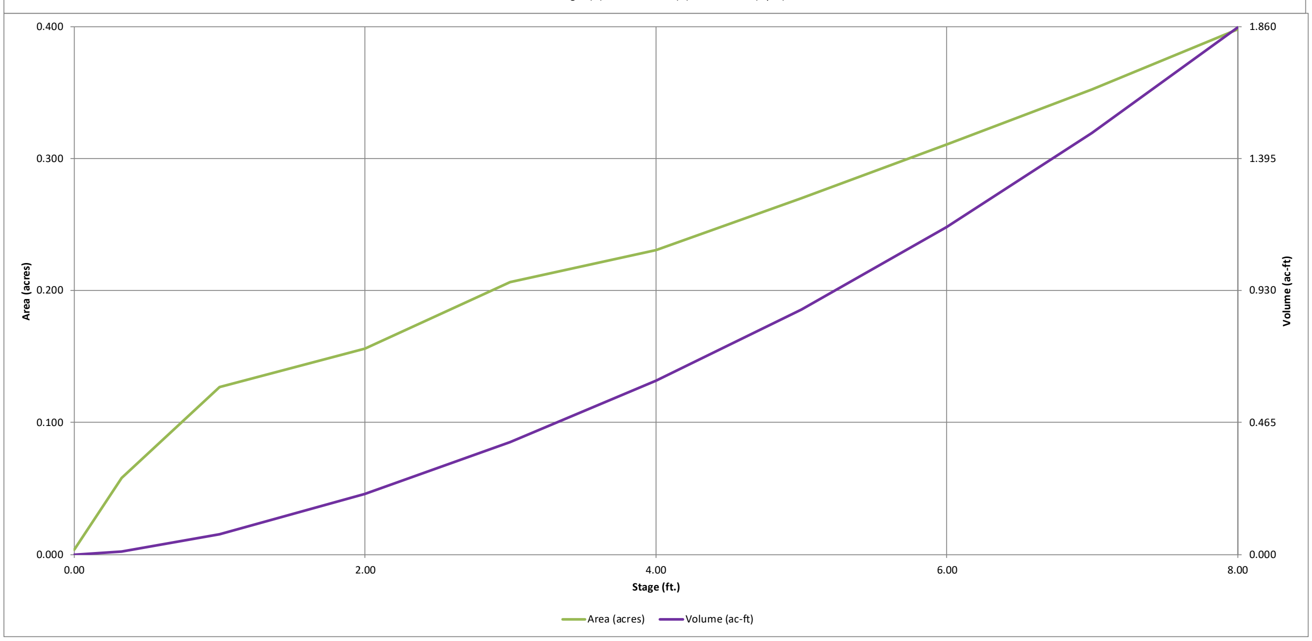
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



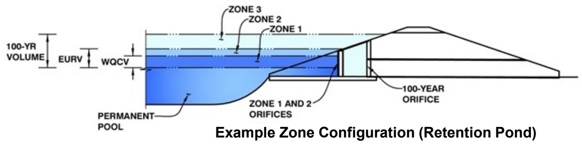


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge - Filing No. 4

Basin ID: Northeast Pond: Marksheffel Tributary to Jimmy Camp Creek: Sub-basin L



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.77	0.177	Orifice Plate
Zone 2 (EURV)	3.87	0.405	Circular Orifice
Zone 3 (100-year)	5.37	0.381	Weir&Pipe (Restrict)
		0.962	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 Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

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)
Depth at top of Zone using Orifice Plate =	1.77	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	8.80	inches
Orifice Plate: Orifice Area per Row =	1.10	sq. inches (diameter = 1-3/16 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row =	7.639E-03	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.59	1.18					
Orifice Area (sq. inches)	1.10	1.10	1.10					

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

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	1.77	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	3.87	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	0.38	N/A	inches

Calculated Parameters for Vertical Orifice

	Zone 2 Circular	Not Selected	
Vertical Orifice Area =	0.00	N/A	ft^2
Vertical Orifice Centroid =	0.02	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.25	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	6.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	5.25	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	24.85	N/A	should be $\geq$ 4
Overflow Grate Open Area w/o Debris =	17.32	N/A	ft^2
Overflow Grate Open Area w/ Debris =	8.66	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	7.50		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.70	N/A	ft^2
Outlet Orifice Centroid =	0.36	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.40	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	5.70	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	30.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

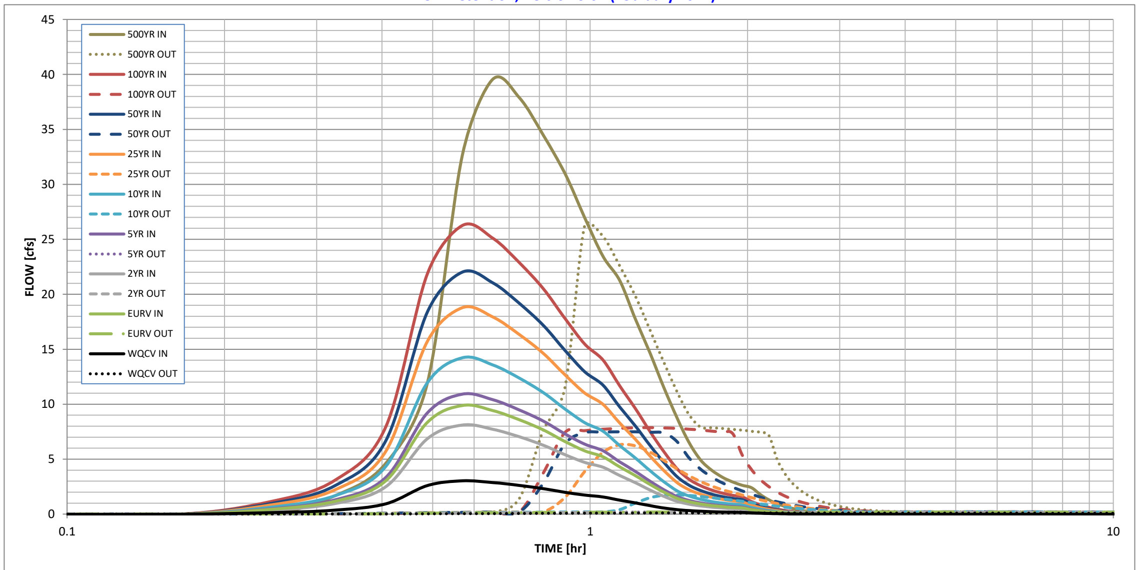
Spillway Design Flow Depth=	0.42	feet
Stage at Top of Freeboard =	7.12	feet
Basin Area at Top of Freeboard =	0.36	acres

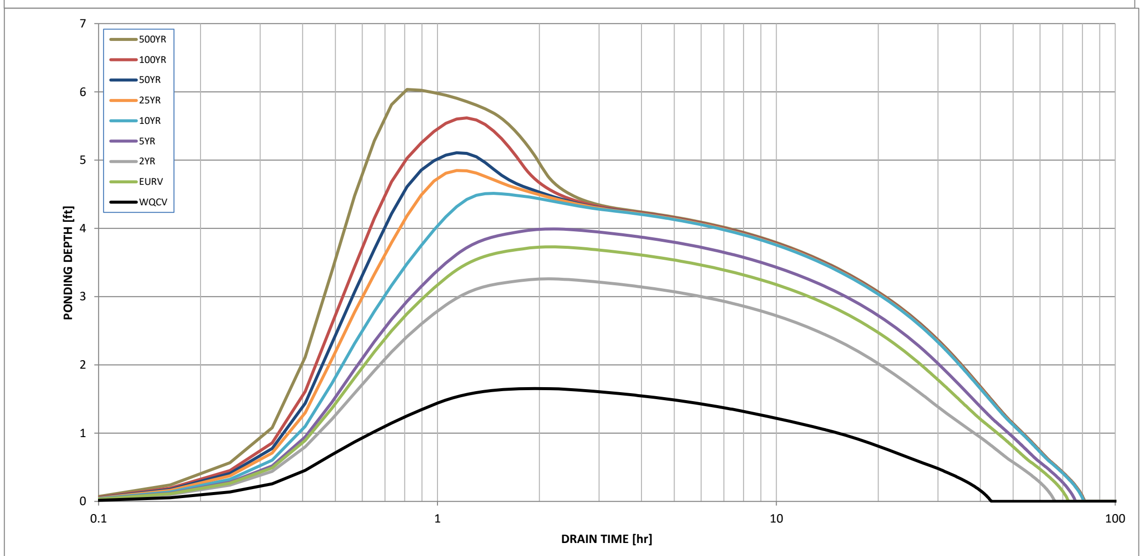
Routed Hydrograph Results

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	1.19	1.50	1.75	2.00	2.25	2.52	3.55
Calculated Runoff Volume (acre-ft) =	0.177	0.582	0.477	0.642	0.840	1.113	1.307	1.561	2.364
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.176	0.581	0.475	0.642	0.839	1.111	1.305	1.560	2.361
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.20	0.66	0.91	1.23	2.05
Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.2	1.8	6.0	8.3	11.2	18.7
Peak Inflow Q (cfs) =	3.0	9.9	8.1	10.9	14.2	18.8	22.0	26.3	39.5
Peak Outflow Q (cfs) =	0.1	0.2	0.2	0.2	1.8	6.3	7.5	7.9	26.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.1	1.0	1.1	0.9	0.7	1.4
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.1	0.4	0.4	0.4	0.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	61	56	64	65	62	61	59	54
Time to Drain 99% of Inflow Volume (hours) =	**41**	67	62	71	74	72	71	70	67
Maximum Ponding Depth (ft) =	1.66	3.73	3.26	3.99	4.51	4.85	5.11	5.62	6.04
Area at Maximum Ponding Depth (acres) =	0.15	0.22	0.21	0.23	0.25	0.26	0.27	0.29	0.31
Maximum Volume Stored (acre-ft) =	0.160	0.551	0.449	0.610	0.735	0.820	0.890	1.035	1.162

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)





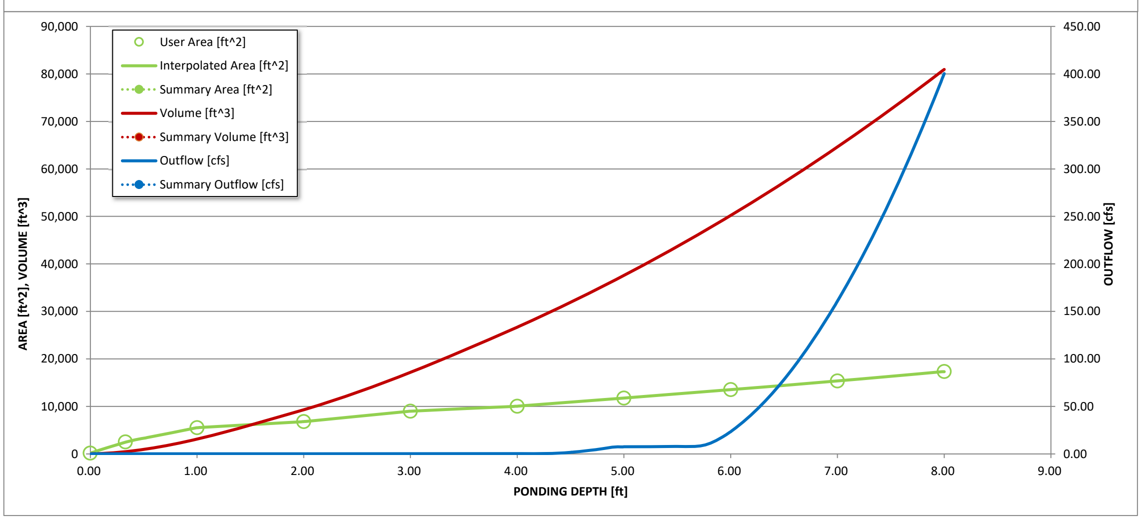


Figure 13-12b. Emergency Spillway Profile at Embankment

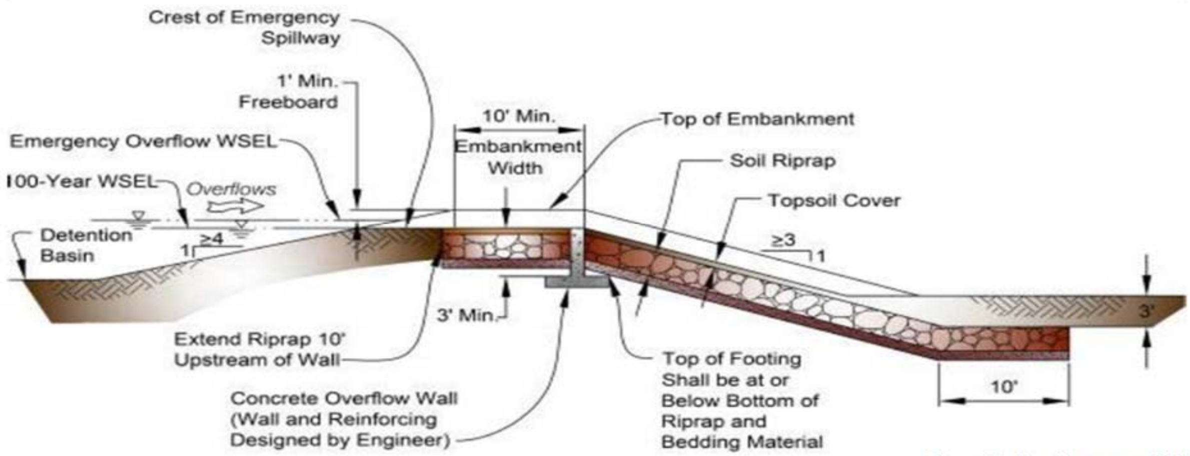
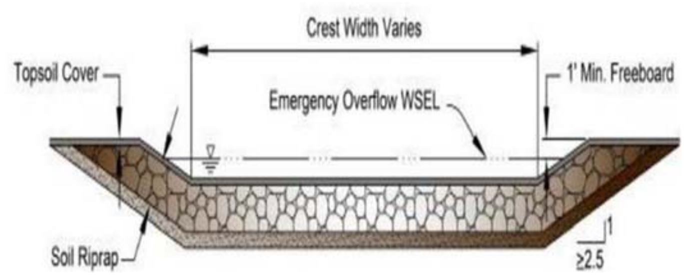


Figure 13-12c. Emergency Spillway Protection

NE Pond: Side slopes: 4:1
Unit Discharge: 0.88 cfs



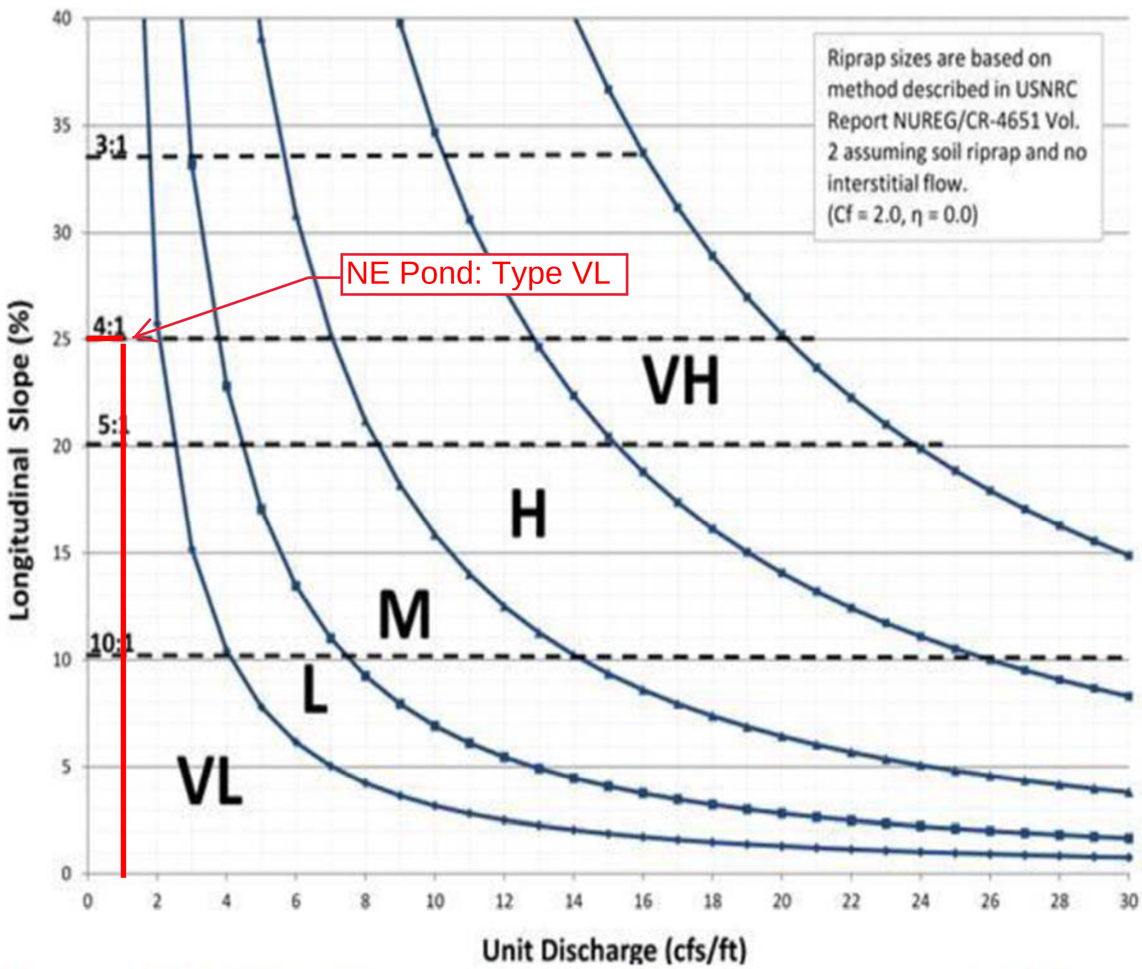


Figure 13-12d. Riprap Types for Emergency Spillway Protection

Channel Report

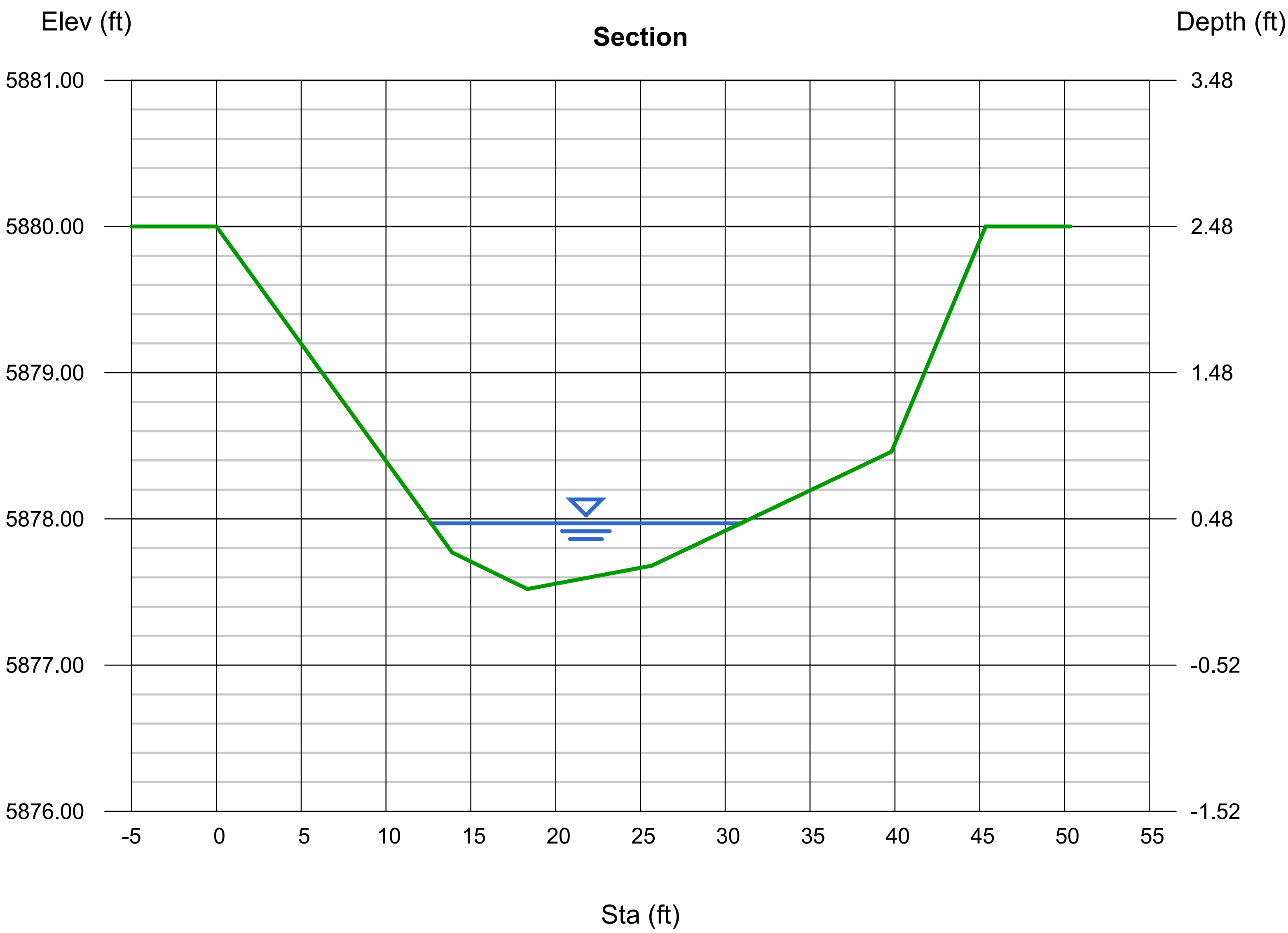
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Jun 8 2021

Bradley Road Ditch Capacity Combined Bradley Runoff and NE Pond Discharge

User-defined		**Highlighted**	
Invert Elev (ft)	= 5877.52	Depth (ft)	= 0.45
Slope (%)	= 3.00	Q (cfs)	= 15.30
N-Value	= 0.035	Area (sqft)	= 5.04
		Velocity (ft/s)	= 3.03
Calculations		Wetted Perim (ft)	= 18.31
Compute by:	Known Q	Crit Depth, Yc (ft)	= 0.46
Known Q (cfs)	= 15.30	Top Width (ft)	= 18.27
		EGL (ft)	= 0.59

(Sta, El, n)-(Sta, El, n)...

(0.00, 5880.00)-(13.90, 5877.77, 0.035)-(18.33, 5877.52, 0.035)-(25.67, 5877.68, 0.035)-(39.80, 5878.46, 0.035)-(45.35, 5880.00, 0.035)



Worksheet Protected

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches
***Minor Storm: 1-Hour Rain Depth	5-Year Event	1.50	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event	2.52	
Max Intensity for Optional User Defined Storm	2.51496		

Designer: Jesse Sullivan
Company: Matrix Design Group
Date: April 20, 2021
Project: FDR: Trails at Aspen Ridge Filing No. 4 (Internal F6)
Location: El Paso County, CO

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	Filing No. 1	Filing No. 2	Filing No. 3	Filing No. 4	TAR Future	Offsite								
Receiving Pervious Area Soil Type	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Clay Loam	Sandy Loam	Sandy Loam
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	49.763	17.614	18.328	9.090	26.919	41.161								
Directly Connected Impervious Area (DCIA, acres)	28.168	10.645	9.799	5.368	0.538	0.823								
Unconnected Impervious Area (UIA, acres)	0.000	0.000	0.000	0.000	0.000	0.000								
Receiving Pervious Area (RPA, acres)	0.000	0.000	0.000	0.000	0.000	0.000								
Separate Pervious Area (SPA, acres)	21.595	6.969	8.529	3.722	26.381	40.338								
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	C	C	C	C	C	C	C	C	C	C	C	C	C	C
							MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT	MISSING INPUT

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	49.763	17.614	18.328	9.090	26.919	41.161								
Directly Connected Impervious Area (DCIA, %)	56.6%	60.4%	53.5%	59.1%	2.0%	2.0%								
Unconnected Impervious Area (UIA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
Receiving Pervious Area (RPA, %)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
Separate Pervious Area (SPA, %)	43.4%	39.6%	46.5%	41.0%	98.0%	98.0%								
A_R (RPA / UIA)	0.000	0.000	0.000	0.000	0.000	0.000								
I_a Check	1.000	1.000	1.000	1.000	1.000	1.000								
f / I for WQCV Event:	1.7	1.7	1.7	1.7	1.7	1.7								
f / I for 5-Year Event:	0.5	0.5	0.5	0.5	0.5	0.5								
f / I for 100-Year Event:	0.3	0.3	0.3	0.3	0.3	0.3								
f / I for Optional User Defined Storm CUHP:	0.31	0.31	0.31	0.31	0.31	0.31								
IRF for WQCV Event:	1.00	1.00	1.00	1.00	1.00	1.00								
IRF for 5-Year Event:	1.00	1.00	1.00	1.00	1.00	1.00								
IRF for 100-Year Event:	1.00	1.00	1.00	1.00	1.00	1.00								
IRF for Optional User Defined Storm CUHP:	1.00	1.00	1.00	1.00	1.00	1.00								
Total Site Imperviousness: I_{total}	56.6%	60.4%	53.5%	59.1%	2.0%	2.0%								
Effective Imperviousness for WQCV Event:	56.6%	60.4%	53.5%	59.1%	2.0%	2.0%								
Effective Imperviousness for 5-Year Event:	56.6%	60.4%	53.5%	59.1%	2.0%	2.0%								
Effective Imperviousness for 100-Year Event:	56.6%	60.4%	53.5%	59.1%	2.0%	2.0%								
Effective Imperviousness for Optional User Defined Storm CUHP:	56.6%	60.4%	53.5%	59.1%	2.0%	2.0%								

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								
This line only for 10-Year Event	N/A	N/A	N/A	N/A	N/A	N/A								
100-Year Event CREDIT**: Reduce Detention By:	0.0%	0.0%	0.0%	0.0%	-14.9%	-9.7%								
User Defined CUHP CREDIT: Reduce Detention By:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%								

Total Site Imperviousness:	**34.0%**
Total Site Effective Imperviousness for WQCV Event:	**34.0%**
Total Site Effective Imperviousness for 5-Year Event:	**34.0%**
Total Site Effective Imperviousness for 100-Year Event:	**34.0%**
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	**34.0%**

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3.

** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.

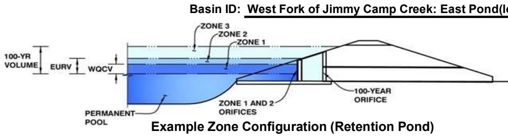
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge

Basin ID: West Fork of Jimmy Camp Creek: East Pond(located in Sub-basin M) Updated to include development of Filing 4 (Internal F6)



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**			
Watershed Area =	162.88	acres		
Watershed Length =	3,742	ft		
Watershed Slope =	0.030	ft/ft		
Watershed Imperviousness =	34.00%	percent		
Percentage Hydrologic Soil Group A =	0.0%	percent		
Percentage Hydrologic Soil Group B =	87.0%	percent		
Percentage Hydrologic Soil Groups C/D =	13.0%	percent		
Desired WQCV Drain Time =	40.0	hours		
Location for 1-hr Rainfall Depths =	User Input			
Water Quality Capture Volume (WQCV) =	2.218	acre-feet	Optional User Override	
Excess Urban Runoff Volume (EURV) =	5.654	acre-feet	1-hr Precipitation	
2-yr Runoff Volume (P1 = 1.19 in.) =	4.485	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	6.442	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	9.434	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	14.949	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	18.644	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	23.459	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.55 in.) =	37.392	acre-feet	3.55	inches
Approximate 2-yr Detention Volume =	4.191	acre-feet		
Approximate 5-yr Detention Volume =	6.051	acre-feet		
Approximate 10-yr Detention Volume =	8.345	acre-feet		
Approximate 25-yr Detention Volume =	9.486	acre-feet		
Approximate 50-yr Detention Volume =	9.969	acre-feet		
Approximate 100-yr Detention Volume =	11.676	acre-feet		

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	2.218	acre-feet
Zone 2 Volume (EURV - Zone 1) =	3.437	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	6.022	acre-feet
Total Detention Basin Volume =	11.676	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 = 1 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	443	0.010		
5817	--	1.00	--	--	--	6,211	0.143	3,265	0.075
5818	--	2.00	--	--	--	31,782	0.730	22,007	0.505
5819	--	3.00	--	--	--	76,551	1.757	76,490	1.756
5820	--	4.00	--	--	--	116,770	2.681	173,150	3.975
5821	--	5.00	--	--	--	141,034	3.238	302,052	6.934
5822	--	6.00	--	--	--	154,951	3.557	450,045	10.332
5823	--	7.00	--	--	--	165,754	3.805	610,397	14.013
5824	--	8.00	--	--	--	174,708	4.011	780,628	17.921
5825	--	9.00	--	--	--	180,233	4.138	958,098	21.995
5826	--	10.00	--	--	--	186,799	4.288	1,141,614	26.208
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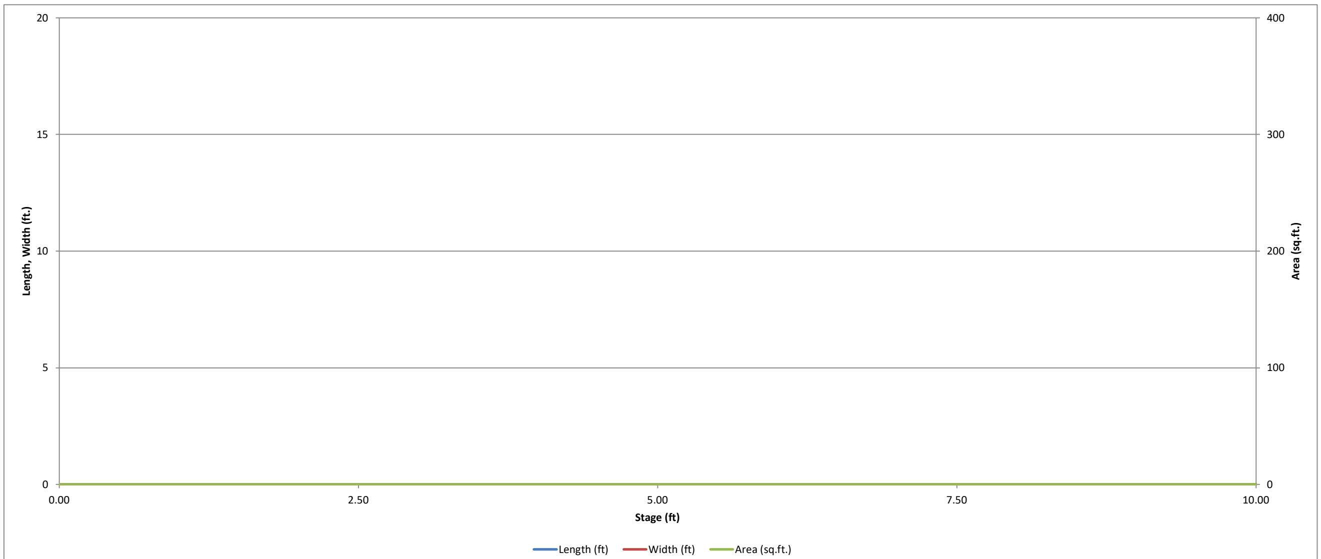
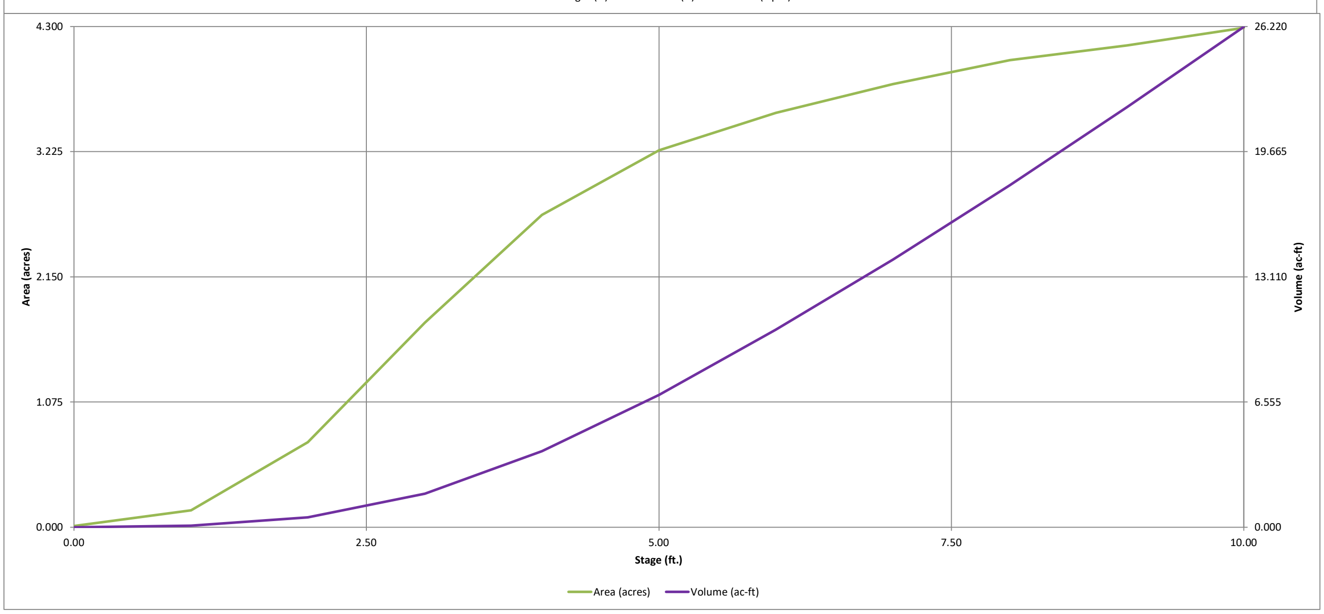
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



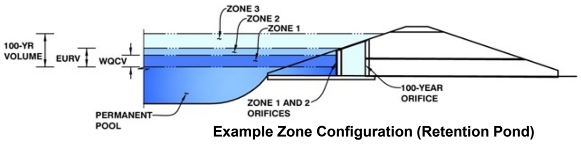


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge

Basin ID: West Fork of Jimmy Camp Creek-East Pond. (Full Buildout with SWMM Hydrographs-PDR Amendment)



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.25	2.218	Orifice Plate
Zone 2 (EURV)	4.60	3.437	Rectangular Orifice
Zone 3 (100-year)	6.38	6.022	Weir&Pipe (Restrict)
		11.676	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 Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

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)
Depth at top of Zone using Orifice Plate =	3.33	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area CHECK CELLS AB84:BE84	N/A	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.70	1.40	2.10	2.80			
Orifice Area (sq. inches)	4.10	4.20	4.20	4.20	4.30			

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

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Rectangular	Not Selected	
Invert of Vertical Orifice =	3.73	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	6.95	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Height =	15.00	N/A	inches
Vertical Orifice Width =	24.00		inches

Calculated Parameters for Vertical Orifice

	Zone 2 Rectangular	Not Selected	
Vertical Orifice Area =	2.50	N/A	ft^2
Vertical Orifice Centroid =	0.63	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.94	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	14.50	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	9.50	N/A	feet
Overflow Grate Open Area % =	75%	N/A	%, grate open area/total area
Debris Clogging % =	45%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	6.94	N/A	feet
Over Flow Weir Slope Length =	9.50	N/A	feet
Grate Open Area / 100-yr Orifice Area =	9.23	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	103.31	N/A	ft^2
Overflow Grate Open Area w/ Debris =	56.82	N/A	ft^2

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	48.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	40.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	11.19	N/A	ft^2
Outlet Orifice Centroid =	1.80	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.30	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.08	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	136.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

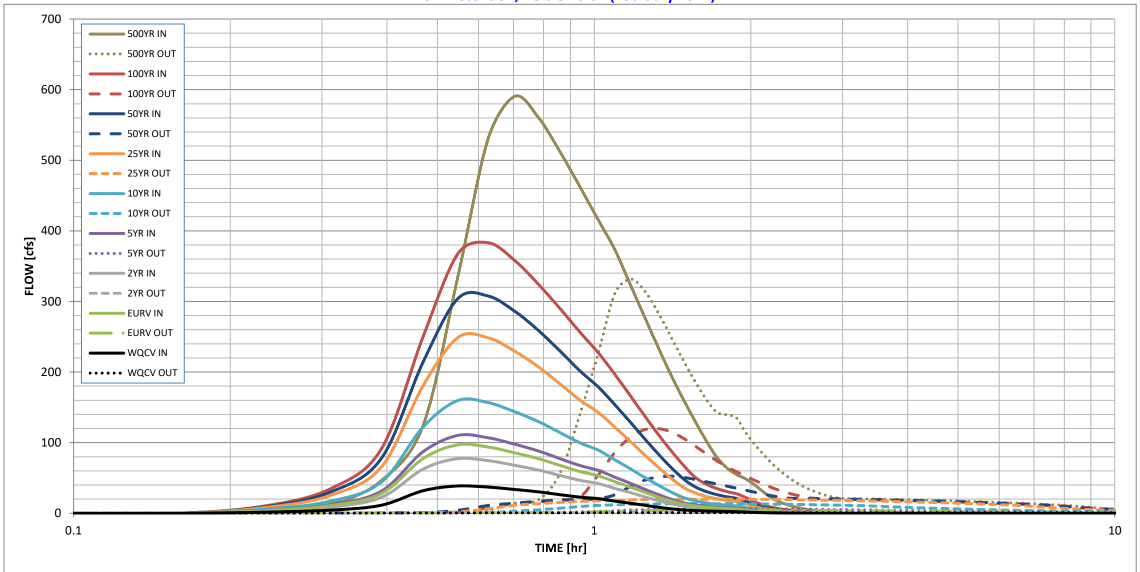
Spillway Design Flow Depth=	1.02	feet
Stage at Top of Freeboard =	10.10	feet
Basin Area at Top of Freeboard =	4.29	acres

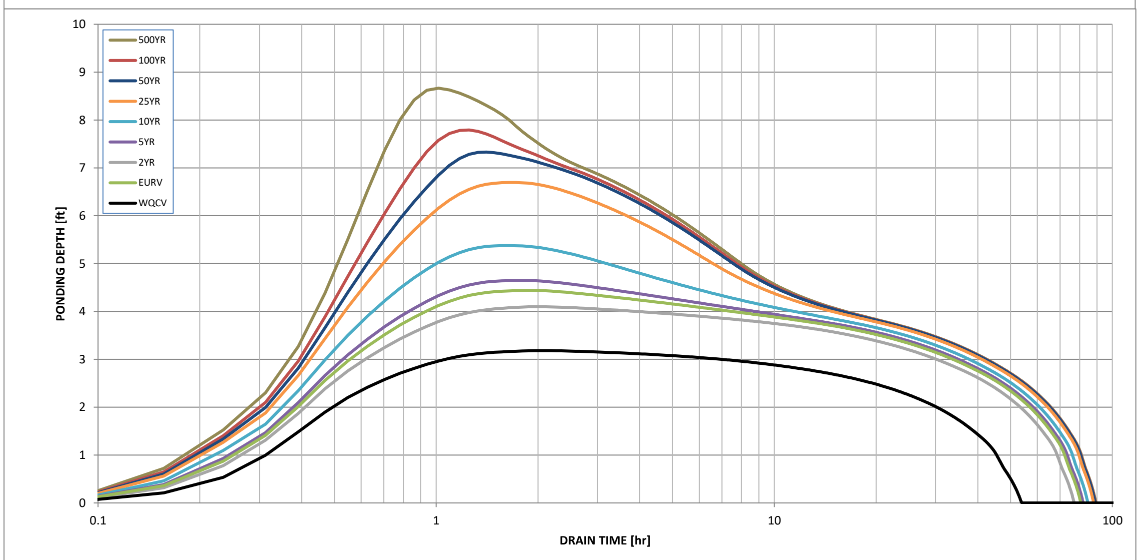
Routed Hydrograph Results

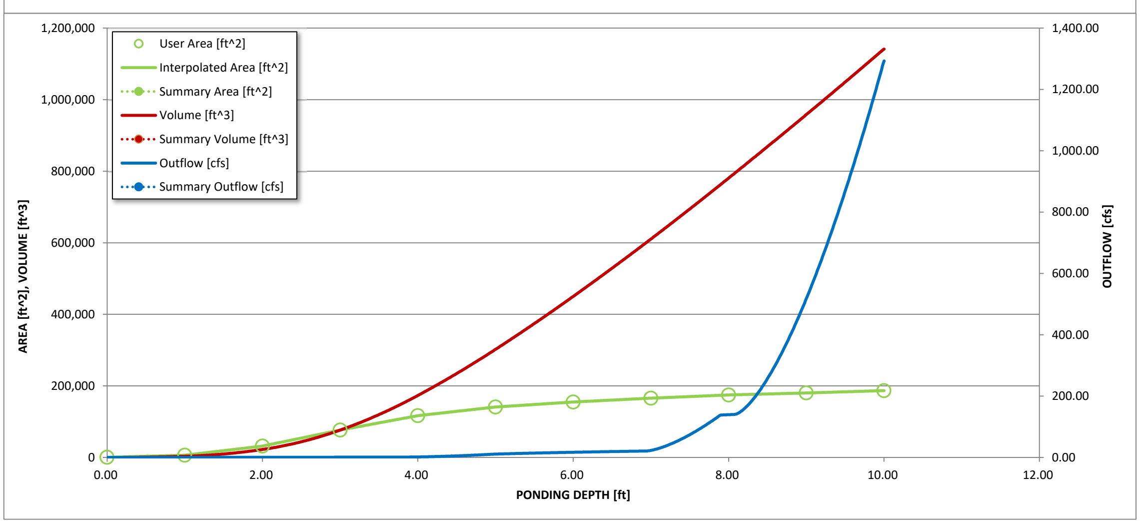
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.55
Calculated Runoff Volume (acre-ft) =	2.218	5.654	4.485	6.442	9.434	14.949	18.644	23.459	37.392
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	2.219	5.657	4.489	6.448	9.441	14.958	18.652	23.475	37.424
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.04	0.24	0.73	1.01	1.35	2.24
Predevelopment Peak Q (cfs) =	0.0	0.0	2.2	6.0	38.9	119.5	164.1	219.2	364.7
Peak Inflow Q (cfs) =	38.7	97.1	77.4	110.3	159.8	248.9	307.9	383.3	590.6
Peak Outflow Q (cfs) =	0.9	4.6	2.2	6.7	13.6	20.0	52.5	120.0	331.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.1	0.3	0.2	0.3	0.5	0.9
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Grate 1	Overflow Grate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.9	1.2
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) =	46	68	66	68	68	66	64	61	53
Time to Drain 99% of Inflow Volume (hours) =	**50**	74	71	74	75	76	75	74	70
Maximum Ponding Depth (ft) =	3.18	4.44	4.10	4.65	5.38	6.70	7.33	7.79	8.67
Area at Maximum Ponding Depth (acres) =	1.92	2.93	2.74	3.04	3.36	3.73	3.87	3.97	4.09
Maximum Volume Stored (acre-ft) =	2.087	5.208	4.246	5.835	8.154	12.845	15.280	17.083	20.595

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







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

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

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

Time Interval: 4.69 min

Hydrograph Constant: 1.067

SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
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]
0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:04:41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:09:23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0:14:04	1.66	3.90	3.19	4.36	5.94	8.35	9.60	10.77	13.11
0:18:46	4.54	11.01	8.90	12.40	17.40	25.77	30.53	35.45	46.67
0:23:27	11.65	28.27	22.84	31.84	44.70	66.30	78.70	92.16	124.14
0:28:08	31.98	77.46	62.62	87.20	122.20	180.72	214.22	250.20	335.07
0:32:50	38.70	97.06	77.41	110.28	159.76	248.93	304.06	367.66	530.45
0:37:31	37.08	93.91	74.57	107.01	156.74	248.67	307.89	383.33	590.57
0:42:13	33.74	85.74	67.96	97.82	143.86	229.61	286.16	358.17	560.46
0:46:54	30.31	77.28	61.23	88.20	129.81	207.37	258.94	324.42	511.97
0:51:35	26.38	67.76	53.59	77.40	114.26	183.20	229.74	290.00	463.09
0:56:17	22.94	59.23	46.80	67.70	100.04	160.57	201.96	256.84	416.53
1:00:58	20.79	53.34	42.22	60.90	89.68	143.24	179.53	228.09	374.30
1:05:40	17.34	44.87	35.42	51.32	76.04	122.50	154.44	197.35	324.44
1:10:21	14.31	37.24	29.36	42.62	63.26	102.08	129.31	166.84	277.66
1:15:02	11.24	29.65	23.29	34.00	50.77	82.55	105.51	137.91	234.11
1:19:44	8.58	23.00	18.01	26.42	39.62	64.75	83.54	111.23	195.00
1:24:25	6.33	17.27	13.47	19.88	29.99	49.40	64.62	88.16	160.56
1:29:07	4.79	12.89	10.09	14.80	22.19	36.56	48.45	67.68	130.10
1:33:48	3.89	10.31	8.10	11.82	17.61	28.70	37.41	50.92	102.71
1:38:29	3.29	8.67	6.82	9.93	14.75	23.92	30.86	41.24	79.44
1:43:11	2.87	7.52	5.93	8.61	12.76	20.60	26.44	35.04	64.47
1:47:52	2.57	6.72	5.30	7.69	11.37	18.30	23.38	30.75	55.04
1:52:34	2.36	6.15	4.85	7.03	10.38	16.65	21.19	27.67	48.67
1:57:15	1.74	4.62	3.62	5.31	7.96	13.06	16.84	22.35	40.25
2:01:56	1.27	3.34	2.62	3.83	5.73	9.41	12.19	16.37	30.53
2:06:38	0.94	2.47	1.94	2.84	4.26	6.98	9.00	11.91	22.30
2:11:19	0.69	1.84	1.44	2.11	3.16	5.18	6.69	8.92	16.43
2:16:01	0.50	1.35	1.06	1.55	2.34	3.84	4.97	6.68	12.42
2:20:42	0.36	0.97	0.76	1.12	1.69	2.78	3.64	4.96	9.36
2:25:23	0.26	0.71	0.55	0.81	1.22	2.01	2.64	3.63	7.03
2:30:05	0.18	0.50	0.39	0.57	0.87	1.45	1.93	2.70	5.27
2:34:46	0.11	0.32	0.25	0.38	0.58	0.97	1.32	1.92	4.00
2:39:28	0.06	0.19	0.14	0.22	0.34	0.59	0.83	1.28	2.90
2:44:09	0.03	0.09	0.07	0.10	0.17	0.30	0.46	0.76	1.97
2:48:50	0.01	0.03	0.02	0.03	0.05	0.11	0.19	0.38	1.23
2:53:32	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.12	0.66
2:58:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
3:02:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
3:07:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:12:17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:16:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:21:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:26:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:31:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:35:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:40:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:45:07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:49:49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:54:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:59:11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:03:53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:08:34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:13:16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:17:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:22:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:27:20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:32:01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:36:43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:41:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:46:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:50:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:55:28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00:10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:04:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:09:32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:14:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:18:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:23:37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:28:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:32:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:37:41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX B

STANDARD DESIGN CHARTS AND TABLES

El Paso County Drainage Basin Fees

Resolution No. 20-424

Basin Number	Receiving Waters	Year Studied	Drainage Basin Name	2021 Drainage Fee (per Impervious Acre)	2021 Bridge Fee (per Impervious Acre)
Drainage Basins with DBPS's:					
CHMS0200	Chico Creek	2013	Haegler Ranch	$11,113	$1,640
CHWS1200	Chico Creek	2001	Bennett Ranch	$12,441	$4,772
CHWS1400	Chico Creek	2013	Falcon	$31,885	$4,380
FOFO2000	Fountain Creek	2001	West Fork Jimmy Camp Creek	$13,524	$4,001
FOFO2600	Fountain Creek	1991*	Big Johnson / Crews Gulch	$19,752	$2,551
FOFO2800	Fountain Creek	1988*	Widefield	$19,752	$0
FOFO2900	Fountain Creek	1988*	Security	$19,752	$0
FOFO3000	Fountain Creek	1991*	Windmill Gulch	$19,752	$296
FOFO3100 / FOFO3200	Fountain Creek	1988*	Carson Street / Little Johnson	$12,048	$0
FOFO3400	Fountain Creek	1984*	Peterson Field	$14,246	$1,080
FOFO3600	Fountain Creek	1991*	Fisher's Canyon	$19,752	$0
FOFO4000	Fountain Creek	1996	Sand Creek	$20,387	$8,339
FOFO4200	Fountain Creek	1977	Spring Creek	$10,244	$0
FOFO4600	Fountain Creek	1984*	Southwest Area	$19,752	$0
FOFO4800	Fountain Creek	1991	Bear Creek	$19,752	$1,080
FOFO5400	Fountain Creek	1977	21st Street	$5,942	$0
FOFO5600	Fountain Creek	1964	19th Street	$3,887	$0
FOFO5800	Fountain Creek	1964	Camp Creek	$2,189	$0
FOMO0400	Monument Creek	1986*	Mesa	$10,331	$0
FOMO1000	Monument Creek	1981	Douglas Creek	$12,421	$274
FOMO1200	Monument Creek	1977	Templeton Gap	$12,752	$296
FOMO1400	Monument Creek	1976	Pope's Bluff	$3,956	$675
FOMO1600	Monument Creek	1976	South Rockrimmon	$4,643	$0
FOMO1800	Monument Creek	1973	North Rockrimmon	$5,942	$0
FOMO2000	Monument Creek	1971	Pulpit Rock	$6,549	$0
FOMO2200	Monument Creek	1994	Cottonwood Creek / S. Pine	$19,752	$1,080
FOMO2400	Monument Creek	1966	Dry Creek	$15,592	$565
FOMO3600	Monument Creek	1989*	Black Squirrel Creek	$8,968	$565
FOMO3700	Monument Creek	1987*	Middle Tributary	$16,482	$0
FOMO3800	Monument Creek	1987*	Monument Branch	$19,752	$0
FOMO4000	Monument Creek	1996	Smith Creek	$8,052	$1,080
FOMO4200	Monument Creek	1989*	Black Forest	$19,752	$538
FOMO5200	Monument Creek	1993*	Dirty Woman Creek	$19,752	$1,080
FOMO5300	Fountain Creek	1993*	Crystal Creek	$19,752	$1,080
Miscellaneous Drainage Basins: [1]					
CHBS0800	Chico Creek		Book Ranch	$18,533	$2,683
CHEC0400	Chico Creek		Upper East Chico	$10,097	$293
CHWS0200	Chico Creek		Telephone Exchange	$11,093	$260
CHWS0400	Chico Creek		Livestock Company	$18,273	$217
CHWS0600	Chico Creek		West Squirrel	$9,525	$3,953
CHWS0800	Chico Creek		Solberg Ranch	$19,752	$0
FOFO1200	Fountain Creek		Crooked Canyon	$5,963	$0
FOFO1400	Fountain Creek		Calhan Reservoir	$4,979	$290
FOFO1600	Fountain Creek		Sand Canyon	$3,597	$0
FOFO2000	Fountain Creek		Jimmy Camp Creek[3]	$19,752	$924
FOFO2200	Fountain Creek		Fort Carson	$15,592	$565
FOFO2700	Fountain Creek		West Little Johnson	$1,301	$0
FOFO3800	Fountain Creek		Stratton	$9,474	$424
FOFO5000	Fountain Creek		Midland	$15,592	$565
FOFO6000	Fountain Creek		Palmer Trail	$15,592	$565
FOFO6800	Fountain Creek		Black Canyon	$15,592	$565
FOMO4600	Monument Creek		Beaver Creek	$11,808	$0
FOMO3000	Monument Creek		Kettle Creek	$10,666	$0
FOMO3400	Monument Creek		Elkhorn	$1,792	$0
FOMO5000	Monument Creek		Monument Rock	$8,561	$0
FOMO5400	Monument Creek		Palmer Lake	$13,689	$0
FOMO5600	Monument Creek		Raspberry Mountain	$4,605	$0
PLPL0200	Monument Creek		Bald Mountain	$9,813	$0
Interim Drainage Basins: [2]					
FOFO1800	Fountain Creek		Little Fountain Creek	$2,525	$0
FOMO4400	Monument Creek		Jackson Creek	$7,818	$0
FOMO4800	Monument Creek		Teachout Creek	$5,429	$816

1. The miscellaneous drainage fee previous to September 1999 resolution was the average of all drainage fees for basins with Basin Planning Studies performed within the last 14 years.
2. Interim Drainage Fees are based upon draft Drainage Basin Planning Studies or the Drainage Basin Identification and Fee Estimation Report. (Best available information suitable for setting a fee.)
3. This is an interim fee and will be adjusted when a DBPS is completed. In addition to the Drainage Fee a surety in the amount of $7,285 per impervious acre shall be provided to secure payment of additional fees in the event that the DBPS results in a fee greater than the current fee. Fees paid in excess of the future revised fee will be reimbursed. See Resolution 06-326 (9/14/06) and Resolution 16-320 (9/07/16).

EPC Stormwater Management *Jennifer Irvine, P.E.*

depths over the duration of the storm as a fraction of the 1-hour depth and is also shown in Figure 6-19. By applying the 1-hour depths shown in Table 6-2 to the values shown in Table 6-3, a short-duration project design storm can be developed for any return period storm from a 2-year up to 100-year frequency. By applying the appropriate 1-hour depth for other project locations, a project design storm can be created for any location.

Table 6-3. 2-Hour Design Storm Distribution, ≤ 1 mi²

Time (minutes)	Fraction of 1-Hour Rainfall Depth	Time (minutes)	Fraction of 1-Hour Rainfall Depth
5	0.014	65	1.004
10	0.046	70	1.018
15	0.079	75	1.030
20	0.120	80	1.041
25	0.179	85	1.052
30	0.258	90	1.063
35	0.421	95	1.072
40	0.712	100	1.082
45	0.824	105	1.091
50	0.892	110	1.100
55	0.935	115	1.109
60	0.972	120	1.119

- **Frontal Storms**: The characteristics of longer-duration "frontal storms" (general) is less well understood than the shorter duration thunderstorms and should be studied further. However, some events of this nature have been observed, such as the April 1999 storm which produced flooding on Fountain Creek, showing that these types of events do occur and tend to produce hazardous flood flows. In addition, modeling of the Jimmy Camp Creek drainage basin using the 24-hour, Type II distribution shows that it produces results reasonably comparably to recorded flow data. Therefore, the NRCS 24-hour Type II distribution has replaced the Type IIa distribution as the standard, long-duration design storm. This distribution can be applied to drainage basins up to 10 square miles without a DARF correction and is shown in Table 6-4. This distribution is included as a standard storm option in the HEC-HMS program.

Table 6-6. Runoff Coefficients for Rational Method

(Source: UDFCD 2001)

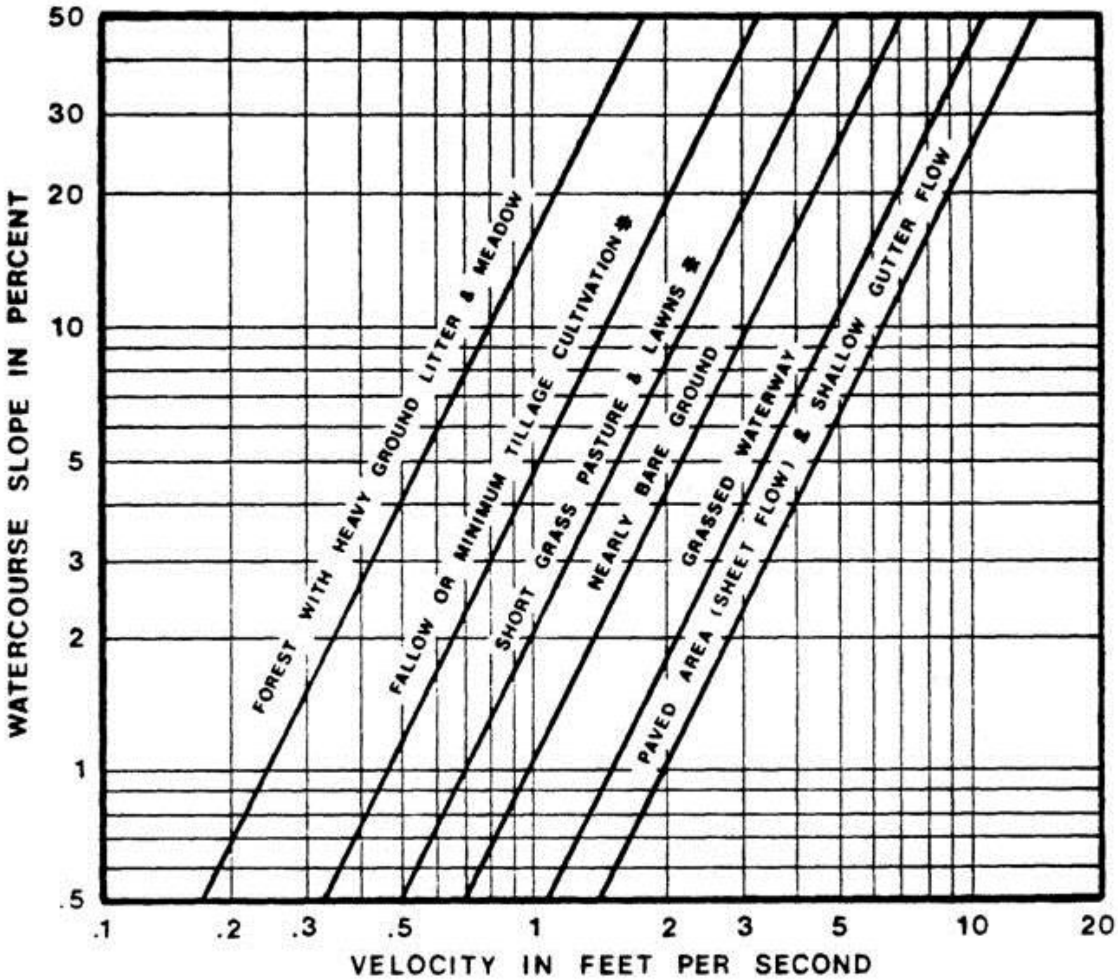
Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

3.2 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration (t_c) consists of an initial time or overland flow time (t_i) plus the travel time (t_t) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time (t_i) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion (t_t) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

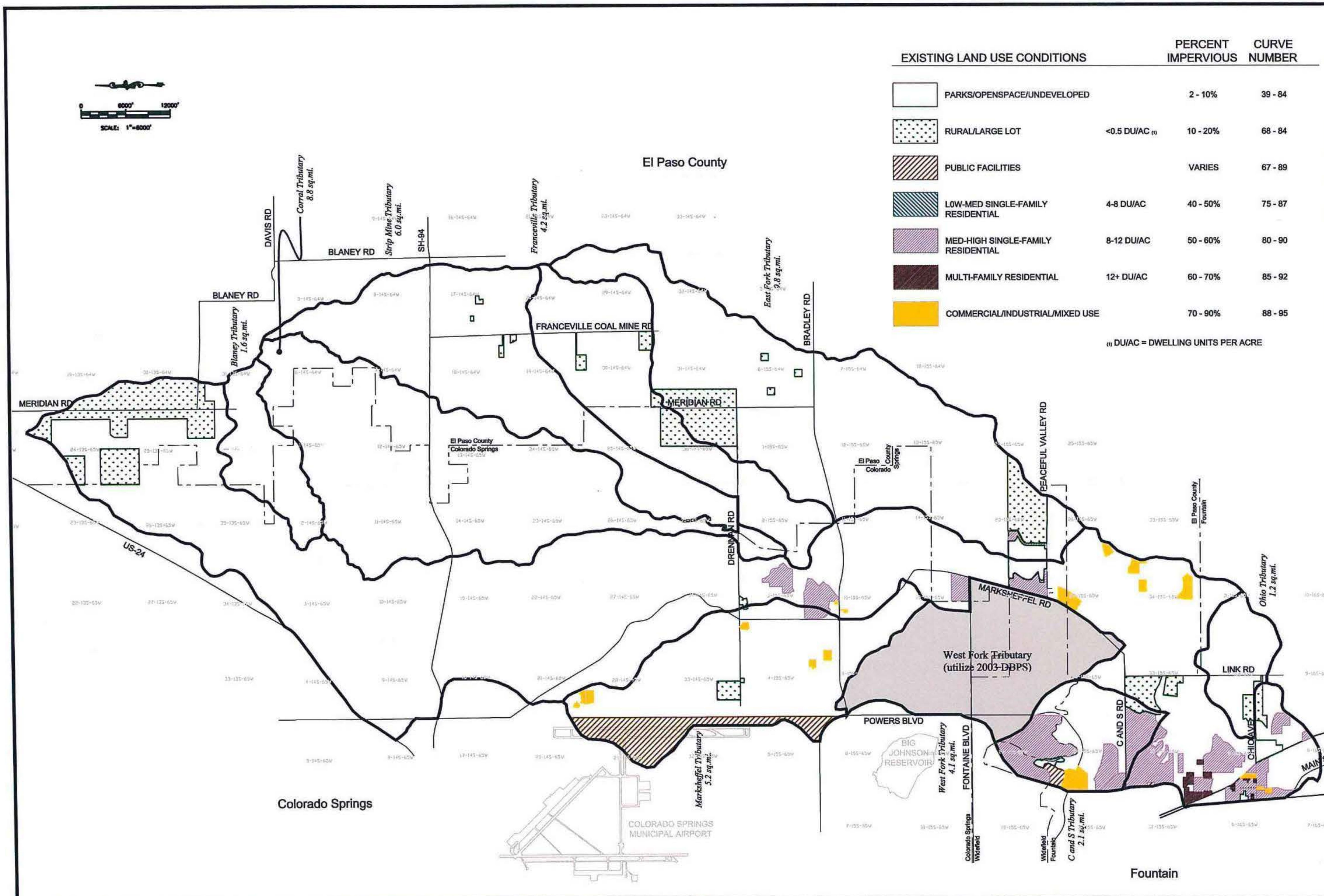
Figure 6-25. Estimate of Average Concentrated Shallow Flow



APPENDIX C

REPORT REFERENCES

EXCERPTS FROM DBPS
WEST FORK JIMMY CAMP CREEK



Kiowa Engineering Corporation

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

JIMMY CAMP CREEK WATERSHED DRAINAGE BASIN PLANNING STUDY

EXISTING CONDITIONS LAND USE MAP

CITY OF COLORADO SPRINGS

Project No.: 14008
Date: OCT 2014
Design:
Drawn: BJW
Check:
Revisions:

II-1

VII. IMPLEMENTATION OF SELECTED PLAN

7.1 General

The results of the analyses summarized in Chapter 6 represent a concept level design process. The selected plan improvements shown on the conceptual design drawings will be subject to refinement as the development of the land within the Jimmy Camp Creek Basin commences. The size and location of the channel conveyances will have to be determined based upon a higher level of engineering analysis that is typically carried out during the preparation of the master development drainage and final drainage planning reports. It is an underlying intent of the selected to plan to preserve to the greatest extent practical the existing condition 100-year floodplain and environmental resources that exist therein. It will be important that the major drainageway channel conveyances that have been identified in this DBPS be followed and major deviations from the concepts presented herein should be discouraged when land development applications are made to the City of Colorado Springs.

With respect to FSD as presented in this DBPS, the location of future FSD basins will be refined during the land development process. Guidelines for locating FSD's have been provided in previous sections of the DBPS. If implemented, FSD will result in the limitation of peak discharges released from developing areas to pre-development conditions. As such, the future major drainageway conveyances and road crossings need only to be designed to be able to carry the pre-development condition discharges. Consolidation of FSD sites should be encouraged in order to limit long-term maintenance costs so long as the intent of the FSD system is achieved. Implementation of the concepts in this DBPS will reduce the level of planning and engineering that will be required during later drainage planning phases associated with the land development process.

7.2 Cost Estimates

Presented on Table VII-1 are the costs estimates for the major drainageway conveyances for Jimmy Camp Creek and its major sub-tributaries within the City of Colorado Springs. Presented on Table VII-2 are conveyance costs for sub-drainageways for the City of Colorado Springs. There has been no cost estimate made for local storm sewer systems. An estimate for the cost to replace roadway crossings found to be deficient when the hydraulic analysis was prepared has also not been made in this DBPS. Unit costs applied when calculating the conveyance costs are prepared on the tables. Engineering design costs have been estimated at 10 percent of the construction. A contingency allowance of 10 percent off the construction has been assumed. No allowance for the relocation of utilities has been assumed when developing the conveyance cost estimates.

Presented on tables within the DBPS are costs estimates for the major drainageway conveyances for Jimmy Camp Creek and its major sub-tributaries within the City of Colorado Springs. There has been no cost estimate made for local storm sewer systems. An estimate for the cost to replace roadway crossings found to be deficient when the hydraulic analysis was prepared has also not been made in this DBPS. Unit costs applied when calculating the conveyance costs are prepared on the tables. The estimated cost of the FSD basins was presented in Chapter 5 of the DBPS. The cost and acreage data associated with FSD has been provided in the DBPS and used in the development of a storage fee. Since the effect of implementing the FSD alternative is to maintain rates of runoff to be conveyed by the receiving drainageways to pre-development conditions it is has been concluded to be reasonable to spread only the cost of the major drainage conveyances in amongst all un-platted property within Colorado Springs.

The total cost for future roadway culverts and bridges has not been made in this DBPS. This is primarily because the number and location of the future roadway crossing cannot be accurately determined at this time. All future roadway crossings should be sized to convey the pre-development condition discharge. Because runoff will be controlled to existing peak discharges, there is no additional costs for culverts and bridges associated with providing capacity because of increased runoff due to development.

7.3 Unplatted Acreage

Presented on Figure VII-1 are the jurisdictional limits and corresponding acreage of the three governmental entities in the Jimmy Camp Creek watershed. Presented on Figure VII-2 are the un-plattable acreage that lies within the City of Colorado Springs, City of Fountain and El Paso County. Using El Paso County Tax Assessor maps, plats and ownership records the amount of un-platted and developable acreage was estimated. From these records the following total un-platted acreages were determined:

City of Colorado Spring outside BLR	**148 acres**
City of Colorado Spring inside BLR	**13,341acres**
City of Colorado Springs Total	**13,489 acres**
El Paso County	**14,018 acres**
City of Fountain	**664 acres**

The unplatted acreage shown on Figure VII-2 excludes the existing 100-year floodplains, large regional parks, school sites and public utility easement corridors Land that is already platted has not been accounted for in the estimate of the plattable acreage unless the platted parcel exceeded 15 acres in size. Most of these large acreage platted parcels occur within the County. The un-platted acreage listed in the report is the land that is considered developable and would be subject to drainage and storage fees.

The weighted percent imperviousness was estimated for the entire watershed. Based upon the land use planning information accumulated and applied in this DBPS, the weighted percent imperviousness for the watershed was determined to be 57.5 percent.

7.4 Unit Drainage Costs

Presented on Table VII-3 of the DBPS and this Executive Summary are the unit major drainageway and FSD storage fee calculations for the City of Colorado Springs. All of the improvements that were used in the calculation of the unit drainage costs are considered public facilities subject to maintenance by the Colorado Springs in accordance with this DBPS and applicable drainage criteria. The unit drainage costs can be used to structure a fee system for the Jimmy Camp Creek watershed to replace the present fee system that has been established using the 1987 Wilson DBPS. It is recommended that a drainage fee be established within each of the jurisdictions to cover the capital improvement costs associated with the stabilization of the major and sub-drainageways identified in this DBPS. Since FSD is the selected storage option for the watershed, it may be possible to have the fees associated with the unit drainage costs accumulate during the initial phases of land development until such time that major drainageway or sub-drainageway stabilization is needed. Having the drainage fund accumulate by not requiring a developer to install major drainageway improvements during the initial phase of the land development process will help the keep the drainage fund from becoming immediately in debt. It will also give the City time and some greater flexibility in focusing the capital improvement funds generated by the fee system. Managing the fees system in this way may also help the land development process by not front-end loading the very initial phases of development with the costs of major and sub-drainageway improvements that could very well be offsite from the land development activity itself.

The FSD storage cost can be used to develop a FSD storage fee. The unit storage fee can be assessed at the time of platting if the parcel subject to platting is so limited in size as to not to be feasible to site a regional FSD. In developing the FSD unit storage fee 15 percent has been added to the unit acre-foot construction cost presented on Table V-4 of the DBPS to bring the unit storage cost to 2014 dollars. Fees that accumulate in the FSD storage fund could later be used to reimburse a property owner that would be required because of its size to construct and FSD. It is however preferable to construct the regional FSD's at the earliest possible time during the development of a sub-watershed so that the impact of develop runoff on the receiving drainageway is mitigated.

Because the land area within the watershed and the land that is within the City is controlled by one major land owner it may be feasible to "close" the basin to fees. This would then end the need to collect drainage and FSD fees at the time of platting land. Accordingly, no reimbursement for any public major drainageway or FSD facilities would occur.

A bridge fee has not been calculated for this watershed. This is primarily because the number and location of bridges cannot be accurately determined, and the fact that any bridge or major roadway crossing would only have to be sized to convey pre-development condition discharges. In this regard, the cost of a bridge or culvert associated with a future road is based on the need for transportation and not storm water conveyance. It may be necessary to establish some form of interim fee to cover the cost of reimbursements already established under the present Jimmy Camp Creek bridge fee system.

Teble I[illegible]xisting Major Drainegeway Structure Inventory

Dralnageway	Dratnage Structure Description	Structure tnvantory #	Roadway	Structure Condition	Intet Channel Condition	Outlet Channel Condition	Exlsting 100-year (cfs)	Structure Capacity (cfs)	% of Exlstlng 100-year Q
Jimmy Camp Creek	360' Bridge 3-spans	PR1	Old Pueblo Road	Good to Fair	Good	Fair	22,100	>24000	100
	244' Bridga Mulit-span	RR1	D & RGW RR	Good to Falr	Good to Fair	Good to Feir	22,100	>>24000	100
	220' Bridga 3-spens	O1	Ohio Avenua	Good to Feir	Good to Fair	Fair	22,100	19800	95
	190' Bridge 3-spans	LR1	Link Roed	Good	Good Floodplain well vegatated	Poor Headcut et outlet	21,880	26000	100
	4-48" X 29" CMP	PV1	Peeceful Velley Roed	Poor Mosliy clogged	Poor	Poor	17,360	< 200	<5
	Bridge	FB1	Fonlalna Boulaverd	Good	Good	Good Riprap channel	15,380	>16000	100
	360' Bridge 3-spans	B2	Bradley Roed	Good	Fair	Fair Benk sloughlng along west benk	15,380	>18000	100
	54' Bridge 2-spans	DR3	Drennen Roed	Feir	Good	Low flow stable	5,760	>6500	100
	160' Bridge 4-spans	NF2	State Highway 94	Good	Good to Fair	Felr Bank sloughing elong west bank	4,760	15000	100
East Fork Jimmy Camp Creek	Twin CBC 8' x 12'	B4	Bradley Roed	Good	Good Chennel poorly defined	Good Chennel poorly defined	2,860	2400	84
	54' Bridge 2-spans	DR5	Drannan Road	Poor to Feir	Good	Good	1,720	>3000	100
	2-43" X 29" CMP	M7	Meridien Roed	Inlet bent Outlat rusted	Poor	Poor	1,610	140	<10
Marksheffel Tributery	Twin 72-inch CMP	MS2	Marksheffal Road	Poor No wingwalls	Good	Feir	950	300	32
	Detention Basin	MK1	Marksheffel Roed	Good	Good	Poor	1,920 in/950 out	na	100
	Triple 7' X 12' CBC	B3	Bradley Road	Good	Good Well vegeleted	Good Well vegeteted	1,640	2800	100
Corral Tributary	80' Bridga 2-spans	DR4	Drannan Roed	Fair Wingwalls in poor condition	Good Send invert	Poor Bank sloughing on west benk	11,550	>40000	100
	Triple 12' X 10' CBC	NF12	Stete Hghway 94	Good	Feir Wide sand Invert	Feir Wide sand Invert	3,230	>3750	100

(1) Bridge capacity equel to the bridge erea below the low chord et a velocity of 10 feet per second. Culvart cepacity besed upon inlet control at a HW/D equal to 1.

on the design plans. The purpose of the detention basins is to limit peak discharges at the basin's outfall to Jimmy Camp Creek to the existing hydrologic condition. The regional basins have also been sited within each of the major land developments to more locally control runoff to existing levels. Wherever practical, the regional detention basins should be designed so as to take advantage of the adjacent roadway embankments. It is not anticipated that any of the regional detention basins will be subject to State Engineer's regulations. Stormwater quality measures should be designed into the regional stormwater detention basins. These measures would include the provision of a water quality and sediment pool area in addition to the volume required for stormwater detention.

Right-of-Way

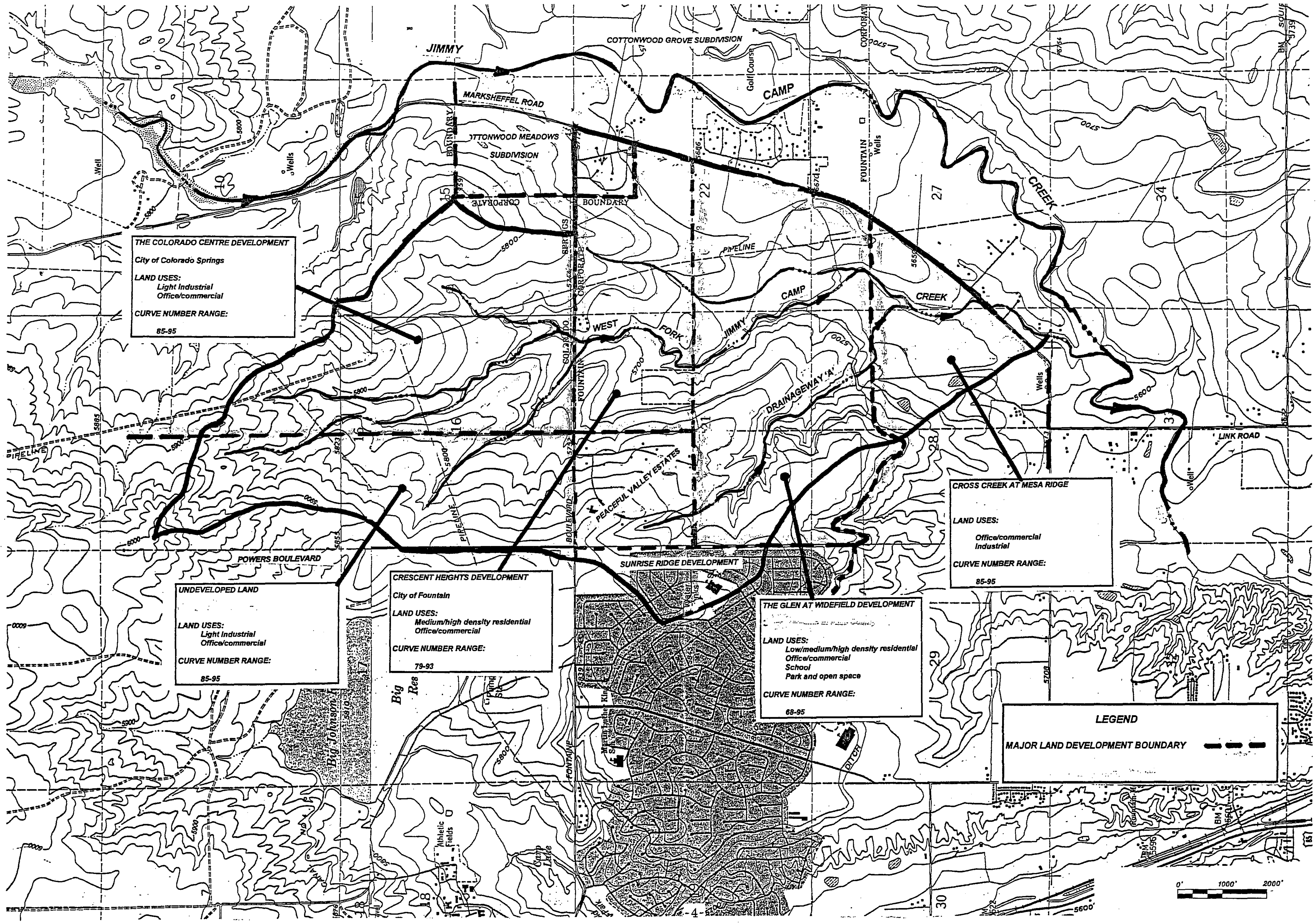
For the most part the main channels within the basin which pass through undeveloped areas and the right-of-way can be dedicated as part of the land development process. For those segments of the drainageway where floodplain preservation is the recommended plan, a combination of open space dedication (such as park-land and greenbelts), in combination with a more narrow dedicated right-of-way along the low flow area of the drainageway should be obtained through the land development process. Land acquisition will be required for the regional detention basins. The dedication of easements and right-of-way for the drainageways and detention basins would be accomplished at the time of development planning and platting of the parcels that lie adjacent to or upstream of the stormwater facility.

Cost Estimates and Drainage Basin Fees

Cost estimates have been prepared and are contained within the DBPS. The cost of the major drainageway facilities has been determined for each jurisdiction. The facility cost estimate will be used in the determination of the drainage and bridge fees for this basin. Bridge crossing costs have been determined as well for the basin.

Presented on Table 17 through 19 is the cost and plattable acreage (i.e., that area available for platting into subdivisions), data associated with the determination of drainage and bridge fees for the basin. The plattable acreage has been determined using a combination of assessor's maps, aerial photographs and topographic mapping that covering the watershed. As presented on Table 17, the reductions in the area available for platting have been listed. The reductions are mostly attributable to areas that are already platted, known roadway or planned road right-of-ways for minor and major arterials, and the area underlying the proposed detention basins.

Drainage basin fees have been determined for those areas that are within the City of Colorado Springs and El Paso County. The City of Fountain does not have a drainage basin fee system and therefore no fees have been calculated for the areas within the City of Fountain. The area of the basin within the City of Colorado Springs lies within the Colorado Centre development and the Banning-Lewis Ranch Flood Conservancy District (District). It is the intent of the City of Colorado Springs that the District will be responsible for all drainage, detention and bridge improvement construction and maintenance. Prior to any development within the City, specific agreements will have to be finalized between the City and the District. The drainage and bridge fees calculated for the County areas have been determined in accordance with Resolution No. 99-383. The percent impervious values listed on Exhibit 3 of this resolution where applied when calculating the weighted percent impervious value for the sub-basins within the County.



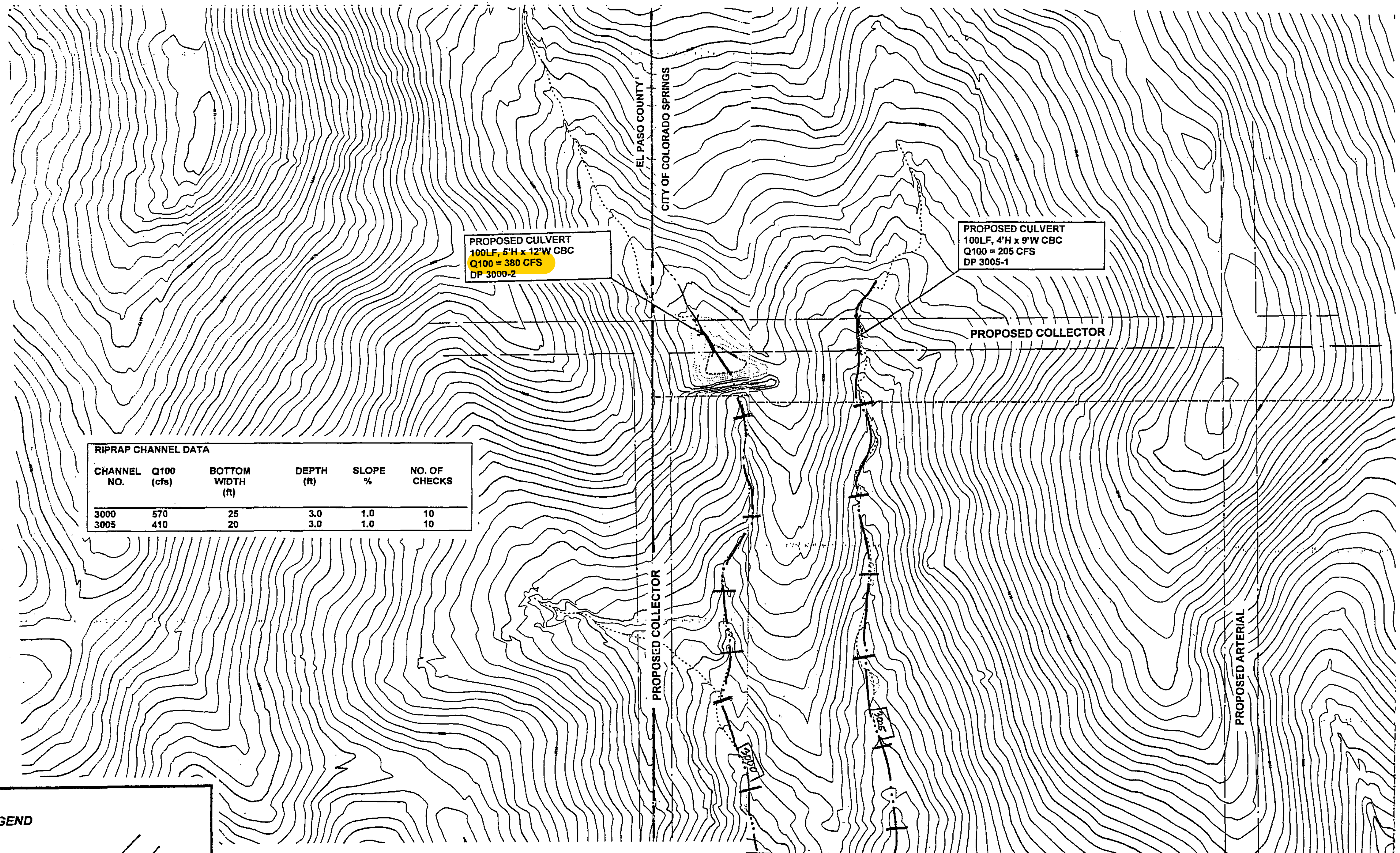
Kiowa Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado
80904
(719) 630-7342

West Fork Jimmy Camp Creek
Drainage Basin Planning Study
MAJOR DEVELOPMENT & LAND USE MAP
EL PASO COUNTY, COLORADO

Project No.:	9893
Date:	6/99
Design:	RNW
Drawn:	CAD
Check:	RNW
Revisions:	

FIGURE 2

THIS DRAWING IS A MASTER PLANNING SHEET REPRESENTING PRELIMINARY AND CONCEPTUAL ENGINEERING. IT SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



RIPRAP CHANNEL DATA

CHANNEL NO.	Q100 (cfs)	BOTTOM WIDTH (ft)	DEPTH (ft)	SLOPE %	NO. OF CHECKS
3000	570	25	3.0	1.0	10
3005	410	20	3.0	1.0	10

LEGEND

ROADWAY CROSSING

DRAINAGEWAY AND ROUTING ELEMENT NUMBER

DRAINAGEWAY GRADE CONTROL STRUCTURE

DESIGN POINT NUMBER

0' 200' 400'

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

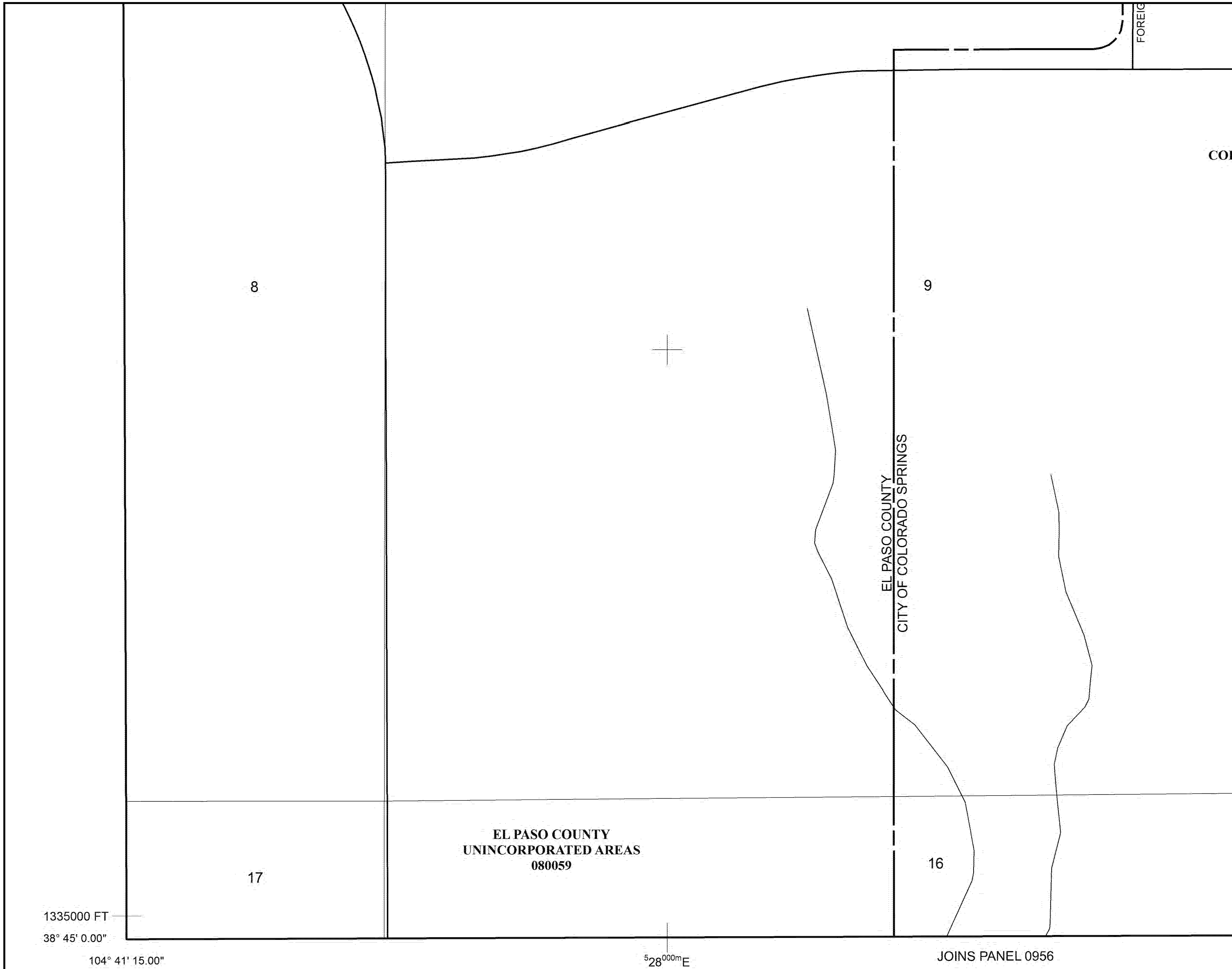
WEST FORK JIMMY CAMP CREEK DRAINAGE BASIN PLANNING STUDY

PRELIMINARY PLAN
EL PASO COUNTY, COLORADO

Project No.: 9893
Date: 2/00
Design: RNW
Drawn: CAD
Check: RNW
Revisions:

6

FIRMETTE



MAP SCALE 1" = 500'

250 0 500 1000 FEET

50 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0768G

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

PANEL 768 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0768	G
EL PASO COUNTY	080059	0768	G

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

MAP NUMBER
08041C0768G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

USDA NRCS WEB SOIL SURVEY REPORT


104° 41' 2" W
104° 40' 19" W
38° 45' 47" N
38° 45' 1" N
527500
527600
527700
527800
527900
528000
528100
528200
528300
528400
4290500
4290400
4290300
4290200
4290100
4290000
4289900
4289800
4289700
4289600
4289500
4289400
4289300
4289200
Bradley
Powers
31
86
86
8
52
108
56
86
Soil Map may not be valid at this scale.
Map Scale: 1:6,790 if printed on A portrait (8.5" x 11") sheet.
Meters
0
100
200
400
600
Feet
0
300
600
1200
1800
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

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

Date(s) aerial images were photographed: Apr 12, 2017—Nov 17, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	17.8	8.6%
31	Fort Collins loam, 3 to 8 percent slopes	B	0.0	0.0%
52	Manzanst clay loam, 0 to 3 percent slopes	C	21.0	10.2%
56	Nelson-Tassel fine sandy loams, 3 to 18 percent slopes	B	137.7	66.8%
86	Stoneham sandy loam, 3 to 8 percent slopes	B	5.3	2.6%
108	Wiley silt loam, 3 to 9 percent slopes	B	24.3	11.8%
Totals for Area of Interest			**206.0**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix D

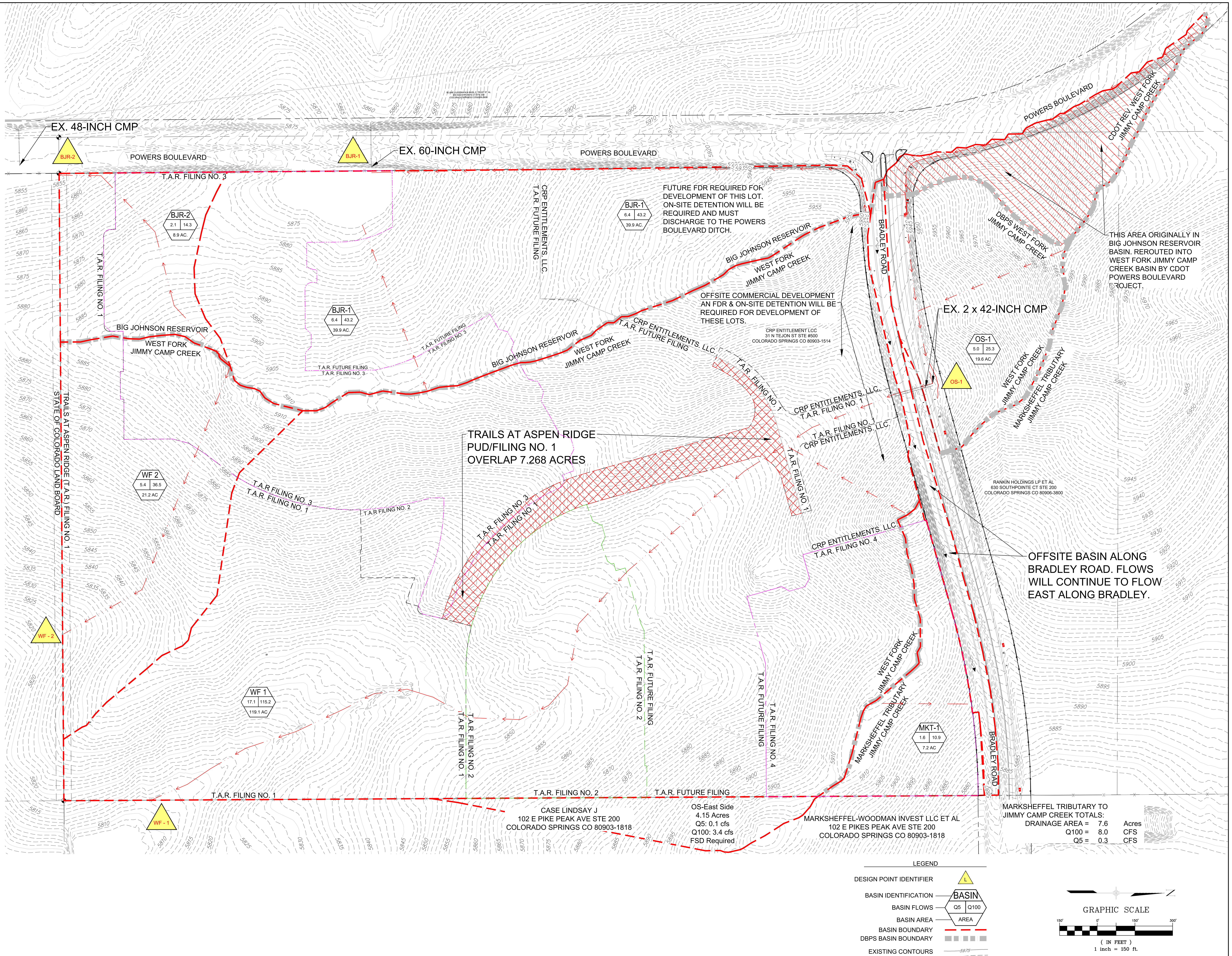
Maps

Trails at Aspen Ridge Vicinity Map

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

Trails at Aspen Ridge Final Drainage Report Existing Design Point Summary				
Design Point	**Sub-Basins**	**Total Area (ac.)**	**Q(5) (cfs)**	**Q(100) (cfs)**
BJR-1	BJR-1	39.94	6.43	43.22
BJR-2	BJR-2	8.85	2.13	14.32
TO BIG JOHNSON RESERVOIR	BJR-1 & BJR-2 (Basins are parallel so this is a sum of BJR-1 & BJR-2.)	**48.79**	**8.56**	**57.54**
OS-1	OS-1 (Note: 7.3 Acres diverted by CDOT from Big Johnson)	19.60	4.79	24.15
WF-1	WF-1 & OS-1	138.69	16.90	108.09
WF-2	WF-2	21.15	5.43	36.51
TO WEST FORK JIMMY CAMP CREEK	WF-1, WF-2, & OS-1 (Basins are parallel so this is a sum of WF-1 & WF-2.)	**159.84**	**37.00**	**170.00**
MARKSHEFFEL TRIBUTARY TO JIMMY CAMP CREEK MKT-1	MKT-1	**7.21**	**1.63**	**10.95**

Trails at Aspen Ridge Final Drainage Report Existing Conditions Basin Summary Table			
Area ID	**Area (Acres)**	**Q5 (cfs)**	**Q100 (cfs)**
Big Johnson Reservoir / BJR-1	39.94	6.43	43.22
Big Johnson Reservoir / BJR-2	8.85	2.13	14.32
West Fork Jimmy Camp Creek / OS - 1	19.60	4.79	24.15
West Fork Jimmy Camp Creek / WF-1	119.08	17.15	115.23
West Fork Jimmy Camp Creek / WF-2	21.15	5.43	36.51
Markhseffel Tributary to Jimmy Camp Creek / MKT-1	7.21	1.63	10.95



REFERENCE DRAWINGS
X-886-PR SITE_F1
X-886-PR SITE
10415-Storm Base-2017
886-PR Legacy Drive
X-886-EX SURVEY
X-Title(Drainage)

NO.	DATE	DESCRIPTION	BY

REVISIONS

NAME: S:\21.886.038 (Trails F6)\200 Drainage\201 Drainage Reports\FDR\DWG\DR01-TAR FDR F4 (F6).dwg
PCP: Matrix.ctb
PLOT DATE: Fri Aug 06, 2021 12:53pm

BENCHMARK DATA(ELEV.) ______
(DATUM) ______
(DESCRIPTION/LOCATION) ______

VERTICAL BENCHMARK:

BASIS OF BEARING:

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

Matrix
2435 Research Parkway, Suite 300 Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

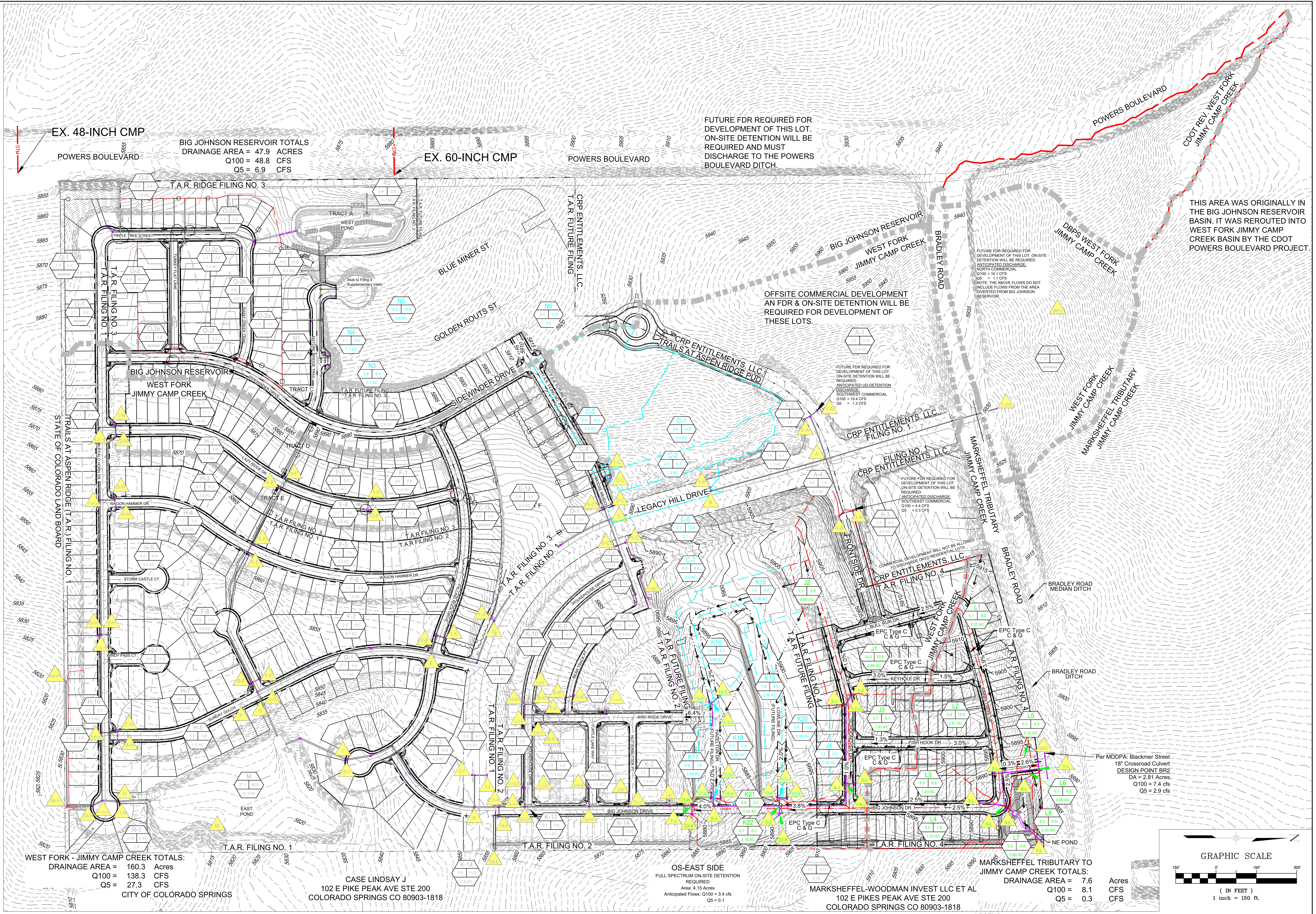
COLA, LLC.

TRAILS AT ASPEN RIDGE
FINAL DRAINAGE REPORT
PRE-DEVELOPMENT CONDITIONS

DESIGNED BY: JTS
DRAWN BY: JTS
CHECKED BY:
SCALE HORIZ: VERT:
DATE ISSUED: AUGUST 2021
SHEET NO. 1 OF 5 SHEETS

DR-01

PLEASE SEE FOLLOWING SHEET DR-03 FOR SUB-BASIN AND DESIGN POINT SUMMARIES.



LEGEND

	FILING #4	PREV. FILING	FUT. FILING
DESIGN POINT IDENTIFIER	L	L	L
BASIN IDENTIFICATION	BASIN	BASIN	BASIN
BASIN FLOWS	Q5 / Q100	Q5 / Q100	Q5 / Q100
BASIN AREA	AREA	AREA	AREA
BASIN BOUNDARY			
DBPS BASIN BOUNDARY			
EXISTING CONTOURS			
PROPOSED CONTOURS			

NOTES:

1. INLETS AND MANHOLES BETWEEN FILING NO. 4 AND FILING NO. 2 WHICH ARE NOT ON THE BIG JOHNSON STORM MAIN WILL NOT BE INSTALLED AS PART OF THIS FILING. STORM PIPES WILL BE STUBBED OUT FROM THE MAIN AND PLUGGED UNTIL THE FUTURE FILING IS CONSTRUCTED.
2. ALL STORM SEWER SHALL BE PUBLICLY OWNED AND MAINTAINED.
3. THE DETENTION PONDS AND INTERNAL STRUCTURES WILL BE PRIVATELY OWNED AND MAINTAINED BY THE WATERVIEW II METRO DIST.
4. SEE SHEET DR-03 FOR SUB-BASIN AND DESIGN POINT SUMMARIES.

REFERENCE DRAWINGS
X-886-PR-SITE - F4
X-886-PR-SITE - F3
X-886-PR SITE_F1
X-Title(Drainage)
X-886-PR SITE-F2
886-PR Legacy Drive-Roundabout
886-pr legacy drive

NO.	DATE	DESCRIPTION	BY

REVISIONS

NAME: S:\21.886.038 (Trails F6)\200 Drainage\201 Drainage Reports\FDR\DWG\DR-02.dwg
PCP: Matrix.ctb
PLOT DATE: Thu Aug 26, 2021 11:17am

BENCHMARK DATA(ELEV.) ______
(DATUM) ______
(DESCRIPTION/LOCATION) ______

VERTICAL BENCHMARK:

BASIS OF BEARING:

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

Matrix
2435 Research Parkway, Suite 300 Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

COLA, LLC.

TRAILS AT ASPEN RIDGE FILING #4

FINAL DRAINAGE REPORT
PROPOSED CONDITIONS

DESIGNED BY: JTS
DRAWN BY: JTS
CHECKED BY:
SCALE HORIZ: VERT:
DATE ISSUED: AUGUST 2021
SHEET NO. 2 OF 5 SHEETS
DR-02

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

Design Point Routing Trails at Aspen Ridge Filing No. 2						
StormCAD						
Design Point	Total Drainage Area	Surface		Storm Sewer		Downstream Design Point
		Q5	Q100	Q5	Q100	
1-OS	**19.67**	4.0	26.8	-	-	A
1-A	**12.34**	3.5	17.6	-	-	A
2-A	**1.09**	2.7	5.2	-	-	A
3-A	**4.98**	2.2	8.9	-	-	A
4-A	**0.12**	0.6	1.0	-	-	A
A	**38.20**	-	-	12.0	55.6	B
1-B	**1.06**	1.8	4.1	-	-	B
B	**39.26**	-	-	12.7	57.1	C
1-C	**3.27**	5.9	12.9	-	-	C
2-C	**1.19**	2.4	5.3	-	-	C
3-C	**4.60**	8.4	18.5	-	-	C
4-C	**0.36**	1.6	3.0	-	-	C
5-C	**3.13**	5.7	12.5	-	-	C
6-C	**0.07**	0.3	0.6	-	-	C
7+8-C	**2.26**	4.2	9.2	-	-	C
C	**54.14**	-	-	27.6	90.2	D
1-D	**2.21**	1.6	5.2	-	-	D
D	**56.34**	0.0	0.0	28.1	92.1	E
1-E	**6.43**	2.6	11.4	-	-	E
2-E	**2.14**	3.9	8.7	-	-	E
E	**64.91**	-	-	33.7	108.8	F
1-F	**2.07**	2.7	6.0	2.7	6.0	3-F
2-F	**0.58**	1.1	2.5	1.6	3.6	3-F
3-F	**3.32**	2.3	5.0	3.8	8.4	4-F
4-F	**3.89**	1.1	2.5	5.0	11.1	5-F
5-F	**6.16**	3.5	7.8	6.6	14.6	6-F
6-F	**7.16**	1.7	3.9	7.9	17.5	8-F
7-F	**5.06**	7.5	16.5	7.5	16.5	8-F
8-F	**13.07**	1.5	3.3	16.2	35.8	F
F	**77.98**	-	-	43.5	131.0	G
1-G	**1.11**	2.1	4.6	-	-	G
G	**79.09**	-	-	44.2	132.7	M
1-H	**3.60**	5.9	13.1	-	-	1-2 H
2-H	**1.16**	1.9	4.2	-	-	1-2 H
1-2 H	**4.76**	-	-	9.0	19.8	1-4 H
3-H	**2.97**	4.7	10.3	-	-	1-4 H
4-H	**0.92**	1.6	3.6	-	-	1-4 H
1-4 H	**8.65**	-	-	16.4	36.1	1-6 H
5-H	**2.42**	4.0	8.9	-	-	1-6 H
6-H	**2.46**	3.9	8.6	-	-	1-6 H
1-6 H	**13.53**	-	-	20.2	44.9	1-8 H
7-H	**2.03**	2.9	6.4	-	-	1-8 H
8-H	**0.97**	1.7	3.7	-	-	1-8 H
1-8 H	**16.52**	-	-	23.3	49.3	1-10 H
9-H	**2.32**	3.3	8.0	-	-	1-10 H
10-H	**1.33**	2.4	5.2	2.8	6.5	1-10 H
10-H	**1.33**	2.4	5.2	-	-	1-10 H
1-10 H	**21.50**	-	-	29.6	66.5	11-H
11-H	**3.42**	5.0	11.0	-	-	H
H	**24.92**			37.4	83.0	M
1-J	**5.89**	10.2	23.5	-	-	1-2-J
2-J	**0.90**	1.7	3.8	-	-	1-2-J
1-2-J	**6.79**			5.6	13.6	1-4-J
3-J	**1.81**	3.7	8.1	-	-	1-4-J
4-J	**0.56**	1.2	2.6	-	-	1-4-J
1-4-J	**9.16**			14.8	36.0	5-J
15-K	**1.65**	3.0	6.6	-	-	15-16-K
16-K	**1.20**	2.4	5.4	-	-	15-16-K
15-16-K	**2.85**			4.1	9.6	15-18-K
17-K	**0.41**	0.9	1.9	-	-	15-18-K
18-K	**1.90**	3.5	7.8	-	-	15-18-K
15-18-K	**5.17**			8.2	19.1	6-J
19-K	**0.93**	1.8	4.0	-	-	19-20-K
20-K	**2.78**	5.4	11.8	-	-	19-20-K
19-20-K	**3.71**			6.7	15.6	5-J
21-K	**0.44**	0.9	2.0	-	-	7-J
22-K	**2.18**	3.7	9.2	-	-	7-J
5-J	**12.87**	-	-	23.8	58.6	6-J
6-J	**18.04**	-	-	30.2	72.6	7-J
7-J	**20.66**	-	-	30.8	73.9	OS-2-K
1-K	**0.78**	0.8	2.3	-	-	OS-2-K
2-K	**1.58**	2.7	5.9	-	-	OS-2-K
OS-2-K	**23.02**	-	-	33.3	81.2	OS-12-K
3+4-K	**1.23**	2.9	6.3	-	-	3-4-K
OS-4-K	**24.25**	-	-	35.2	85.4	OS-12-K
5-K	**0.95**	2.0	4.4	-	-	6-K
6-K	**0.72**	1.5	3.3	3.4	7.6	5-8-K
7-K	**3.26**	2.9	7.9	-	-	5-8-K
8-K	**0.15**	0.5	0.9	-	-	5-8-K
5-8-K	**5.08**	-	-	5.2	12.0	5-10-K
9-K	**1.16**	2.1	4.7	-	-	9-10-K
10-K	**1.10**	2.2	4.7	-	-	9-10-K
9-10-K	**2.26**	-	-	4.0	8.8	5-10-K
5-10-K	**7.34**	-	-	7.8	18.0	5-12-K
11-K	**1.39**	2.6	5.8	-	-	5-12-K
12-K	**0.67**	1.4	3.0	-	-	5-12-K
5-12-K	**9.40**	-	-	10.3	23.6	OS-12-K
OS-12-K	**33.65**	-	-	36.9	89.9	OS-14-K
13-K	**0.09**	0.3	0.6	-	-	OS-14-K
OS-E	**4.15**	3.1	3.4	-	-	14-K
14-K	**2.78**	5.0	11.0	5.1	11.0	OS-14-K
OS-14-K	**36.52**	-	-	43.6	100.9	K
K	**40.23**	-	-	48.0	110.6	3-I
1-I	**3.13**	6.9	12.3	-	-	K
2-I	**0.59**	2.3	4.1	-	-	K
3-I	**4.18**	9.3	16.5	8.7	15.5	M
I	**44.42**	-	-	52.0	120.3	M
M	**158.79**	-	-	**154.5**	**383.7**	East Pond Discharge
East Pond Discharge (Filing 1-4 Buildout)	**158.79**	-	-	6.7	120.0	Existing Swale

Trails at Aspen Ridge - Filing No. 6 Proposed Conditions Sub-basin Summary			
Basin	**Area**	Q5	Q100
	acres	cfs	cfs
WEST FORK JIMMY CAMP CREEK			
J1	5.89	10.2	23.5
J2	0.90	1.7	3.8
J3	1.81	3.7	8.1
J4	0.56	1.2	2.6
K15	1.65	3.0	6.6
K16	1.20	2.4	5.4
K17	0.41	0.9	1.9
K18	1.90	3.5	7.8
K19	0.93	1.8	4.0
K20	2.78	5.4	11.8
K21	0.44	0.9	2.0
K22	2.18	3.7	9.2

SUB-BASIN SUMMARY TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6) MARKSHEFFEL TRIBUTARY TO JIMMY CAMP CREEK			
Basin	**Area**	Q5	Q100
	acres	cfs	cfs
L1	2.23	4.1	9.2
L2	2.91	5.9	13.0
L3	1.43	3.0	6.6
L4	1.70	3.3	7.6
L5	0.10	0.2	0.5
L6	0.05	0.1	0.2
L7	0.68	0.5	2.4
L8	0.20	0.2	0.9

PROPOSED DESIGN POINT SUMMARY TRAILS AT ASPEN RIDGE FILING NO. 4 (INTERNAL PHASE 6)				
Design Point	**Sub-Basins**	**Total Area (ac.)**	**Q(5) (cfs)**	**Q(100) (cfs)**
Marksheffel Tributary to Jimmy Camp Creek				
SUB-BASIN L5	SUB-BASIN L5	0.10	0.23	0.50
SUB-BASIN L6	SUB-BASIN L6	0.05	0.11	0.24
1-L	SUB-BASINS L5 & L6	0.15	0.34	0.74
SUB-BASIN L2	SUB-BASIN L2	2.91	5.90	12.99
2-L	SUB-BASINS L2, L5 & L6	3.06	6.19	13.64
3-L	SUB-BASIN L3	1.43	2.98	6.57
4-L	SUB-BASINS L2, L3, L5 & L6	4.49	9.08	20.01
5-L	SUB-BASINS L1-L6	8.42	15.64	34.94
6-L	NE POND (SUB-BASINS L1-L7)	9.09	15.53	35.92
7-L	NE POND DISCHARGE	9.09	0.20	7.90
8-L	SITE DISCHARGE	9.30	0.39	8.77
West Fork Tributary to Jimmy Camp Creek				
1-J	SUB-BASIN J1	5.89	10.21	23.54
2-J	SUB-BASIN J2	0.90	1.72	3.78
1-2-J	SUB-BASINS J1 & J2	6.79	11.87	27.20
3-J	SUB-BASIN J3	1.81	3.68	8.10
4-J	SUB-BASIN J4	0.56	1.16	2.55
1-4-J	SUB-BASINS J1 TO J4	9.16	14.63	33.18
15-K	SUB-BASIN K15	1.65	2.99	6.59
16-K	SUB-BASIN K16	1.20	2.44	5.37
15-16-K	SUB-BASINS K15 & K16	2.85	5.79	12.76
17-K	SUB-BASIN K17	0.41	0.87	1.91
18-K	SUB-BASIN K18	1.90	3.54	7.80
15-18-K	SUB-BASINS K15 & K18	5.17	10.49	23.11
19-K	SUB-BASIN K19	0.93	1.82	4.02
20-K	SUB-BASIN K20	2.78	5.35	11.79
19-20-K	SUB-BASINS K19 & K20	3.71	7.15	15.74
21-K	SUB-BASIN K21	0.44	0.93	2.04
22-K	SUB-BASIN K22	2.18	3.67	9.23
5-J	SUB-BASINS J1-J4, K19 & K20	12.87	21.48	48.30
6-J	SUB-BASINS J1-J4 & K15-K20	18.04	26.65	59.57
7-J	SUB-BASINS J1-J4 & K15-K22	20.66	30.05	67.92

REFERENCE DRAWINGS
X-886-PR-SITE - F6
X-886-PR-SITE - F3
X-886-PR SITE_F1
X-Title(Drainage)
X-886-PR SITE-F2
886-PR Legacy Drive-Roundabout
886-pr legacy drive

NO.	DATE	DESCRIPTION	BY

REVISIONS

NAME: S:\21.886.038 (Trails F6)\200 Drainage\201 Drainage Reports\FDR\DWG\DR-02.dwg
PCP: Matrix.ctb
PLOT DATE: Fri Aug 06, 2021 12:37pm

BENCHMARK DATA(ELEV.)
(DATUM)
(DESCRIPTION/LOCATION)

VERTICAL BENCHMARK:

BASIS OF BEARING:

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

Matrix
2435 Research Parkway, Suite 300 Colorado Springs, CO 80920
Phone 719-575-0100
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COLA, LLC.

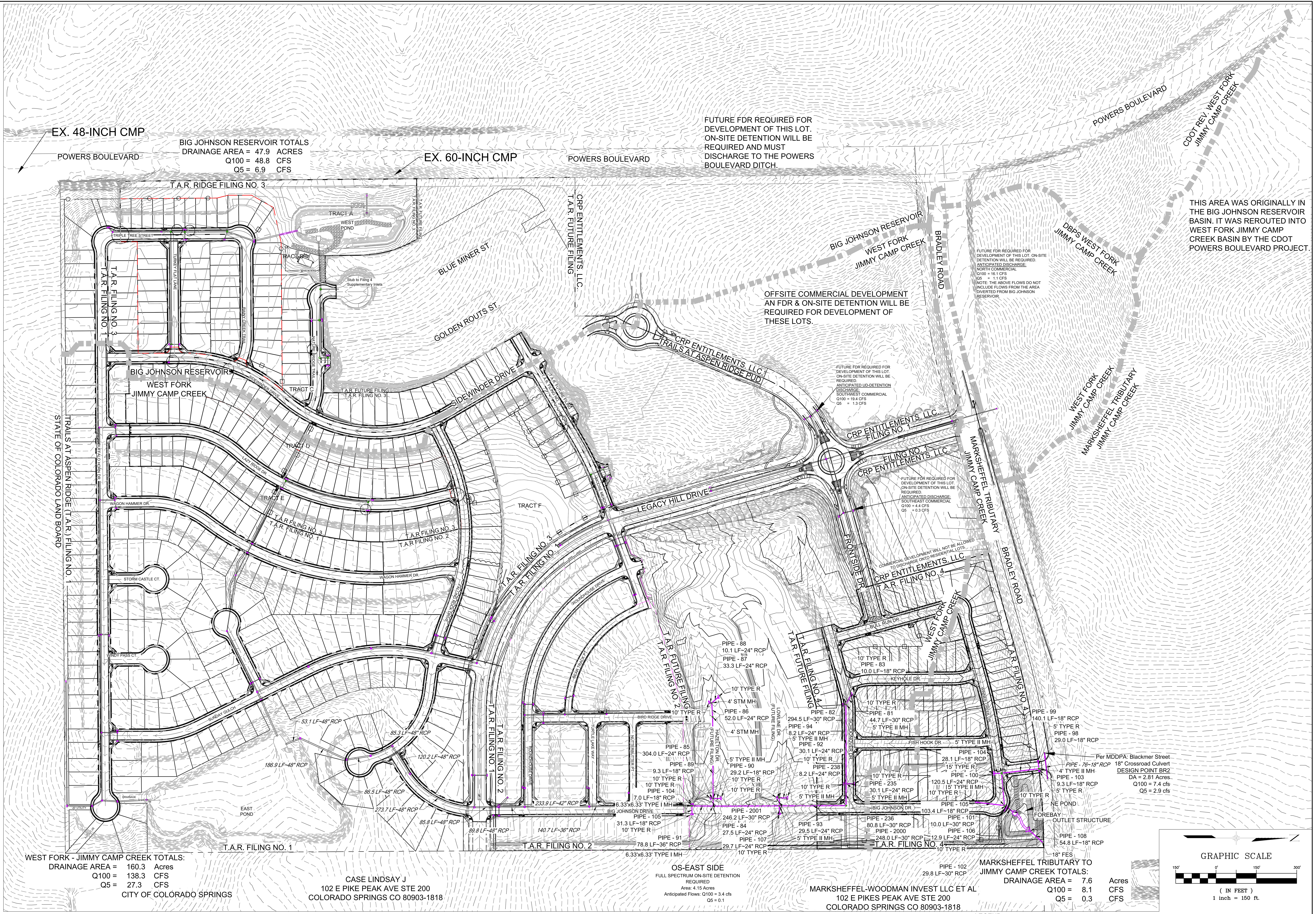
TRAILS AT ASPEN RIDGE FILING #4
FINAL DRAINAGE REPORT
SUB-BASIN & DESIGN POINT SUMMARY

DESIGNED BY: JTS
DRAWN BY: JTS
CHECKED BY:
SCALE
HORIZ:
VERT:
DATE ISSUED: AUGUST 2021
SHEET NO. 3 OF 5 SHEETS
DR-03

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

PIPE SUMMARY TABLE				
PIPE NAME	PIPE DESCRIPTION	PIPE SLOPE	PIPE LENGTH	CHORD LENGTH
PIPE - 81	30" RCP	1.00%	44.70	44.70
PIPE - 82	30" RCP	1.00%	294.47	294.47
PIPE - 83	18" RCP	0.98%	9.99	9.99
PIPE - 84	24" RCP	2.00%	27.54	27.54
PIPE - 85	24" RCP	1.67%	303.98	303.98
PIPE - 86	24" RCP	2.00%	52.01	52.01
PIPE - 87	24" RCP	1.00%	33.27	33.27
PIPE - 88	24" RCP	0.99%	10.05	10.05
PIPE - 89	18" RCP	4.99%	9.26	9.26
PIPE - 90	18" RCP	4.97%	29.17	29.17
PIPE - 91	36" RCP	2.83%	78.84	78.84
PIPE - 92	24" RCP	1.00%	30.14	30.14
PIPE - 93	24" RCP	1.88%	29.46	29.46
PIPE - 94	24" RCP	1.06%	8.17	8.17
PIPE - 104	18" RCP	2.00%	7.01	7.01
PIPE - 105	18" RCP	0.99%	31.32	31.32
PIPE - 107	24" RCP	0.97%	29.72	29.72
PIPE - 235	24" RCP	4.08%	30.14	30.14
PIPE - 236	30" RCP	1.00%	80.81	80.81
PIPE - 238	24" RCP	3.71%	8.20	8.20
PIPE - 2000	30" RCP	3.21%	248.03	248.03
PIPE - 2001	30" RCP	3.90%	246.18	246.18

PIPE SUMMARY TABLE				
PIPE NAME	PIPE DESCRIPTION	PIPE SLOPE	PIPE LENGTH	CHORD LENGTH
PIPE - 98	18" RCP	0.50%	29.04	29.04
PIPE - 99	18" RCP	0.50%	140.10	140.10
PIPE - 100	24" RCP	0.66%	120.47	120.47
PIPE - 101	30" RCP	0.50%	10.03	10.03
PIPE - 102	30" RCP	3.44%	29.75	29.75
PIPE - 103	18" RCP	0.49%	9.31	9.31
PIPE - 104	18" RCP	3.91%	28.13	28.13
PIPE - 105	18" RCP	0.50%	103.39	103.39
PIPE - 106	24" RCP	5.78%	12.85	12.85
PIPE - 108	18" RCP	0.49%	54.77	54.77



LEGEND

DBPS BASIN BOUNDARY

EXISTING CONTOURS

PROPOSED CONTOURS

NOTE:
1. STORM SEWER ON FUTURE ROADS HAZELTON DRIVE AND LOWLINE DRIVE WILL BE INSTALLED IN A LATER FILING. STORM SEWER WILL BE STUBBED OUT AS APPROPRIATE TO ALLOW FUTURE TIE-INS.

REFERENCE DRAWINGS
X-886-PR-SITE - F4
X-886-PR SITE - F3
X-886-PR SITE_F1
X-Title(Drainage)
X-886-PR SITE-F2
886-PR Legacy Drive-Roundabout
886-pr legacy drive

NO.	DATE	DESCRIPTION	BY

REVISIONS

NAME: S:\21.886.038 (Trails F6)\200 Drainage\201 Drainage Reports\FDR\DWG\DR-02.dwg
PCP: Matrix.ctb
PLOT DATE: Thu Aug 26, 2021 11:19am

BENCHMARK DATA(ELEV.)
(DATUM)
(DESCRIPTION/LOCATION)

VERTICAL BENCHMARK:

BASIS OF BEARING:

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

Matrix
2435 Research Parkway, Suite 300 Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

COLA, LLC.

TRAILS AT ASPEN RIDGE FILING #4

FINAL DRAINAGE REPORT
STORM SEWER MAP & SUMMARY

DESIGNED BY: JTS
DRAWN BY: JTS
CHECKED BY:
SCALE: HORIZ: VERT:
DATE ISSUED: AUGUST 2021
SHEET NO. 4 OF 5 SHEETS
DR-04

PLEASE SEE SHEET DR-03 FOR SUB-BASIN AND DESIGN POINT SUMMARIES.

GRAPHIC SCALE

60' 0' 60' 120'

(IN FEET)
1 inch = 60 ft.

LEGEND

BASINS DRAINING TOWARDS NORTHEAST POND

BASINS DRAINING TOWARDS EAST POND

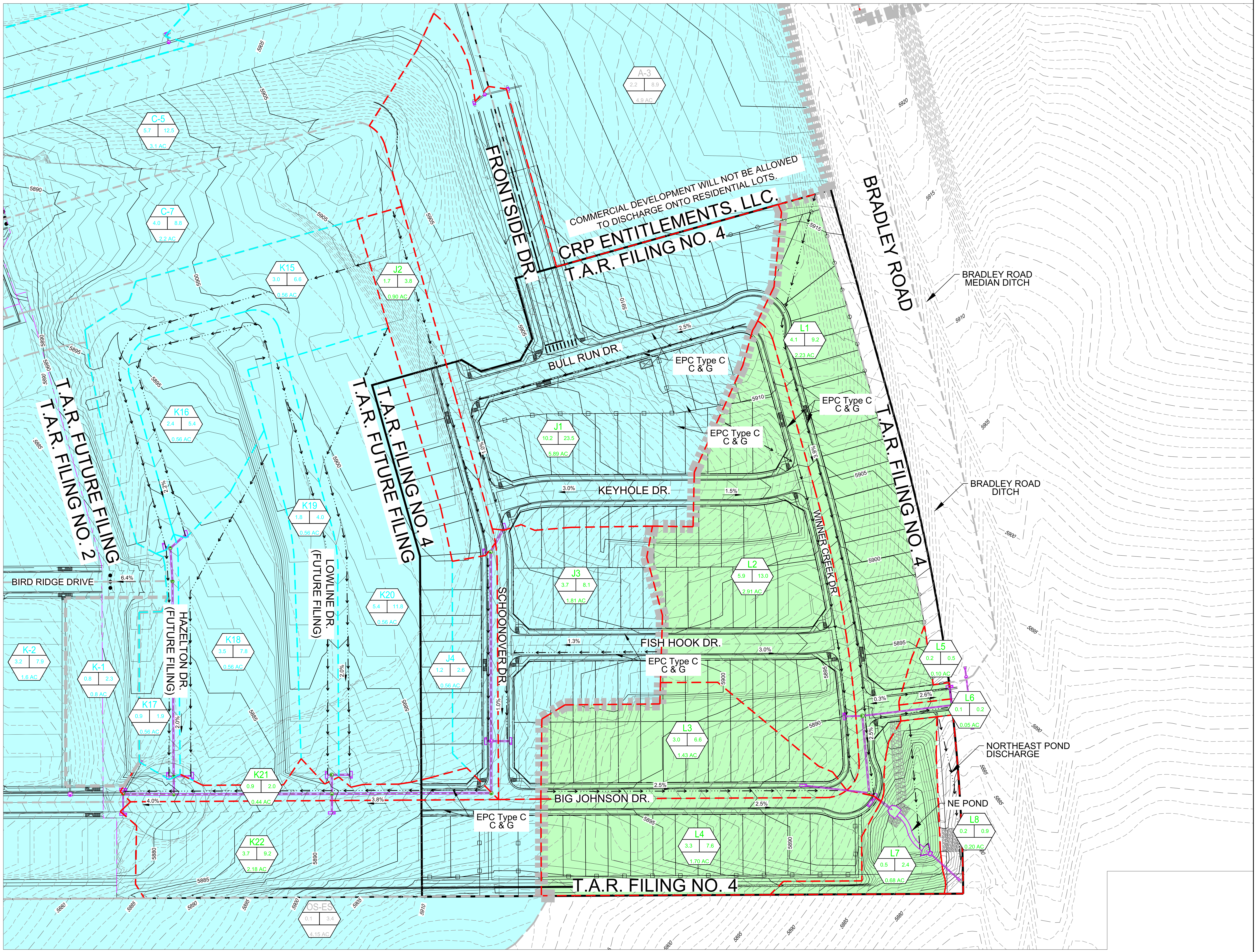
FILING #4 | PREV. FILING | FUT. FILING

BASIN IDENTIFICATION — BASIN
BASIN FLOWS — Q5 Q100
BASIN AREA — AREA
BASIN BOUNDARY

EXISTING CONTOURS 5975

PROPOSED CONTOURS 7050

NOTES:
1. INLETS AND MANHOLES BETWEEN FILING NO. 4 AND FILING NO. 2 WHICH ARE NOT ON THE BIG JOHNSON STORM MAIN WILL NOT BE INSTALLED AS PART OF THIS FILING. STORM PIPES WILL BE STUBBED OUT FROM THE MAIN AND PLUGGED UNTIL THE FUTURE FILING IS CONSTRUCTED.
2. ALL STORM SEWER SHALL BE PUBLICLY OWNED AND MAINTAINED.
3. THE DETENTION PONDS AND INTERNAL STRUCTURES WILL BE PRIVATELY OWNED AND MAINTAINED BY THE WATERVIEW II METRO DIST.
4. SEE SHEET DR-03 FOR SUB-BASIN AND DESIGN POINT SUMMARIES.



REFERENCE DRAWINGS
X-886-PR-SITE - F4
X-886-PR-SITE - F3
X-886-PR SITE_F1
X-Title(Drainage)
X-886-PR SITE-F2
886-PR Legacy Drive-Roundabout
886-pr legacy drive

NO.	DATE	DESCRIPTION	BY

REVISIONS

NAME: S:\21.886.038 (Trails F6)\200 Drainage\201 Drainage Reports\FDR\DWG\DR-05.dwg
PCP: Matrix.ctb
PLOT DATE: Thu Aug 26, 2021 11:24am

BENCHMARK DATA(ELEV.) ____
(DATUM) ____
(DESCRIPTION/LOCATION) ____

VERTICAL BENCHMARK:

BASIS OF BEARING:

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

Matrix
2435 Research Parkway, Suite 300 Colorado Springs, CO 80920
Phone 719-575-0100
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COLA, LLC.

TRAILS AT ASPEN RIDGE FILING #4
FINAL DRAINAGE REPORT
OVERVIEW MAP

DESIGNED BY: JTS
DRAWN BY: JTS
CHECKED BY:

SCALE
HORIZ:
VERT:

DATE ISSUED: AUGUST 2021

SHEET NO. 5 OF 5 SHEETS

DR-05