

RESERVE AT HOCKETT GULCH – PHASE 2

DRAINAGE REPORT TOWN OF EAGLE, CO

Martin/Martin, Inc. Project No.: 23.1012

November 1, 2024



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I. INTRODUCTION

A. SITE DESCRIPTION

The proposed Phase 2 development for the Reserve at Hockett Gulch is located just south of U.S. Highway 6 and west of Sylvan Lake Road in the Town of Eagle, Colorado. See Figure 1 below for a vicinity map.



Figure 1: Vicinity Map

The Phase 2 development includes Lot 2 (6.93 acres) and Lot 3 (5.96 acres) for a combined total area of 12.89 acres, shown approximately in the red phase 2 outline above. The project consists of the construction of several multi-family buildings, townhomes, and a clubhouse.

The following have already been constructed as part of Phase 1:

- Lot 1 (Buildings are still being finished but site improvements are fully constructed.)
- Four detention ponds along the northern perimeter of the site
- Storm inlets and pipes that Phase 2 will tie into
- Box culvert under Mt. Powell Road



- Berm south of Lot 2 that diverts offsite flows from Basin OS-H2 away from the site and towards Hockett Gulch.

Hockett Gulch conveys stormwater through the site from an undeveloped tributary offsite basin south of the site with an area of approximately 2.1 square miles. Flow within Hockett Gulch exits the site through the existing box culvert constructed in Phase 1 and then through a second box culvert under U.S. Hwy. 6, where it then appears to be conveyed to Brush Creek and eventually to Eagle River.

Some tributary offsite areas south of the site (i.e. Basin OS-4A) will be conveyed to the northwest corner of the site to an existing 15" CMP culvert that runs underneath U.S. Hwy. 6. This drainage scheme complies with historic drainage patterns and recommendations from the Geotechnical consultant (WJE).

The Phase 2 project generally drains to the north where stormwater is detained in the existing detention ponds previously constructed in Phase 1 and then released via the pond outlet structures. From the ponds, it appears flow then drains to Brush Creek and eventually to Eagle River.

According to the NRCS Web Soil Survey, the site consists of Hydrologic Soil Group B soils, indicating a moderate infiltration rate.

According to FEMA FIRMette mapping for the site which shows portions of FIRM map numbers 08037C0388D and 08037C0389D, the site is within an area of minimal flood hazard designated as Zone X.

B. ALPINE DRAINAGE REPORT

This report references the previous drainage report prepared by Alpine Engineering Inc., dated August 2021 (hereafter referred to as the "Alpine report"). The Alpine report designed master drainage facilities for the site which included:

- Sizing Hockett Gulch and the box culvert under Mt. Powell Road to adequately convey 100-year flows from the 2.1 square mile tributary area.
- Designing four detention ponds to provide water quality and 25-year and 100-year detention for the anticipated development within Lots 1-3.
- Designing storm inlets and pipes to receive flow from the anticipated development within Lots 2 and 3.
- Designing a berm south of Lot 2 to divert offsite flows from basin OS-H2 away from the site and towards Hockett Gulch.



II. EXISTING DRAINAGE

A. EXISTING DRAINAGE BASINS

Alpine's developed drainage plan divided the site into Basins 1-4 for the anticipated development within Lots 1-3. Refer to Appendix A for Alpine's developed drainage map.

- Basin 1 is 4.4 acres and was assigned a curve number of 82. The basin consists mostly of Lot 1 and a section of Lot 2. Runoff from this basin drains to Pond 1.
- Basin 2 is 9.3 acres and was assigned a curve number of 87. The basin consists mostly of Lot 1 and a section of Lot 2. Runoff from this basin drains to Pond 2.
- Basin 3 is 5.2 acres and was assigned a curve number of 87. The basin consists mostly of Lot 2. Runoff from this basin drains to Pond 3.
- Basin 4 is 6.5 acres and was assigned a curve number of 82. The basin consists mostly of Lot 3. Runoff from this basin drains to Pond 4.

The proposed drainage plan presented in this report aims to closely maintain the area and imperviousness of Alpine's developed Basins 1-4 to prevent impacts to the existing detention ponds.

B. EXISTING DETENTION PONDS

It is our understanding that the existing detention ponds designed by Alpine were sized to provide water quality capture volume (WQCV) and to attenuate the 25-year and 100-year developed flows from the site. The outlet structures for Ponds 2 and 3 consist of a riser box with a 2" diameter orifice and an 18" outlet pipe. The outlet structure for Pond 4 differs from the other ponds only in that it has a 4" orifice. Refer to Alpine's report for details on the detention pond designs.

The Owner is coordinating with Alpine Engineering and the Contractor to conduct an as-built survey of the ponds and remedy any deficiencies found. Alpine Engineering is in the process of providing stamped letters verifying the ponds have been built in accordance with their approved construction documents. This report assumes that the detention ponds will be built per Alpine's design.

Figure 2 on the next page is a table excerpt from Alpine's report providing a summary of the historic and developed flows into and out of the ponds as well as 100-year water surface elevations.



<i>HISTORIC vs. DEVELOPED INTO AND OUT OF PONDS (HYDRAFLOW)</i>							
<i>STUDY POINT</i>	<i>HISTORIC</i>		<i>DEVELOPED INTO POND</i>		<i>DEVELOPED OUT OF POND</i>		<i>POND 100 YEAR WATER SURFACE ELEVATION (WSE)</i>
	<i>25 YEAR (cfs)</i>	<i>100 YEAR (cfs)</i>	<i>25 YEAR (cfs)</i>	<i>100 YEAR (cfs)</i>	<i>25 YEAR (cfs)</i>	<i>100 YEAR (cfs)</i>	
<i>BASIN 1</i>	0.1	0.9	3.4	5.0	0.1	0.4	6556.03
<i>BASIN 2</i>	0.2	1.4	10.6	14.4	0.2	1.1	6555.11
<i>BASIN 3</i>	0.2	0.8	6.8	9.2	0.1	0.2	6556.60
<i>BASIN 4</i>	1.4	4.2	7.4	10.3	0.6	2.3	6554.66
<i>TOTAL</i>	1.9	7.3	27.5	38.2	1.1	3.8	

Figure 2: Table A Excerpt from Alpine's 08/2021 report

Flow released from Pond 1 outfalls into the Sylvan Lake Road ditch and then appears to be conveyed to Brush Creek. Flow released from Ponds 2 and 3 outfalls into the U.S. Hwy 6 roadside ditch and then appears to be conveyed to Brush Creek. Flow released from Pond 4 outfalls into Hockett Gulch where it is then conveyed through an existing box culvert underneath U.S. Hwy 6. Flows released from the above noted ponds appear to ultimately make their way to the Eagle River. Refer to the Alpine report for more information on downstream conveyance of the pond outfalls.

C. EXISTING OFFSITE DRAINAGE

As shown on Alpine's Developed Drainage Map, there is a 3.9-acre offsite basin that is tributary to Lot 2/Basin 3, and there is a 9.5-acre offsite basin that is tributary to Lot 3/Basin 4.

The 3.9-acre offsite basin was not labeled with a particular identifier in the Alpine report; therefore, it will be referred to as Basin OS-H2 herein. It is our understanding that Alpine designed a berm to divert offsite flows from Basin OS-H2 to Hockett Gulch and that the berm has already been constructed with Phase 1. Therefore, it is not anticipated that anything more needs to be done with Phase II to address offsite flows from Basin OS-H2.

Flows from the 9.5-acre offsite basin do not appear to have been addressed with Phase 1 and will need to be addressed with Phase 2. To preface the analysis of the 9.5-acre offsite basin, a report prepared by WJE titled "Proposed Phase II – Debris Flow Analysis and Potential



Mitigation”, dated July 26, 2019 (Hereafter referred to as the “WJE-Phase II report”) was used to determine offsite tributary areas south of the site that pose the potential for landslides. “Basin 2” from the WJE-Phase II report was identified as an area within the 9.5-acre offsite basin that is prone to landslide risk. Therefore, the 9.5-acre basin was subdivided in this report into Basins OS-H1 and OS-4A. OS-H1 represents “Basin 2” from the WJE-Phase II report and Basin OS-4A represents the area just to the north of “Basin 2” that is tributary to the site but does not pose landslide risks according to WJE. Per the WJE-Phase II report:

“Basin 2 could be diverted to the Hockett Gulch channel. Runoff from steep slopes bordering steep slopes north of Basin 2 could be diverted to the northwest corner of the property and/or to the existing box culvert under US 6.”

Therefore, Basin OS-H1 will be routed to Hockett Gulch and flow from Basin OS-4A will be diverted to the northwest corner of the property to an existing 15” CMP culvert that runs underneath U.S. Hwy 6. Refer to Section III.D. for more detailed information on the proposed drainage design for handling the offsite flows from Basins OS-4A and OS-H1.

III. PROPOSED DRAINAGE

A. PROPOSED DRAINAGE BASINS

As previously noted, the proposed drainage basins generally match Alpine’s developed Basins 1-4. Refer to Appendix A for the proposed drainage plan.

- Basin 1 remains unchanged with an area of 4.4 acres and a curve number of 82. Runoff continues to drain to Pond 1.
- Proposed Basin P-2 is 9.44 acres with a curve number of 87. Runoff generally flows overland in curb & gutter before being captured by inlets and routed northerly via storm pipes to Pond 2.
- Proposed Basin P-3 is 5.04 acres with a curve number of 89. Runoff generally flows overland in curb & gutter before being captured by inlets and routed northerly via storm pipes to Pond 3.
- Proposed Basin P-4 is 6.05 acres with a curve number of 86. Runoff generally flows overland in curb & gutter before being captured by inlets and routed northerly via storm pipes to Pond 4. It should be noted that offsite flow from Basin OS-4A is conveyed through Basin 4.10a, where it is then diverted via a 10” HDPE bypass pipe in Inlet 4.10a before ultimately discharging into the roadside swale at the northwest corner of the site. Refer to Section III.D for more detailed information on offsite drainage.

Proposed Basins P-2, P-3, and P-4 were further subdivided into several sub-basins for each of the proposed inlets to supplement the storm network hydraulic analysis. Refer to the proposed drainage plan in the Appendix for the sub-basin delineations, including areas and runoff coefficients.



The table below shows a comparison between the existing basins (i.e. Alpine's developed basins) and the proposed basins.

BASIN		AREA (AC)		CURVE NUMBER (CN)		TIME OF CONCENTRATION (MIN)	
EXISTING (Per Alpine's Developed Basins)	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
1	1 (Remains unchanged)	4.4	4.4	82	82	15.1	15.1
2	P-2	9.3	9.44	87	87	14.8	10
3	P-3	5.2	5.04	87	89	12.8	10
4	P-4	6.5	6.05	82	86	10	10

Table 1: Existing vs. Proposed Basin Properties

B. IMPACTS TO EXISTING DETENTION PONDS

Existing detention ponds 2-4 were analyzed to determine impacts resulting from the proposed Phase 2 development. Pond 1 was not analyzed due to no proposed change to Basin 1.

As stated previously, Alpine Engineering is in the process of providing stamped letters verifying the ponds have been built in accordance with their approved construction documents. This report assumes that the detention ponds will be built per Alpine's design.

Below is a summary table of the proposed flow rates into and out of the ponds:

BASIN	HISTORIC PEAK FLOW (PER ALPINE REPORT)		POND 100-YEAR WSEL (PER ALPINE REPORT)	PROPOSED PEAK FLOW OUT OF POND		PROPOSED POND 100-YEAR WSEL
	25-YEAR (CFS)	100-YEAR (CFS)		25-YEAR (CFS)	100-YEAR (CFS)	
2	0.2	1.4	6555.11	0.17	0.96	6555.09
3	0.2	0.8	6555.60	0.13	0.16	6555.57
4	1.4	4.2	6554.66	0.53	1.21	6554.57

Table 2: Historic vs. Proposed Flows Out of Ponds & Pond WSELs



Per Table 2 on the previous page, the proposed peak flow rates out of ponds 2-4 all remain below the historic rates. Ponds 2-4 also have sufficient volume to detain the 25-year and 100-year flows from the Phase 2 development given that the proposed 100-year WSELs are less than Alpine's 100-year WSELs.

C. IMPACTS TO EXISTING STORM PIPES AND INLETS

The hydraulic analysis conducted for this project evaluated both the existing and proposed storm sewers. The results of the hydraulic analysis indicate that several of the existing 18" HDPE pipes and inlets installed with Phase 1 may be undersized where the proposed Phase 2 system will tie into the Phase 1 system. It appears the HGL overtops several inlets which may cause significant ponding in some areas within Mt. Powell Road during the 100-year storm event. Per the Town's stormwater drainage criteria, it is understood that overtopping of flows during the 100-year event is allowed if the drainage system integrity is maintained. Therefore, while ponding may occur, it is anticipated that the existing elevations of curb and gutter and/or nearest overflow path allow for the release of the ponded stormwater without inundating the buildings. The overflow paths have been indicated on the drainage plans. At a minimum, the existing 18" HDPE outfall pipes into Ponds 2 and 3 will need to be upsized to 24" HDPE pipes. This will be necessary to mitigate the level of ponding in Mt. Powell Road and prevent stormwater from overflowing from one major basin to another which would consequently impact the detention ponds. The replacement of the 18" HDPE outfall pipes into Ponds 2 and 3 with 24" HDPE pipes are shown on the Construction Documents.

D. OFFSITE DRAINAGE CONVEYANCE

As described previously, it is our understanding that offsite flow from Basin OS-H2 has already been addressed by Alpine with a berm south of Lot 2 that diverts offsite flow towards Hockett Gulch.

Basin OS-4A:

Offsite flow from Basin OS-4A is tributary to Basin 4.10a and will be conveyed in a proposed swale to a proposed Type D inlet (Inlet 4.10a). Flow will then be diverted through a proposed 10" HDPE pipe that outfalls into an existing swale at the northwest corner of the site. Offsite flow from Basin OS-4A will finally be discharged from the site through an existing 15" CMP culvert that runs underneath U.S. Hwy 6. This drainage scheme complies with historic drainage patterns and with recommendations from the WJE-Phase II report.

The invert of the proposed 10" HDPE bypass pipe that connects to proposed Inlet 4.10a has been set to the 100-year HGL elevation in Inlet 4.10a when no flow from Basin OS-4A is routed into the inlet. This ensures that excess offsite flow from Basin OS-4A will be diverted through the 10" HDPE pipe. The 10" HDPE pipe has been sized to convey the peak 100-year flow from Basin OS-4A (2.63 cfs).



The peak 100-year flow for Basin OS-4A was calculated with WinTR-55 software utilizing an NRCS 24-hour hydrograph with a Type II storm distribution. This flow calculation method complies with recommendations from the WJE-Phase II report.

Basin OS-H1:

Offsite flow from Basin OS-H1 is tributary to Basin H1 and will be conveyed in a proposed swale to a proposed Type D Inlet (Inlet H1). Flow will then be conveyed through a proposed 18" HDPE pipe which ultimately outfalls into Hockett Gulch. This drainage scheme complies with historic drainage patterns and with recommendations from the WJE-Phase II report.

The Type D inlet (Inlet H1) and 18" HDPE outfall pipe have been adequately sized to capture and convey the 100-year peak flows from Basins OS-H1 (13.68 cfs - Bulking factor applied) and H1 (0.54 cfs). The peak 100-year flow for Basin OS-H1 was calculated with WinTR-55 software utilizing an NRCS 24-hour hydrograph with a Type II storm distribution. A bulking factor of 2.5 was applied to the peak 100-year flow output from WinTR-55 given the landslide risk associated with Basin OS-H1. This flow calculation method complies with the recommendations from the WJE-Phase II report.

IV. DRAINAGE DESIGN CRITERIA

A. DRAINAGE CRITERIA MANUAL REFERENCES

The following criteria manuals were incorporated into the drainage analysis:

- Urban Storm Drainage Criteria Manual: Volumes 1-3, prepared by the Mile High Flood District (MHFD), latest editions. (Hereafter referred to as the "District Manual").
- Town of Eagle Public Works Manual, dated January 2018. (Hereafter referred to as the "PW Manual").

B. MINOR AND MAJOR EVENT CLASSIFICATION

Per the PW Manual, the 25-year storm was classified as the minor storm event and the 100-year storm was classified as the major storm event.

C. RAINFALL CRITERIA

To remain consistent with Alpine's report, rainfall intensities for use with the Rational Method were obtained from the intensity-duration frequency (IDF) rainfall data in the PW Manual. NOAA Atlas 14 rainfall intensities were not utilized. Refer to Appendix B for the Town's IDF rainfall data and the NOAA Atlas rainfall intensity table specific to the site.

A comparison between the IDF rainfall data in the PW Manual and NOAA Atlas 14 shows that NOAA Atlas 14 rainfall intensities are greater than the Town's rainfall data. This discrepancy has been discussed with the Town Engineer, and it was decided to proceed with the rainfall data in the PW manual to remain consistent with Alpine's report. To mitigate the risk associated with



this discrepancy in rainfall intensities, overflow paths have been provided to allow for the release of ponded stormwater without inundating the buildings.

24-hour 25-year and 100-year precipitation depths from NOAA Atlas 14 were utilized for the NRCS hydrograph routing calculations associated with the analysis of the ponds. This is consistent with Alpine's analysis.

NOAA Atlas 14 24-hour precipitation depths were also utilized for calculating the peak 25-year and 100-year flows from the offsite basins. This complies with recommendations from the WJE-Phase II Report.

D. RUNOFF CRITERIA

The Rational Method was utilized for calculating 25-year and 100-year peak flows for sizing storm inlets and pipes and determining street drainage capacities. Runoff coefficients for hydrologic soil group B soils were utilized per the District Manual. Time of concentrations were calculated in accordance with the District Manual. As stated previously, rainfall intensities were obtained from the IDF rainfall data in the PW Manual.

E. STREET, INLET, AND STORM PIPE DRAINAGE CRITERIA

Streets were designed to convey the 25-year and 100-year flows without overtopping the curb.

Inlets were sized to capture 100-year flows such that the resulting ponding depths remain at least 1 foot below adjacent building finished floor elevations. Furthermore, the inlets were sized such that overflow does not occur from one major basin to another during the 100-year storm event.

Street and inlet capacities were calculated using the MHFD-Inlet Excel workbook, version 5.03. Nyloplast inlet capacities were calculated using an inlet capacity calculator provided by the manufacturer (i.e. Advanced Drainage Systems). Inlet capacities for on-grade Type 13 valley inlets were calculated utilizing FlowMaster software.

Storm pipes were sized to convey the 25-year flows without the HGL overtopping finished grade. The pipes were also generally sized to convey 100-year flows without the HGL overtopping finished grade; however, as stated in Sections III.C. this is not possible in some instances due to the existing undersized pipes that Phase 2 is tying into.

The storm network hydraulic analysis was conducted utilizing StormCAD software with a gradually varied flow rational solver.

F. DETENTION POND CRITERIA

The detention ponds were analyzed in the Hydraflow Hydrographs Extension for Autodesk Civil3D. NRCS hydrograph routing for 24-hour rainfall events was used in the Hydraflow analysis. As stated previously, 24-hour precipitation depths for the 25-year and 100-year events were



obtained from NOAA Atlas 14. Curve numbers and time of concentrations were determined using WinTR-55 software. A Type II storm distribution was utilized in the analysis.

Refer to Section III.C. for additional information on assumed as-built conditions and allowable release rates.

V. INSPECTION AND MAINTENANCE OF HOCKETT GULCH AND STORMWATER FACILITIES INTERCEPTING OFFSITE FLOWS

A. INSPECTION PROCEDURES

Routine inspection of Hockett Gulch and the proposed stormwater facilities intercepting offsite flows will be important given the potential for landslides and debris flow. It is critical that these stormwater facilities be maintained and that they function as designed, otherwise, there could be adverse impacts in a debris flow event. The stormwater facilities shall be inspected after each rainfall event or at least once per month by a qualified individual. The appropriate inspection form shall be filled out as required by the Town of Eagle and shall be submitted to the town upon request. Safety measures shall be incorporated, and appropriate inspection equipment shall be utilized during inspection procedures.

Observe and note the following items at a minimum:

- Any accumulation of sediment, debris, and overgrown vegetation within Hockett Gulch and the swales receiving offsite flows (i.e. swales H1, OS-H2, and 4.10a).
- Any erosion of Hocket Gulch, the swales receiving offsite flows, and the embankment along the north border of Basin OS-H2.
- Any accumulation of sediment, trash, and debris on the grate and within the box of Inlets H1 and 4.10a.
- Any accumulation of sediment, trash, and debris within and just downstream of the 18" HDPE culvert that outfalls into Hockett Gulch, as well as the 10" HDPE storm bypass lateral that outfalls at the northwest corner of the site.

B. MAINTENANCE PROCEDURES

Proper maintenance shall be performed to address any issues found during inspections. It is recommended maintenance be performed after each rainfall event or least once per month to ensure Hocket Gulch and the proposed stormwater facilities intercepting offsite flows will function as designed in the event of a debris flow.

At a minimum, maintenance activities shall include:

- Routine sediment, trash, debris, and overgrown vegetation removal from the gulch, swales, inlets, and pipes.
- Erosion repair of the gulch, swales, and embankments when needed.
- Structural repair of the inlets and pipes when needed.



In the event of a disturbance to the upslope hillsides, either on or off property, the debris flow mitigation measures implemented within this design should be re-evaluated by an engineer.

VI. CONCLUSION

The proposed drainage plan for Phase 2 is to provide safe and efficient conveyance of flows through the property in compliance with previous studies. The proposed developed areas will drain through a system of gutters, inlets, and storm pipes to discharge points at the existing detention ponds. Detention Ponds 2-4 have been verified to provide sufficient 25-year and 100-year detention volumes for the Phase 2 development. Furthermore, the proposed release rates from the ponds remain below historic rates. Therefore, the proposed Phase 2 development for the Reserve at Hockett Gulch is not anticipated to impose adverse effects on the adjacent or downstream properties.

REFERENCES

- “PUD Plan Drainage Report for The Reserve at Hockett Gulch,” prepared by Alpine Engineering Inc., dated August 2021.
- Urban Storm Drainage Criteria Manual: Volumes 1-3, prepared by the Mile High Flood District (MHFD), latest editions.
- Town of Eagle Public Works Manual, dated January 2018.
- “Final Hydraulic Report, US 6 over the Brush Creek, US 6 over Hockett Gulch, Eagle, Colorado,” prepared by AMEC, dated September 2014.
- “The Reserve at Hockett Gulch, Phase III – Debris Flow Analysis and Potential Mitigation,” prepared by WJE, dated October 22, 2021.
- “Estimation of the Flood Discharge from the Hockett Gulch Watershed,” prepared by WEST Consultants, dated August 2021.
- “Proposed Phase II – Debris Flow Analysis and Potential Mitigation,” prepared by WJE, dated July 26, 2019.

APPENDIX A

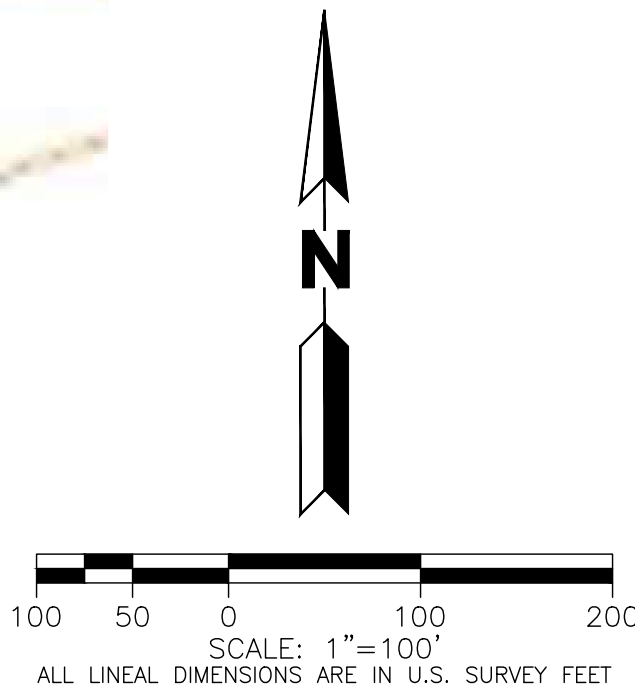
Proposed Drainage Plan & Alpine's Developed Drainage Map

PLOT DATE: Friday, November 1, 2024 3:12 PM LAST SAVED BY: MBONILLA
DRAWING LOCATION: J:\Civil\23-1012-Hockett Gulch\PLANS\EXHIBITS OVERALL DRAINAGE PLAN.dwg



NOTES:

1. SURVEYED SURFACE PROVIDED BY PEAK LAND CONSULTANTS, INC. ON NOVEMBER 30, 2023. THIS SURVEY IS INCOMPLETE FOR PREVIOUSLY CONSTRUCTED FEATURES.
2. ALPINE SURFACE PROVIDED BY ALPINE ENGINEERING, INC. CONSTRUCTION DRAWINGS, MOST RECENT EDITION [SEPTEMBER 2022]. THIS SURFACE REPRESENTS RECENT CONSTRUCTION FOR PHASE 1.
3. OFFSITE TOPOGRAPHY SOUTH AND WEST OF THE SITE OBTAINED FROM USGS ONLINE MAPPING.



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LEGEND

BASIN BOUNDARY [thick dashed line]

SUB-BASIN BOUNDARY [thin dashed line]

DIRECTION OF FLOW [arrow]

DESIGN POINT [triangle with number]

BASIN [circle with 'B' and area]

WEIGHTED CURVE NUMBER [circle with number]

AREA IN ACRES [circle with number]

SURVEYED SURFACE CONTOURS [dashed line] 5750
SEE NOTE 1.

ALPINE SURFACE CONTOURS [solid line] 5750
SEE NOTE 2.

PROPOSED SURFACE CONTOURS [solid line] 5750

RESERVE AT
HOCKETT GULCH
PHASE 2
PROPOSED OVERALL DRAINAGE PLAN

No.	Issue / Revision	Date	Name

Job Number	23.1012
Project Manager	DV
Design By	MB
Drawn By	MB
Principal In Charge	ML

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PLOT DATE: Friday, November 1, 2024, 3:15 PM LAST SAVED BY: MBONILLA
DRAWING LOCATION: J:\Civ\231012-Hockett Gulch PLANS\EXHIBITS\PROPOSED DRAINAGE PLAN.dwg



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NOTES:

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- ALPINE SURFACE PROVIDED BY ALPINE ENGINEERING, INC. CONSTRUCTION DRAWINGS, MOST RECENT EDITION [SEPTEMBER 2022]. THIS SURFACE REPRESENTS RECENT CONSTRUCTION FOR PHASE 1.

RUNOFF SUMMARY							
BASIN	DESIGN POINT	AREA (ACRES)	% IMP.	C ₂₅	C ₁₀₀	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
2.1	2.1	0.80	87.7%	0.80	0.83	2.32	3.06
2.2	2.2	0.14	93.0%	0.83	0.86	0.42	0.55
2.3	2.3	0.35	97.2%	0.86	0.88	1.09	1.41
2.3a	2.3a	0.07	52.3%	0.58	0.67	0.15	0.21
2.3b	2.3b	0.13	42.6%	0.52	0.62	0.24	0.37
2.3c	2.3c	0.15	32.0%	0.45	0.57	0.24	0.40
2.3d	2.3d	0.14	71.1%	0.70	0.76	0.35	0.49
2.3f	2.3f	0.39	65.2%	0.66	0.73	0.93	1.31
2.4	2.4	0.56	81.3%	0.76	0.80	1.49	2.00
2.4a	2.4a	0.27	92.7%	0.83	0.86	0.81	1.06
2.4b	2.4b	0.15	78.3%	0.74	0.79	0.40	0.54
2.5a	2.5a	0.30	64.0%	0.65	0.72	0.71	1.00
2.5b	2.5b	0.13	69.7%	0.69	0.75	0.32	0.45
2.5c	2.5c	0.03	34.7%	0.47	0.59	0.05	0.08
2.6	2.6	0.06	62.3%	0.54	0.72	0.14	0.20
2.7	2.7	0.43	47.0%	0.55	0.64	0.85	1.27
2.8a	2.8a	0.22	78.0%	0.74	0.79	0.59	0.80
2.8b	2.8b	0.16	73.5%	0.71	0.77	0.41	0.56
2.9a	2.9a	0.97	81.4%	0.76	0.80	2.68	3.58
2.9b	2.9b	0.09	31.3%	0.45	0.57	0.15	0.24
2.9c	2.9c	0.09	34.7%	0.47	0.59	0.15	0.24
2.10	2.1	0.08	79.0%	0.75	0.79	0.22	0.29
2.11	2.11	0.06	75.3%	0.72	0.78	0.16	0.21
2.12	2.12	0.08	68.0%	0.68	0.74	0.20	0.27
2.0	2.0	3.59	37.5%	0.49	0.60	5.09	7.97
SITE COMPOSITE		9.44	60.0%	0.50	0.71	20.16	28.57

LEGEND

- BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- DIRECTION OF FLOW
- DESIGN POINT
- BASIN
- AREA IN ACRES
- SURVEYED SURFACE CONTOURS
SEE NOTE 1.
- ALPINE SURFACE CONTOURS
SEE NOTE 2.
- PROPOSED SURFACE CONTOURS

MARTIN/MARTIN
CONSULTING ENGINEERS
12499 WEST COLFAX AVENUE, LAKEWOOD, COLORADO 80215
303.431.6100 MARTINMARTIN.COM

RESERVE AT
HOCKETT GULCH
PHASE 2
LOT 2 - BASIN 2 DRAINAGE PLAN

No.	Issue / Revision	Date	Name

Job Number	23.1012
Project Manager	DV
Design By	MB
Drawn By	MB
Principal in Charge	ML

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Sheet Number:

D2

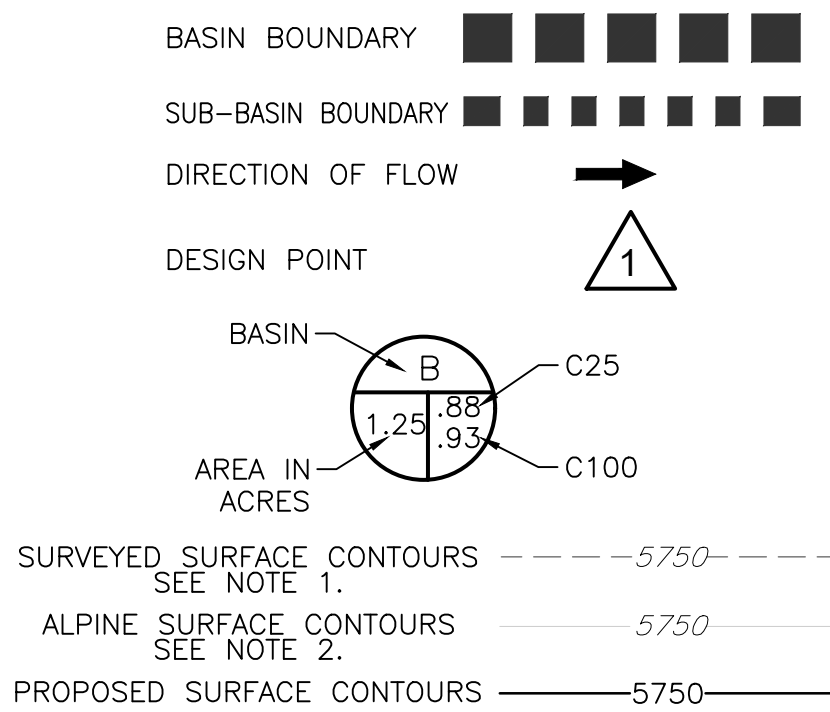
NOT FOR CONSTRUCTION

[illegible]

NOTES:

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2. ALPINE SURFACE PROVIDED BY ALPINE ENGINEERING, INC. CONSTRUCTION DRAWINGS, MOST RECENT EDITION [SEPTEMBER 2022]. THIS SURFACE REPRESENTS RECENT CONSTRUCTION FOR PHASE 1.

LEGEND



RESERVE AT HOCKETT GULCH PHASE 2 LOT 2 - BASIN 3 DRAINAGE PLAN

LOT 2 - BASIN 3 DRAINAGE PLAN

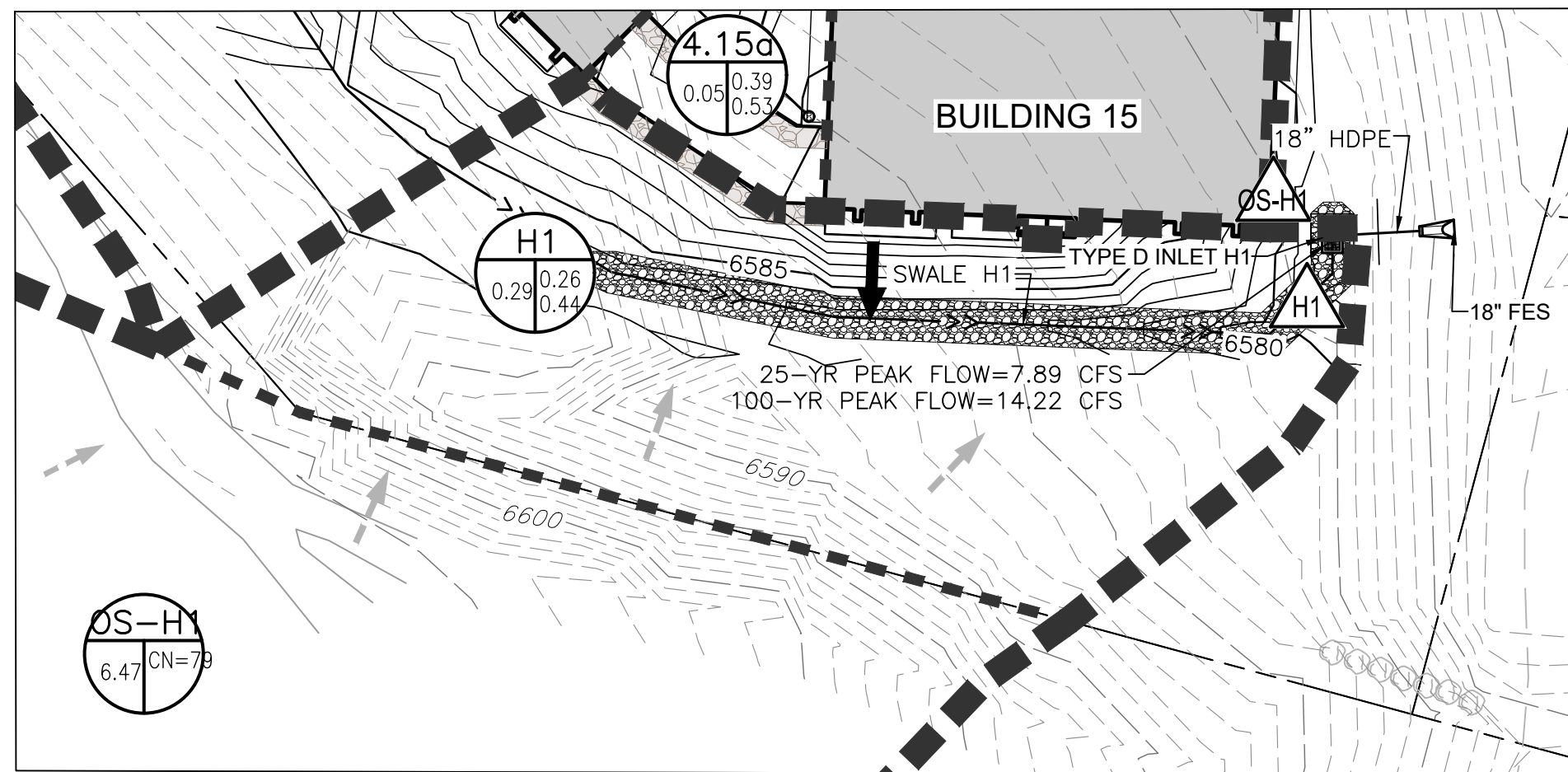
Job Number:	23.1012	No.	Issue / Revision	Date	Name
Project Manager	DV				
Design By	MB				
Drawn By	MB				
Principal In Charge	ML				
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Sheet Number:

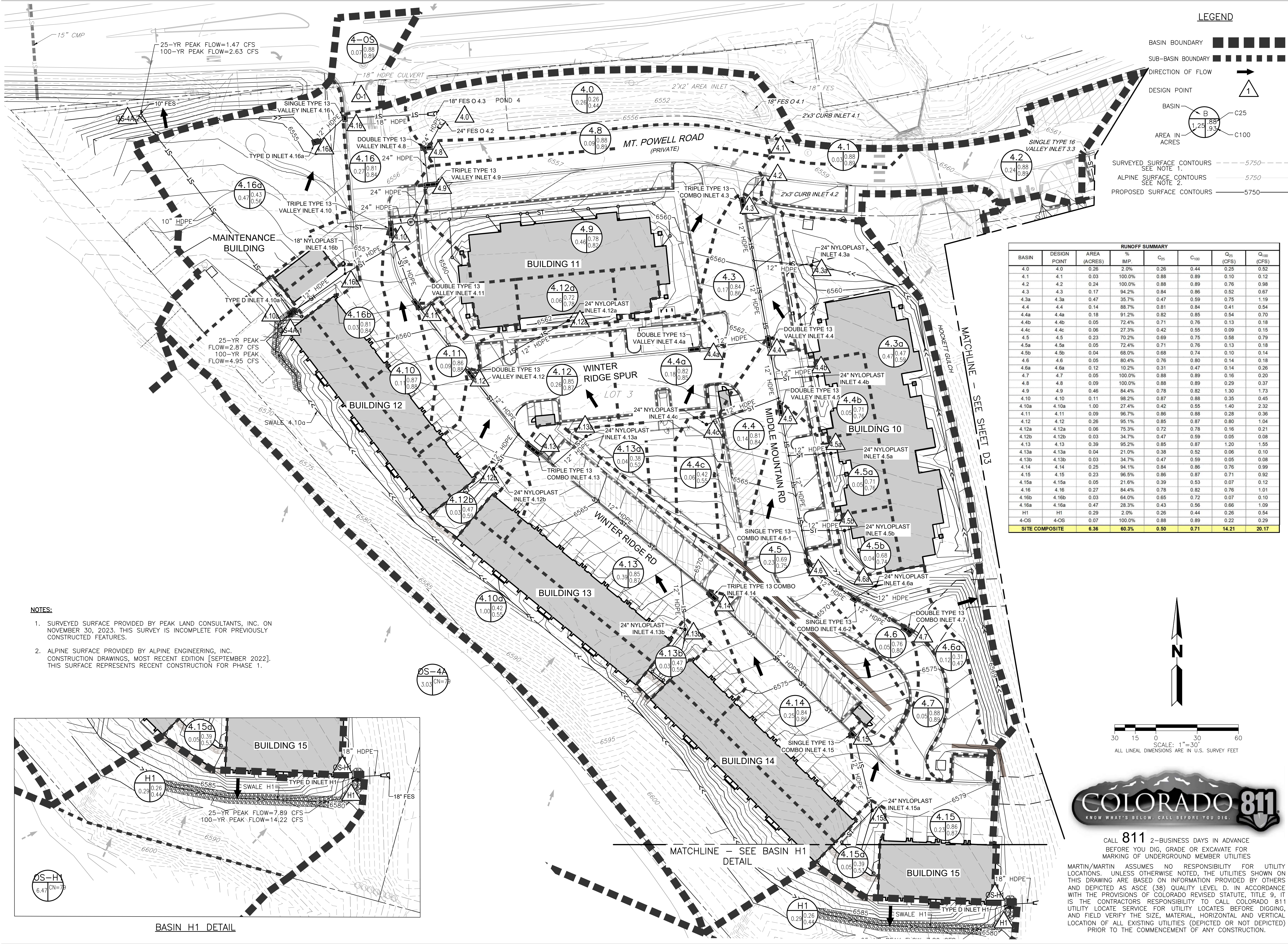
D3

NOTES:

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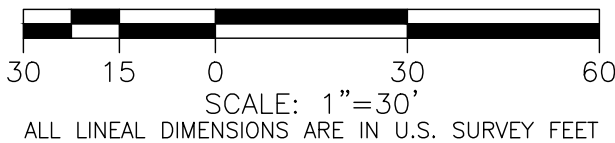
BASIN H1 DETAIL



LEGEND

- BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- DIRECTION OF FLOW
- BASIN
- AREA IN ACRES
- SURVEYED SURFACE CONTOURS SEE NOTE 1.
- ALPINE SURFACE CONTOURS SEE NOTE 2.
- PROPOSED SURFACE CONTOURS

RUNOFF SUMMARY									
BASIN	DESIGN POINT	AREA (ACRES)	% IMP.	C ₂₅	C ₁₀₀	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
4.0	4.0	0.26	2.0%	0.26	0.44	0.25	0.52		
4.1	4.1	0.03	100.0%	0.88	0.89	0.10	0.12		
4.2	4.2	0.24	100.0%	0.88	0.89	0.76	0.98		
4.3	4.3	0.17	94.2%	0.84	0.86	0.52	0.67		
4.3a	4.3a	0.47	35.7%	0.47	0.59	0.75	1.19		
4.4	4.4	0.14	88.7%	0.81	0.84	0.41	0.54		
4.4a	4.4a	0.18	91.2%	0.82	0.85	0.54	0.70		
4.4b	4.4b	0.05	72.4%	0.71	0.76	0.13	0.18		
4.4c	4.4c	0.06	27.3%	0.42	0.55	0.09	0.15		
4.5	4.5	0.23	70.2%	0.69	0.75	0.58	0.79		
4.5a	4.5a	0.05	72.4%	0.71	0.76	0.13	0.18		
4.5b	4.5b	0.04	68.0%	0.68	0.74	0.10	0.14		
4.6	4.6	0.05	80.4%	0.76	0.80	0.14	0.18		
4.6a	4.6a	0.12	10.2%	0.31	0.47	0.14	0.26		
4.7	4.7	0.05	100.0%	0.88	0.89	0.16	0.20		
4.8	4.8	0.09	100.0%	0.88	0.89	0.29	0.37		
4.9	4.9	0.46	84.4%	0.78	0.82	1.30	1.73		
4.10	4.10	0.11	98.2%	0.87	0.88	0.35	0.45		
4.10a	4.10a	1.00	27.4%	0.42	0.55	1.40	2.32		
4.11	4.11	0.09	96.7%	0.86	0.88	0.28	0.36		
4.12	4.12	0.26	95.1%	0.85	0.87	0.80	1.04		
4.12a	4.12a	0.06	75.3%	0.72	0.78	0.16	0.21		
4.12b	4.12b	0.03	34.7%	0.47	0.59	0.05	0.08		
4.13	4.13	0.39	95.2%	0.85	0.87	1.20	1.55		
4.13a	4.13a	0.04	21.0%	0.38	0.52	0.06	0.10		
4.13b	4.13b	0.03	34.7%	0.47	0.59	0.05	0.08		
4.14	4.14	0.25	94.1%	0.84	0.86	0.76	0.99		
4.15	4.15	0.23	96.5%	0.86	0.87	0.71	0.92		
4.15a	4.15a	0.05	21.6%	0.39	0.53	0.07	0.12		
4.16	4.16	0.27	84.4%	0.78	0.82	0.76	1.01		
4.16b	4.16b	0.03	64.0%	0.65	0.72	0.07	0.10		
4.16a	4.16a	0.47	28.3%	0.43	0.56	0.66	1.09		
H1	H1	0.29	2.0%	0.26	0.44	0.26	0.54		
4-OS	4-OS	0.07	100.0%	0.88	0.89	0.22	0.29		
SITE COMPOSITE		6.36	60.3%	0.50	0.71	14.21	20.17		



CALL 811 2-BUSINESS DAYS IN ADVANCE
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RESERVE AT
HOCKETT GULCH

PHASE 2

LOT 3 DRAINAGE PLAN

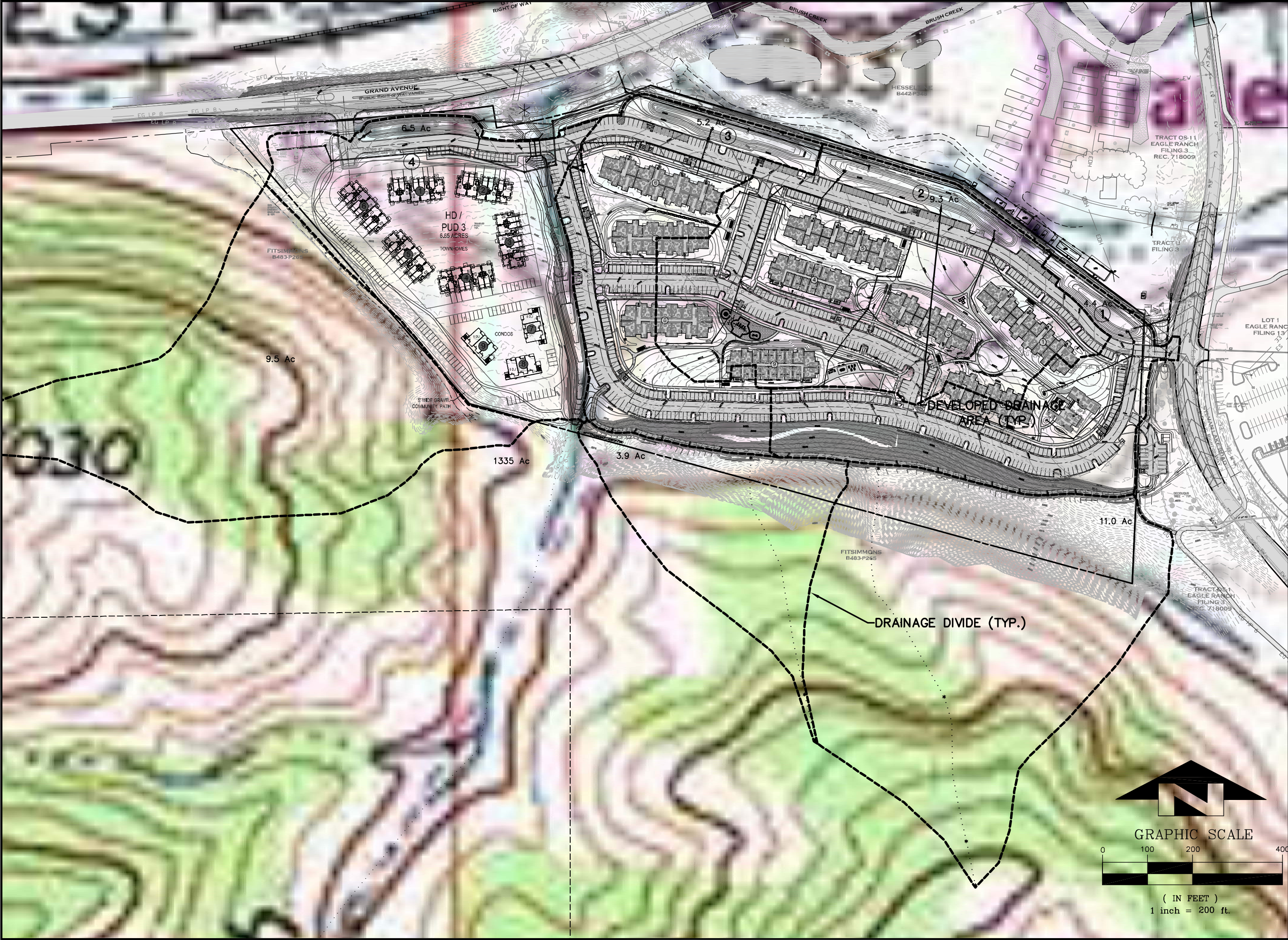
No.	Issue / Revision	Date	Name

Job Number	23.1012
Project Manager	DV
Design By	MB
Drawn By	MB
Principal In Charge	ML

Sheet Number:

D4

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ALPINE
ENGINEERING INC.
SARNO VALLEY, UT 84401
EDWARDS CO #1632 / 970.926.3373
WWW.ALPINECIVIL.COM

RESERVE AT HOCKETT GULCH
EAGLE, CO
DEVELOPED DRAINAGE AREA MAP

DESIGNED	GLB/RF/TS	NO.	DATE	REVISIONS	BY
DRAWN	GLB/RF/TS	1	07.21.2021	MAJOR DEVELOPMENT PERMIT	AEI
CHECKED	MW				
JOB NO.					
DATE					

SHEET
2



APPENDIX B

Vicinity Map, NRCS Web Soil Survey, FEMA Firmette, NOAA Atlas 14 Tables, PW Manual IDF Rainfall Data

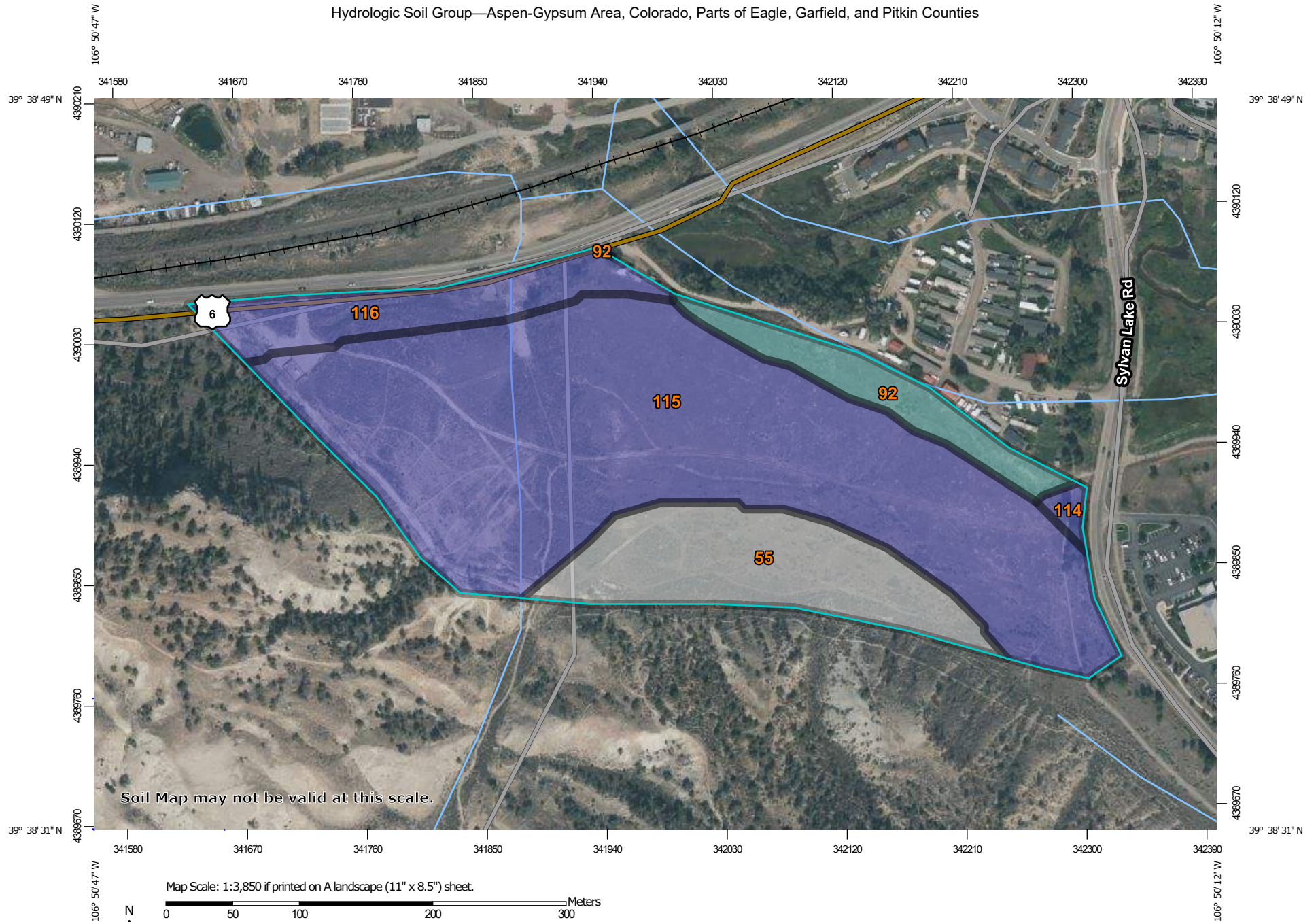


Google Earth

Image © 2024 Airbus

4000 ft

Hydrologic Soil Group—Aspen-Gypsum Area, Colorado, Parts of Eagle, Garfield, and Pitkin Counties



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: Aspen-Gypsum Area, Colorado, Parts of Eagle, Garfield, and Pitkin Counties
 Survey Area Data: Version 14, Aug 23, 2023

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

Date(s) aerial images were photographed: Sep 5, 2021—Sep 7, 2021

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
55	Gypsum land-Gypsiorthids complex, 12 to 65 percent slopes		4.9	16.2%
92	Redrob loam, 1 to 6 percent slopes	C	2.0	6.7%
114	Yamo loam, 1 to 6 percent slopes	B	0.2	0.8%
115	Yamo loam, 6 to 12 percent slopes	B	20.4	66.8%
116	Yamo loam, 12 to 25 percent slopes	B	2.9	9.5%
Totals for Area of Interest			30.5	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.

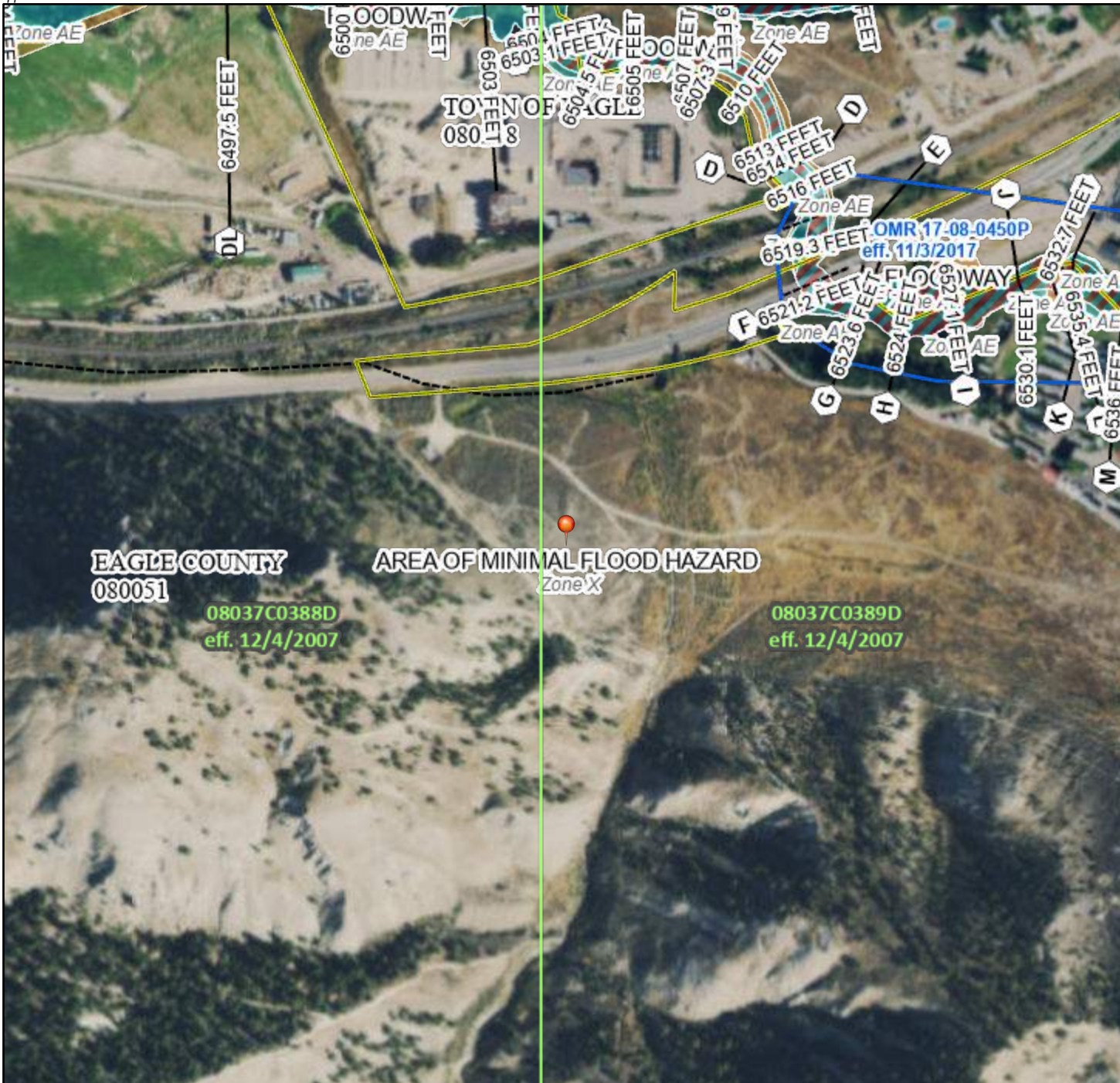
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ff 1



HW

ff 1

HJOG

6) 658 273 (11,13) 581,827

[illegible]

7KLVBSFFBOLH/ZWK\$VWDDUG/IRU WKHXHR
GLJWDD IOFFBS/LI LW LVQRW YR.GDV/GHFULBGEORZ
7KHEDBSWQFFBOLH/ZWK\$VWEDHBS
DFFXUDWDDUG/

7KHIFRFGKDUJGLQRUBWLRLVLGULYHGGLUHFWOIUIRNVKH
DVKRWLUWDLVYLZEVYUHLAF/SJRLGCGEJ 7LVBES
ZV/FRUHWGRO DW ZE V DGGHAFQW
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JSSQHOQEU DQGJSHIFAWLYHGWDHOSL8HJIRU
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UHDWDRUJSUSRVH



NOAA Atlas 14, Volume 8, Version 2
Location name: Eagle, Colorado, USA*
Latitude: 39.6461°, Longitude: -106.8396°
Elevation: 6533 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.104 (0.085-0.129)	0.155 (0.127-0.192)	0.237 (0.194-0.295)	0.304 (0.247-0.382)	0.395 (0.305-0.518)	0.464 (0.349-0.622)	0.532 (0.383-0.739)	0.600 (0.410-0.866)	0.688 (0.448-1.03)	0.753 (0.476-1.16)
10-min	0.152 (0.125-0.188)	0.226 (0.186-0.281)	0.347 (0.284-0.432)	0.445 (0.362-0.559)	0.578 (0.446-0.759)	0.679 (0.510-0.911)	0.779 (0.561-1.08)	0.878 (0.600-1.27)	1.01 (0.655-1.51)	1.10 (0.698-1.70)
15-min	0.185 (0.152-0.229)	0.276 (0.227-0.343)	0.423 (0.346-0.527)	0.543 (0.441-0.681)	0.705 (0.544-0.926)	0.828 (0.622-1.11)	0.950 (0.684-1.32)	1.07 (0.731-1.55)	1.23 (0.799-1.84)	1.34 (0.851-2.07)
30-min	0.254 (0.209-0.315)	0.349 (0.287-0.433)	0.503 (0.412-0.628)	0.632 (0.514-0.793)	0.810 (0.627-1.07)	0.947 (0.713-1.27)	1.08 (0.782-1.51)	1.22 (0.838-1.77)	1.41 (0.919-2.12)	1.55 (0.981-2.39)
60-min	0.330 (0.272-0.410)	0.421 (0.347-0.523)	0.573 (0.469-0.715)	0.702 (0.571-0.881)	0.883 (0.687-1.17)	1.02 (0.774-1.38)	1.17 (0.846-1.63)	1.32 (0.905-1.92)	1.52 (0.995-2.30)	1.68 (1.06-2.59)
2-hr	0.406 (0.337-0.500)	0.494 (0.409-0.609)	0.643 (0.530-0.796)	0.772 (0.631-0.961)	0.956 (0.751-1.25)	1.10 (0.842-1.47)	1.26 (0.918-1.74)	1.42 (0.982-2.03)	1.64 (1.08-2.44)	1.81 (1.16-2.75)
3-hr	0.469 (0.390-0.574)	0.549 (0.456-0.673)	0.687 (0.568-0.845)	0.808 (0.664-1.00)	0.985 (0.780-1.29)	1.13 (0.868-1.50)	1.28 (0.943-1.76)	1.44 (1.01-2.06)	1.67 (1.11-2.47)	1.85 (1.19-2.78)
6-hr	0.602 (0.504-0.731)	0.677 (0.565-0.823)	0.809 (0.674-0.989)	0.930 (0.769-1.14)	1.11 (0.888-1.44)	1.26 (0.978-1.66)	1.42 (1.06-1.94)	1.60 (1.13-2.25)	1.84 (1.24-2.69)	2.04 (1.33-3.02)
12-hr	0.750 (0.632-0.904)	0.856 (0.720-1.03)	1.04 (0.869-1.26)	1.20 (0.995-1.46)	1.42 (1.14-1.82)	1.61 (1.26-2.09)	1.80 (1.35-2.42)	2.01 (1.43-2.79)	2.29 (1.56-3.29)	2.52 (1.65-3.68)
24-hr	0.914 (0.775-1.09)	1.06 (0.893-1.26)	1.29 (1.09-1.55)	1.50 (1.25-1.81)	1.79 (1.44-2.25)	2.02 (1.58-2.59)	2.26 (1.70-2.98)	2.51 (1.80-3.42)	2.85 (1.95-4.02)	3.11 (2.07-4.48)
2-day	1.09 (0.933-1.30)	1.25 (1.06-1.48)	1.51 (1.28-1.80)	1.74 (1.47-2.09)	2.08 (1.69-2.60)	2.35 (1.86-2.98)	2.63 (2.00-3.44)	2.93 (2.12-3.96)	3.34 (2.32-4.66)	3.67 (2.46-5.20)
3-day	1.20 (1.03-1.42)	1.38 (1.18-1.62)	1.67 (1.42-1.98)	1.92 (1.62-2.29)	2.28 (1.87-2.84)	2.58 (2.05-3.26)	2.89 (2.21-3.75)	3.21 (2.34-4.30)	3.66 (2.55-5.05)	4.01 (2.71-5.62)
4-day	1.30 (1.11-1.52)	1.48 (1.27-1.74)	1.78 (1.52-2.11)	2.05 (1.74-2.44)	2.44 (2.00-3.01)	2.74 (2.19-3.44)	3.06 (2.35-3.95)	3.40 (2.48-4.52)	3.86 (2.70-5.29)	4.22 (2.86-5.88)
7-day	1.54 (1.33-1.80)	1.73 (1.49-2.02)	2.05 (1.76-2.40)	2.32 (1.98-2.74)	2.71 (2.24-3.32)	3.03 (2.43-3.76)	3.36 (2.59-4.28)	3.70 (2.72-4.86)	4.16 (2.94-5.64)	4.53 (3.10-6.23)
10-day	1.75 (1.52-2.04)	1.95 (1.68-2.27)	2.28 (1.96-2.66)	2.56 (2.19-3.00)	2.96 (2.45-3.60)	3.29 (2.65-4.06)	3.62 (2.81-4.58)	3.97 (2.94-5.18)	4.45 (3.16-5.97)	4.82 (3.32-6.57)
20-day	2.33 (2.03-2.69)	2.58 (2.24-2.98)	2.99 (2.59-3.46)	3.33 (2.87-3.88)	3.82 (3.18-4.58)	4.20 (3.41-5.11)	4.59 (3.59-5.73)	4.99 (3.73-6.40)	5.53 (3.96-7.29)	5.94 (4.14-7.97)
30-day	2.81 (2.46-3.23)	3.12 (2.72-3.58)	3.62 (3.15-4.17)	4.03 (3.48-4.66)	4.59 (3.83-5.46)	5.03 (4.10-6.07)	5.46 (4.29-6.75)	5.90 (4.43-7.49)	6.48 (4.67-8.46)	6.92 (4.85-9.19)
45-day	3.44 (3.02-3.93)	3.82 (3.35-4.37)	4.44 (3.88-5.08)	4.93 (4.28-5.68)	5.59 (4.68-6.59)	6.09 (4.98-7.28)	6.57 (5.18-8.04)	7.04 (5.31-8.84)	7.65 (5.54-9.86)	8.09 (5.71-10.6)
60-day	3.98 (3.51-4.53)	4.44 (3.90-5.06)	5.15 (4.51-5.88)	5.72 (4.98-6.56)	6.45 (5.40-7.55)	6.99 (5.73-8.30)	7.50 (5.93-9.11)	7.99 (6.04-9.95)	8.60 (6.24-11.0)	9.02 (6.39-11.8)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

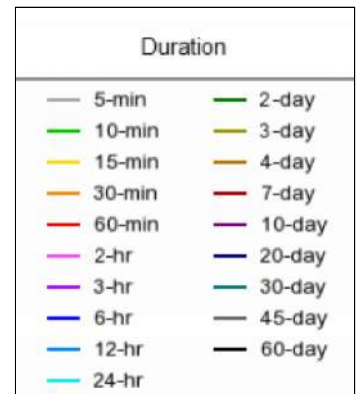
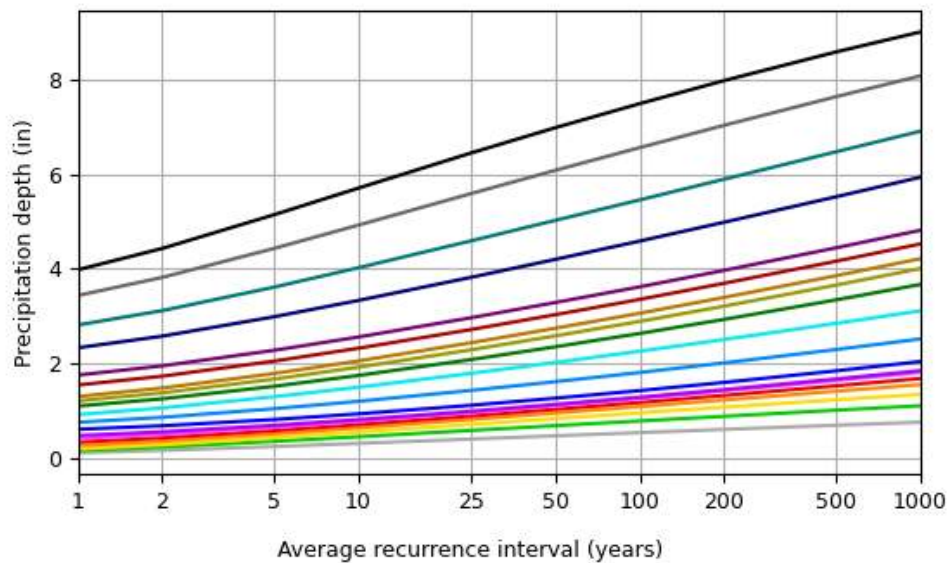
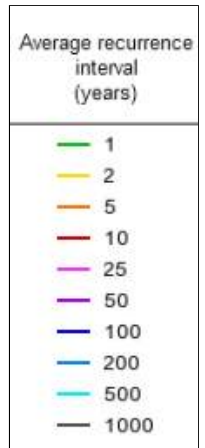
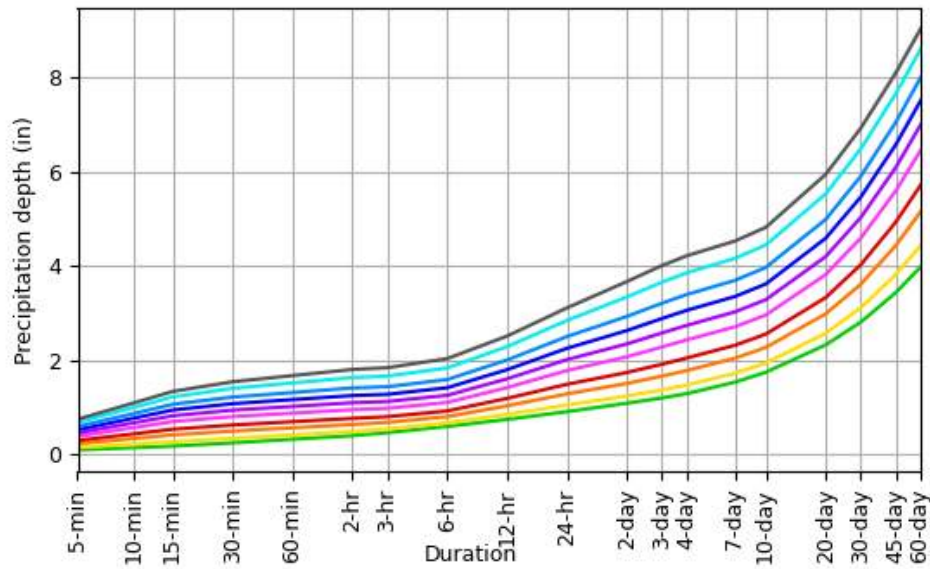
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves

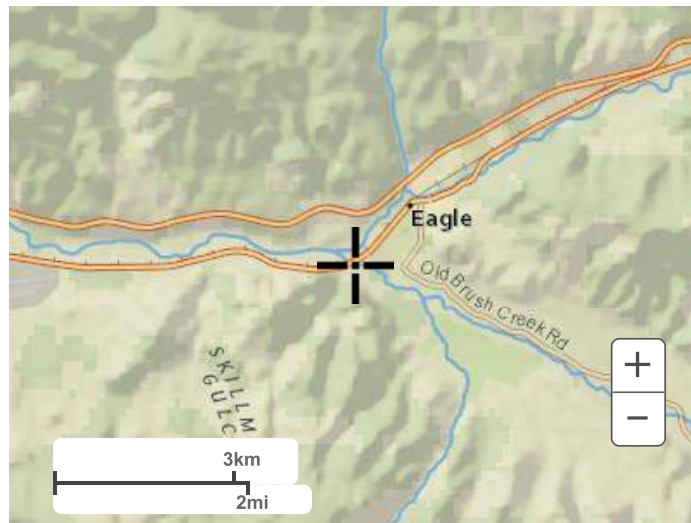
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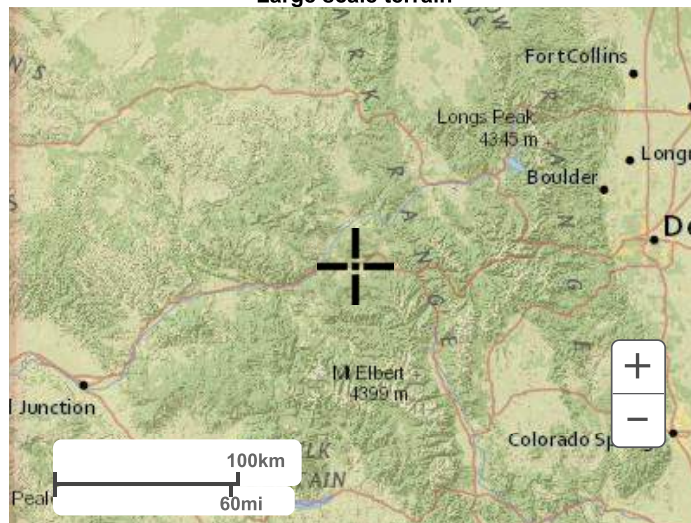
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Maps & arials

Small scale terrain



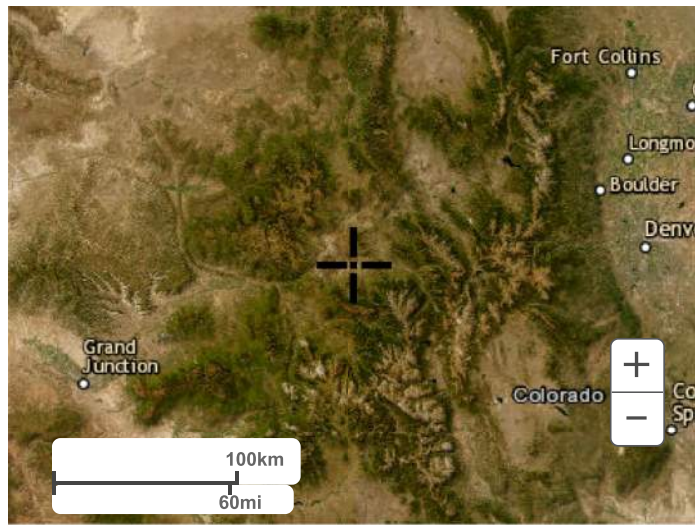
Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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NOAA Atlas 14, Volume 8, Version 2
Location name: Eagle, Colorado, USA*
Latitude: 39.6462°, Longitude: -106.8426°
Elevation: 6548 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.25 (0.02-1.55)	1.86 (1.52-2.30)	2.84 (2.33-3.54)	3.65 (2.96-4.58)	4.74 (3.66-6.22)	5.57 (4.19-7.46)	6.38 (4.60-8.87)	7.20 (4.92-10.4)	8.26 (5.38-12.4)	9.04 (5.71-13.9)
10-min	0.912 (0.608-0.916)	1.36 (1.12-1.69)	2.08 (1.70-2.59)	2.67 (2.17-3.35)	3.47 (2.68-4.55)	4.07 (3.06-5.47)	4.67 (3.37-6.49)	5.27 (3.60-7.61)	6.04 (3.93-9.08)	6.61 (4.19-10.2)
15-min	0.740 (0.608-0.916)	1.10 (0.908-1.37)	1.69 (1.38-2.11)	2.17 (1.76-2.72)	2.82 (2.18-3.70)	3.31 (2.49-4.44)	3.80 (2.74-5.28)	4.28 (2.92-6.18)	4.91 (3.20-7.38)	5.38 (3.40-8.28)
30-min	0.508 (0.418-0.630)	0.698 (0.574-0.866)	1.01 (0.824-1.26)	1.26 (1.03-1.59)	1.62 (1.25-2.13)	1.89 (1.43-2.55)	2.17 (1.56-3.02)	2.45 (1.68-3.54)	2.82 (1.84-4.24)	3.10 (1.96-4.77)
60-min	0.330 (0.272-0.410)	0.421 (0.347-0.523)	0.573 (0.469-0.715)	0.702 (0.571-0.881)	0.883 (0.687-1.17)	1.02 (0.774-1.38)	1.17 (0.846-1.63)	1.32 (0.905-1.92)	1.52 (0.995-2.30)	1.68 (1.06-2.59)
2-hr	0.203 (0.168-0.250)	0.247 (0.204-0.304)	0.321 (0.265-0.398)	0.386 (0.315-0.480)	0.478 (0.375-0.626)	0.552 (0.421-0.737)	0.628 (0.459-0.868)	0.708 (0.491-1.02)	0.818 (0.541-1.22)	0.904 (0.578-1.37)
3-hr	0.156 (0.129-0.191)	0.182 (0.151-0.224)	0.228 (0.189-0.281)	0.269 (0.221-0.333)	0.328 (0.259-0.428)	0.376 (0.289-0.500)	0.426 (0.314-0.587)	0.480 (0.335-0.685)	0.555 (0.369-0.821)	0.614 (0.395-0.925)
6-hr	0.100 (0.084-0.122)	0.113 (0.094-0.137)	0.135 (0.112-0.165)	0.155 (0.128-0.190)	0.185 (0.148-0.240)	0.210 (0.163-0.277)	0.237 (0.176-0.323)	0.266 (0.188-0.375)	0.307 (0.207-0.449)	0.340 (0.221-0.504)
12-hr	0.062 (0.052-0.075)	0.071 (0.059-0.085)	0.086 (0.072-0.104)	0.099 (0.082-0.120)	0.118 (0.094-0.150)	0.133 (0.104-0.173)	0.149 (0.112-0.200)	0.166 (0.118-0.231)	0.190 (0.129-0.273)	0.208 (0.137-0.305)
24-hr	0.038 (0.032-0.045)	0.043 (0.037-0.052)	0.053 (0.045-0.064)	0.062 (0.052-0.075)	0.074 (0.060-0.093)	0.084 (0.065-0.107)	0.094 (0.070-0.124)	0.104 (0.074-0.142)	0.118 (0.081-0.167)	0.129 (0.086-0.186)
2-day	0.022 (0.019-0.027)	0.025 (0.022-0.030)	0.031 (0.026-0.037)	0.036 (0.030-0.043)	0.043 (0.035-0.054)	0.048 (0.038-0.062)	0.054 (0.041-0.071)	0.061 (0.044-0.082)	0.069 (0.048-0.097)	0.076 (0.051-0.108)
3-day	0.016 (0.014-0.019)	0.019 (0.016-0.022)	0.023 (0.019-0.027)	0.026 (0.022-0.031)	0.031 (0.025-0.039)	0.035 (0.028-0.045)	0.040 (0.030-0.052)	0.044 (0.032-0.059)	0.050 (0.035-0.070)	0.055 (0.037-0.078)
4-day	0.013 (0.011-0.015)	0.015 (0.013-0.018)	0.018 (0.015-0.021)	0.021 (0.018-0.025)	0.025 (0.020-0.031)	0.028 (0.022-0.035)	0.031 (0.024-0.041)	0.035 (0.025-0.047)	0.040 (0.028-0.055)	0.043 (0.029-0.061)
7-day	0.009 (0.007-0.010)	0.010 (0.008-0.012)	0.012 (0.010-0.014)	0.013 (0.011-0.016)	0.016 (0.013-0.019)	0.018 (0.014-0.022)	0.019 (0.015-0.025)	0.022 (0.016-0.028)	0.024 (0.017-0.033)	0.026 (0.018-0.037)
10-day	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.011)	0.010 (0.009-0.012)	0.012 (0.010-0.015)	0.013 (0.011-0.016)	0.015 (0.011-0.019)	0.016 (0.012-0.021)	0.018 (0.013-0.024)	0.020 (0.013-0.027)
20-day	0.004 (0.004-0.005)	0.005 (0.004-0.006)	0.006 (0.005-0.007)	0.006 (0.005-0.008)	0.007 (0.006-0.009)	0.008 (0.007-0.010)	0.009 (0.007-0.011)	0.010 (0.007-0.013)	0.011 (0.008-0.015)	0.012 (0.008-0.016)
30-day	0.003 (0.003-0.004)	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.005 (0.004-0.006)	0.006 (0.005-0.007)	0.006 (0.005-0.008)	0.007 (0.005-0.009)	0.008 (0.006-0.010)	0.008 (0.006-0.011)	0.009 (0.006-0.012)
45-day	0.003 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.003-0.004)	0.004 (0.003-0.005)	0.005 (0.004-0.006)	0.005 (0.004-0.006)	0.006 (0.004-0.007)	0.006 (0.004-0.008)	0.007 (0.005-0.009)	0.007 (0.005-0.009)
60-day	0.002 (0.002-0.003)	0.003 (0.002-0.003)	0.003 (0.003-0.004)	0.003 (0.003-0.004)	0.004 (0.003-0.005)	0.004 (0.003-0.005)	0.005 (0.004-0.006)	0.005 (0.004-0.006)	0.005 (0.004-0.007)	0.006 (0.004-0.008)

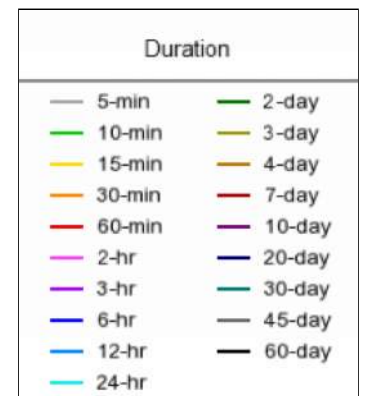
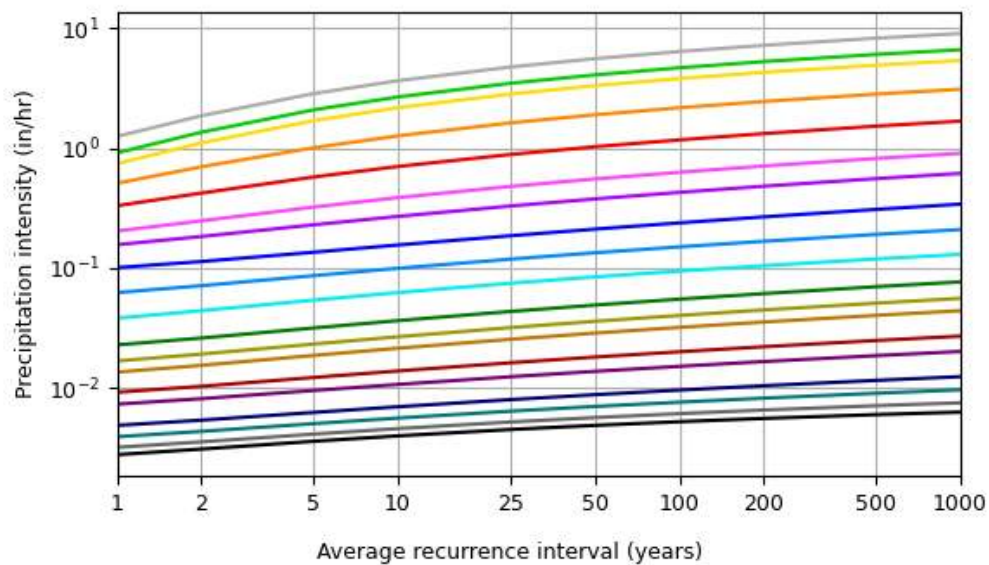
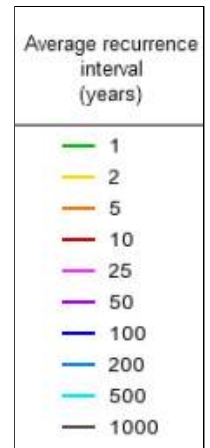
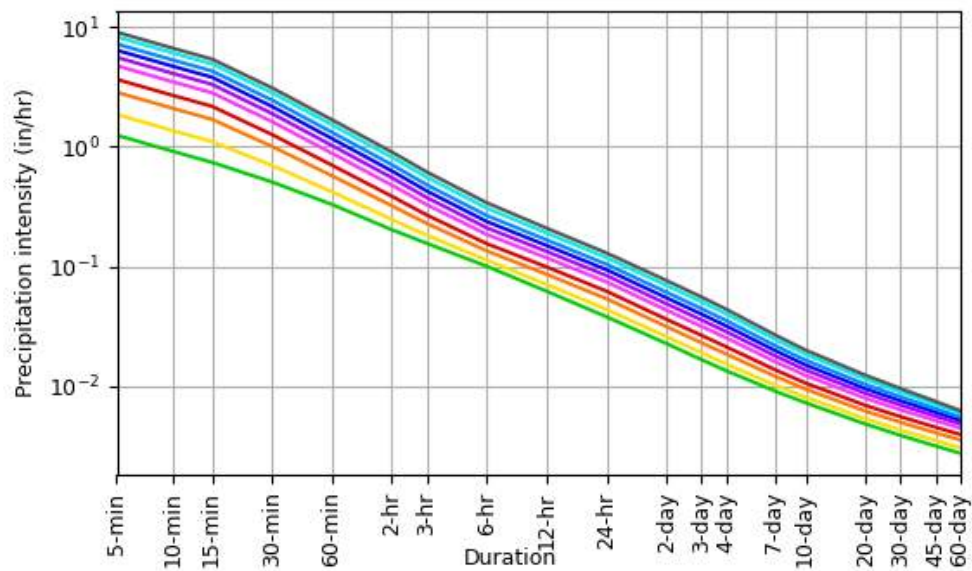
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based intensity-duration-frequency (IDF) curves

Latitude: 39.6462°, Longitude: -106.8426°

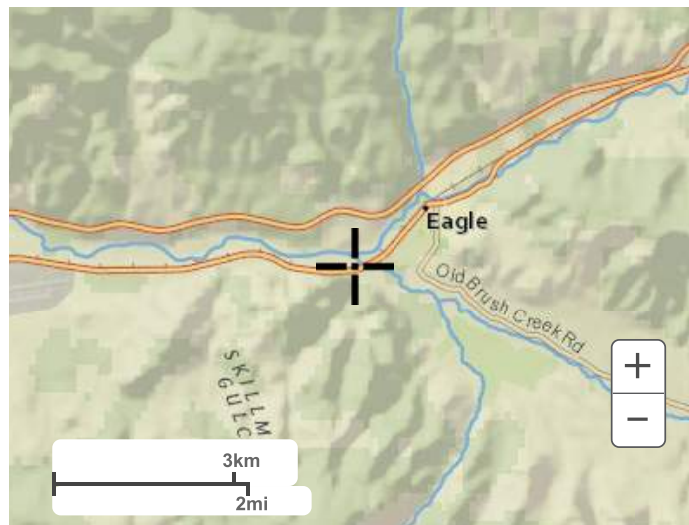


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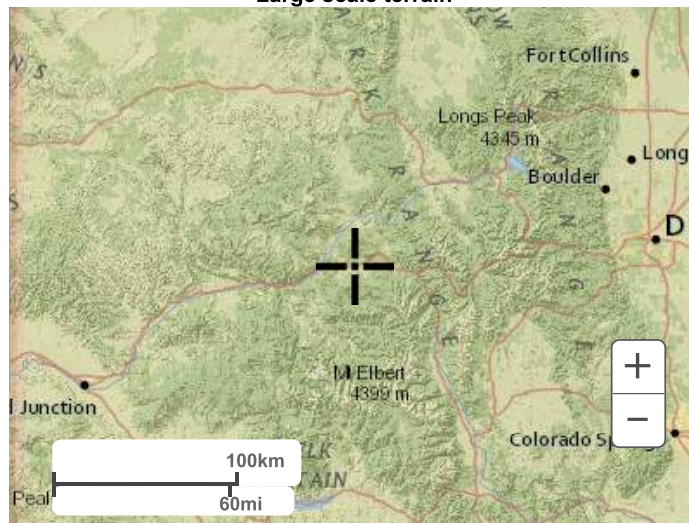
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Small scale terrain



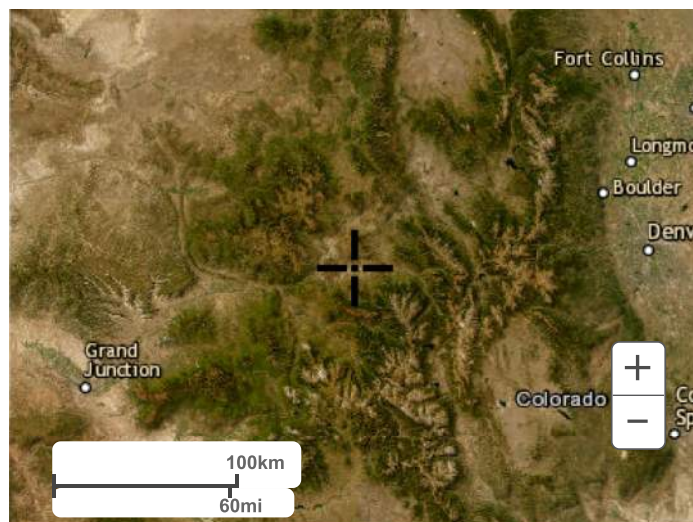
Large scale terrain



Large scale map



Large scale aerial

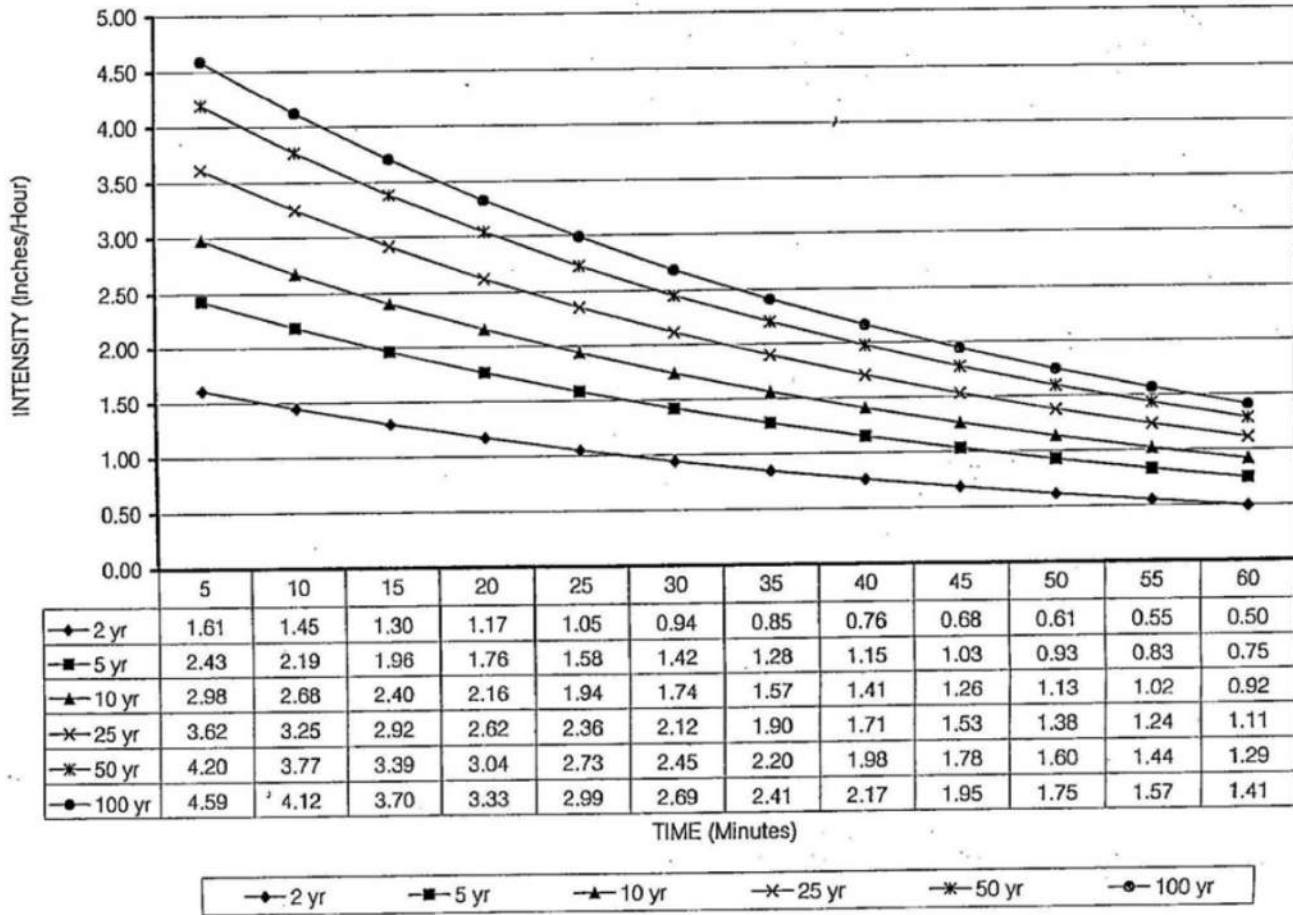


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PW MANUAL IDF RAINFALL DATA

Town of Gypsum - TIME-INTENSITY-FREQUENCY VALUES





APPENDIX C

Rational Method Calculations

PROJECT INFORMATION

PROJECT NAME: Hockett Gulch
 PROJECT NO: 23.1012
 DESIGN BY: MB
 REVIEWED BY: DV
 JURISDICTION: Town of Eagle
 REPORT TYPE: Drainage
 DATE: 07/01/24



JURISDICTIONAL STANDARD	C2	C5	C25	C100	% IMPERV
LANDSCAPE	0.01	0.01	0.26	0.44	2%
ROOF	0.74	0.76	0.81	0.84	90%
PAVED	0.84	0.86	0.88	0.89	100%
DRIVES AND WALKS	0.74	0.76	0.81	0.84	90%

TOTAL SITE COMPOSITE	9.44	0.47	0.50	0.63	0.71	60.0%
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SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.1	LANDSCAPE	0.08	0.01	0.01	0.26	0.44	2%
	ROOF	0.20	0.74	0.76	0.81	0.84	90%
	PAVED	0.52	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.80	0.72	0.74	0.80	0.83	87.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.2	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.13	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.14	0.77	0.79	0.83	0.86	93.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.3	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.34	0.84	0.86	0.81	0.89	100%
					0.88		
SUB-BASIN COMPOSITE		0.35	0.81	0.83	0.86	0.88	97.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.3a	LANDSCAPE	0.03	0.01	0.01	0.26	0.44	2%
	ROOF	0.04	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.07	0.39	0.42	0.58	0.67	52.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.3b	LANDSCAPE	0.07	0.01	0.01	0.26	0.44	2%
	ROOF	0.06	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.13	0.31	0.34	0.52	0.62	42.6%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.3c	LANDSCAPE	0.10	0.01	0.01	0.26	0.44	2%
	ROOF	0.04	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.15	0.22	0.25	0.45	0.57	32.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.3d	LANDSCAPE	0.03	0.01	0.01	0.26	0.44	2%
	ROOF	0.11	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.14	0.56	0.59	0.70	0.76	71.1%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.3f	LANDSCAPE	0.11	0.01	0.01	0.26	0.44	2%
	ROOF	0.28	0.74	0.76	0.81	0.84	90%
					0.88		
SUB-BASIN COMPOSITE		0.39	0.51	0.54	0.66	0.73	65.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.4	LANDSCAPE	0.10	0.01	0.01	0.26	0.44	2%
	PAVED	0.39	0.84	0.86	0.88	0.89	100%
	ROOF	0.07	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.56	0.66	0.68	0.76	0.80	81.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.4a	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	PAVED	0.25	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.27	0.76	0.79	0.83	0.86	92.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.4b	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	ROOF	0.13	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.15	0.63	0.66	0.74	0.79	78.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.5a	LANDSCAPE	0.10	0.01	0.01	0.26	0.44	2%
	ROOF	0.10	0.74	0.76	0.81	0.84	90%
	PAVED	0.10	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.30	0.50	0.53	0.65	0.72	64.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.5b	LANDSCAPE	0.03	0.01	0.01	0.26	0.44	2%
	ROOF	0.10	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.13	0.55	0.58	0.69	0.75	69.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.5c	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.03	0.24	0.27	0.47	0.59	34.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.6	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	ROOF	0.03	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.06	0.48	0.51	0.64	0.72	62.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.7	LANDSCAPE	0.21	0.01	0.01	0.26	0.44	2%
	ROOF	0.22	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.43	0.35	0.38	0.55	0.64	47.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.8a	LANDSCAPE	0.03	0.01	0.01	0.26	0.44	2%
	ROOF	0.19	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.22	0.62	0.65	0.74	0.79	78.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.8b	LANDSCAPE	0.03	0.01	0.01	0.26	0.44	2%
	ROOF	0.13	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.16	0.58	0.61	0.71	0.77	73.5%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.9a	LANDSCAPE	0.18	0.01	0.01	0.26	0.44	2%
	ROOF	0.04	0.74	0.76	0.81	0.84	90%
	PAVED	0.75	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.97	0.66	0.69	0.76	0.80	81.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.9b	LANDSCAPE	0.06	0.01	0.01	0.26	0.44	2%
	ROOF	0.03	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.09	0.22	0.24	0.45	0.57	31.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.9c	LANDSCAPE	0.06	0.01	0.01	0.26	0.44	2%
	PAVED	0.03	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.09	0.24	0.27	0.47	0.59	34.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.10	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.07	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.08	0.63	0.66	0.75	0.79	79.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.11	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.05	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.06	0.60	0.63	0.72	0.78	75.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.12	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	ROOF	0.06	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.08	0.53	0.56	0.68	0.74	68.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
2.0	LANDSCAPE	2.23	0.01	0.01	0.26	0.44	2%
	ROOF	0.59	0.74	0.76	0.81	0.84	90%
	PAVED	0.77	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		3.59	0.27	0.29	0.49	0.60	37.5%

TOTAL SITE COMPOSITE		9.44	0.47	0.50	0.63	0.71	60.0%
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CALCULATED BY: MB
CHECKED BY: DV
DATE: 07/01/24

STANDARD FORM SF-2
TIME OF CONCENTRATION SUMMARY
(RATIONAL METHOD PROCEDURE)

23.1012
Hockett Gulch

SUB-BASIN DATA				INITIAL/OVERLAND TIME (t _i)			TRAVEL TIME (t _t)					t _c CHECK (URBANIZED BASINS)							REMARKS
BASIN	DESIGN POINT	C _s	AREA ac	LENGTH ft	SLOPE ft/ft	t _i min	LENGTH ft	SLOPE ft/ft	C _v	VEL. fps	t _t min	COMP. t _c	TOT. LENGTH ft	SLOPE ft/ft	Is Project Urban?		tc First DP	tc min	
															Yes				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)			
2.1	2.1	0.74	0.80			0.0				0.00	0.0	0.0	0.0	#DIV/0!	87.7%		5.0		
2.2	2.2	0.79	0.14			0.0				0.00	0.0	0.0	0.0	#DIV/0!	93.0%		5.0		
2.3	2.3	0.83	0.35	104	0.0300	3.4	166	0.0300	20	3.46	0.8	4.2	270.0	0.03	97.2%	10.2	5.0		
2.3a	2.3a	0.42	0.07			0.0				0.00	0.0	0.0	0.0	#DIV/0!	52.3%		5.0		
2.3b	2.3b	0.34	0.13			0.0				0.00	0.0	0.0	0.0	#DIV/0!	42.6%		5.0		
2.3c	2.3c	0.25	0.15			0.0				0.00	0.0	0.0	0.0	#DIV/0!	32.0%		5.0		
2.3d	2.3d	0.59	0.14			0.0				0.00	0.0	0.0	0.0	#DIV/0!	71.1%		5.0		
2.3f	2.3f	0.54	0.39			0.0				0.00	0.0	0.0	0.0	#DIV/0!	65.2%		5.0		
2.4	2.4	0.68	0.56	130	0.0300	6.0	150	0.0200	20	2.83	0.9	6.8	280.0	0.02	81.3%	13.1	6.8		
2.4a	2.4a	0.79	0.27			0.0				0.00	0.0	0.0	0.0	#DIV/0!	92.7%		5.0		
2.4b	2.4b	0.66	0.15			0.0				0.00	0.0	0.0	0.0	#DIV/0!	78.3%		5.0		
2.5a	2.5a	0.53	0.30	30	0.0150	5.0	150	0.0300	20	3.46	0.7	5.7	180.0	0.03	64.0%	15.9	5.7		
2.5b	2.5b	0.58	0.13			0.0				0.00	0.0	0.0	0.0	#DIV/0!	69.7%		5.0		
2.5c	2.5c	0.27	0.03			0.0				0.00	0.0	0.0	0.0	#DIV/0!	34.7%		5.0		
2.6	2.6	0.51	0.06			0.0				0.00	0.0	0.0	0.0	#DIV/0!	62.3%		5.0		
2.7	2.70	0.38	0.43			0.0				0.00	0.0	0.0	0.0	#DIV/0!	47.0%		5.0		
2.8a	2.8a	0.65	0.22			0.0				0.00	0.0	0.0	0.0	#DIV/0!	78.0%		5.0		
2.8b	2.8b	0.61	0.16			0.0				0.00	0.0	0.0	0.0	#DIV/0!	73.5%		5.0		
2.9a	2.9a	0.69	0.97	35	0.0300	3.1	255	0.0200	20	2.83	1.5	4.6	290.0	0.02	81.4%	13.6	5.0		
2.9b	2.9b	0.24	0.09			0.0				0.00	0.0	0.0	0.0	#DIV/0!	31.3%		5.0		
2.9c	2.9c	0.27	0.09			0.0				0.00	0.0	0.0	0.0	#DIV/0!	34.7%		5.0		
2.10	2.1	0.66	0.08			0.0				0.00	0.0	0.0	0.0	#DIV/0!	79.0%		5.0		
2.11	2.11	0.63	0.06			0.0				0.00	0.0	0.0	0.0	#DIV/0!	75.3%		5.0		
2.12	2.12	0.56	0.08			0.0				0.00	0.0	0.0	0.0	#DIV/0!	68.0%		5.0		
2.0	2.0	0.29	3.59	75	0.0300	8.8	830	0.0130	20	2.28	6.1	14.8	905.0	0.01	37.5%	28.1	14.8		

*Velocity (V) = C_vS_w^{0.5}

TABLE 6-2

Type of Land Surface	Conveyance Coefficient, C _v
Heavy Meadow	2.5
Tillage / Field	5
Short Pasture and Lawns	7
Nearly Bare Ground	10
Grassed Waterway	15
Paved Areas and Shallow Paved Swales	20

*Table 6-2, UDFCD (V.1), Chapter 6, Page 6-5

in which: C_v = Conveyance Coefficient (See Table Above)
S_w = Watercourse Slope (ft/ft)



CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 2-YEAR
 ONE-HR PRECIP: 0.421

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2.1	2.1	0.80	0.72	5.0	0.57	1.61	0.92					
2.2	2.2	0.14	0.77	5.0	0.11	1.61	0.17					
2.3	2.3	0.35	0.81	5.0	0.28	1.61	0.46					
2.3a	2.3a	0.07	0.39	5.0	0.03	1.61	0.04					
2.3b	2.3b	0.13	0.31	5.0	0.04	1.61	0.06					
2.3c	2.3c	0.15	0.22	5.0	0.03	1.61	0.05					
2.3d	2.3d	0.14	0.56	5.0	0.08	1.61	0.13					
2.3f	2.3f	0.39	0.51	5.0	0.20	1.61	0.32					
2.4	2.4	0.56	0.66	6.8	0.37	1.55	0.57					
2.4a	2.4a	0.27	0.76	5.0	0.21	1.61	0.33					
2.4b	2.4b	0.15	0.63	5.0	0.09	1.61	0.15					
2.5a	2.5a	0.30	0.50	5.7	0.15	1.61	0.24					
2.5b	2.5b	0.13	0.55	5.0	0.07	1.61	0.11					
2.5c	2.5c	0.03	0.24	5.0	0.01	1.61	0.01					
2.6	2.6	0.06	0.48	5.0	0.03	1.61	0.05					
2.7	2.7	0.43	0.35	5.0	0.15	1.61	0.24					
2.8a	2.8a	0.22	0.62	5.0	0.14	1.61	0.22					
2.8b	2.8b	0.16	0.58	5.0	0.09	1.61	0.15					
2.9a	2.9a	0.97	0.66	5.0	0.64	1.61	1.03					
2.9b	2.9b	0.09	0.22	5.0	0.02	1.61	0.03					
2.9c	2.9c	0.09	0.24	5.0	0.02	1.61	0.04					
2.10	2.1	0.08	0.63	5.0	0.05	1.61	0.08					
2.11	2.11	0.06	0.60	5.0	0.04	1.61	0.06					
2.12	2.12	0.08	0.53	5.0	0.04	1.61	0.07					
2.0	2.0	3.59	0.27	14.8	0.95	1.30	1.24					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P_1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)

P1 = 1-Hour Point Rainfall Depth (Inches)

t_c = Time Of Concentration (Minutes)



Not used, rainfall intensities obtained from PW Manual IDF data (Typ.)

CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 5-YEAR
 ONE-HR PRECIP: 0.573

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2.1	2.1	0.80	0.74	5.0	0.59	2.43	1.44					
2.2	2.2	0.14	0.79	5.0	0.11	2.43	0.27					
2.3	2.3	0.35	0.83	5.0	0.29	2.43	0.71					
2.3a	2.3a	0.07	0.42	5.0	0.03	2.43	0.07					
2.3b	2.3b	0.13	0.34	5.0	0.04	2.43	0.11					
2.3c	2.3c	0.15	0.25	5.0	0.04	2.43	0.09					
2.3d	2.3d	0.14	0.59	5.0	0.08	2.43	0.20					
2.3f	2.3f	0.39	0.54	5.0	0.21	2.43	0.51					
2.4	2.4	0.56	0.68	6.8	0.38	2.34	0.90					
2.4a	2.4a	0.27	0.79	5.0	0.21	2.43	0.52					
2.4b	2.4b	0.15	0.66	5.0	0.10	2.43	0.24					
2.5a	2.5a	0.30	0.53	5.7	0.16	2.43	0.38					
2.5b	2.5b	0.13	0.58	5.0	0.08	2.43	0.18					
2.5c	2.5c	0.03	0.27	5.0	0.01	2.43	0.02					
2.6	2.6	0.06	0.51	5.0	0.03	2.43	0.07					
2.7	2.7	0.43	0.38	5.0	0.16	2.43	0.39					
2.8a	2.8a	0.22	0.65	5.0	0.14	2.43	0.35					
2.8b	2.8b	0.16	0.61	5.0	0.10	2.43	0.24					
2.9a	2.9a	0.97	0.69	5.0	0.66	2.43	1.61					
2.9b	2.9b	0.09	0.24	5.0	0.02	2.43	0.05					
2.9c	2.9c	0.09	0.27	5.0	0.02	2.43	0.06					
2.10	2.1	0.08	0.66	5.0	0.05	2.43	0.13					
2.11	2.11	0.06	0.63	5.0	0.04	2.43	0.09					
2.12	2.12	0.08	0.56	5.0	0.05	2.43	0.11					
2.0	2.0	3.59	0.29	14.8	1.06	1.96	2.07					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)
 P1 = 1-Hour Point Rainfall Depth (Inches)
 t_c = Time Of Concentration (Minutes)



CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 25-YEAR
 ONE-HR PRECIP: 0.883

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2.1	2.1	0.80	0.80	5.0	0.64	3.62	2.32					
2.2	2.2	0.14	0.83	5.0	0.12	3.62	0.42					
2.3	2.3	0.35	0.86	5.0	0.30	3.62	1.09					
2.3a	2.3a	0.07	0.58	5.0	0.04	3.62	0.15					
2.3b	2.3b	0.13	0.52	5.0	0.07	3.62	0.24					
2.3c	2.3c	0.15	0.45	5.0	0.07	3.62	0.24					
2.3d	2.3d	0.14	0.70	5.0	0.10	3.62	0.35					
2.3f	2.3f	0.39	0.66	5.0	0.26	3.62	0.93					
2.4	2.4	0.56	0.76	6.8	0.43	3.49	1.49					
2.4a	2.4a	0.27	0.83	5.0	0.22	3.62	0.81					
2.4b	2.4b	0.15	0.74	5.0	0.11	3.62	0.40					
2.5a	2.5a	0.30	0.65	5.7	0.20	3.62	0.71					
2.5b	2.5b	0.13	0.69	5.0	0.09	3.62	0.32					
2.5c	2.5c	0.03	0.47	5.0	0.01	3.62	0.05					
2.6	2.6	0.06	0.64	5.0	0.04	3.62	0.14					
2.7	2.7	0.43	0.55	5.0	0.23	3.62	0.85					
2.8a	2.8a	0.22	0.74	5.0	0.16	3.62	0.59					
2.8b	2.8b	0.16	0.71	5.0	0.11	3.62	0.41					
2.9a	2.9a	0.97	0.76	5.0	0.74	3.62	2.68					
2.9b	2.9b	0.09	0.45	5.0	0.04	3.62	0.15					
2.9c	2.9c	0.09	0.47	5.0	0.04	3.62	0.15					
2.10	2.1	0.08	0.75	5.0	0.06	3.62	0.22					
2.11	2.11	0.06	0.72	5.0	0.04	3.62	0.16					
2.12	2.12	0.08	0.68	5.0	0.05	3.62	0.20					
2.0	2.0	3.59	0.49	14.8	1.74	2.92	5.09					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)
 P1 = 1-Hour Point Rainfall Depth (Inches)
 t_c = Time Of Concentration (Minutes)



CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 100-YEAR
 ONE-HR PRECIP: 1.17

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2.1	2.1	0.80	0.83	5.0	0.67	4.59	3.06					
2.2	2.2	0.14	0.86	5.0	0.12	4.59	0.55					
2.3	2.3	0.35	0.88	5.0	0.31	4.59	1.41					
2.3a	2.3a	0.07	0.67	5.0	0.05	4.59	0.21					
2.3b	2.3b	0.13	0.62	5.0	0.08	4.59	0.37					
2.3c	2.3c	0.15	0.57	5.0	0.09	4.59	0.40					
2.3d	2.3d	0.14	0.76	5.0	0.11	4.59	0.49					
2.3f	2.3f	0.39	0.73	5.0	0.28	4.59	1.31					
2.4	2.4	0.56	0.80	6.8	0.45	4.45	2.00					
2.4a	2.4a	0.27	0.86	5.0	0.23	4.59	1.06					
2.4b	2.4b	0.15	0.79	5.0	0.12	4.59	0.54					
2.5a	2.5a	0.30	0.72	5.7	0.22	4.59	1.00					
2.5b	2.5b	0.13	0.75	5.0	0.10	4.59	0.45					
2.5c	2.5c	0.03	0.59	5.0	0.02	4.59	0.08					
2.6	2.6	0.06	0.72	5.0	0.04	4.59	0.20					
2.7	2.7	0.43	0.64	5.0	0.28	4.59	1.27					
2.8a	2.8a	0.22	0.79	5.0	0.17	4.59	0.80					
2.8b	2.8b	0.16	0.77	5.0	0.12	4.59	0.56					
2.9a	2.9a	0.97	0.80	5.0	0.78	4.59	3.58					
2.9b	2.9b	0.09	0.57	5.0	0.05	4.59	0.24					
2.9c	2.9c	0.09	0.59	5.0	0.05	4.59	0.24					
2.10	2.1	0.08	0.79	5.0	0.06	4.59	0.29					
2.11	2.11	0.06	0.78	5.0	0.05	4.59	0.21					
2.12	2.12	0.08	0.74	5.0	0.06	4.59	0.27					
2.0	2.0	3.59	0.60	14.8	2.16	3.70	7.97					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)
 P1 = 1-Hour Point Rainfall Depth (Inches)
 t_c = Time Of Concentration (Minutes)



PROJECT: Hockett Gulch
 JOB NO: 23.101
 DATE: 07/01/24



RUNOFF SUMMARY							
BASIN	DESIGN POINT	AREA (ACRES)	% IMP.	C ₂₅	C ₁₀₀	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
2.1	2.1	0.80	87.7%	0.80	0.83	2.32	3.06
2.2	2.2	0.14	93.0%	0.83	0.86	0.42	0.55
2.3	2.3	0.35	97.2%	0.86	0.88	1.09	1.41
2.3a	2.3a	0.07	52.3%	0.58	0.67	0.15	0.21
2.3b	2.3b	0.13	42.6%	0.52	0.62	0.24	0.37
2.3c	2.3c	0.15	32.0%	0.45	0.57	0.24	0.40
2.3d	2.3d	0.14	71.1%	0.70	0.76	0.35	0.49
2.3f	2.3f	0.39	65.2%	0.66	0.73	0.93	1.31
2.4	2.4	0.56	81.3%	0.76	0.80	1.49	2.00
2.4a	2.4a	0.27	92.7%	0.83	0.86	0.81	1.06
2.4b	2.4b	0.15	78.3%	0.74	0.79	0.40	0.54
2.5a	2.5a	0.30	64.0%	0.65	0.72	0.71	1.00
2.5b	2.5b	0.13	69.7%	0.69	0.75	0.32	0.45
2.5c	2.5c	0.03	34.7%	0.47	0.59	0.05	0.08
2.6	2.6	0.06	62.3%	0.64	0.72	0.14	0.20
2.7	2.7	0.43	47.0%	0.55	0.64	0.85	1.27
2.8a	2.8a	0.22	78.0%	0.74	0.79	0.59	0.80
2.8b	2.8b	0.16	73.5%	0.71	0.77	0.41	0.56
2.9a	2.9a	0.97	81.4%	0.76	0.80	2.68	3.58
2.9b	2.9b	0.09	31.3%	0.45	0.57	0.15	0.24
2.9c	2.9c	0.09	34.7%	0.47	0.59	0.15	0.24
2.10	2.1	0.08	79.0%	0.75	0.79	0.22	0.29
2.11	2.11	0.06	75.3%	0.72	0.78	0.16	0.21
2.12	2.12	0.08	68.0%	0.68	0.74	0.20	0.27
2.0	2.0	3.59	37.5%	0.49	0.60	5.09	7.97
SITE COMPOSITE		9.44	60.0%	0.50	0.71	20.16	28.57

RUNOFF_SUMMARY
 7/1/2024 8:24 PM

J:\Civil\23.1012-Hockett Gulch\ENG\DRAINAGE\Rational\Rational - Town IDF Curve Data\Rational (MHFD) - Basin 2.xlsm

PROJECT INFORMATION

PROJECT NAME: Hockett Gulch
 PROJECT NO: 23.1012
 DESIGN BY: MB
 REVIEWED BY: DV
 JURISDICTION: Town of Eagle
 REPORT TYPE: Drainage
 DATE: 07/01/24



JURISDICTIONAL STANDARD	C2	C5	C25	C100	% IMPERV
LANDSCAPE	0.01	0.01	0.26	0.44	2%
ROOF	0.74	0.76	0.81	0.84	90%
PAVED	0.84	0.86	0.88	0.89	100%
DRIVES AND WALKS	0.74	0.76	0.81	0.84	90%

TOTAL SITE COMPOSITE	5.04	0.53	0.56	0.67	0.74	67.1%
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SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.1	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	PAVED	0.46	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.48	0.80	0.82	0.85	0.87	95.9%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.1a	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.07	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.08	0.63	0.66	0.75	0.79	79.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.1b	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.05	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.06	0.60	0.63	0.72	0.78	75.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.1c	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.07	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.08	0.63	0.66	0.75	0.79	79.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.1d	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	ROOF	0.02	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.05	0.43	0.46	0.61	0.69	56.8%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.2	PAVED	0.13	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.13	0.84	0.86	0.88	0.89	100.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.3	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.08	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.09	0.73	0.76	0.81	0.84	89.1%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.3a	LANDSCAPE	0.08	0.01	0.01	0.26	0.44	2%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.09	0.08	0.09	0.33	0.49	12.9%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.3b	LANDSCAPE	0.12	0.01	0.01	0.26	0.44	2%
	ROOF	0.08	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.86	0.89	100%
SUB-BASIN COMPOSITE		0.21	0.29	0.32	0.50	0.61	40.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.3c	LANDSCAPE	0.08	0.01	0.01	0.26	0.44	2%
	ROOF	0.17	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.25	0.48	0.51	0.64	0.71	61.8%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.4	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	PAVED	0.33	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.35	0.78	0.80	0.84	0.86	94.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.5a	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.19	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.20	0.79	0.81	0.85	0.87	95.1%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.5b	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.12	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.13	0.76	0.79	0.83	0.86	92.5%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.6	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.14	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.15	0.77	0.80	0.84	0.86	93.5%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.6a	LANDSCAPE	0.04	0.01	0.01	0.26	0.44	2%
	ROOF	0.11	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.15	0.52	0.55	0.67	0.74	66.5%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.7	PAVED	0.16	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.16	0.84	0.86	0.88	0.89	100.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.7a	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	ROOF	0.04	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.06	0.47	0.50	0.63	0.71	60.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.8	LANDSCAPE	0.08	0.01	0.01	0.26	0.44	2%
	PAVED	0.24	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.32	0.60	0.63	0.72	0.78	75.5%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.8a	LANDSCAPE	0.04	0.01	0.01	0.26	0.44	2%
	ROOF	0.21	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.86	0.89	100%
SUB-BASIN COMPOSITE		0.26	0.61	0.64	0.73	0.78	76.8%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.8b	LANDSCAPE	0.03	0.01	0.01	0.26	0.44	2%
	ROOF	0.06	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.10	0.50	0.53	0.66	0.73	64.6%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.9	LANDSCAPE	0.33	0.01	0.01	0.26	0.44	2%
	PAVED	0.56	0.84	0.86	0.88	0.89	100%
	ROOF	0.02	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.91	0.50	0.53	0.65	0.72	64.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
3.0	LANDSCAPE	0.53	0.01	0.01	0.26	0.44	2%
	GRAVEL	0.20	0.29	0.32	0.50	0.61	40%
SUB-BASIN COMPOSITE		0.73	0.07	0.09	0.33	0.48	12.4%

TOTAL SITE COMPOSITE		5.04	0.53	0.56	0.67	0.74	67.1%
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CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-2
 TIME OF CONCENTRATION SUMMARY
 (RATIONAL METHOD PROCEDURE)

23.1012
 Hockett Gulch

SUB-BASIN DATA				INITIAL/OVERLAND TIME (t _i)			TRAVEL TIME (t _t)					t _c CHECK (URBANIZED BASINS)							REMARKS
BASIN	DESIGN POINT	C _s	AREA ac	LENGTH ft	SLOPE ft/ft	t _i min	LENGTH ft	SLOPE ft/ft	C _v	VEL. fps	t _t min	COMP. t _c	Is Project Urban?		IMP %	tc First DP	tc min		
													Yes						
													(1)	(2)				(3)	
3.1	3.1	0.82	0.48	54	0.0180	3.1	188	0.0120	20	2.19	1.4	4.5	242.0	0.01	95.9%	11.0	5.0		
3.1a	3.1a	0.66	0.08			0.0				0.00	0.0	0.0	0.0	#DIV/0!	79.0%		5.0		
3.1b	3.1b	0.63	0.06			0.0				0.00	0.0	0.0	0.0	#DIV/0!	75.3%		5.0		
3.1c	3.1c	0.66	0.08			0.0				0.00	0.0	0.0	0.0	#DIV/0!	79.0%		5.0		
3.1d	3.1d	0.46	0.05			0.0				0.00	0.0	0.0	0.0	#DIV/0!	56.8%		5.0		
3.2	3.2	0.86	0.13			0.0				0.00	0.0	0.0	0.0	#DIV/0!	100.0%		5.0		
3.3	3.3	0.76	0.09			0.0				0.00	0.0	0.0	0.0	#DIV/0!	89.1%		5.0		
3.3a	3.3a	0.09	0.09			0.0				0.00	0.0	0.0	0.0	#DIV/0!	12.9%		5.0		
3.3b	3.3b	0.32	0.21			0.0				0.00	0.0	0.0	0.0	#DIV/0!	40.2%		5.0		
3.3c	3.3c	0.51	0.25			0.0				0.00	0.0	0.0	0.0	#DIV/0!	61.8%		5.0		
3.4	3.4	0.80	0.35	69	0.0380	2.8	130	0.0280	20	3.35	0.6	3.5	199.0	0.03	94.4%	10.5	5.0		
3.5a	3.5a	0.81	0.20			0.0				0.00	0.0	0.0	0.0	#DIV/0!	95.1%		5.0		
3.5b	3.5b	0.79	0.13			0.0				0.00	0.0	0.0	0.0	#DIV/0!	92.5%		5.0		
3.6	3.6	0.80	0.15			0.0				0.00	0.0	0.0	0.0	#DIV/0!	93.5%		5.0		
3.6a	3.6a	0.55	0.15			0.0				0.00	0.0	0.0	0.0	#DIV/0!	66.5%		5.0		
3.7	3.7	0.86	0.16			0.0				0.00	0.0	0.0	0.0	#DIV/0!	100.0%		5.0		
3.7a	3.7a	0.50	0.06			0.0				0.00	0.0	0.0	0.0	#DIV/0!	60.7%		5.0		
3.8	3.8	0.63	0.32	87	0.0700	4.2	175	0.0300	20	3.46	0.8	5.0	262.0	0.04	75.5%	14.0	5.0		
3.8a	3.8a	0.64	0.26			0.0				0.00	0.0	0.0	0.0	#DIV/0!	76.8%		5.0		
3.8b	3.8b	0.53	0.10			0.0				0.00	0.0	0.0	0.0	#DIV/0!	64.6%		5.0		
3.9	3.9	0.53	0.91	102	0.2500	3.6	307	0.0200	20	2.83	1.8	5.4	409.0	0.08	64.2%	17.1	5.4		
3.0	3.0	0.09	0.73			0.0				0.00	0.0	0.0	0.0	#DIV/0!	12.4%		5.0		

*Velocity (V) = C_vS_w^{0.5}

TABLE 6-2

Type of Land Surface	Conveyance Coefficient, C _v
Heavy Meadow	2.5
Tillage / Field	5
Short Pasture and Lawns	7
Nearly Bare Ground	10
Grassed Waterway	15
Paved Areas and Shallow Paved Swales	20

*Table 6-2, UDFCD (V.1), Chapter 6, Page 6-5

in which: C_v = Conveyance Coefficient (See Table Above)
 S_w = Watercourse Slope (ft/ft)



CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 2-YEAR
 ONE-HR PRECIP: 0.421

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
3.1	3.1	0.48	0.80	5.0	0.38	1.61	0.61					
3.1a	3.1a	0.08	0.63	5.0	0.05	1.61	0.08					
3.1b	3.1b	0.06	0.60	5.0	0.04	1.61	0.06					
3.1c	3.1c	0.08	0.63	5.0	0.05	1.61	0.08					
3.1d	3.1d	0.05	0.43	5.0	0.02	1.61	0.03					
3.2	3.2	0.13	0.84	5.0	0.11	1.61	0.17					
3.3	3.3	0.09	0.73	5.0	0.07	1.61	0.11					
3.3a	3.3a	0.09	0.08	5.0	0.01	1.61	0.01					
3.3b	3.3b	0.21	0.29	5.0	0.06	1.61	0.10					
3.3c	3.3c	0.25	0.48	5.0	0.12	1.61	0.19					
3.4	3.4	0.35	0.78	5.0	0.27	1.61	0.44					
3.5a	3.5a	0.20	0.79	5.0	0.16	1.61	0.25					
3.5b	3.5b	0.13	0.76	5.0	0.10	1.61	0.16					
3.6	3.6	0.15	0.77	5.0	0.12	1.61	0.19					
3.6a	3.6a	0.15	0.52	5.0	0.08	1.61	0.13					
3.7	3.7	0.16	0.84	5.0	0.13	1.61	0.22					
3.7a	3.7a	0.06	0.47	5.0	0.03	1.61	0.04					
3.8	3.8	0.32	0.60	5.0	0.19	1.61	0.31					
3.8a	3.8a	0.26	0.61	5.0	0.16	1.61	0.26					
3.8b	3.8b	0.10	0.50	5.0	0.05	1.61	0.08					
3.9	3.9	0.91	0.50	5.4	0.45	1.60	0.72					
3.0	3.0	0.73	0.07	5.0	0.05	1.61	0.09					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P_1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)

P1 = 1-Hour Point Rainfall Depth (Inches)

t_c = Time Of Concentration (Minutes)



Not used, rainfall intensities obtained from PW Manual IDF data (Typ.)

CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 5-YEAR
 ONE-HR PRECIP: 0.573

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
3.1	3.1	0.48	0.82	5.0	0.39	2.43	0.96					
3.1a	3.1a	0.08	0.66	5.0	0.05	2.43	0.13					
3.1b	3.1b	0.06	0.63	5.0	0.04	2.43	0.09					
3.1c	3.1c	0.08	0.66	5.0	0.05	2.43	0.13					
3.1d	3.1d	0.05	0.46	5.0	0.02	2.43	0.06					
3.2	3.2	0.13	0.86	5.0	0.11	2.43	0.27					
3.3	3.3	0.09	0.76	5.0	0.07	2.43	0.17					
3.3a	3.3a	0.09	0.09	5.0	0.01	2.43	0.02					
3.3b	3.3b	0.21	0.32	5.0	0.07	2.43	0.16					
3.3c	3.3c	0.25	0.51	5.0	0.13	2.43	0.31					
3.4	3.4	0.35	0.80	5.0	0.28	2.43	0.68					
3.5a	3.5a	0.20	0.81	5.0	0.16	2.43	0.39					
3.5b	3.5b	0.13	0.79	5.0	0.10	2.43	0.25					
3.6	3.6	0.15	0.80	5.0	0.12	2.43	0.29					
3.6a	3.6a	0.15	0.55	5.0	0.08	2.43	0.20					
3.7	3.7	0.16	0.86	5.0	0.14	2.43	0.33					
3.7a	3.7a	0.06	0.50	5.0	0.03	2.43	0.07					
3.8	3.8	0.32	0.63	5.0	0.20	2.43	0.49					
3.8a	3.8a	0.26	0.64	5.0	0.17	2.43	0.41					
3.8b	3.8b	0.10	0.53	5.0	0.05	2.43	0.13					
3.9	3.9	0.91	0.53	5.4	0.48	2.41	1.16					
3.0	3.0	0.73	0.09	5.0	0.06	2.43	0.16					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)
 P1 = 1-Hour Point Rainfall Depth (Inches)
 t_c = Time Of Concentration (Minutes)



CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 25-YEAR
 ONE-HR PRECIP: 0.883

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
3.1	3.1	0.48	0.85	5.0	0.41	3.62	1.48					
3.1a	3.1a	0.08	0.75	5.0	0.06	3.62	0.22					
3.1b	3.1b	0.06	0.72	5.0	0.04	3.62	0.16					
3.1c	3.1c	0.08	0.75	5.0	0.06	3.62	0.22					
3.1d	3.1d	0.05	0.61	5.0	0.03	3.62	0.11					
3.2	3.2	0.13	0.88	5.0	0.11	3.62	0.41					
3.3	3.3	0.09	0.81	5.0	0.07	3.62	0.26					
3.3a	3.3a	0.09	0.33	5.0	0.03	3.62	0.11					
3.3b	3.3b	0.21	0.50	5.0	0.11	3.62	0.38					
3.3c	3.3c	0.25	0.64	5.0	0.16	3.62	0.58					
3.4	3.4	0.35	0.84	5.0	0.30	3.62	1.07					
3.5a	3.5a	0.20	0.85	5.0	0.17	3.62	0.61					
3.5b	3.5b	0.13	0.83	5.0	0.11	3.62	0.39					
3.6	3.6	0.15	0.84	5.0	0.13	3.62	0.45					
3.6a	3.6a	0.15	0.67	5.0	0.10	3.62	0.36					
3.7	3.7	0.16	0.88	5.0	0.14	3.62	0.51					
3.7a	3.7a	0.06	0.63	5.0	0.04	3.62	0.14					
3.8	3.8	0.32	0.72	5.0	0.23	3.62	0.84					
3.8a	3.8a	0.26	0.73	5.0	0.19	3.62	0.69					
3.8b	3.8b	0.10	0.66	5.0	0.07	3.62	0.24					
3.9	3.9	0.91	0.65	5.4	0.59	3.59	2.14					
3.0	3.0	0.73	0.33	5.0	0.24	3.62	0.86					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)
 P1 = 1-Hour Point Rainfall Depth (Inches)
 t_c = Time Of Concentration (Minutes)



CALCULATED BY: MB
 CHECKED BY: DV
 DATE: 07/01/24

STANDARD FORM SF-3
 STORM DRAINAGE SYSTEM DESIGN
 (RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
 PROJECT: Hockett Gulch
 DESIGN STORM: 100-YEAR
 ONE-HR PRECIP: 1.17

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
3.1	3.1	0.48	0.87	5.0	0.42	4.59	1.92					
3.1a	3.1a	0.08	0.79	5.0	0.06	4.59	0.29					
3.1b	3.1b	0.06	0.78	5.0	0.05	4.59	0.21					
3.1c	3.1c	0.08	0.79	5.0	0.06	4.59	0.29					
3.1d	3.1d	0.05	0.69	5.0	0.03	4.59	0.16					
3.2	3.2	0.13	0.89	5.0	0.12	4.59	0.53					
3.3	3.3	0.09	0.84	5.0	0.08	4.59	0.35					
3.3a	3.3a	0.09	0.49	5.0	0.04	4.59	0.20					
3.3b	3.3b	0.21	0.61	5.0	0.13	4.59	0.59					
3.3c	3.3c	0.25	0.71	5.0	0.18	4.59	0.82					
3.4	3.4	0.35	0.86	5.0	0.30	4.59	1.39					
3.5a	3.5a	0.20	0.87	5.0	0.17	4.59	0.80					
3.5b	3.5b	0.13	0.86	5.0	0.11	4.59	0.51					
3.6	3.6	0.15	0.86	5.0	0.13	4.59	0.59					
3.6a	3.6a	0.15	0.74	5.0	0.11	4.59	0.51					
3.7	3.7	0.16	0.89	5.0	0.14	4.59	0.65					
3.7a	3.7a	0.06	0.71	5.0	0.04	4.59	0.20					
3.8	3.8	0.32	0.78	5.0	0.25	4.59	1.14					
3.8a	3.8a	0.26	0.78	5.0	0.20	4.59	0.93					
3.8b	3.8b	0.10	0.73	5.0	0.07	4.59	0.33					
3.9	3.9	0.91	0.72	5.4	0.66	4.55	3.00					
3.0	3.0	0.73	0.48	5.0	0.35	4.59	1.62					

I. One-Hr Precipitation Values from NOAA Atlas 14 PFDS

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

*Equation 5-1, UDFCD (V.1), Chapter 5, Page 5-9

*Rainfall Intensity:

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

In Which:

I = Rainfall Intensity (Inches Per Hour)
 P1 = 1-Hour Point Rainfall Depth (Inches)
 t_c = Time Of Concentration (Minutes)



PROJECT: Hockett Gulch
 JOB NO: 23.101
 DATE: 07/01/24



RUNOFF SUMMARY							
BASIN	DESIGN POINT	AREA (ACRES)	% IMP.	C ₂₅	C ₁₀₀	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
3.1	3.1	0.48	95.9%	0.85	0.87	1.48	1.92
3.1a	3.1a	0.08	79.0%	0.75	0.79	0.22	0.29
3.1b	3.1b	0.06	75.3%	0.72	0.78	0.16	0.21
3.1c	3.1c	0.08	79.0%	0.75	0.79	0.22	0.29
3.1d	3.1d	0.05	56.8%	0.61	0.69	0.11	0.16
3.2	3.2	0.13	100.0%	0.88	0.89	0.41	0.53
3.3	3.3	0.09	89.1%	0.81	0.84	0.26	0.35
3.3a	3.3a	0.09	12.9%	0.33	0.49	0.11	0.20
3.3b	3.3b	0.21	40.2%	0.50	0.61	0.38	0.59
3.3c	3.3c	0.25	61.8%	0.64	0.71	0.58	0.82
3.4	3.4	0.35	94.4%	0.84	0.86	1.07	1.39
3.5a	3.5a	0.20	95.1%	0.85	0.87	0.61	0.80
3.5b	3.5b	0.13	92.5%	0.83	0.86	0.39	0.51
3.6	3.6	0.15	93.5%	0.84	0.86	0.45	0.59
3.6a	3.6a	0.15	66.5%	0.67	0.74	0.36	0.51
3.7	3.7	0.16	100.0%	0.88	0.89	0.51	0.65
3.7a	3.7a	0.06	60.7%	0.63	0.71	0.14	0.20
3.8	3.8	0.32	75.5%	0.72	0.78	0.84	1.14
3.8a	3.8a	0.26	76.8%	0.73	0.78	0.69	0.93
3.8b	3.8b	0.10	64.6%	0.66	0.73	0.24	0.33
3.9	3.9	0.91	64.2%	0.65	0.72	2.14	3.00
3.0	3.0	0.73	12.4%	0.33	0.48	0.86	1.62
SITE COMPOSITE		5.04	67.1%	0.56	0.74	12.23	17.04

PROJECT INFORMATION

PROJECT NAME: Hockett Gulch
 PROJECT NO: 23.1012
 DESIGN BY: MB
 REVIEWED BY: DV
 JURISDICTION: Town of Eagle
 REPORT TYPE: Drainage
 DATE: 07/16/24



JURISDICTIONAL STANDARD	C2	C5	C25	C100	% IMPERV
LANDSCAPE	0.01	0.01	0.26	0.44	2%
ROOF	0.74	0.76	0.81	0.84	90%
PAVED	0.84	0.86	0.88	0.89	100%
DRIVES AND WALKS	0.74	0.76	0.81	0.84	90%

TOTAL SITE COMPOSITE	6.36	0.48	0.50	0.63	0.71	60.3%
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SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.0	LANDSCAPE	0.26	0.01	0.01	0.88	0.44	2%
SUB-BASIN COMPOSITE		0.26	0.01	0.01	0.26	0.44	2.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.1	PAVED	0.03	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.03	0.84	0.86	0.88	0.89	100.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.2	PAVED	0.24	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.24	0.84	0.86	0.88	0.89	100.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.3	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.16	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.17	0.78	0.80	0.84	0.86	94.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.3a	LANDSCAPE	0.29	0.01	0.01	0.26	0.44	2%
	ROOF	0.18	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.47	0.25	0.28	0.47	0.59	35.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.4	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	GRAVEL	0.01	0.29	0.32	0.50	0.61	40%
	PAVED	0.12	0.84	0.86	0.86	0.89	100%
SUB-BASIN COMPOSITE		0.14	0.73	0.75	0.81	0.84	88.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.4a	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	GRAVEL	0.01	0.29	0.32	0.50	0.61	40%
	PAVED	0.16	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.18	0.75	0.78	0.82	0.85	91.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.4b	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.04	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.05	0.57	0.60	0.71	0.76	72.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.4c	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	GRAVEL	0.04	0.29	0.32	0.50	0.61	40%
SUB-BASIN COMPOSITE		0.06	0.18	0.21	0.42	0.55	27.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.5	LANDSCAPE	0.07	0.01	0.01	0.26	0.44	2%
	PAVED	0.16	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.23	0.55	0.58	0.69	0.75	70.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.5a	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.04	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.05	0.57	0.60	0.71	0.76	72.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.5b	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.03	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.04	0.53	0.56	0.68	0.74	68.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.6	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	PAVED	0.04	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.05	0.65	0.68	0.76	0.80	80.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.6a	LANDSCAPE	0.11	0.01	0.01	0.26	0.44	2%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.12	0.06	0.07	0.31	0.47	10.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.7	PAVED	0.05	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.05	0.84	0.86	0.88	0.89	100.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.8	PAVED	0.09	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.09	0.84	0.86	0.88	0.89	100.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.9	LANDSCAPE	0.06	0.01	0.01	0.26	0.44	2%
	ROOF	0.13	0.74	0.76	0.81	0.84	90%
	PAVED	0.27	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.46	0.68	0.71	0.78	0.82	84.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.10	ROOF	0.02	0.74	0.76	0.81	0.84	90%
	PAVED	0.09	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.11	0.82	0.84	0.87	0.88	98.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.10a	LANDSCAPE	0.70	0.01	0.01	0.26	0.44	2%
	ROOF	0.28	0.74	0.76	0.81	0.84	90%
	GRAVEL	0.02	0.29	0.32	0.50	0.61	40%
SUB-BASIN COMPOSITE		1.00	0.18	0.21	0.42	0.55	27.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.11	ROOF	0.03	0.74	0.76	0.88	0.84	90%
	PAVED	0.06	0.84	0.86	0.86	0.89	100%
SUB-BASIN COMPOSITE		0.09	0.80	0.83	0.86	0.88	96.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.12	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.03	0.74	0.76	0.78	0.84	90%
	PAVED	0.22	0.84	0.86	0.86	0.89	100%
SUB-BASIN COMPOSITE		0.26	0.79	0.81	0.85	0.87	95.1%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.12a	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.05	0.74	0.76	0.81	0.84	90%
SUB-BASIN COMPOSITE		0.06	0.60	0.63	0.72	0.78	75.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.12b	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.03	0.24	0.27	0.47	0.59	34.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.13	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.09	0.74	0.76	0.81	0.84	90%
	PAVED	0.29	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.39	0.79	0.81	0.85	0.87	95.2%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.13a	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	GRAVEL	0.02	0.29	0.32	0.50	0.61	40%
SUB-BASIN COMPOSITE		0.04	0.13	0.16	0.38	0.52	21.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.13b	LANDSCAPE	0.02	0.01	0.01	0.26	0.44	2%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.03	0.24	0.27	0.47	0.59	34.7%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.14	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.05	0.74	0.76	0.81	0.84	90%
	PAVED	0.19	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.25	0.78	0.80	0.84	0.86	94.1%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.15	ROOF	0.08	0.74	0.76	0.81	0.84	90%
	PAVED	0.15	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.23	0.80	0.82	0.86	0.87	96.5%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.15a	LANDSCAPE	0.04	0.01	0.01	0.26	0.44	2%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.05	0.14	0.16	0.39	0.53	21.6%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.16	LANDSCAPE	0.04	0.01	0.01	0.26	0.44	2%
	ROOF	0.03	0.74	0.76	0.81	0.84	90%
	PAVED	0.20	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.27	0.68	0.71	0.78	0.82	84.4%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.16b	LANDSCAPE	0.01	0.01	0.01	0.26	0.44	2%
	ROOF	0.01	0.74	0.76	0.81	0.84	90%
	PAVED	0.01	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.03	0.50	0.53	0.65	0.72	64.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4.16a	LANDSCAPE	0.24	0.01	0.01	0.26	0.44	2%
	GRAVEL	0.17	0.29	0.32	0.50	0.61	40%
	PAVED	0.06	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.47	0.19	0.22	0.43	0.56	28.3%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
H1	LANDSCAPE	0.29	0.01	0.01	0.26	0.44	2%
SUB-BASIN COMPOSITE		0.29	0.01	0.01	0.26	0.44	2.0%

SUB-BASIN	SURFACE CHARACTERISTICS	AREA	COMPOSITE RUNOFF COEFFICIENTS				PERCENT IMPERVIOUSNESS
		(ACRES)	C2	C5	C25	C100	
4-OS	PAVED	0.07	0.84	0.86	0.88	0.89	100%
SUB-BASIN COMPOSITE		0.07	0.84	0.86	0.88	0.89	100.0%

TOTAL SITE COMPOSITE		6.36	0.48	0.50	0.63	0.71	60.3%
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23.1012

Hockett Gulch

J:\Civil\23.1012-Hockett Gulch\ENG\DRAINAGE\Rational\Rational - Town IDF Curve Data\Rational (MHFD) - Basin 4.xlsm

23.1012

Hockett Gulch

J:\Civil\23.1012-Hockett Gulch\ENG\DRainage\Rational\Rational - Town IDF Curve Data\Rational (MHFD) - Basin 4.xlsm

CALCULATED BY: MB
CHECKED BY: DV
DATE: 07/16/24

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
PROJECT: Hockett Gulch
DESIGN STORM: 2-YEAR
ONE-HR PRECIP: 0.421

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
4.0	4.0	0.26	0.01	5.0	0.00	1.61	0.00					
4.1	4.1	0.03	0.84	5.0	0.03	1.61	0.04					
4.2	4.2	0.24	0.84	5.0	0.20	1.61	0.32					
4.3	4.3	0.17	0.78	5.0	0.13	1.61	0.21					
4.3a	4.3a	0.47	0.25	7.6	0.12	1.56	0.18					
4.4	4.4	0.14	0.73	5.0	0.10	1.61	0.16					
4.4a	4.4a	0.18	0.75	5.0	0.13	1.61	0.22					
4.4b	4.4b	0.05	0.57	5.0	0.03	1.61	0.05					
4.4c	4.4c	0.06	0.18	5.0	0.01	1.61	0.02					
4.5	4.5	0.23	0.55	5.0	0.13	1.61	0.20					
4.5a	4.5a	0.05	0.57	5.0	0.03	1.61	0.05					
4.5b	4.5b	0.04	0.53	5.0	0.02	1.61	0.03					
4.6	4.6	0.05	0.65	5.0	0.03	1.61	0.05					
4.6a	4.6a	0.12	0.06	5.0	0.01	1.61	0.01					
4.7	4.7	0.05	0.84	5.0	0.04	1.61	0.07					
4.8	4.8	0.09	0.84	5.0	0.08	1.61	0.12					
4.9	4.9	0.46	0.68	5.0	0.31	1.61	0.51					
4.10	4.10	0.11	0.82	5.0	0.09	1.61	0.14					
4.10a	4.10a	1.00	0.18	9.1	0.18	1.48	0.27					
4.11	4.11	0.09	0.80	5.0	0.07	1.61	0.12					
4.12	4.12	0.26	0.79	5.0	0.20	1.61	0.33					
4.12a	4.12a	0.06	0.60	5.0	0.04	1.61	0.06					
4.12b	4.12b	0.03	0.24	5.0	0.01	1.61	0.01					
4.13	4.13	0.39	0.79	5.0	0.31	1.61	0.49					
4.13a	4.13a	0.04	0.13	5.0	0.01	1.61	0.01					
4.13b	4.13b	0.03	0.24	5.0	0.01	1.61	0.01					
4.14	4.14	0.25	0.78	5.0	0.19	1.61	0.31					
4.15	4.15	0.23	0.80	5.0	0.18	1.61	0.30					
4.15a	4.15a	0.05	0.14	5.0	0.01	1.61	0.01					
4.16	4.16	0.27	0.68	5.0	0.18	1.61	0.30					
4.16b	4.16b	0.03	0.50	5.0	0.01	1.61	0.02					
4.16a	4.16a	0.47	0.19	9.8	0.09	1.46	0.13					
H1	H1	0.29	0.01	8.2	0.00	1.51	0.00					
4-OS	4-OS	0.07	0.84	5.0	0.06	1.61	0.09					

JOB NO: 23.1012

PROJECT: Hockett Gulch

DESIGN STORM: 2-YEAR

ONE-HR PRECIP: 0.421

[illegible]

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

~~$$T = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$~~

~~tc = Time Of Concentration (Minutes)~~



Not used, rainfall intensities obtained from PW Manual IDF data (Typ.)

CALCULATED BY: MB
CHECKED BY: DV
DATE: 07/16/24

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
PROJECT: Hockett Gulch
DESIGN STORM: 5-YEAR
ONE-HR PRECIP: 0.573

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
4.0	4.0	0.26	0.01	5.0	0.00	2.43	0.01					
4.1	4.1	0.03	0.86	5.0	0.03	2.43	0.06					
4.2	4.2	0.24	0.86	5.0	0.21	2.43	0.50					
4.3	4.3	0.17	0.80	5.0	0.14	2.43	0.33					
4.3a	4.3a	0.47	0.28	7.6	0.13	2.27	0.30					
4.4	4.4	0.14	0.75	5.0	0.11	2.43	0.26					
4.4a	4.4a	0.18	0.78	5.0	0.14	2.43	0.34					
4.4b	4.4b	0.05	0.60	5.0	0.03	2.43	0.07					
4.4c	4.4c	0.06	0.21	5.0	0.01	2.43	0.03					
4.5	4.5	0.23	0.58	5.0	0.13	2.43	0.33					
4.5a	4.5a	0.05	0.60	5.0	0.03	2.43	0.07					
4.5b	4.5b	0.04	0.56	5.0	0.02	2.43	0.05					
4.6	4.6	0.05	0.68	5.0	0.03	2.43	0.08					
4.6a	4.6a	0.12	0.07	5.0	0.01	2.43	0.02					
4.7	4.7	0.05	0.86	5.0	0.04	2.43	0.10					
4.8	4.8	0.09	0.86	5.0	0.08	2.43	0.19					
4.9	4.9	0.46	0.71	5.0	0.33	2.43	0.80					
4.10	4.10	0.11	0.84	5.0	0.09	2.43	0.22					
4.10a	4.10a	1.00	0.21	9.1	0.21	2.23	0.47					
4.11	4.11	0.09	0.83	5.0	0.07	2.43	0.18					
4.12	4.12	0.26	0.81	5.0	0.21	2.43	0.51					
4.12a	4.12a	0.06	0.63	5.0	0.04	2.43	0.09					
4.12b	4.12b	0.03	0.27	5.0	0.01	2.43	0.02					
4.13	4.13	0.39	0.81	5.0	0.32	2.43	0.77					
4.13a	4.13a	0.04	0.16	5.0	0.01	2.43	0.02					
4.13b	4.13b	0.03	0.27	5.0	0.01	2.43	0.02					
4.14	4.14	0.25	0.80	5.0	0.20	2.43	0.49					
4.15	4.15	0.23	0.82	5.0	0.19	2.43	0.46					
4.15a	4.15a	0.05	0.16	5.0	0.01	2.43	0.02					
4.16	4.16	0.27	0.71	5.0	0.19	2.43	0.47					
4.16b	4.16b	0.03	0.53	5.0	0.02	2.43	0.04					
4.16a	4.16a	0.47	0.22	9.8	0.10	2.20	0.22					
H1	H1	0.29	0.01	8.2	0.00	2.28	0.01					
4-OS	4-OS	0.07	0.86	5.0	0.06	2.43	0.15					

JOB NO: 23.1012

PROJECT: Hockett Gulch

DESIGN STORM: 5-YEAR

ONE-HR PRECIP: 0.573

[illegible]

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

tc = Time Of Concentration (Minutes)



CALCULATED BY: MB
CHECKED BY: DV
DATE: 07/16/24

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO: 23.1012
PROJECT: Hockett Gulch
DESIGN STORM: 25-YEAR
ONE-HR PRECIP: 0.883

BASIN	DESIGN POINT	DIRECT RUNOFF						TOTAL RUNOFF				REMARKS
		AREA (AC)	RUNOFF COEFF	t _c (MIN)	CxA (AC)	I (IN/HR)	Q (CFS)	t _c (MIN)	S(CxA) (AC)	I (IN/HR)	Q (CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
4.0	4.0	0.26	0.26	5.0	0.07	3.62	0.25					
4.1	4.1	0.03	0.88	5.0	0.03	3.62	0.10					
4.2	4.2	0.24	0.88	5.0	0.21	3.62	0.76					
4.3	4.3	0.17	0.84	5.0	0.14	3.62	0.52					
4.3a	4.3a	0.47	0.47	7.6	0.22	3.38	0.75					
4.4	4.4	0.14	0.81	5.0	0.11	3.62	0.41					
4.4a	4.4a	0.18	0.82	5.0	0.15	3.62	0.54					
4.4b	4.4b	0.05	0.71	5.0	0.04	3.62	0.13					
4.4c	4.4c	0.06	0.42	5.0	0.03	3.62	0.09					
4.5	4.5	0.23	0.69	5.0	0.16	3.62	0.58					
4.5a	4.5a	0.05	0.71	5.0	0.04	3.62	0.13					
4.5b	4.5b	0.04	0.68	5.0	0.03	3.62	0.10					
4.6	4.6	0.05	0.76	5.0	0.04	3.62	0.14					
4.6a	4.6a	0.12	0.31	5.0	0.04	3.62	0.14					
4.7	4.7	0.05	0.88	5.0	0.04	3.62	0.16					
4.8	4.8	0.09	0.88	5.0	0.08	3.62	0.29					
4.9	4.9	0.46	0.78	5.0	0.36	3.62	1.30					
4.10	4.10	0.11	0.87	5.0	0.10	3.62	0.35					
4.10a	4.10a	1.00	0.42	9.1	0.42	3.32	1.40					
4.11	4.11	0.09	0.86	5.0	0.08	3.62	0.28					
4.12	4.12	0.26	0.85	5.0	0.22	3.62	0.80					
4.12a	4.12a	0.06	0.72	5.0	0.04	3.62	0.16					
4.12b	4.12b	0.03	0.47	5.0	0.01	3.62	0.05					
4.13	4.13	0.39	0.85	5.0	0.33	3.62	1.20					
4.13a	4.13a	0.04	0.38	5.0	0.02	3.62	0.06					
4.13b	4.13b	0.03	0.47	5.0	0.01	3.62	0.05					
4.14	4.14	0.25	0.84	5.0	0.21	3.62	0.76					
4.15	4.15	0.23	0.86	5.0	0.20	3.62	0.71					
4.15a	4.15a	0.05	0.39	5.0	0.02	3.62	0.07					
4.16	4.16	0.27	0.78	5.0	0.21	3.62	0.76					
4.16b	4.16b	0.03	0.65	5.0	0.02	3.62	0.07					
4.16a	4.16a	0.47	0.43	9.8	0.20	3.27	0.66					
H1	H1	0.29	0.26	8.2	0.08	3.38	0.26					
4-OS	4-OS	0.07	0.88	5.0	0.06	3.62	0.22					

JOB NO: 23.1012

PROJECT: Hockett Gulch

DESIGN STORM: 25-YEAR

ONE-HR PRECIP: 0.883

[illegible]

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

tc = Time Of Concentration (Minutes)



JOB NO: 23.1012

PROJECT: Hockett Gulch

DESIGN STORM: 100-YEAR

ONE-HR PRECIP: 1.17

100-YEAR
7/16/2024 3:46 PM
J:\Civil\23.1012-Hockett Gulch\ENG\DRAINAGE\Rational\Rational - Town IDF Curve Data\Rational (MHFD) - Basin 4.xlsm

JOB NO: 23.1012

PROJECT: Hockett Gulch

DESIGN STORM: 100-YEAR

ONE-HR PRECIP: 1.17

[illegible]

Return Period:	2-YEAR	5-YEAR	25-YEAR	100-YEAR
Depth In Inches:	0.42	0.57	0.88	1.17

$$I = \frac{(28.5 \times P1)}{(10 + t_c)^{0.786}}$$

tc = Time Of Concentration (Minutes)



PROJECT: Hockett Gulch
 JOB NO: 23.101
 DATE: 07/16/24



RUNOFF SUMMARY							
BASIN	DESIGN POINT	AREA (ACRES)	% IMP.	C ₂₅	C ₁₀₀	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
4.0	4.0	0.26	2.0%	0.26	0.44	0.25	0.52
4.1	4.1	0.03	100.0%	0.88	0.89	0.10	0.12
4.2	4.2	0.24	100.0%	0.88	0.89	0.76	0.98
4.3	4.3	0.17	94.2%	0.84	0.86	0.52	0.67
4.3a	4.3a	0.47	35.7%	0.47	0.59	0.75	1.19
4.4	4.4	0.14	88.7%	0.81	0.84	0.41	0.54
4.4a	4.4a	0.18	91.2%	0.82	0.85	0.54	0.70
4.4b	4.4b	0.05	72.4%	0.71	0.76	0.13	0.18
4.4c	4.4c	0.06	27.3%	0.42	0.55	0.09	0.15
4.5	4.5	0.23	70.2%	0.69	0.75	0.58	0.79
4.5a	4.5a	0.05	72.4%	0.71	0.76	0.13	0.18
4.5b	4.5b	0.04	68.0%	0.68	0.74	0.10	0.14
4.6	4.6	0.05	80.4%	0.76	0.80	0.14	0.18
4.6a	4.6a	0.12	10.2%	0.31	0.47	0.14	0.26
4.7	4.7	0.05	100.0%	0.88	0.89	0.16	0.20
4.8	4.8	0.09	100.0%	0.88	0.89	0.29	0.37
4.9	4.9	0.46	84.4%	0.78	0.82	1.30	1.73
4.10	4.10	0.11	98.2%	0.87	0.88	0.35	0.45
4.10a	4.10a	1.00	27.4%	0.42	0.55	1.40	2.32
4.11	4.11	0.09	96.7%	0.86	0.88	0.28	0.36
4.12	4.12	0.26	95.1%	0.85	0.87	0.80	1.04
4.12a	4.12a	0.06	75.3%	0.72	0.78	0.16	0.21
4.12b	4.12b	0.03	34.7%	0.47	0.59	0.05	0.08
4.13	4.13	0.39	95.2%	0.85	0.87	1.20	1.55
4.13a	4.13a	0.04	21.0%	0.38	0.52	0.06	0.10
4.13b	4.13b	0.03	34.7%	0.47	0.59	0.05	0.08
4.14	4.14	0.25	94.1%	0.84	0.86	0.76	0.99
4.15	4.15	0.23	96.5%	0.86	0.87	0.71	0.92
4.15a	4.15a	0.05	21.6%	0.39	0.53	0.07	0.12
4.16	4.16	0.27	84.4%	0.78	0.82	0.76	1.01
4.16b	4.16b	0.03	64.0%	0.65	0.72	0.07	0.10
4.16a	4.16a	0.47	28.3%	0.43	0.56	0.66	1.09
H1	H1	0.29	2.0%	0.26	0.44	0.26	0.54
4-OS	4-OS	0.07	100.0%	0.88	0.89	0.22	0.29

RUNOFF SUMMARY
 7/16/2024 3:46 PM

PROJECT:	Hockett Gulch
JOB NO:	23.101
DATE:	07/16/24



RUNOFF SUMMARY							
BASIN	DESIGN POINT	AREA (ACRES)	% IMP.	C ₂₅	C ₁₀₀	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
SITE COMPOSITE		6.36	60.3%	0.50	0.71	14.21	20.17

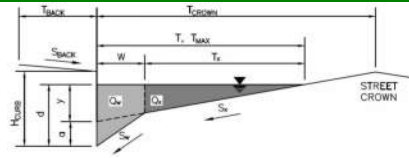


APPENDIX D

Inlet and Street Capacity Calculations

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

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

Project: **Hockett Gulch**Inlet ID: **Inlet 2.1****Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches

☐ ☐

MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

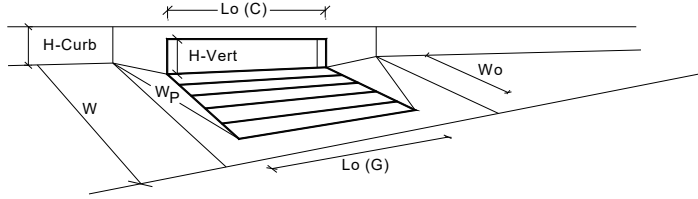
$Q_{allow} =$

	Minor Storm	Major Storm
	SUMP	SUMP

 cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



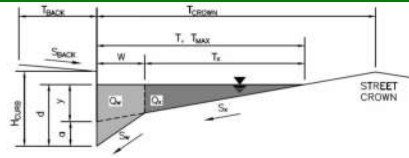
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	7.0	9.0	inches
Grate Information			MINOR	MAJOR	☒ Override Depths
Length of a Unit Grate		L _o (G) =	3.00	3.00	feet
Width of a Unit Grate		W _o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A _{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C _f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C _w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C _o (G) =	0.60	0.60	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L _o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches		H _{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches		H _{throat} =	N/A	N/A	inches
Angle of Throat		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W _p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C _f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C _w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C _o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d _{Grate} =	0.61	0.77	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	1.00	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _s =	3.5	4.6	cfs
		Q _{PEAK REQUIRED} =	3.0	4.3	cfs

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

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

Project: Hockett Gulch

Inlet ID: Inlet 2.2

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

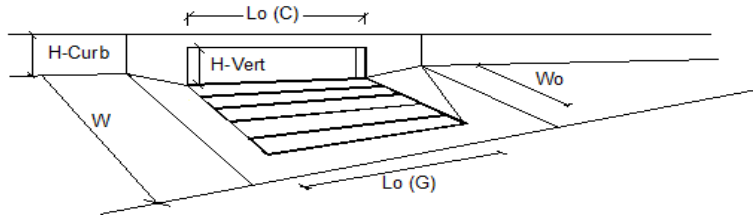
Minor Storm	Major Storm	
		cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.62 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.34 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	N/A	N/A	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	0.9	1.1	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.7	1.2	cfs
Capture Percentage = Q_i/Q_o		$C\%$ =	56	49	%

Worksheet for Inlet 2.3 - 25 yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.030 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.79 cfs
Grate Width	1.73 ft
Grate Length	3.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	32.74 %
Intercepted Flow	0.59 cfs
Bypass Flow	1.20 cfs
Flow Area	0.6 ft ²
Wetted Perimeter	11.1 ft
Top Width	11.15 ft
Velocity	2.88 ft/s
Splash Over Velocity	3.85 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.025
Grate Flow Ratio	0.310
Active Grate Length	1.5 ft
Critical Depth	1.8 in
Critical Slope	0.006 ft/ft
Froude Number	2.152
Flow Type	Supercritical
Specific Energy	0.24 ft
Velocity Head	0.13 ft
Depth	1.3 in

Worksheet for Inlet 2.3 - 25 yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 2.3 - 100 yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.030 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	2.51 cfs
Grate Width	1.73 ft
Grate Length	3.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	28.87 %
Intercepted Flow	0.72 cfs
Bypass Flow	1.79 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	12.7 ft
Top Width	12.66 ft
Velocity	3.13 ft/s
Splash Over Velocity	3.85 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.021
Grate Flow Ratio	0.273
Active Grate Length	1.5 ft
Critical Depth	2.1 in
Critical Slope	0.006 ft/ft
Froude Number	2.194
Flow Type	Supercritical
Specific Energy	0.28 ft
Velocity Head	0.15 ft
Depth	1.5 in

Worksheet for Inlet 2.3 - 100 yr

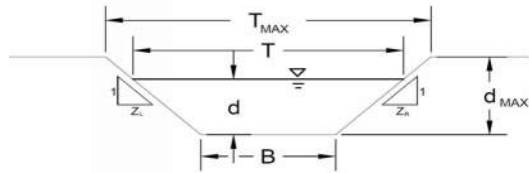
Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

AREA INLET IN A SWALE

Hockett Gulch

Inlet 2.3a



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

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

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

NRCS Vegetal Retardance (A, B, C, D, or E)

Manning's n (Leave cell D16 blank to manually enter an n value)

Channel Invert Slope

Bottom Width

Left Side Slope

Right Side Slope

Check one of the following soil types:

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

A, B, C, D, or E =

n =	0.030	ft/ft
S_0 =	0.0300	ft/ft
B =	0.00	ft
Z1 =	12.00	ft/ft
Z2 =	20.00	ft/ft

Choose One:

- ☒ Non-Cohesive
☐ Cohesive
☐ Paved

Maximum Allowable Top Width of Channel for Minor & Major Storm

Maximum Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX} =	10.00	10.00	ft
d_{MAX} =	0.50	0.50	ft

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Top Width Criterion

MAJOR STORM Allowable Capacity is based on Top Width Criterion

	Minor Storm	Major Storm	
Q_{allow} =	3.9	3.9	cfs
d_{allow} =	0.31	0.31	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow

Water Depth

Q_o =	0.2	0.2	cfs
d =	0.09	0.10	ft

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

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

AREA INLET IN A SWALE

Hockett Gulch

Inlet 2.3a

Inlet Design Information (Input)

Type of Inlet

User-Defined

Inlet Type =

User-Defined

Angle of Inclined Grate (must be ≤ 30 degrees)

Width of Grate

Length of Grate

Open Area Ratio

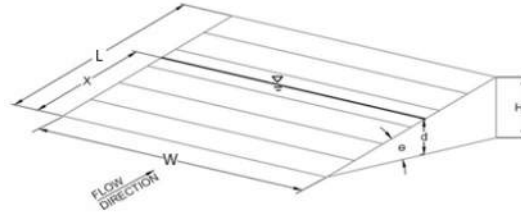
Height of Inclined Grate

Clogging Factor

Grate Discharge Coefficient

Orifice Coefficient

Weir Coefficient

 $\theta =$ 0.00 degrees

W = 2.00 ft

L = 2.00 ft

 $A_{RATIO} =$ 0.70 $H_b =$ 0.00 ft $C_f =$ 0.50 $C_d =$ N/A $C_o =$ 0.64 $C_w =$ 2.05

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

Total Inlet Interception Capacity (assumes clogged condition)

Bypassed Flow

Capture Percentage = Q_a/Q_o

	MINOR	MAJOR	
d =	0.09	0.10	
$Q_a =$	0.3	0.4	cfs
$Q_b =$	0.0	0.0	cfs
C% =	100	100	%

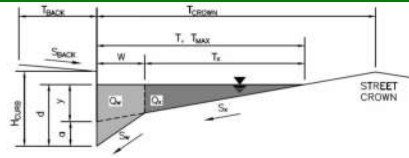
Warning 04: Froude No. exceeds USDCM Volume I recommendation.

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

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

Project: Hockett Gulch

Inlet ID: Inlet 2.4

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

 $T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$
 $H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

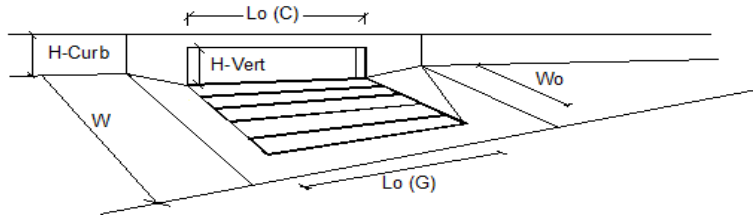
	Minor Storm	Major Storm	
$Q_{allow} =$			cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.88 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.55 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination	
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0 inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	1	1
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00 ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73 ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$			MINOR	MAJOR
Total Inlet Interception Capacity		Q =	1.2	1.4 cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.7	1.1 cfs
Capture Percentage = Q_o/Q_s		$C\%$ =	64	57 %

Worksheet for Inlet 2.4a - 25 yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.81 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	51.90 %
Intercepted Flow	0.42 cfs
Bypass Flow	0.39 cfs
Flow Area	0.5 ft ²
Wetted Perimeter	10.2 ft
Top Width	10.16 ft
Velocity	1.57 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.271
Grate Flow Ratio	0.340
Active Grate Length	3.0 ft
Critical Depth	1.3 in
Critical Slope	0.006 ft/ft
Froude Number	1.226
Flow Type	Supercritical
Specific Energy	0.14 ft
Velocity Head	0.04 ft
Depth	1.2 in

Worksheet for Inlet 2.4a - 25 yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 2.4a - 100 yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.06 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	47.93 %
Intercepted Flow	0.51 cfs
Bypass Flow	0.55 cfs
Flow Area	0.6 ft ²
Wetted Perimeter	11.3 ft
Top Width	11.25 ft
Velocity	1.67 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.248
Grate Flow Ratio	0.307
Active Grate Length	3.0 ft
Critical Depth	1.5 in
Critical Slope	0.006 ft/ft
Froude Number	1.244
Flow Type	Supercritical
Specific Energy	0.16 ft
Velocity Head	0.04 ft
Depth	1.4 in

Worksheet for Inlet 2.4a - 100 yr

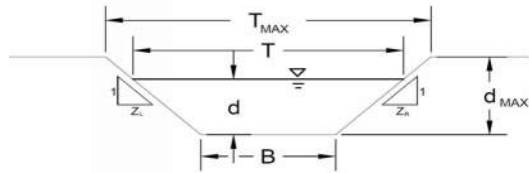
Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

AREA INLET IN A SWALE

Hocket Gulch

Inlet 2.5a



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

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

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

NRCS Vegetal Retardance (A, B, C, D, or E)

Manning's n (Leave cell D16 blank to manually enter an n value)

Channel Invert Slope

Bottom Width

Left Side Slope

Right Side Slope

Check one of the following soil types:

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

A, B, C, D, or E =

n =	0.030	
S_0 =	0.0200	ft/ft
B =	0.00	ft
Z1 =	10.00	ft/ft
Z2 =	10.00	ft/ft

Choose One:

- ☐ Non-Cohesive
☐ Cohesive
☐ Paved

Maximum Allowable Top Width of Channel for Minor & Major Storm

Maximum Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX} =	10.00	10.00	ft
d_{MAX} =	0.50	0.50	ft

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	6.9	6.9	cfs
d_{allow} =	0.50	0.50	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow

Water Depth

Q_o =	0.7	0.9	cfs
d =	0.21	0.24	ft

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

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

AREA INLET IN A SWALE

Hocket Gulch

Inlet 2.5a

Inlet Design Information (Input)

Type of Inlet

CDOT Type C

Inlet Type =

CDOT Type C

Angle of Inclined Grate (must be ≤ 30 degrees)

Width of Grate

Length of Grate

Open Area Ratio

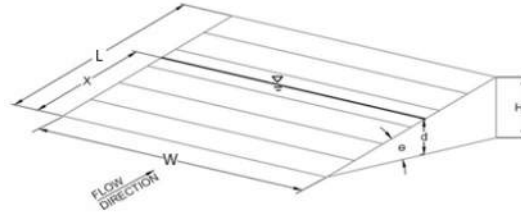
Height of Inclined Grate

Clogging Factor

Grate Discharge Coefficient

Orifice Coefficient

Weir Coefficient



θ = 0.00 degrees

W = 3.00 ft

L = 3.00 ft

A_{RATIO} = 0.70H_B = 0.00 ftC_f = 0.50C_g = 0.96C_o = 0.64C_w = 2.05

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

Total Inlet Interception Capacity (assumes clogged condition)

Bypassed Flow

Capture Percentage = Q_a/Q_o

	MINOR	MAJOR	
d =	0.21	0.24	
Q _a =	1.8	2.1	cfs
Q _b =	0.0	0.0	cfs
C% =	100	100	%

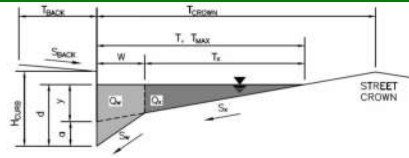
Warning 04: Froude No. exceeds USDCM Volume I recommendation.

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

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

Project: Hockett Gulch

Inlet ID: Inlet 3.1

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches

☐ ☐

MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

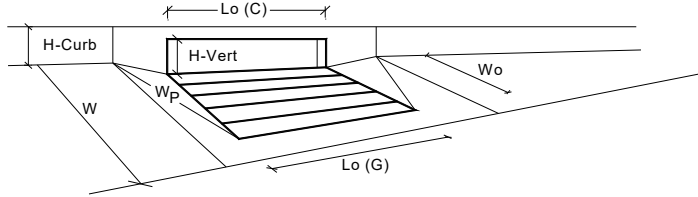
$Q_{allow} =$

Minor Storm	Major Storm
SUMP	SUMP

 cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	7.0	inches
Grate Information			MINOR	MAJOR	☒ Override Depths
Length of a Unit Grate		L _o (G) =	3.00	3.00	feet
Width of a Unit Grate		W _o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A _{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C _f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C _w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C _o (G) =	0.60	0.60	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L _o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches		H _{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches		H _{throat} =	N/A	N/A	inches
Angle of Throat		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W _p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C _f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C _w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C _o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d _{Grate} =	0.51	0.59	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	0.94	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _s =	2.6	3.4	cfs
		Q _{PEAK REQUIRED} =	1.7	2.2	cfs

Worksheet for Inlet 3.2 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.015 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.41 cfs
Grate Width	1.73 ft
Grate Length	3.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	51.25 %
Intercepted Flow	0.21 cfs
Bypass Flow	0.20 cfs
Flow Area	0.3 ft ²
Wetted Perimeter	7.3 ft
Top Width	7.29 ft
Velocity	1.54 ft/s
Splash Over Velocity	3.85 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.072
Grate Flow Ratio	0.475
Active Grate Length	1.5 ft
Critical Depth	1.0 in
Critical Slope	0.007 ft/ft
Froude Number	1.425
Flow Type	Supercritical
Specific Energy	0.11 ft
Velocity Head	0.04 ft
Depth	0.9 in

Worksheet for Inlet 3.2 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.2 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.015 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.53 cfs
Grate Width	1.73 ft
Grate Length	3.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	46.78 %
Intercepted Flow	0.25 cfs
Bypass Flow	0.28 cfs
Flow Area	0.3 ft ²
Wetted Perimeter	8.0 ft
Top Width	8.03 ft
Velocity	1.64 ft/s
Splash Over Velocity	3.85 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.065
Grate Flow Ratio	0.431
Active Grate Length	1.5 ft
Critical Depth	1.1 in
Critical Slope	0.007 ft/ft
Froude Number	1.447
Flow Type	Supercritical
Specific Energy	0.12 ft
Velocity Head	0.04 ft
Depth	1.0 in

Worksheet for Inlet 3.2 - 100 Yr

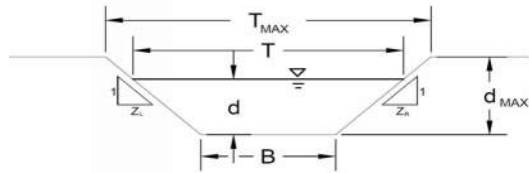
Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

AREA INLET IN A SWALE

Hockett Gulch

Inlet 3.3



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

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

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

NRCS Vegetal Retardance (A, B, C, D, or E)

Manning's n (Leave cell D16 blank to manually enter an n value)

Channel Invert Slope

Bottom Width

Left Side Slope

Right Side Slope

Check one of the following soil types:

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

A, B, C, D, or E =

n =	0.013	
S_0 =	0.0100	ft/ft
B =	0.00	ft
Z1 =	50.00	ft/ft
Z2 =	50.00	ft/ft

Choose One:

- ☐ Non-Cohesive
☐ Cohesive
☐ Paved

Maximum Allowable Top Width of Channel for Minor & Major Storm

Maximum Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX} =	20.00	20.00	ft
d_{MAX} =	0.50	0.50	ft

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Top Width Criterion

MAJOR STORM Allowable Capacity is based on Top Width Criterion

	Minor Storm	Major Storm	
Q_{allow} =	4.9	4.9	cfs
d_{allow} =	0.20	0.20	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow

Water Depth

Q_o =	0.3	0.4	cfs
d =	0.07	0.07	ft

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

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

AREA INLET IN A SWALE

Hockett Gulch

Inlet 3.3

Inlet Design Information (Input)

Type of Inlet

User-Defined

Inlet Type =

User-Defined

Angle of Inclined Grate (must be ≤ 30 degrees)

Width of Grate

Length of Grate

Open Area Ratio

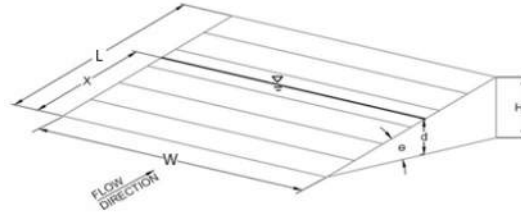
Height of Inclined Grate

Clogging Factor

Grate Discharge Coefficient

Orifice Coefficient

Weir Coefficient

 $\theta =$ 0.00 degrees $W =$ 1.73 ft $L =$ 3.00 ft $A_{\text{RATIO}} =$ 0.43 $H_b =$ 0.00 ft $C_f =$ 0.50 $C_d =$ N/A $C_o =$ 0.60 $C_w =$ 3.30

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

Total Inlet Interception Capacity (assumes clogged condition)

Bypassed Flow

Capture Percentage = Q_a/Q_o

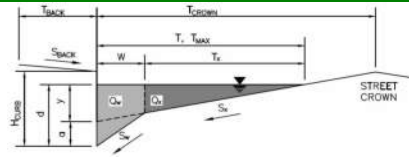
	MINOR	MAJOR	
$d =$	0.07	0.07	
$Q_a =$	0.3	0.4	cfs
$Q_b =$	0.0	0.0	cfs
$C\% =$	100	100	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 3.4

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_x =$ ft/ft
 $S_w =$ ft/ft
 $S_o =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches

☐ ☐

MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

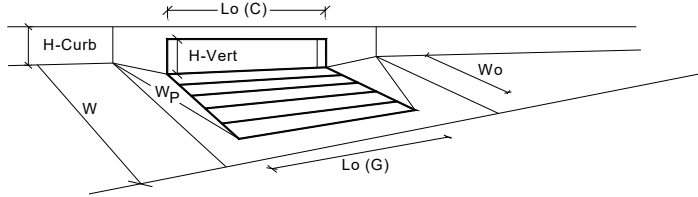
$Q_{allow} =$

Minor Storm	Major Storm
SUMP	SUMP

 cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	3	3	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	4.9	6.0	inches
Grate Information			MINOR	MAJOR	Override Depths
Length of a Unit Grate		L _o (G) =	3.00	3.00	feet
Width of a Unit Grate		W _o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A _{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C _f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C _w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C _o (G) =	0.60	0.60	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L _o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches		H _{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches		H _{throat} =	N/A	N/A	inches
Angle of Throat		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W _p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C _f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C _w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C _o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d _{Grate} =	0.42	0.51	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	0.46	0.57	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _s =	2.6	4.2	cfs
		Q _{PEAK REQUIRED} =	2.3	1.9	cfs

Worksheet for Inlet 3.5a - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.035 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.01 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	47.25 %
Intercepted Flow	0.48 cfs
Bypass Flow	0.53 cfs
Flow Area	0.4 ft ²
Wetted Perimeter	8.7 ft
Top Width	8.73 ft
Velocity	2.65 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.126
Grate Flow Ratio	0.396
Active Grate Length	3.0 ft
Critical Depth	1.4 in
Critical Slope	0.006 ft/ft
Froude Number	2.236
Flow Type	Supercritical
Specific Energy	0.20 ft
Velocity Head	0.11 ft
Depth	1.0 in

Worksheet for Inlet 3.5a - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.5a - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.035 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.99 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	37.39 %
Intercepted Flow	0.74 cfs
Bypass Flow	1.25 cfs
Flow Area	0.6 ft ²
Wetted Perimeter	11.3 ft
Top Width	11.27 ft
Velocity	3.13 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.096
Grate Flow Ratio	0.307
Active Grate Length	3.0 ft
Critical Depth	1.9 in
Critical Slope	0.006 ft/ft
Froude Number	2.328
Flow Type	Supercritical
Specific Energy	0.27 ft
Velocity Head	0.15 ft
Depth	1.4 in

Worksheet for Inlet 3.5a - 100 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.5b - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.015 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.81 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	50.64 %
Intercepted Flow	0.41 cfs
Bypass Flow	0.40 cfs
Flow Area	0.4 ft ²
Wetted Perimeter	9.4 ft
Top Width	9.41 ft
Velocity	1.83 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.219
Grate Flow Ratio	0.368
Active Grate Length	3.0 ft
Critical Depth	1.3 in
Critical Slope	0.006 ft/ft
Froude Number	1.489
Flow Type	Supercritical
Specific Energy	0.15 ft
Velocity Head	0.05 ft
Depth	1.1 in

Worksheet for Inlet 3.5b - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

3.5b-100

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.015 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.93 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	38.31 %
Intercepted Flow	0.74 cfs
Bypass Flow	1.19 cfs
Flow Area	0.9 ft ²
Wetted Perimeter	13.1 ft
Top Width	13.05 ft
Velocity	2.27 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.161
Grate Flow Ratio	0.265
Active Grate Length	3.0 ft
Critical Depth	1.9 in
Critical Slope	0.006 ft/ft
Froude Number	1.564
Flow Type	Supercritical
Specific Energy	0.21 ft
Velocity Head	0.08 ft
Depth	1.6 in

3.5b-100

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.6 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.85 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	51.17 %
Intercepted Flow	0.43 cfs
Bypass Flow	0.42 cfs
Flow Area	0.5 ft ²
Wetted Perimeter	10.4 ft
Top Width	10.35 ft
Velocity	1.59 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.267
Grate Flow Ratio	0.334
Active Grate Length	3.0 ft
Critical Depth	1.4 in
Critical Slope	0.006 ft/ft
Froude Number	1.230
Flow Type	Supercritical
Specific Energy	0.14 ft
Velocity Head	0.04 ft
Depth	1.2 in

Worksheet for Inlet 3.6 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.6 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.39 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	44.12 %
Intercepted Flow	0.61 cfs
Bypass Flow	0.78 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	12.5 ft
Top Width	12.47 ft
Velocity	1.79 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.227
Grate Flow Ratio	0.278
Active Grate Length	3.0 ft
Critical Depth	1.6 in
Critical Slope	0.006 ft/ft
Froude Number	1.263
Flow Type	Supercritical
Specific Energy	0.17 ft
Velocity Head	0.05 ft
Depth	1.5 in

Worksheet for Inlet 3.6 - 100 Yr

Messages:

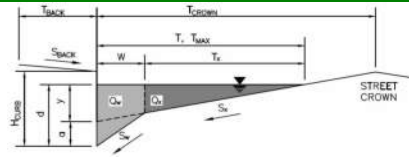
Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

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

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

Project: Hockett Gulch

Inlet ID: Inlet 3.7

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

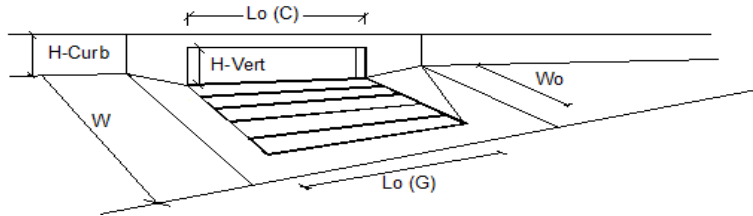
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.74 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.57 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	1.3	1.7	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.4	0.8	cfs
Capture Percentage = Q_i/Q_o		$C\%$ =	76	67	%

Worksheet for Inlet 3.8 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.030 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.97 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	37.39 %
Intercepted Flow	0.74 cfs
Bypass Flow	1.23 cfs
Flow Area	0.7 ft ²
Wetted Perimeter	11.6 ft
Top Width	11.56 ft
Velocity	2.95 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.106
Grate Flow Ratio	0.299
Active Grate Length	3.0 ft
Critical Depth	1.9 in
Critical Slope	0.006 ft/ft
Froude Number	2.162
Flow Type	Supercritical
Specific Energy	0.25 ft
Velocity Head	0.14 ft
Depth	1.4 in

Worksheet for Inlet 3.8 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.8 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.030 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	2.86 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	32.80 %
Intercepted Flow	0.94 cfs
Bypass Flow	1.92 cfs
Flow Area	0.9 ft ²
Wetted Perimeter	13.3 ft
Top Width	13.29 ft
Velocity	3.24 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.091
Grate Flow Ratio	0.260
Active Grate Length	3.0 ft
Critical Depth	2.2 in
Critical Slope	0.005 ft/ft
Froude Number	2.216
Flow Type	Supercritical
Specific Energy	0.30 ft
Velocity Head	0.16 ft
Depth	1.6 in

Worksheet for Inlet 3.8 - 100 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.9 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.020 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	2.14 cfs
Grate Width	1.73 ft
Grate Length	9.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	47.16 %
Intercepted Flow	1.01 cfs
Bypass Flow	1.13 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	12.9 ft
Top Width	12.87 ft
Velocity	2.58 ft/s
Splash Over Velocity	7.96 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.277
Grate Flow Ratio	0.269
Active Grate Length	4.5 ft
Critical Depth	2.0 in
Critical Slope	0.006 ft/ft
Froude Number	1.796
Flow Type	Supercritical
Specific Energy	0.23 ft
Velocity Head	0.10 ft
Depth	1.5 in

Worksheet for Inlet 3.9 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 3.9 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.020 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	3.00 cfs
Grate Width	1.73 ft
Grate Length	9.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	42.55 %
Intercepted Flow	1.28 cfs
Bypass Flow	1.72 cfs
Flow Area	1.1 ft ²
Wetted Perimeter	14.6 ft
Top Width	14.58 ft
Velocity	2.82 ft/s
Splash Over Velocity	7.96 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.247
Grate Flow Ratio	0.237
Active Grate Length	4.5 ft
Critical Depth	2.2 in
Critical Slope	0.005 ft/ft
Froude Number	1.843
Flow Type	Supercritical
Specific Energy	0.27 ft
Velocity Head	0.12 ft
Depth	1.7 in

Worksheet for Inlet 3.9 - 100 Yr

Messages:

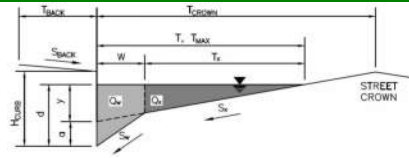
Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.1

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_x =$ ft/ft
 $S_y =$ ft/ft
 $S_o =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

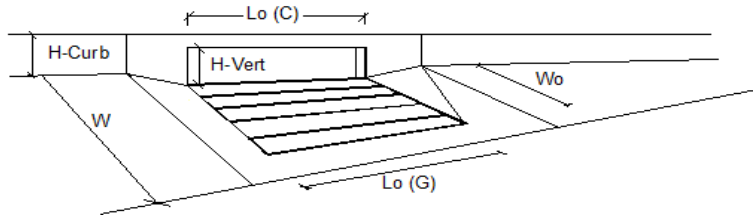
Minor Storm	Major Storm	
		cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.10 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.12 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



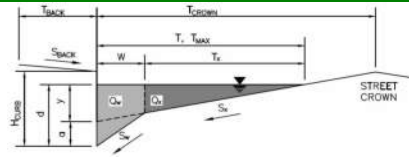
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity					
Total Inlet Interception Capacity		Q =	0.1	0.1	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _s =	0.0	0.0	cfs
Capture Percentage = Q _i /Q _a		C% =	100	100	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.2

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

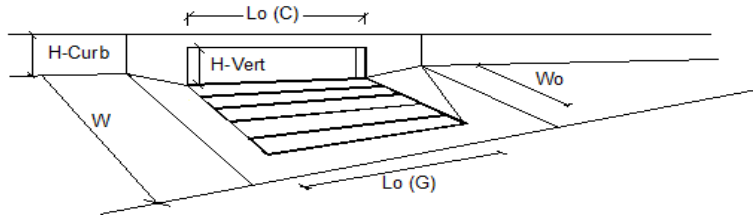
Minor Storm	Major Storm	
		cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.76 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.98 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



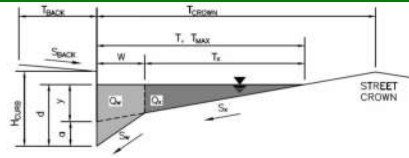
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity					
Total Inlet Interception Capacity		Q =	0.7	0.8	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _s =	0.1	0.2	cfs
Capture Percentage = Q _i /Q _a		C% =	87	82	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.3

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

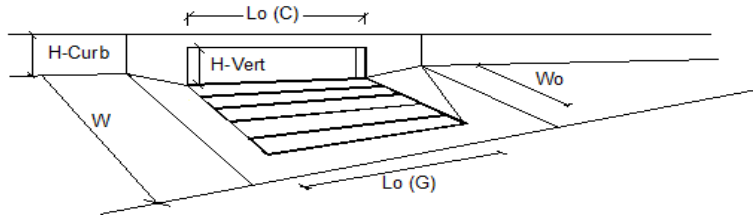
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.82 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.14 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity					
Total Inlet Interception Capacity		Q =	0.8	1.1	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _s =	0.0	0.0	cfs
Capture Percentage = Q _i /Q _a		C% =	100	99	%

Worksheet for Inlet 4.4 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.67 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	54.79 %
Intercepted Flow	0.37 cfs
Bypass Flow	0.30 cfs
Flow Area	0.4 ft ²
Wetted Perimeter	9.5 ft
Top Width	9.45 ft
Velocity	1.50 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.287
Grate Flow Ratio	0.366
Active Grate Length	3.0 ft
Critical Depth	1.2 in
Critical Slope	0.007 ft/ft
Froude Number	1.216
Flow Type	Supercritical
Specific Energy	0.13 ft
Velocity Head	0.03 ft
Depth	1.1 in

Worksheet for Inlet 4.4 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.4 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.93 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	49.84 %
Intercepted Flow	0.46 cfs
Bypass Flow	0.47 cfs
Flow Area	0.6 ft ²
Wetted Perimeter	10.7 ft
Top Width	10.71 ft
Velocity	1.62 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.259
Grate Flow Ratio	0.323
Active Grate Length	3.0 ft
Critical Depth	1.4 in
Critical Slope	0.006 ft/ft
Froude Number	1.236
Flow Type	Supercritical
Specific Energy	0.15 ft
Velocity Head	0.04 ft
Depth	1.3 in

Worksheet for Inlet 4.4 - 100 Yr

Messages:

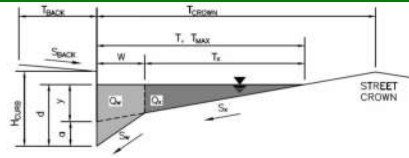
Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.4a

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_x =$ ft/ft
 $S_y =$ ft/ft
 $S_0 =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches

☐ ☐

MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

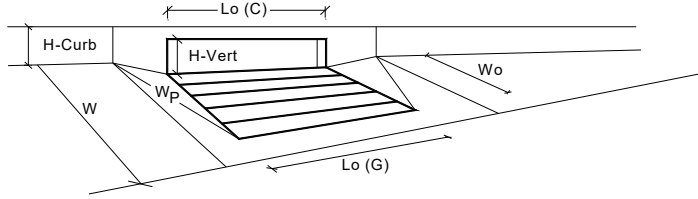
$Q_{allow} =$

Minor Storm	Major Storm
SUMP	SUMP

 cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	2	2	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	3.7	4.0	inches
Grate Information			MINOR	MAJOR	☒ Override Depths
Length of a Unit Grate		L _o (G) =	3.00	3.00	feet
Width of a Unit Grate		W _o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A _{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C _f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C _w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C _o (G) =	0.60	0.60	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L _o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches		H _{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches		H _{throat} =	N/A	N/A	inches
Angle of Throat		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W _p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C _f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C _w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C _o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d _{Grate} =	0.32	0.34	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	0.44	0.47	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)		Q _s =	1.1	1.3	cfs
		Q _{PEAK REQUIRED} =	0.5	0.7	cfs

Worksheet for Inlet 4.5 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.020 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.58 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	55.87 %
Intercepted Flow	0.32 cfs
Bypass Flow	0.26 cfs
Flow Area	0.3 ft ²
Wetted Perimeter	7.9 ft
Top Width	7.87 ft
Velocity	1.87 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.212
Grate Flow Ratio	0.440
Active Grate Length	3.0 ft
Critical Depth	1.2 in
Critical Slope	0.007 ft/ft
Froude Number	1.666
Flow Type	Supercritical
Specific Energy	0.13 ft
Velocity Head	0.05 ft
Depth	0.9 in

Worksheet for Inlet 4.5 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.5 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.020 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.79 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	50.72 %
Intercepted Flow	0.40 cfs
Bypass Flow	0.39 cfs
Flow Area	0.4 ft ²
Wetted Perimeter	8.8 ft
Top Width	8.84 ft
Velocity	2.02 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.190
Grate Flow Ratio	0.391
Active Grate Length	3.0 ft
Critical Depth	1.3 in
Critical Slope	0.006 ft/ft
Froude Number	1.694
Flow Type	Supercritical
Specific Energy	0.15 ft
Velocity Head	0.06 ft
Depth	1.1 in

Worksheet for Inlet 4.5 - 100 Yr

Messages:

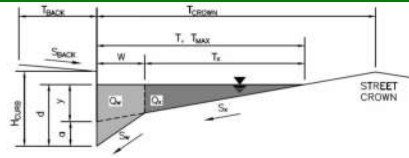
Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.6

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

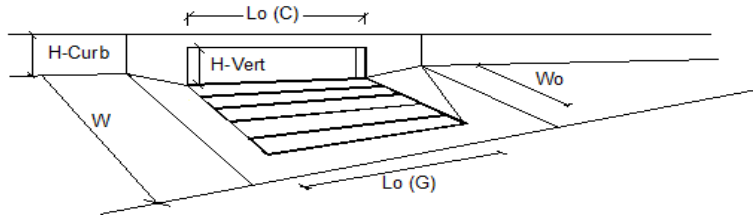
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.14 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.19 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



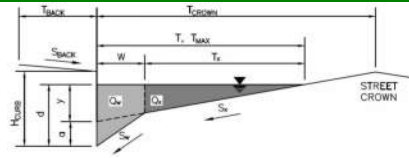
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	0.1	0.2	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.0	0.0	cfs
Capture Percentage = Q_o/Q_a		$C\%$ =	84	81	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.7

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

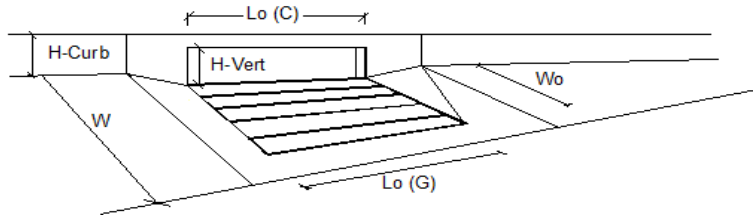
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.16 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.20 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



Design Information (Input)		MINOR		MAJOR
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination	
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0 inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	2	2
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00 ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73 ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$				
Total Inlet Interception Capacity		Q =	0.2	0.2 cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.0	0.0 cfs
Capture Percentage = Q_o/Q_a		$C\%$ =	98	96 %

Worksheet for Inlet 4.8 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.29 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	68.55 %
Intercepted Flow	0.20 cfs
Bypass Flow	0.09 cfs
Flow Area	0.2 ft ²
Wetted Perimeter	6.9 ft
Top Width	6.91 ft
Velocity	1.22 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.370
Grate Flow Ratio	0.501
Active Grate Length	3.0 ft
Critical Depth	0.9 in
Critical Slope	0.007 ft/ft
Froude Number	1.153
Flow Type	Supercritical
Specific Energy	0.09 ft
Velocity Head	0.02 ft
Depth	0.8 in

Worksheet for Inlet 4.8 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.8 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.37 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	64.43 %
Intercepted Flow	0.24 cfs
Bypass Flow	0.13 cfs
Flow Area	0.3 ft ²
Wetted Perimeter	7.6 ft
Top Width	7.57 ft
Velocity	1.29 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.345
Grate Flow Ratio	0.457
Active Grate Length	3.0 ft
Critical Depth	1.0 in
Critical Slope	0.007 ft/ft
Froude Number	1.171
Flow Type	Supercritical
Specific Energy	0.10 ft
Velocity Head	0.03 ft
Depth	0.9 in

Worksheet for Inlet 4.8 - 100 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.9 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.40 cfs
Grate Width	1.73 ft
Grate Length	9.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	58.48 %
Intercepted Flow	0.82 cfs
Bypass Flow	0.58 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	12.5 ft
Top Width	12.50 ft
Velocity	1.79 ft/s
Splash Over Velocity	7.96 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.426
Grate Flow Ratio	0.277
Active Grate Length	4.5 ft
Critical Depth	1.6 in
Critical Slope	0.006 ft/ft
Froude Number	1.264
Flow Type	Supercritical
Specific Energy	0.17 ft
Velocity Head	0.05 ft
Depth	1.5 in

Worksheet for Inlet 4.9 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.9 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.010 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	1.93 cfs
Grate Width	1.73 ft
Grate Length	9.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	53.91 %
Intercepted Flow	1.04 cfs
Bypass Flow	0.89 cfs
Flow Area	1.0 ft ²
Wetted Perimeter	14.1 ft
Top Width	14.06 ft
Velocity	1.95 ft/s
Splash Over Velocity	7.96 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.389
Grate Flow Ratio	0.246
Active Grate Length	4.5 ft
Critical Depth	1.9 in
Critical Slope	0.006 ft/ft
Froude Number	1.298
Flow Type	Supercritical
Specific Energy	0.20 ft
Velocity Head	0.06 ft
Depth	1.7 in

Worksheet for Inlet 4.9 - 100 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.10 - 25 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.020 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.45 cfs
Grate Width	1.73 ft
Grate Length	6.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	60.34 %
Intercepted Flow	0.27 cfs
Bypass Flow	0.18 cfs
Flow Area	0.3 ft ²
Wetted Perimeter	7.2 ft
Top Width	7.15 ft
Velocity	1.76 ft/s
Splash Over Velocity	6.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.232
Grate Flow Ratio	0.484
Active Grate Length	3.0 ft
Critical Depth	1.0 in
Critical Slope	0.007 ft/ft
Froude Number	1.640
Flow Type	Supercritical
Specific Energy	0.12 ft
Velocity Head	0.05 ft
Depth	0.9 in

Worksheet for Inlet 4.10 - 25 Yr

Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Inlet 4.10 - 100 Yr

Project Description	
Solve For	Efficiency
Input Data	
Roughness Coefficient	0.013
Slope	0.020 ft/ft
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V
Bottom Width	0.00 ft
Discharge	0.65 cfs
Grate Width	1.73 ft
Grate Length	9.0 ft
Grate Type	P-50 mm x 100 mm (P-1- 7/8"-4")
Clogging	50.0 %
Options	
Grate Flow Option	Exclude None
Results	
Efficiency	64.96 %
Intercepted Flow	0.42 cfs
Bypass Flow	0.23 cfs
Flow Area	0.3 ft ²
Wetted Perimeter	8.2 ft
Top Width	8.22 ft
Velocity	1.92 ft/s
Splash Over Velocity	7.96 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.395
Grate Flow Ratio	0.421
Active Grate Length	4.5 ft
Critical Depth	1.2 in
Critical Slope	0.007 ft/ft
Froude Number	1.673
Flow Type	Supercritical
Specific Energy	0.14 ft
Velocity Head	0.06 ft
Depth	1.0 in

Worksheet for Inlet 4.10 - 100 Yr

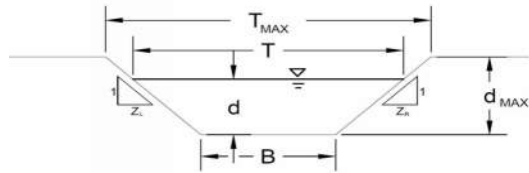
Messages:

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

AREA INLET IN A SWALE

Hockett Gulch

Inlet 4.10a



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

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

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

NRCS Vegetal Retardance (A, B, C, D, or E)

Manning's n (Leave cell D16 blank to manually enter an n value)

Channel Invert Slope

Bottom Width

Left Side Slope

Right Side Slope

Check one of the following soil types:

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

A, B, C, D, or E =

n =	0.030	
S_0 =	0.0600	ft/ft
B =	0.00	ft
Z1 =	4.00	ft/ft
Z2 =	4.00	ft/ft

Choose One:

- ☐ Non-Cohesive
☐ Cohesive
☐ Paved

Maximum Allowable Top Width of Channel for Minor & Major Storm

Maximum Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX} =	20.00	20.00	ft
d_{MAX} =	0.50	0.50	ft

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	4.7	4.7	cfs
d_{allow} =	0.50	0.50	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow

Water Depth

Q_o =	3.0	5.1	cfs
d =	0.42	0.52	ft

Warning 05

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

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

AREA INLET IN A SWALE

Hockett Gulch

Inlet 4.10a

Inlet Design Information (Input)

Type of Inlet

CDOT Type D (In Series)

Inlet Type =

CDOT Type D (In Series)

Angle of Inclined Grate (must be ≤ 30 degrees)

Width of Grate

Length of Grate

Open Area Ratio

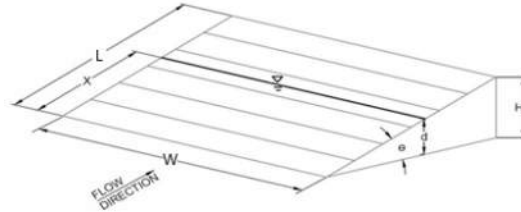
Height of Inclined Grate

Clogging Factor

Grate Discharge Coefficient

Orifice Coefficient

Weir Coefficient

 $\theta =$ 0.00 degrees

W = 3.00 ft

L = 6.00 ft

 $A_{\text{RATIO}} =$ 0.70 $H_g =$ 0.00 ft $C_f =$ 0.38 $C_d =$ 0.78 $C_o =$ 0.52 $C_w =$ 1.67

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

Total Inlet Interception Capacity (assumes clogged condition)

Bypassed Flow

Capture Percentage = Q_a/Q_o

MINOR

MAJOR

d = 0.42 0.52

 $Q_a =$ 8.1 11.0 cfs $Q_b =$ 0.0 0.0 cfs $C\% =$ 100 100 %

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

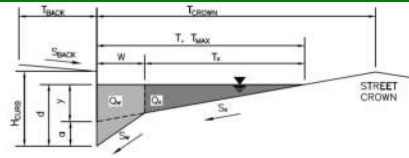
Warning 05: Depth (d) exceeds max allowable depth (dmax).

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.11

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

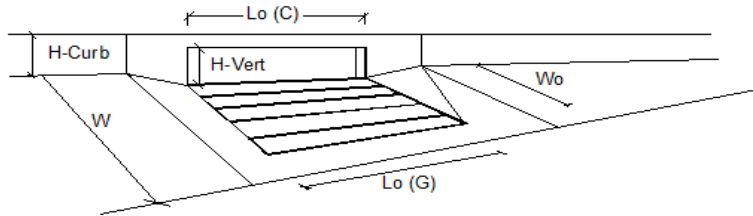
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.44 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.65 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



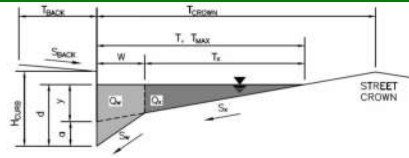
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	N/A	N/A	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	0.3	0.5	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.1	0.2	cfs
Capture Percentage = Q_o/Q_a		$C\%$ =	77	73	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.12

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

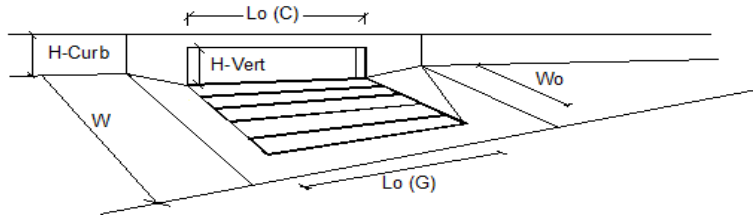
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.82 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.14 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



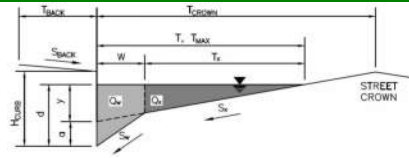
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	N/A	N/A	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	0.7	0.9	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.2	0.3	cfs
Capture Percentage = Q_i/Q_o		$C\%$ =	80	75	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.13

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

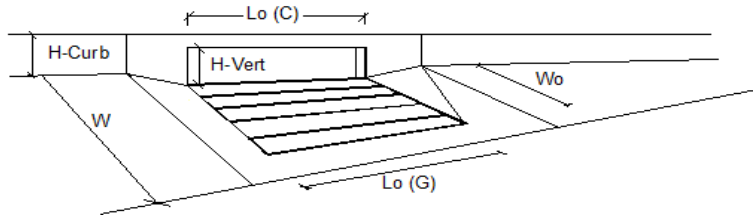
Minor Storm	Major Storm	
		cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.42 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.76 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



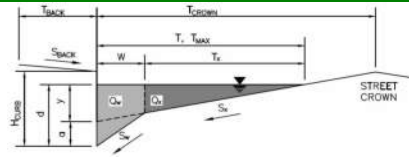
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		N_o =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		$C_f (G)$ =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		$C_f (C)$ =	0.10	0.10	
Street Hydraulics: OK - $Q < \text{Allowable Street Capacity}$					
Total Inlet Interception Capacity		Q =	1.4	1.7	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q_s =	0.0	0.1	cfs
Capture Percentage = Q_i/Q_o		$C\%$ =	98	95	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.14

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

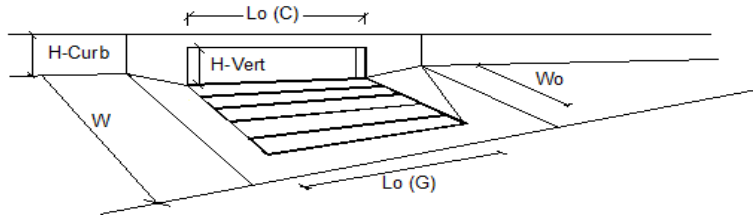
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.86 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.16 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



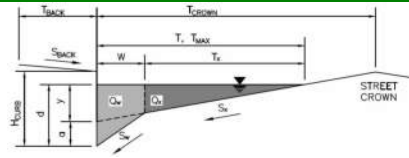
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity					
Total Inlet Interception Capacity		Q =	0.6	1.0	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _s =	0.2	0.2	cfs
Capture Percentage = Q _i /Q _a		C% =	74	82	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.15

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Allow Flow Depth at Street Crown (check box for yes, leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is based on Spread Criterion

MAJOR STORM Allowable Capacity is based on Spread Criterion

$Q_{allow} =$

Minor Storm	Major Storm

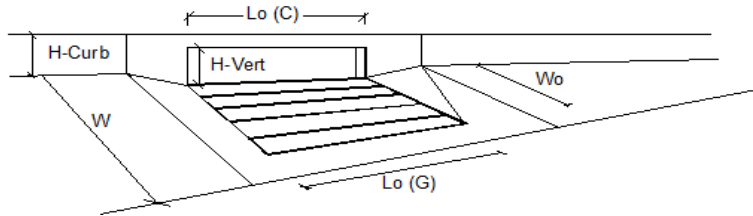
 cfs

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.71 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.92 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.03 (August 2023)



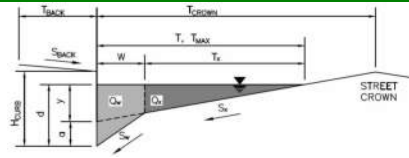
Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Combination	Type =	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a')		a _{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L _o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W _o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C _f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C _f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity					
Total Inlet Interception Capacity		Q =	0.6	0.8	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)		Q _s =	0.1	0.2	cfs
Capture Percentage = Q _i /Q _a		C% =	86	82	%

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

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

Project: Hockett Gulch

Inlet ID: Inlet 4.16

**Gutter Geometry:**

Maximum Allowable Width for Spread Behind Curb

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

Height of Curb at Gutter Flow Line

Distance from Curb Face to Street Crown

Gutter Width

Street Transverse Slope

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

Street Longitudinal Slope - Enter 0 for sump condition

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} =$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} =$

$H_{CURB} =$ inches
 $T_{CROWN} =$ ft
 $W =$ ft
 $S_X =$ ft/ft
 $S_W =$ ft/ft
 $S_O =$ ft/ft
 $n_{STREET} =$

Max. Allowable Spread for Minor & Major Storm

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

Check boxes are not applicable in SUMP conditions

	Minor Storm	Major Storm	
$T_{MAX} =$			ft
$d_{MAX} =$			inches
	☐	☐	

MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

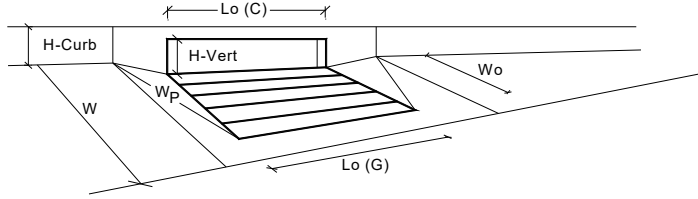
$Q_{allow} =$

Minor Storm	Major Storm
SUMP	SUMP

 cfs

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.03 (August 2023)

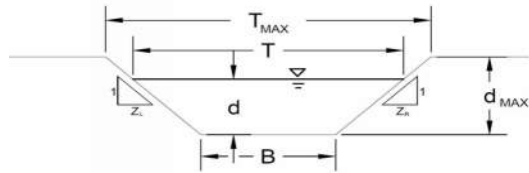


Design Information (Input)		MINOR		MAJOR	
Type of Inlet	CDOT/Denver 13 Valley Grate	Type =	CDOT/Denver 13 Valley Grate		
Local Depression (additional to continuous gutter depression 'a' from above)		a _{local} =	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	1.0	1.0	inches
Grate Information			MINOR	MAJOR	☒ Override Depths
Length of a Unit Grate		L _o (G) =	3.00	3.00	feet
Width of a Unit Grate		W _o =	1.73	1.73	feet
Open Area Ratio for a Grate (typical values 0.15-0.90)		A _{ratio} =	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C _f (G) =	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C _w (G) =	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C _o (G) =	0.60	0.60	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L _o (C) =	N/A	N/A	feet
Height of Vertical Curb Opening in Inches		H _{vert} =	N/A	N/A	inches
Height of Curb Orifice Throat in Inches		H _{throat} =	N/A	N/A	inches
Angle of Throat		Theta =	N/A	N/A	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W _p =	N/A	N/A	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C _f (C) =	N/A	N/A	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C _w (C) =	N/A	N/A	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C _o (C) =	N/A	N/A	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d _{Grate} =	0.09	0.09	ft
Depth for Curb Opening Weir Equation		d _{Curb} =	N/A	N/A	ft
Grated Inlet Performance Reduction Factor for Long Inlets		RF _{Grate} =	0.16	0.16	
Curb Opening Performance Reduction Factor for Long Inlets		RF _{Curb} =	N/A	N/A	
Combination Inlet Performance Reduction Factor for Long Inlets		RF _{Combination} =	N/A	N/A	
Total Inlet Interception Capacity (assumes clogged condition)			MINOR	MAJOR	
WARNING: Inlet Capacity < Q Peak for Minor and Major Storms		Q _s =	0.0	0.0	cfs
		Q _{PEAK REQUIRED} =	0.8	1.1	cfs

AREA INLET IN A SWALE

Hockett Gulch

Inlet 4.16a



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

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

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

NRCS Vegetal Retardance (A, B, C, D, or E)

Manning's n (Leave cell D16 blank to manually enter an n value)

Channel Invert Slope

Bottom Width

Left Side Slope

Right Side Slope

Check one of the following soil types:

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

A, B, C, D, or E =

n =	0.030	
S_0 =	0.0200	ft/ft
B =	0.00	ft
Z1 =	6.00	ft/ft
Z2 =	6.00	ft/ft

Choose One:

- ☐ Non-Cohesive
☐ Cohesive
☐ Paved

Maximum Allowable Top Width of Channel for Minor & Major Storm

Maximum Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX} =	10.00	10.00	ft
d_{MAX} =	0.50	0.50	ft

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	4.1	4.1	cfs
d_{allow} =	0.50	0.50	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow

Water Depth

	Minor Storm	Major Storm	
Q_o =	1.7	2.5	cfs
d =	0.36	0.41	ft

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

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

AREA INLET IN A SWALE

Hockett Gulch

Inlet 4.16a

Inlet Design Information (Input)

Type of Inlet

CDOT Type D (In Series)

Inlet Type =

CDOT Type D (In Series)

Angle of Inclined Grate (must be ≤ 30 degrees)

Width of Grate

Length of Grate

Open Area Ratio

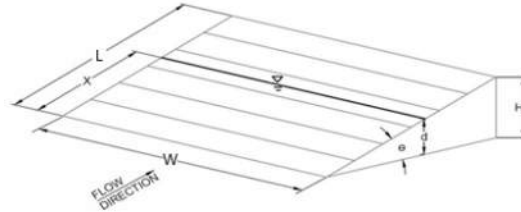
Height of Inclined Grate

Clogging Factor

Grate Discharge Coefficient

Orifice Coefficient

Weir Coefficient

 $\theta =$ 0.00 degrees

W = 3.00 ft

L = 6.00 ft

A_{RATIO} = 0.70H_B = 0.00 ftC_f = 0.38C_d = 0.78C_o = 0.52C_w = 1.67

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

Total Inlet Interception Capacity (assumes clogged condition)

Bypassed Flow

Capture Percentage = Q_a/Q_o

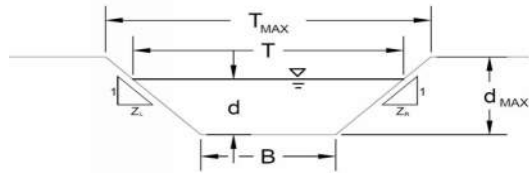
	MINOR	MAJOR	
d =	0.36	0.41	
Q _a =	6.3	7.8	cfs
Q _b =	0.0	0.0	cfs
C% =	100	100	%

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

AREA INLET IN A SWALE

Hockett Gulch

Inlet H1



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

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

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

NRCS Vegetal Retardance (A, B, C, D, or E)

Manning's n (Leave cell D16 blank to manually enter an n value)

Channel Invert Slope

Bottom Width

Left Side Slope

Right Side Slope

Check one of the following soil types:

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

A, B, C, D, or E =

n =	0.035	
S_0 =	0.0400	ft/ft
B =	2.00	ft
Z1 =	3.00	ft/ft
Z2 =	3.00	ft/ft

Choose One:

- ☐ Non-Cohesive
☒ Cohesive
☐ Paved

Maximum Allowable Top Width of Channel for Minor & Major Storm

Maximum Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T_{MAX} =	8.00	8.00	ft
d_{MAX} =	1.00	1.00	ft

Maximum Channel Capacity Based On Allowable Top Width

Maximum Allowable Top Width

Water Depth

Flow Area

Wetted Perimeter

Hydraulic Radius

Manning's n

Flow Velocity

Velocity-Depth Product

Hydraulic Depth

Froude Number

Maximum Flow Based on Allowable Water Depth

	Minor Storm	Major Storm	
T_{MAX} =	8.00	8.00	ft
d =	1.00	1.00	ft
A =	5.00	5.00	sq ft
P =	8.32	8.32	ft
R =	0.60	0.60	ft
n =	0.035	0.035	
V =	6.06	6.06	fps
VR =	3.64	3.64	ft ² /s
D =	0.63	0.63	ft
Fr =	1.35	1.35	
Q_T =	30.3	30.3	cfs

Maximum Channel Capacity Based On Allowable Water Depth

Maximum Allowable Water Depth

Top Width

Flow Area

Wetted Perimeter

Hydraulic Radius

Manning's n

Flow Velocity

Velocity-Depth Product

Hydraulic Depth

Froude Number

Maximum Flow Based on Allowable Water Depth

	Minor Storm	Major Storm	
d_{MAX} =	1.00	1.00	ft
T =	8.00	8.00	ft
A =	5.00	5.00	sq ft
P =	8.32	8.32	ft
R =	0.60	0.60	ft
n =	0.035	0.035	
V =	6.06	6.06	fps
VR =	3.64	3.64	ft ² /s
D =	0.63	0.63	ft
Fr =	1.35	1.35	
Q_d =	30.3	30.3	cfs

Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Depth Criterion

MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q_{allow} =	30.3	30.3	cfs
d_{allow} =	1.00	1.00	ft

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow

Water Depth

Top Width

Flow Area

Wetted Perimeter

Hydraulic Radius

Manning's n

Flow Velocity

Velocity-Depth Product

Hydraulic Depth

Froude Number

	Minor Storm	Major Storm	
Q_o =	7.9	14.2	cfs
d =	0.52	0.70	ft
T =	5.13	6.19	ft
A =	1.86	2.86	sq ft
P =	5.30	6.42	ft
R =	0.35	0.45	ft
n =	0.035	0.035	
V =	4.24	4.97	fps
VR =	1.49	2.22	ft ² /s
D =	0.36	0.46	ft
Fr =	1.24	1.29	

Warning 04

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'

MHFD-Inlet, Version 5.03 (August 2023)

AREA INLET IN A SWALE

Hockett Gulch
Inlet H1

Inlet Design Information (Input)							
Type of Inlet	CDOT Type D (In Series)						
Inlet Type = CDOT Type D (In Series)							
Angle of Inclined Grate (must be <= 30 degrees)	$\theta = 0.00$ degrees						
Width of Grate	$W = 3.00$ ft						
Length of Grate	$L = 6.00$ ft						
Open Area Ratio	$A_{\text{RATIO}} = 0.70$						
Height of Inclined Grate	$H_B = 0.00$ ft						
Clogging Factor	$C_f = 0.38$						
Grate Discharge Coefficient	$C_d = 0.78$						
Orifice Coefficient	$C_o = 0.52$						
Weir Coefficient	$C_w = 1.67$						
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	<table border="1"> <thead> <tr> <th></th> <th>MINOR</th> <th>MAJOR</th> </tr> </thead> <tbody> <tr> <td>$d =$</td> <td>0.52</td> <td>0.70</td> </tr> </tbody> </table>		MINOR	MAJOR	$d =$	0.52	0.70
	MINOR	MAJOR					
$d =$	0.52	0.70					
Grate Capacity as a Weir							
Submerged Side Weir Length	$X = 6.00$ ft						
Inclined Side Weir Flow	$Q_{ws} = 6.6$ cfs						
Base Weir Flow	$Q_{wb} = 4.7$ cfs						
Interception Without Clogging	$Q_{wi} = 17.9$ cfs						
Interception With Clogging	$Q_{wa} = 11.2$ cfs						
Grate Capacity as an Orifice							
Interception Without Clogging	$Q_{oi} = 38.0$ cfs						
Interception With Clogging	$Q_{oa} = 23.7$ cfs						
Total Inlet Interception Capacity (assumes clogged condition)	$Q_a = 11.2$ cfs						
Bypassed Flow	$Q_b = 0.0$ cfs						
Capture Percentage = Q_a/Q_o	$C\% = 100$ %						

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



Basin 2.3b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.11
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.78
Capacity (gpm)	350.04

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.3b 100-year Q is 0.37 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.37*2 safety factor = 0.74 cfs

Expects head of 0.11' above grate elevation.

Ponding level = grate elev + head = 6560.20' + 0.11' = 6560.31'

This is 1.61' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 2.3c Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.12
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.89
Capacity (gpm)	398.84

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.3c 100-year Q is 0.40 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.40*2 safety factor = 0.80 cfs

Expects head of 0.12' above grate elevation.

Ponding level = grate elev + head = 6559.99' + 0.12' = 6560.11'

This is 1.81' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 2.3d Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.13
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	1.00
Capacity (gpm)	449.73

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

Basin 2.3d 100-year Q is 0.49 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.49*2 safety factor = 0.98 cfs

Expects head of 0.13' above grate elevation.

Ponding level = grate elev + head = 6559.96' + 0.13' = 6560.09'

This is 1.83' below the adjacent Building 6 elevation of 6561.92' and 8.59' below the adjacent Building 7 elevation of 6568.68'.

REV 2.1.21



Basin 2.4b Nyloplast Inlets

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.09
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.58
Capacity (gpm)	259.06

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.4b 100-year Q is 0.54 cfs, with two 24" Nyloplast Inlets.
Assumed equal flow to both inlets.

Each inlet = 0.54*2 safety factor/2 inlets = 0.54 cfs

Expects head of 0.09' above grate elevation.

Ponding level = grate elev + head = 6567.75' + 0.09' = 6567.84'

This is 2.14' below the adjacent Building 8 elevation of 6569.98'.

REV 2.1.21



Basin 2.5b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.13
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	1.00
Capacity (gpm)	449.73

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.5b 100-year Q is 0.45 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.45*2 safety factor = 0.90 cfs

Expects head of 0.13' above grate elevation.

Ponding level = grate elev + head = 6567.59' + 0.13' = 6567.72'

This is 2.26' below the adjacent Building 8 elevation of 6569.98'.

REV 2.1.21



Basin 2.5c Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.07
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.40
Capacity (gpm)	177.70

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.5c 100-year Q is 0.16 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.16*2 safety factor = 0.32 cfs

Expects head of 0.07' above grate elevation.

Ponding level = grate elev + head = 6571.19' + 0.07' = 6571.26

This is 7.86' below the adjacent Building 9 elevation of 6579.12'.

REV 2.1.21



Basin 2.6 Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.08
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.48
Capacity (gpm)	217.10

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

H = Depth of Water Above Center of Orifice (ft)

Basin 2.6 100-year Q is 0.20 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.20*2 safety factor = 0.40 cfs

Expects head of 0.08' above grate elevation.

Ponding level = grate elev + head = 6568.73' + 0.08' = 6568.81'

This is 1.17' below the adjacent Building 8 elevation of 6569.98'.

REV 2.1.21



Basin 2.9c Nyloplast Dry Well

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	18" Standard
Head (ft)	0.11
Properties	
Orifice Flow Area (in)	116.72
Orifice Flow Area (ft)	0.81
Weir Flow Perimeter (in)	52.04
Weir Flow Perimeter (ft)	4.34
Solution	
Capacity (cfs)	0.53
Capacity (gpm)	236.45

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.9c 100-year Q is 0.24 cfs, with an 18" Nyloplast Dry Well.

Inlet = 0.24*2 safety factor = 0.48 cfs

Expects head of 0.11' above grate elevation.

Ponding level = grate elev + head = 6573.94' + 0.11' = 6574.05'

This is 0.07' below the adjacent sidewalk elevation of 6574.12'.

REV 2.1.21



Basin 2.10 Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.1
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.68
Capacity (gpm)	303.41

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.10 100-year Q is 0.29 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.29*2 safety factor = 0.58 cfs

Expects head of 0.10' above grate elevation.

Ponding level = grate elev + head = 6577.01' + 0.10' = 6577.11'

This is 1.51' below the adjacent Building 9 elevation of 6578.62'.

REV 2.1.21



Basin 2.11 Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.08
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.48
Capacity (gpm)	217.10

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 2.11 100-year Q is 0.21 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.21*2 safety factor = 0.42 cfs

Expects head of 0.08' above grate elevation.

Ponding level = grate elev + head = 6578.51' + 0.08' = 6578.59'

This is 1.53' below the adjacent Building 9 elevation of 6580.12'.

REV 2.1.21



Basin 2.12 Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.09
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.58
Capacity (gpm)	259.06

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

Basin 2.12 100-year Q is 0.27 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.27*2 safety factor = 0.54 cfs

Expects head of 0.09' above grate elevation.

Ponding level = grate elev + head = 6577.51' + 0.09' = 6577.60'

This is 1.52' below the adjacent Building 9 elevation of 6579.12'.

REV 2.1.21



Basin 3.1a Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.1
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.68
Capacity (gpm)	303.41

$$Q_{\text{weir}} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{\text{orifice}} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.1a 100-year Q is 0.29 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.29*2 safety factor = 0.58 cfs

Expects head of 0.10' above grate elevation.

Ponding level = grate elev + head = 6560.17' + 0.10' = 6560.27'

This is 1.65' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.1b Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.08
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.48
Capacity (gpm)	217.10

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.1b 100-year Q is 0.21 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.21*2 safety factor = 0.42 cfs

Expects head of 0.08' above grate elevation.

Ponding level = grate elev + head = 6560.41' + 0.08' = 6560.49'

This is 1.43' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.1c Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.1
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.68
Capacity (gpm)	303.41

$$Q_{\text{weir}} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{\text{orifice}} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{\text{ft}}{\text{s}^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

Basin 3.1c 100-year Q is 0.29 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.29*2 safety factor = 0.58 cfs

Expects head of 0.10' above grate elevation.

Ponding level = grate elev + head = 6560.29' + 0.10' = 6560.39'

This is 1.53' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.1d Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.07
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.40
Capacity (gpm)	177.70

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.1d 100-year Q is 0.16 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.16*2 safety factor = 0.32 cfs

Expects head of 0.07' above grate elevation.

Ponding level = grate elev + head = 6560.13' + 0.07' = 6560.20'

This is 1.72' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.3a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.08
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.48
Capacity (gpm)	217.10

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.3a 100-year Q is 0.20 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.20*2 safety factor = 0.40 cfs

Expects head of 0.08' above grate elevation.

Ponding level = grate elev + head = 6559.62' + 0.08' = 6559.70'

This is 2.22' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.3b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.15
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	1.24
Capacity (gpm)	557.40

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.3b 100-year Q is 0.59 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.59*2 safety factor = 1.18 cfs

Expects head of 0.15' above grate elevation.

Ponding level = grate elev + head = 6559.78' + 0.15' = 6559.93'

This is 1.99' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.3c Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.19
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	1.77
Capacity (gpm)	794.63

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.3c 100-year Q is 0.82 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.82*2 safety factor = 1.64 cfs

Expects head of 0.19' above grate elevation.

Ponding level = grate elev + head = 6559.47' + 0.19' = 6559.66'

This is 2.26' below the adjacent Building 6 elevation of 6561.92'.

REV 2.1.21



Basin 3.6a Nyloplast Inlets

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.09
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.58
Capacity (gpm)	259.06

$$Q_{\text{weir}} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{\text{orifice}} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{\text{ft}}{\text{s}^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.6a 100-year Q is 0.51 cfs, with two 24" Nyloplast Inlets.
Assumed equal flow to both inlets.

Each inlet = 0.51*2 safety factor/2 inlets = 0.51 cfs

Expects head of 0.09' above grate elevation.

Ponding level = grate elev + head = 6566.93' + 0.09' = 6567.02'

This is 1.66' below the adjacent Building 7 elevation of 6568.68'.

REV 2.1.21



Basin 3.7a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	18" Standard
Head (ft)	0.1
Properties	
Orifice Flow Area (in)	116.72
Orifice Flow Area (ft)	0.81
Weir Flow Perimeter (in)	52.04
Weir Flow Perimeter (ft)	4.34
Solution	
Capacity (cfs)	0.46
Capacity (gpm)	204.95

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.7a 100-year Q is 0.20 cfs, with an 18" Nyloplast Inlet.

Inlet = 0.20*2 safety factor = 0.40 cfs

Expects head of 0.10' above grate elevation.

Ponding level = grate elev + head = 6567.39' + 0.10' = 6567.49'

This is 2.49' below the adjacent Building 8 elevation of 6569.98'.

REV 2.1.21



Basin 3.8a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.2
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	1.91
Capacity (gpm)	858.18

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.8a 100-year Q is 0.93 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.93*2 safety factor = 1.86 cfs

Expects head of 0.20' above grate elevation.

Ponding level = grate elev + head = 6567.47' + 0.20' = 6567.67'

This is 2.31' below the adjacent Building 8 elevation of 6569.98'.

REV 2.1.21



Basin 3.8b Nyloplast Inlets

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.07
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.40
Capacity (gpm)	177.70

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 3.8b 100-year Q is 0.33 cfs, with two 24" Nyloplast Inlets.
Assumed equal flow to both inlets.

Each inlet = 0.33*2 safety factor/2 inlets = 0.33 cfs

Expects head of 0.07' above grate elevation.

Ponding level = grate elev + head = 6571.99' + 0.07' = 6572.06'

This is 1.15' below the adjacent Clubhouse elevation of 6573.21'.

REV 2.1.21



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.24
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	2.51
Capacity (gpm)	1128.10

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

REV 2.1.21

Basin 4.3a 100-year Q is 1.19 cfs, with a 24" Nyloplast Inlet.

Inlet = 1.19*2 safety factor = 2.38 cfs

Expects head of 0.24' above grate elevation.

Ponding level = grate elev + head = 6558.00' + 0.24' = 6558.24'

This is 4.35' below the adjacent Building 10 elevation of 6562.59'.



Basin 4.4b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.07
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.40
Capacity (gpm)	177.70

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.4b 100-year Q is 0.18 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.18*2 safety factor = 0.36 cfs

Expects head of 0.07' above grate elevation.

Ponding level = grate elev + head = 6560.92' + 0.07' = 6560.99'

This is 1.60' below the adjacent Building 10 elevation of 6562.59'.

REV 2.1.21



Basin 4.4c Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.06
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.31
Capacity (gpm)	141.01

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.4c 100-year Q is 0.15 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.15*2 safety factor = 0.30 cfs

Expects head of 0.06' above grate elevation.

Ponding level = grate elev + head = 6563.26' + 0.06' = 6563.32'

This is 0.08' below the adjacent sidewalk elevation of 6563.40'.

REV 2.1.21



Basin 4.5a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.07
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.40
Capacity (gpm)	177.70

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.5a 100-year Q is 0.18 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.18*2 safety factor = 0.36 cfs

Expects head of 0.07' above grate elevation.

Ponding level = grate elev + head = 6563.06' + 0.07' = 6563.13'

This is 1.60' below the adjacent Building 10 elevation of 6564.73'.

REV 2.1.21



Basin 4.5b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.06
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.31
Capacity (gpm)	141.01

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.5b 100-year Q is 0.14 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.14*2 safety factor = 0.28 cfs

Expects head of 0.06' above grate elevation.

Ponding level = grate elev + head = 6565.26' + 0.06' = 6565.32'

This is 1.72' below the adjacent Building 10 elevation of 6567.04'.

REV 2.1.21



Basin 4.6a Nyloplast Inlet

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	24" Standard
Head (ft)	0.09
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.58
Capacity (gpm)	259.06

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.6a 100-year Q is 0.26 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.26*2 safety factor = 0.52 cfs

REV 2.1.21

Expects head of 0.09' above grate elevation.

Ponding level = grate elev + head = 6565.81' + 0.09' = 6565.90'

This is 1.14' below the adjacent Building 10 elevation of 6567.04'.



Basin 4.12a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.08
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.48
Capacity (gpm)	217.10

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.12a 100-year Q is 0.21 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.21*2 safety factor = 0.42 cfs

Expects head of 0.08' above grate elevation.

Ponding level = grate elev + head = 6561.50' + 0.08' = 6561.58'

This is 1.70' below the adjacent Building 11 elevation of 6563.28'.

REV 2.1.21



Basin 4.12b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.04
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.17
Capacity (gpm)	76.76

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{ft}{s^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

Basin 4.12b 100-year Q is 0.08 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.08*2 safety factor = 0.16 cfs

Expects head of 0.04' above grate elevation.

Ponding level = grate elev + head = 6562.98' + 0.04' = 6563.02'

This is 1.34' below the adjacent Building 12 elevation of 6564.36' and 1.10' below the adjacent Building 13 elevation of 6564.12'.

REV 2.1.21



Basin 4.13a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.05
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.24
Capacity (gpm)	107.27

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.13a 100-year Q is 0.10 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.10*2 safety factor = 0.20 cfs

Expects head of 0.05' above grate elevation.

Ponding level = grate elev + head = 6563.69' + 0.05' = 6563.74'

This is 0.23' below the adjacent sidewalk elevation of 6563.97'.

REV 2.1.21



Basin 4.13b Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.04
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.17
Capacity (gpm)	76.76

$$Q_{\text{weir}} = CLH^{3/2}$$

$C = 3.33$ Weir Discharge Coefficient

$L =$ Perimeter of Grate Opening (ft)

$H =$ Flow Height of Water Surface Above Weir (ft)

$$Q_{\text{orifice}} = CA\sqrt{2gh}$$

$C = 0.60$ Orifice Discharge Coefficient

$A =$ Area of the Orifice (ft²)

$g =$ Gravitational Constant $\left(32.2 \frac{\text{ft}}{\text{s}^2}\right)$

$H =$ Depth of Water Above Center of Orifice (ft)

Basin 4.13b 100-year Q is 0.08 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.08*2 safety factor = 0.16 cfs

Expects head of 0.04' above grate elevation.

Ponding level = grate elev + head = 6570.36' + 0.04' = 6570.40'

This is 1.53' below the adjacent Building 13 elevation of 6571.93' and 3.66' below the adjacent Building 14 elevation of 6574.06'.

REV 2.1.21



Basin 4.15a Nyloplast Inlet

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	24" Standard
Head (ft)	0.06
Properties	
Orifice Flow Area (in)	194.60
Orifice Flow Area (ft)	1.34
Weir Flow Perimeter (in)	77.04
Weir Flow Perimeter (ft)	6.42
Solution	
Capacity (cfs)	0.31
Capacity (gpm)	141.01

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.15a 100-year Q is 0.12 cfs, with a 24" Nyloplast Inlet.

Inlet = 0.12*2 safety factor = 0.24 cfs

Expects head of 0.06' above grate elevation.

Ponding level = grate elev + head = 6578.36' + 0.06' = 6578.42'

This is 1.14' below the adjacent sidewalk elevation of 6579.56'.

REV 2.1.21

Basin 4.16b Nyloplast Inlet



Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	18" Standard
Head (ft)	0.06
Properties	
Orifice Flow Area (in)	116.72
Orifice Flow Area (ft)	0.81
Weir Flow Perimeter (in)	52.04
Weir Flow Perimeter (ft)	4.34
Solution	
Capacity (cfs)	0.21
Capacity (gpm)	95.25

$$Q_{weir} = CLH^{3/2}$$

C = 3.33 Weir Discharge Coefficient

L = Perimeter of Grate Opening (ft)

H = Flow Height of Water Surface Above Weir (ft)

$$Q_{orifice} = CA\sqrt{2gh}$$

C = 0.60 Orifice Discharge Coefficient

A = Area of the Orifice (ft²)

g = Gravitational Constant (32.2 $\frac{ft}{s^2}$)

H = Depth of Water Above Center of Orifice (ft)

Basin 4.16b 100-year Q is 0.10 cfs, with a 18" Nyloplast Inlet.

Inlet = 0.10*2 safety factor = 0.20 cfs

Expects head of 0.06' above grate elevation.

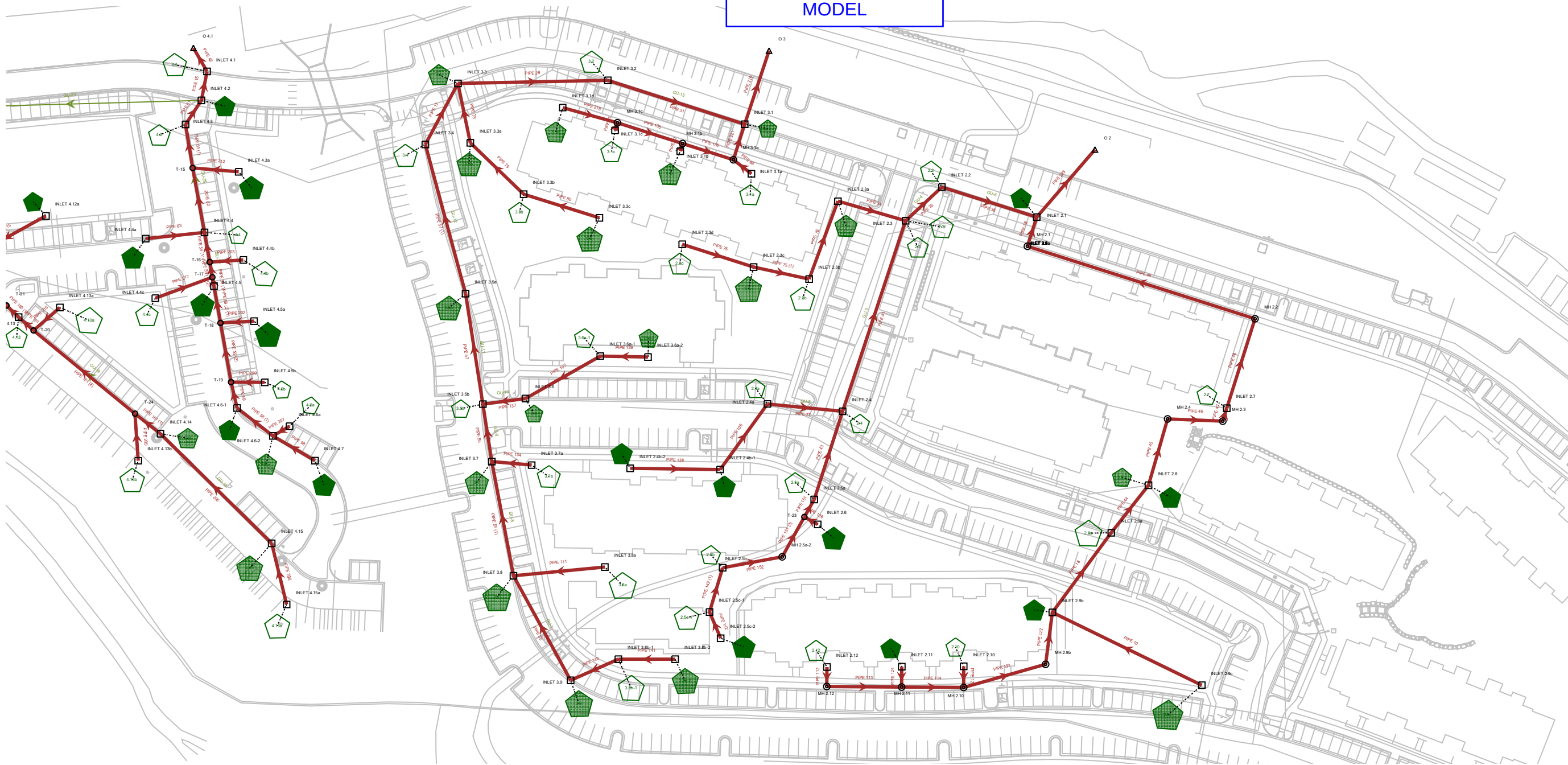
REV 2.1.21



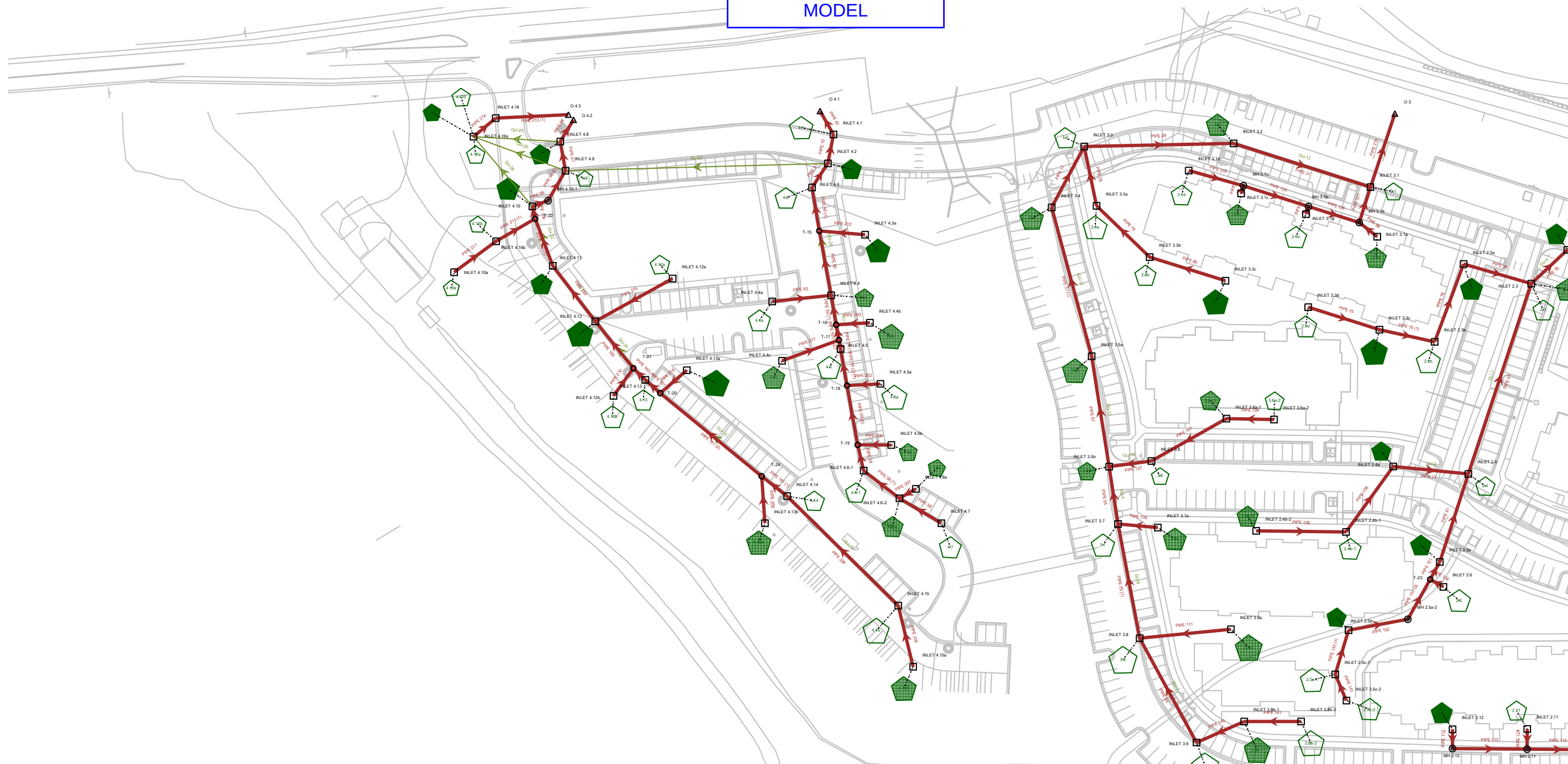
APPENDIX E

StormCAD 25-Year Summary Tables & Hydraulic Profiles

STORMCAD NETWORK
MODEL



STORMCAD NETWORK MODEL



Conduit FlexTable: Combined Pipe/Node Report

Label	Start Node	Stop Node	Diameter (in)	Manning's n	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
PIPE 10	INLET 2.9c	INLET 2.9b	12.0	0.012	152.6	6,570.39	6,567.25	0.021	6,573.94	6,575.75	6,570.61	6,567.51	6,570.55	6,567.36	3.08	0.15	5.54
PIPE 16	INLET 4.2	INLET 4.1	18.0	0.012	27.0	6,552.67	6,552.44	0.009	6,559.91	6,558.34	6,554.10	6,554.07	6,554.01	6,553.99	5.58	4.11	10.50
PIPE 17	INLET 3.4	INLET 3.3	18.0	0.012	63.4	6,557.10	6,556.81	0.005	6,559.72	6,560.88	6,558.68	6,558.45	6,558.36	6,558.17	4.94	7.15	7.69
PIPE 18	INLET 2.9b	INLET 2.9a	12.0	0.012	90.7	6,563.82	6,562.01	0.020	6,575.75	6,566.59	6,564.35	6,562.88	6,564.21	6,562.86	5.05	0.85	5.45
PIPE 29	INLET 3.3	INLET 3.2	18.0	0.012	137.4	6,556.61	6,555.70	0.007	6,560.88	6,560.62	6,558.28	6,557.40	6,557.73	6,556.96	5.94	8.39	9.26
PIPE 31	INLET 3.2	INLET 3.1	18.0	0.012	131.9	6,555.50	6,554.58	0.007	6,560.62	6,558.74	6,557.18	6,556.31	6,556.63	6,555.89	6.08	8.52	9.50
PIPE 34	INLET 2.3a	INLET 2.3	8.0	0.012	64.7	6,556.89	6,556.24	0.010	6,559.43	6,560.56	6,557.57	6,556.93	6,557.36	6,556.67	4.12	0.97	1.31
PIPE 35	INLET 2.3	INLET 2.2	18.0	0.012	45.5	6,554.97	6,554.53	0.010	6,560.56	6,558.78	6,556.15	6,555.81	6,555.81	6,555.62	6.09	4.80	11.19
PIPE 36	INLET 2.2	INLET 2.1	18.0	0.012	91.2	6,554.33	6,553.44	0.010	6,558.78	6,556.92	6,555.72	6,555.49	6,555.47	6,555.32	6.42	5.83	11.24
PIPE 38	MH 2.1	INLET 2.1	18.0	0.012	28.0	6,553.12	6,552.90	0.008	6,558.36	6,556.92	6,555.51	6,555.45	6,555.38	6,555.32	5.73	5.12	10.09
PIPE 41	INLET 2.4	INLET 2.3	18.0	0.012	184.0	6,560.82	6,555.17	0.031	6,565.73	6,560.56	6,561.76	6,556.26	6,561.50	6,556.15	8.26	3.18	19.94
PIPE 42	INLET 4.1	O 4.1	18.0	0.012	25.0	6,552.24	6,552.11	0.005	6,558.34	6,553.67	6,554.02	6,553.99	6,553.93	6,553.90	4.67	4.19	8.21
PIPE 43	INLET 2.5a	INLET 2.4	18.0	0.012	84.9	6,562.72	6,561.02	0.020	6,567.48	6,565.73	6,563.28	6,561.72	6,563.13	6,561.68	5.35	1.21	16.10
PIPE 44	INLET 2.9a	INLET 2.8	18.0	0.012	55.4	6,562.01	6,560.90	0.020	6,566.59	6,567.24	6,562.99	6,561.90	6,562.72	6,561.70	7.26	3.45	16.11
PIPE 45	INLET 2.8	MH 2.4	18.0	0.012	63.3	6,560.70	6,557.70	0.047	6,567.24	6,562.18	6,561.83	6,558.84	6,561.51	6,558.56	10.58	4.41	24.77
PIPE 46	MH 2.4	MH 2.3	18.0	0.012	50.6	6,557.50	6,556.49	0.020	6,562.18	6,560.90	6,558.63	6,557.62	6,558.30	6,557.35	7.76	4.40	16.08
PIPE 47	MH 2.3	INLET 2.7	18.0	0.012	12.4	6,556.29	6,556.16	0.010	6,560.90	6,560.50	6,557.42	6,557.29	6,557.09	6,557.02	6.13	4.39	11.64
PIPE 48	INLET 2.7	MH 2.2	18.0	0.012	86.1	6,555.96	6,555.27	0.008	6,560.50	6,560.17	6,557.20	6,556.53	6,556.84	6,556.24	5.80	5.22	10.19
PIPE 49	MH 2.2	MH 2.1	18.0	0.012	219.1	6,555.07	6,553.32	0.008	6,560.17	6,558.36	6,556.31	6,555.61	6,555.95	6,555.48	5.78	5.19	10.17
PIPE 55	INLET 3.9	INLET 3.8	12.0	0.012	109.2	6,563.73	6,562.72	0.009	6,572.60	6,570.52	6,564.38	6,563.40	6,564.20	6,563.12	4.25	1.24	3.71
PIPE 55 (1)	INLET 3.8	INLET 3.7	18.0	0.012	106.6	6,562.23	6,561.20	0.010	6,570.52	6,567.47	6,563.08	6,562.13	6,562.85	6,562.02	5.18	2.63	11.18
PIPE 56	INLET 3.7	INLET 3.5b	18.0	0.012	53.3	6,561.04	6,560.47	0.011	6,567.47	6,566.54	6,562.11	6,561.57	6,561.81	6,561.37	6.04	4.04	11.77
PIPE 57	INLET 3.5b	INLET 3.5a	18.0	0.012	102.6	6,560.23	6,558.17	0.020	6,566.54	6,563.80	6,561.48	6,559.79	6,561.11	6,558.76	8.14	5.22	16.12
PIPE 57 (1)	INLET 3.5a	INLET 3.4	18.0	0.012	141.5	6,557.84	6,557.13	0.005	6,563.80	6,559.72	6,559.17	6,558.73	6,558.80	6,558.55	4.98	5.87	8.06
PIPE 58	INLET 4.7	INLET 4.6-2	12.0	0.012	44.7	6,566.88	6,564.43	0.055	6,573.22	6,570.43	6,567.10	6,564.82	6,567.04	6,564.52	4.39	0.16	9.03
PIPE 58 (1)	INLET 4.6-2	INLET 4.6-1	12.0	0.012	41.6	6,563.32	6,561.56	0.042	6,570.43	6,567.44	6,563.66	6,562.12	6,563.57	6,561.71	5.13	0.36	7.94
PIPE 59	INLET 4.6-1	T-19	12.0	0.012	24.4	6,561.21	6,560.48	0.030	6,567.44	6,566.13	6,561.58	6,560.90	6,561.48	6,560.86	4.79	0.43	6.68
PIPE 59 (1)	INLET 4.5	T-17	12.0	0.012	8.3	6,557.39	6,557.33	0.007	6,562.47	6,562.31	6,557.97	6,557.95	6,557.86	6,557.88	3.63	0.97	3.27
PIPE 59 (1) (1)	T-16	INLET 4.4	12.0	0.012	27.6	6,557.17	6,556.88	0.010	6,562.13	6,561.84	6,557.81	6,557.56	6,557.63	6,557.26	4.40	1.19	3.95
PIPE 59 (1) (2)	T-17	T-16	12.0	0.012	14.1	6,557.33	6,557.17	0.011	6,562.31	6,562.13	6,557.93	6,557.83	6,557.76	6,557.75	4.39	1.06	4.11
PIPE 59 (2)	T-19	T-18	12.0	0.012	55.2	6,560.48	6,558.74	0.031	6,566.13	6,563.63	6,560.89	6,559.21	6,560.78	6,559.16	5.17	0.53	6.85
PIPE 59 (2) (1)	T-18	INLET 4.5	12.0	0.012	34.2	6,558.74	6,557.77	0.028	6,563.63	6,562.47	6,559.20	6,558.42	6,559.08	6,557.98	5.31	0.66	6.50
PIPE 60	INLET 4.4	T-15	12.0	0.012	60.1	6,556.47	6,555.05	0.024	6,561.84	6,559.66	6,557.35	6,556.10	6,557.09	6,555.98	6.88	2.08	5.93
PIPE 60 (1)	T-15	INLET 4.3	12.0	0.012	40.4	6,555.05	6,554.18	0.022	6,559.66	6,558.21	6,556.08	6,555.43	6,555.76	6,554.68	7.13	2.71	5.66
PIPE 61	INLET 4.3	INLET 4.2	18.0	0.012	26.4	6,553.84	6,552.87	0.037	6,558.21	6,559.91	6,554.83	6,554.15	6,554.55	6,554.07	9.03	3.47	21.81
PIPE 63	INLET 4.4a	INLET 4.4	12.0	0.012	54.3	6,557.64	6,556.88	0.014	6,561.87	6,561.84	6,558.05	6,557.32	6,557.94	6,557.27	3.90	0.54	4.57
PIPE 66	INLET 4.10	MH 4.10-1	24.0	0.012	15.4	6,553.15	6,553.08	0.005	6,556.46	6,556.46	6,554.32	6,554.29	6,554.11	6,554.11	4.72	5.47	16.50
PIPE 66 (2)	MH 4.10-1	INLET 4.9	24.0	0.012	31.8	6,552.88	6,552.74	0.004	6,556.46	6,555.87	6,554.17	6,554.13	6,554.03	6,554.03	4.67	5.46	16.27
PIPE 67	INLET 4.9	INLET 4.8	24.0	0.012	27.1	6,552.43	6,552.31	0.004	6,555.87	6,555.87	6,554.07	6,554.05	6,553.97	6,553.96	4.94	6.69	16.31
PIPE 68	INLET 4.8	O 4.2	24.0	0.012	23.4	6,552.11	6,552.00	0.005	6,555.87	6,554.41	6,553.99	6,553.98	6,553.91	6,553.90	5.08	6.86	16.80
PIPE 75	INLET 2.3d	INLET 2.3c	8.0	0.012	68.7	6,557.87	6,557.53	0.005	6,559.96	6,559.99	6,558.25	6,558.04	6,558.16	6,558.01	2.47	0.36	0.92
PIPE 75 (1)	INLET 2.3c	INLET 2.3b	8.0	0.012	52.1	6,557.53	6,557.27	0.005	6,559.99	6,560.20	6,558.06	6,557.93	6,557.96	6,557.88	2.82	0.60	0.92
PIPE 76	INLET 2.3b	INLET 2.3a	8.0	0.012	76.1	6,557.27	6,556.89	0.005	6,560.20	6,559.43	6,557.91	6,557.59	6,557.77	6,557.49	3.00	0.84	0.92
PIPE 77	INLET 2.4a	INLET 2.4	12.0	0.012	69.4	6,562.51	6,561.52	0.014	6,566.73	6,565.73	6,563.03	6,562.11	6,562.89	6,561.80	4.43	0.81	4.61
PIPE 78	INLET 3.3a	INLET 3.3	12.0	0.012	55.6	6,556.89	6,556.61	0.005	6,559.62	6,560.88	6,558.24	6,558.20	6,558.21	6,558.17	3.27	1.06	2.74

Conduit FlexTable: Combined Pipe/Node Report

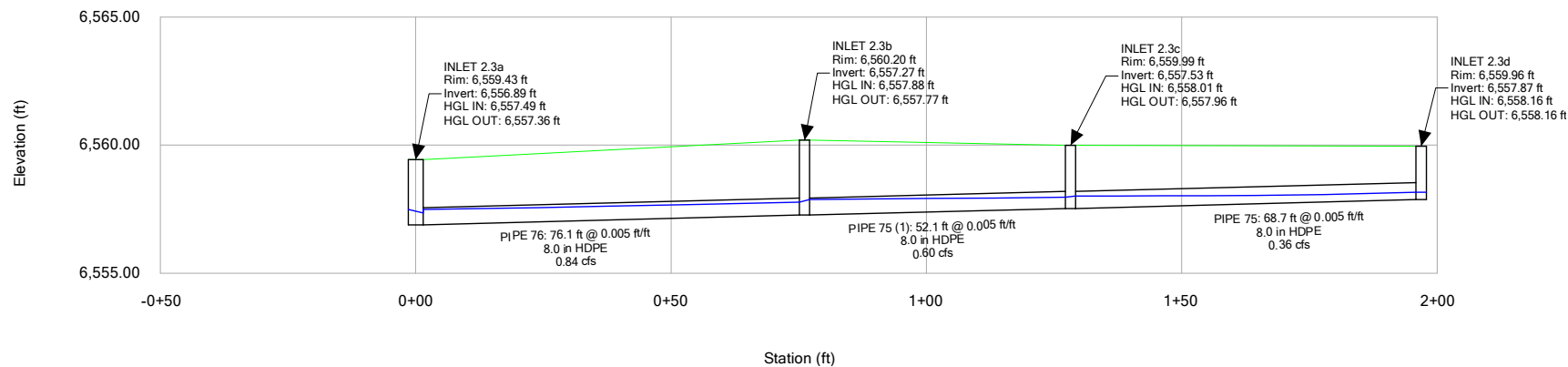
Label	Start Node	Stop Node	Diameter (in)	Manning's n	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
PIPE 79	INLET 3.3b	INLET 3.3a	12.0	0.012	67.9	6,557.23	6,556.89	0.005	6,559.78	6,559.62	6,558.29	6,558.25	6,558.27	6,558.23	3.17	0.96	2.73
PIPE 80	INLET 3.3c	INLET 3.3b	12.0	0.012	72.9	6,557.59	6,557.23	0.005	6,559.47	6,559.78	6,558.31	6,558.29	6,558.29	6,558.28	2.75	0.58	2.71
PIPE 81	INLET 3.1c	MH 3.1c	8.0	0.012	7.3	6,557.81	6,557.44	0.050	6,560.29	6,560.95	6,558.10	6,557.79	6,558.03	6,557.77	4.92	0.22	2.94
PIPE 82	INLET 3.1b	MH 3.1b	8.0	0.012	7.3	6,557.18	6,556.81	0.050	6,560.41	6,561.14	6,557.43	6,557.22	6,557.36	6,557.21	4.48	0.16	2.94
PIPE 98	INLET 3.1a	MH 3.1a	8.0	0.012	21.1	6,558.00	6,557.58	0.020	6,560.17	6,561.13	6,558.29	6,557.93	6,558.22	6,557.73	3.56	0.22	1.85
PIPE 107	INLET 3.6a-1	INLET 3.6	12.0	0.012	79.0	6,563.79	6,563.03	0.010	6,566.93	6,566.90	6,564.13	6,563.37	6,564.04	6,563.29	3.05	0.37	3.79
PIPE 109	INLET 2.4b-1	INLET 2.4a	12.0	0.012	74.1	6,563.87	6,562.71	0.016	6,567.74	6,566.73	6,564.23	6,563.12	6,564.13	6,562.90	3.72	0.40	4.83
PIPE 111	INLET 3.8a	INLET 3.8	12.0	0.012	84.3	6,563.26	6,562.43	0.010	6,567.47	6,570.52	6,563.73	6,563.04	6,563.61	6,563.01	3.70	0.69	3.83
PIPE 112	INLET 2.12	MH 2.12	12.0	0.012	17.8	6,575.08	6,574.90	0.010	6,577.51	6,579.27	6,575.33	6,575.17	6,575.26	6,575.13	2.59	0.20	3.88
PIPE 113	MH 2.12	MH 2.11	12.0	0.012	68.6	6,574.90	6,574.22	0.010	6,579.27	6,579.90	6,575.15	6,574.54	6,575.08	6,574.53	2.57	0.20	3.84
PIPE 114	MH 2.11	MH 2.10	12.0	0.012	56.9	6,574.22	6,573.65	0.010	6,579.90	6,579.31	6,574.55	6,574.00	6,574.46	6,573.85	3.06	0.35	3.86
PIPE 121	MH 2.10	MH 2.9b	12.0	0.012	78.1	6,573.45	6,571.89	0.020	6,579.31	6,576.73	6,573.88	6,572.42	6,573.76	6,572.11	4.49	0.56	5.45
PIPE 122	MH 2.9b	INLET 2.9b	12.0	0.012	48.1	6,571.69	6,570.75	0.020	6,576.73	6,575.75	6,572.11	6,571.27	6,572.00	6,570.97	4.45	0.56	5.40
PIPE 124	INLET 2.11	MH 2.11	12.0	0.012	18.6	6,575.15	6,574.22	0.050	6,578.51	6,579.90	6,575.37	6,574.53	6,575.31	6,574.53	4.24	0.16	8.62
PIPE 125	INLET 2.10	MH 2.10	12.0	0.012	19.3	6,574.40	6,574.01	0.020	6,577.01	6,579.31	6,574.66	6,574.33	6,574.59	6,574.15	3.40	0.22	5.48
PIPE 126	INLET 2.6	T-23	12.0	0.012	14.0	6,563.91	6,563.21	0.050	6,568.73	6,567.90	6,564.12	6,563.58	6,564.06	6,563.58	4.09	0.14	8.63
PIPE 134	INLET 3.7a	INLET 3.7	12.0	0.012	36.7	6,564.70	6,564.33	0.010	6,567.39	6,567.47	6,564.90	6,564.54	6,564.85	6,564.46	2.33	0.14	3.88
PIPE 135	MH 3.1c	MH 3.1b	8.0	0.012	62.7	6,557.44	6,556.81	0.010	6,560.95	6,561.14	6,557.80	6,557.25	6,557.71	6,557.21	3.12	0.33	1.31
PIPE 136	MH 3.1b	MH 3.1a	8.0	0.012	48.9	6,556.81	6,556.33	0.010	6,561.14	6,561.13	6,557.26	6,556.79	6,557.13	6,556.61	3.44	0.48	1.30
PIPE 137	INLET 3.6	INLET 3.5b	12.0	0.012	39.3	6,562.83	6,562.14	0.018	6,566.90	6,566.54	6,563.35	6,562.76	6,563.21	6,562.41	4.77	0.82	5.11
PIPE 138	INLET 2.4b-2	INLET 2.4b-1	12.0	0.012	82.5	6,565.36	6,564.07	0.016	6,568.04	6,567.74	6,565.61	6,564.35	6,565.54	6,564.21	3.05	0.20	4.83
PIPE 139	INLET 3.6a-2	INLET 3.6a-1	12.0	0.012	43.8	6,565.00	6,563.99	0.023	6,566.92	6,566.93	6,565.24	6,564.29	6,565.18	6,564.11	3.39	0.18	5.86
PIPE 140	INLET 3.8b-1	INLET 3.9	12.0	0.012	47.8	6,568.77	6,568.32	0.009	6,573.03	6,572.60	6,569.04	6,568.60	6,568.97	6,568.49	2.67	0.24	3.74
PIPE 141	INLET 3.8b-2	INLET 3.8b-1	12.0	0.012	52.2	6,569.49	6,568.97	0.010	6,571.99	6,573.03	6,569.68	6,569.17	6,569.63	6,569.09	2.23	0.12	3.85
PIPE 142	INLET 2.5c-2	INLET 2.5c-1	12.0	0.012	26.2	6,569.70	6,569.30	0.015	6,572.13	6,571.39	6,569.79	6,569.39	6,569.77	6,569.35	1.61	0.03	4.77
PIPE 142 (1)	INLET 2.5c-1	INLET 2.5b	12.0	0.012	42.4	6,569.04	6,565.09	0.093	6,571.39	6,567.59	6,569.16	6,565.23	6,569.13	6,565.21	3.71	0.05	11.79
PIPE 151	T-23	INLET 2.5a	12.0	0.012	18.4	6,563.21	6,562.92	0.016	6,567.90	6,567.48	6,563.61	6,563.39	6,563.51	6,563.14	4.00	0.51	4.85
PIPE 151 (3)	MH 2.5a-2	T-23	12.0	0.012	41.9	6,563.87	6,563.21	0.016	6,568.92	6,567.90	6,564.21	6,563.61	6,564.12	6,563.58	3.66	0.37	4.84
PIPE 152	INLET 2.5b	MH 2.5a-2	12.0	0.012	55.4	6,564.89	6,564.07	0.015	6,567.59	6,568.92	6,565.23	6,564.46	6,565.14	6,564.26	3.57	0.38	4.69
PIPE 158	T-22	INLET 4.10	18.0	0.012	11.7	6,553.74	6,553.60	0.012	6,556.82	6,556.46	6,554.98	6,554.90	6,554.62	6,554.34	6.72	5.20	12.42
PIPE 158 (1)	INLET 4.11	T-22	18.0	0.012	46.1	6,554.66	6,553.74	0.020	6,558.93	6,556.82	6,555.71	6,554.99	6,555.42	6,554.87	7.50	3.91	16.07
PIPE 159	INLET 4.12	INLET 4.11	12.0	0.012	64.3	6,556.74	6,555.33	0.022	6,561.77	6,558.93	6,557.98	6,556.82	6,557.55	6,555.91	7.69	3.59	5.72
PIPE 160	T-21	INLET 4.12	12.0	0.012	55.4	6,558.35	6,556.94	0.025	6,563.08	6,561.77	6,559.42	6,558.03	6,559.07	6,557.77	7.69	2.86	6.16
PIPE 160 (1)	INLET 4.13	T-21	12.0	0.012	15.4	6,558.63	6,558.35	0.018	6,562.68	6,563.08	6,559.68	6,559.52	6,559.35	6,559.31	6.75	2.81	5.21
PIPE 161	T-20	INLET 4.13	12.0	0.012	18.4	6,559.48	6,558.92	0.031	6,563.06	6,562.68	6,560.19	6,559.65	6,559.99	6,559.52	6.85	1.46	6.74
PIPE 161 (1)	INLET 4.14	T-24	12.0	0.012	29.7	6,565.78	6,564.65	0.038	6,570.91	6,569.33	6,566.47	6,565.39	6,566.27	6,565.29	7.26	1.36	7.53
PIPE 161 (2)	T-24	T-20	12.0	0.012	120.4	6,564.65	6,559.48	0.043	6,569.33	6,563.06	6,565.35	6,560.24	6,565.15	6,560.13	7.68	1.41	8.00
PIPE 200	INLET 4.5b	T-19	12.0	0.012	30.9	6,561.29	6,560.48	0.026	6,562.67	6,566.13	6,561.46	6,560.86	6,561.42	6,560.86	2.94	0.10	6.25
PIPE 202	INLET 4.5a	T-18	12.0	0.012	30.7	6,559.99	6,558.74	0.041	6,561.38	6,563.63	6,560.19	6,559.17	6,560.14	6,559.16	3.71	0.13	7.78
PIPE 203	INLET 4.4b	T-16	12.0	0.012	30.9	6,557.97	6,557.17	0.026	6,559.35	6,562.13	6,558.17	6,557.75	6,558.12	6,557.75	3.17	0.13	6.21
PIPE 206	INLET 4.15	INLET 4.14	12.0	0.012	143.2	6,574.08	6,567.18	0.048	6,577.48	6,570.91	6,574.55	6,568.02	6,574.42	6,567.37	6.45	0.68	8.47
PIPE 207	INLET 4.6a	INLET 4.6-2	12.0	0.012	17.5	6,563.69	6,563.52	0.010	6,565.81	6,570.43	6,563.89	6,563.73	6,563.84	6,563.65	2.29	0.14	3.81
PIPE 208	INLET 4.15a	INLET 4.15	12.0	0.012	57.8	6,575.40	6,574.28	0.019	6,578.35	6,577.48	6,575.55	6,574.50	6,575.51	6,574.50	2.38	0.07	5.37
PIPE 209	INLET 4.13b	T-24	12.0	0.012	43.3	6,567.96	6,564.65	0.076	6,570.82	6,569.33	6,568.08	6,565.29	6,568.05	6,565.29	3.49	0.05	10.67
PIPE 210	INLET 4.12b	T-21	12.0	0.012	31.3	6,559.88	6,558.35	0.049	6,563.05	6,563.08	6,560.00	6,559.31	6,559.97	6,559.31	2.98	0.05	8.53
PIPE 211	INLET 4.10a	INLET 4.16b	12.0	0.012	47.8	6,554.93	6,554.70	0.005	6,557.50	6,557.14	6,555.65	6,555.42	6,555.46	6,555.22	3.50	1.49	2.68
PIPE 211 (1)	INLET 4.16b	T-22	12.0	0.012	41.5	6,554.36	6,553.99	0.009	6,557.14	6,556.82	6,555.10	6,554.94	6,554.89	6,554.87	4.46	1.55	3.65
PIPE 212	INLET 4.3a	T-15	12.0	0.012	42.4	6,555.47	6,555.05	0.010	6,557.97	6,559.66	6,556.03	6,556.00	6,555.97	6,555.98	3.80	0.75	3.84

Conduit FlexTable: Combined Pipe/Node Report

Label	Start Node	Stop Node	Diameter (in)	Manning's n	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
PIPE 213 (1)	INLET 4.16	O 4.3	18.0	0.012	66.8	6,552.33	6,552.00	0.005	6,555.07	6,553.90	6,553.93	6,553.92	6,553.92	6,553.90	3.62	1.75	8.00
PIPE 214	INLET 4.16a	INLET 4.16	12.0	0.012	26.7	6,552.55	6,552.43	0.004	6,554.50	6,555.07	6,554.06	6,554.00	6,553.98	6,553.92	3.54	1.75	2.59
PIPE 215	INLET 4.12a	INLET 4.12	12.0	0.012	81.1	6,558.52	6,556.96	0.019	6,561.50	6,561.77	6,558.74	6,557.77	6,558.68	6,557.77	3.03	0.16	5.35
PIPE 216	INLET 4.13a	T-20	12.0	0.012	32.2	6,560.20	6,559.48	0.022	6,563.69	6,563.06	6,560.33	6,560.13	6,560.30	6,560.13	2.34	0.06	5.77
PIPE 217	INLET 4.4c	T-17	12.0	0.012	55.7	6,559.44	6,557.33	0.038	6,563.26	6,562.31	6,559.61	6,557.88	6,559.56	6,557.88	3.26	0.09	7.51
PIPE 218	INLET 3.1d	MH 3.1c	8.0	0.012	52.1	6,557.96	6,557.44	0.010	6,560.13	6,560.95	6,558.17	6,557.77	6,558.11	6,557.77	2.28	0.11	1.31
PIPE 219	INLET 3.1	O 3	24.0	0.012	71.1	6,554.38	6,553.00	0.019	6,558.74	6,555.41	6,556.04	6,555.09	6,555.55	6,554.90	9.61	10.69	34.14
PIPE 221	MH 3.1a	INLET 3.1	8.0	0.012	34.2	6,555.50	6,554.58	0.027	6,561.13	6,558.74	6,556.06	6,555.95	6,555.89	6,555.89	5.49	0.69	2.15
PIPE 223	INLET 2.1	O 2	24.0	0.012	81.9	6,552.70	6,552.00	0.009	6,556.92	6,554.41	6,555.35	6,555.07	6,555.03	6,554.75	7.63	14.32	22.66

25-YEAR

Profile Report
Engineering Profile - BLDG. 6 - STRM BRANCH 1 (Hockett Gulch - StormCAD Analysis.stsw)



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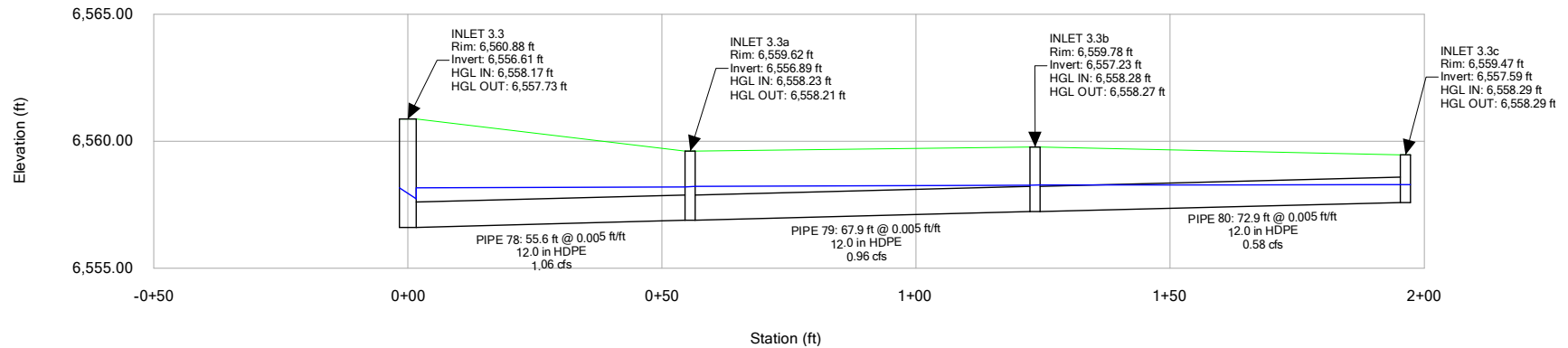
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HGL ———

25-YEAR

Profile Report

Engineering Profile - BLDG. 6 - STRM BRANCH 2 (Hockett Gulch - StormCAD Analysis.stsw)



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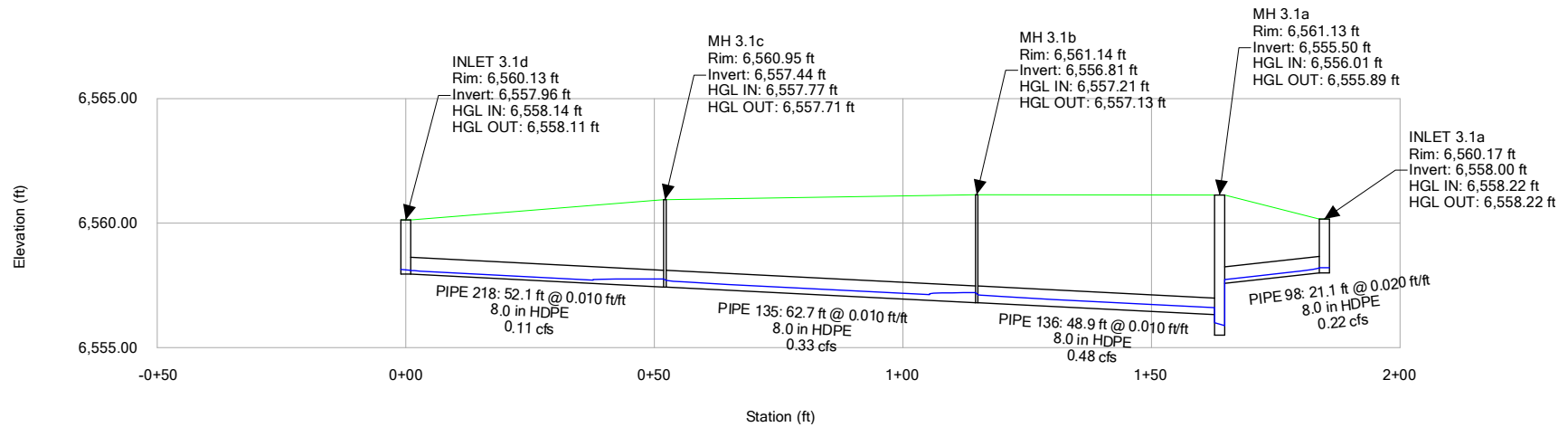
PROPOSED GRADE —

HGL —

25-YEAR

Profile Report

Engineering Profile - BLDG. 6 - STRM BRANCH 3 (Hockett Gulch - StormCAD Analysis.stsw)



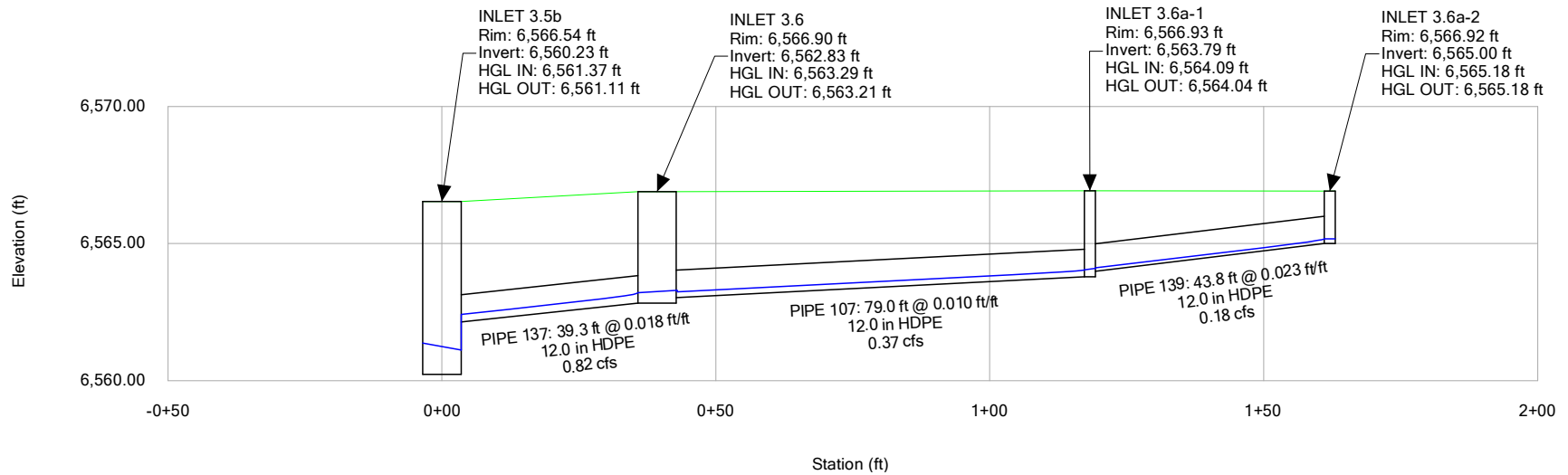
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PROPOSED GRADE —
HGL —

25-YEAR

Profile Report

Engineering Profile - BLDG. 7 STRM LATERAL 1 (Hockett Gulch - StormCAD Analysis.stsw)



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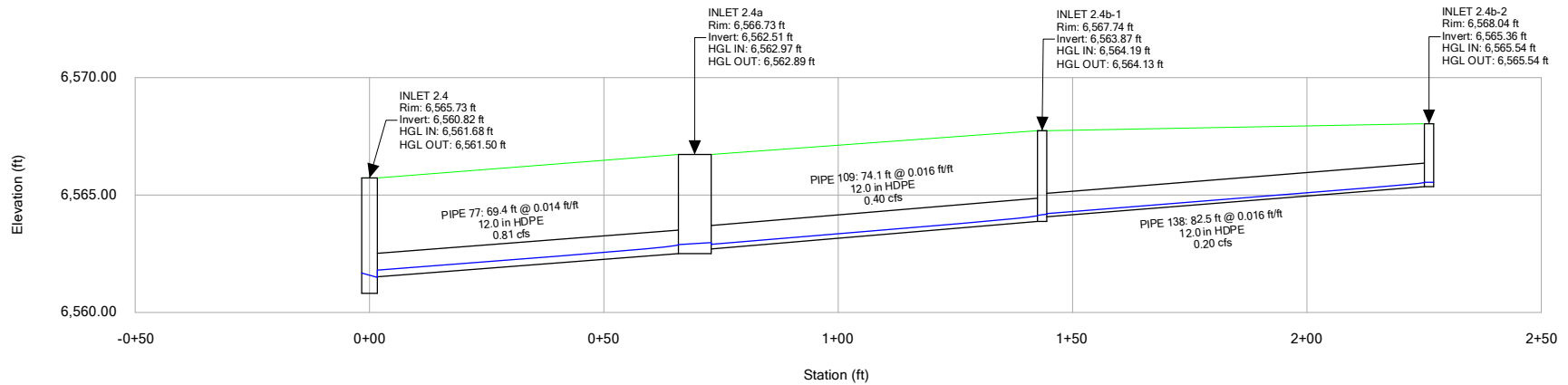
PROPOSED GRADE —

HGL —

25-YEAR

Profile Report

Engineering Profile - BLDG. 8 - STRM BRANCH 1 (Hockett Gulch - StormCAD Analysis.stsw)



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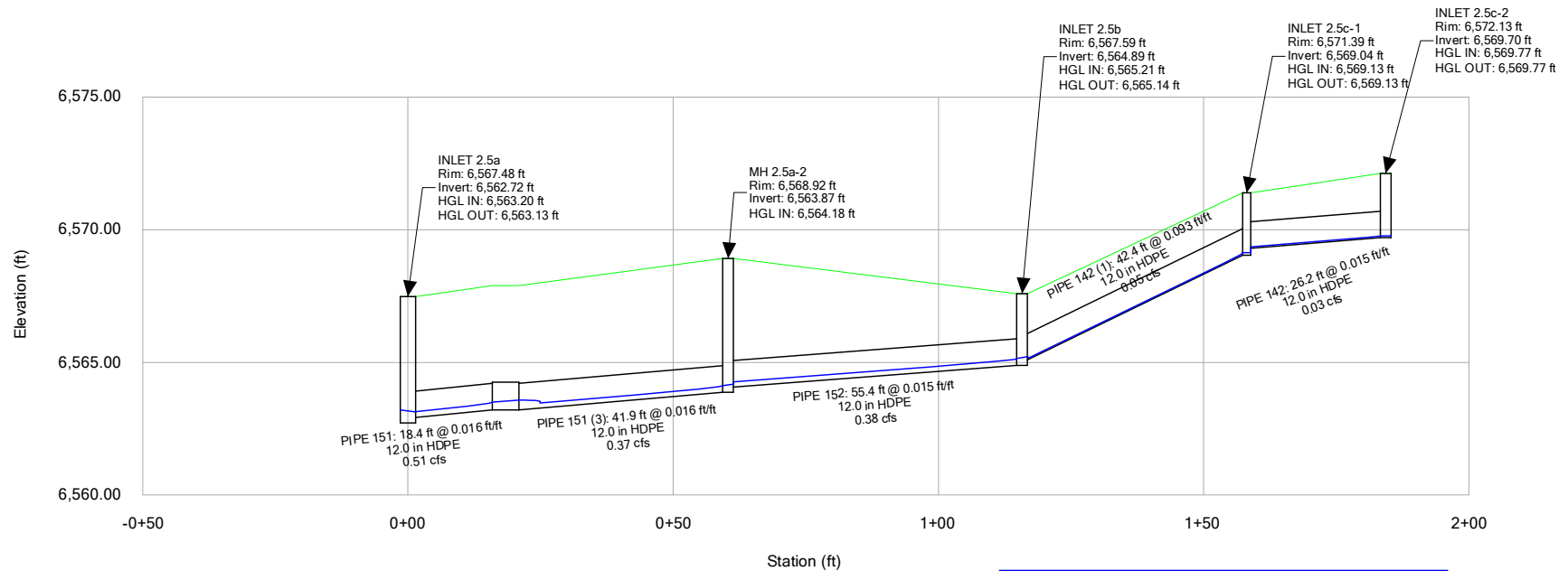
PROPOSED GRADE —

HGL —

25-YEAR

Profile Report

Engineering Profile - BLDG. 8 - STRM BRANCH 2 (Hockett Gulch - StormCAD Analysis.stsw)



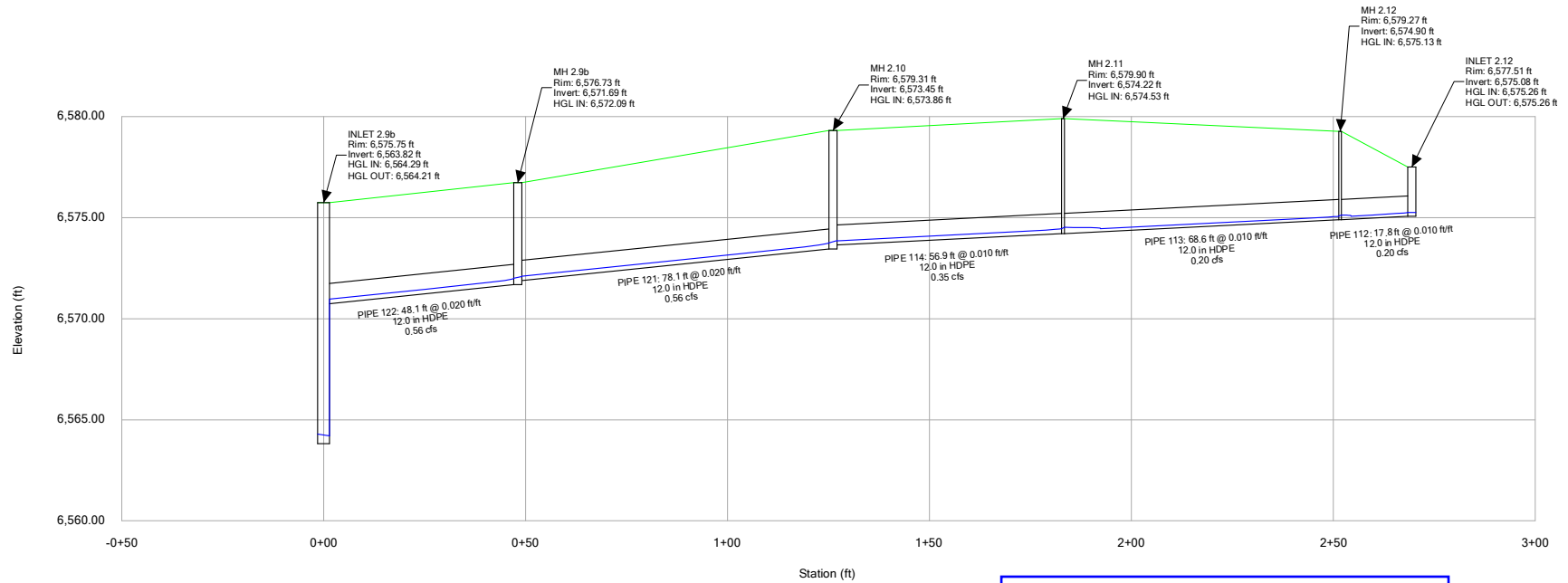
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PROPOSED GRADE —
HGL —

25-YEAR

Profile Report

Engineering Profile - BLDG. 9 - STRM BRANCH (Hockett Gulch - StormCAD Analysis.stsw)



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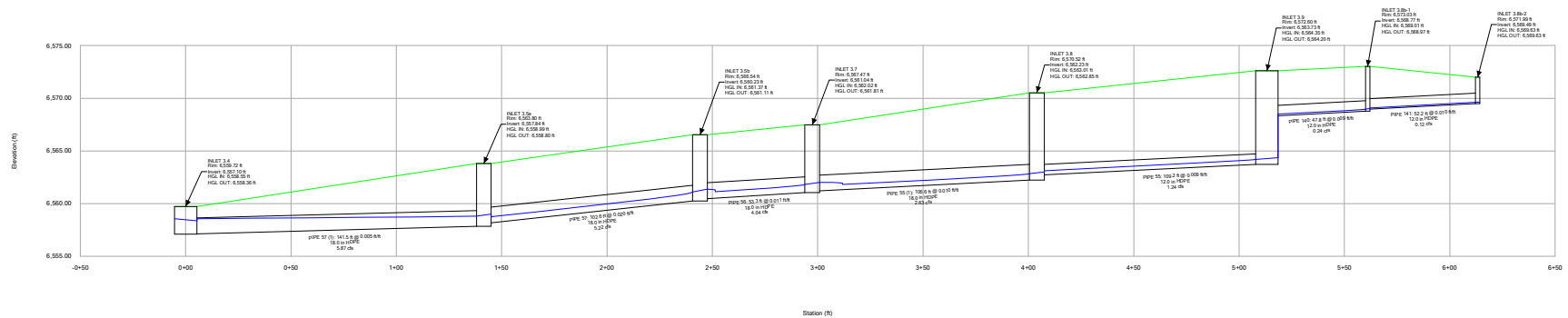
PROPOSED GRADE —

HGL —

25-YEAR

Profile Report

Engineering Profile - STORM MAIN A (Hockett Gulch - StormCAD Analysis.stsw)

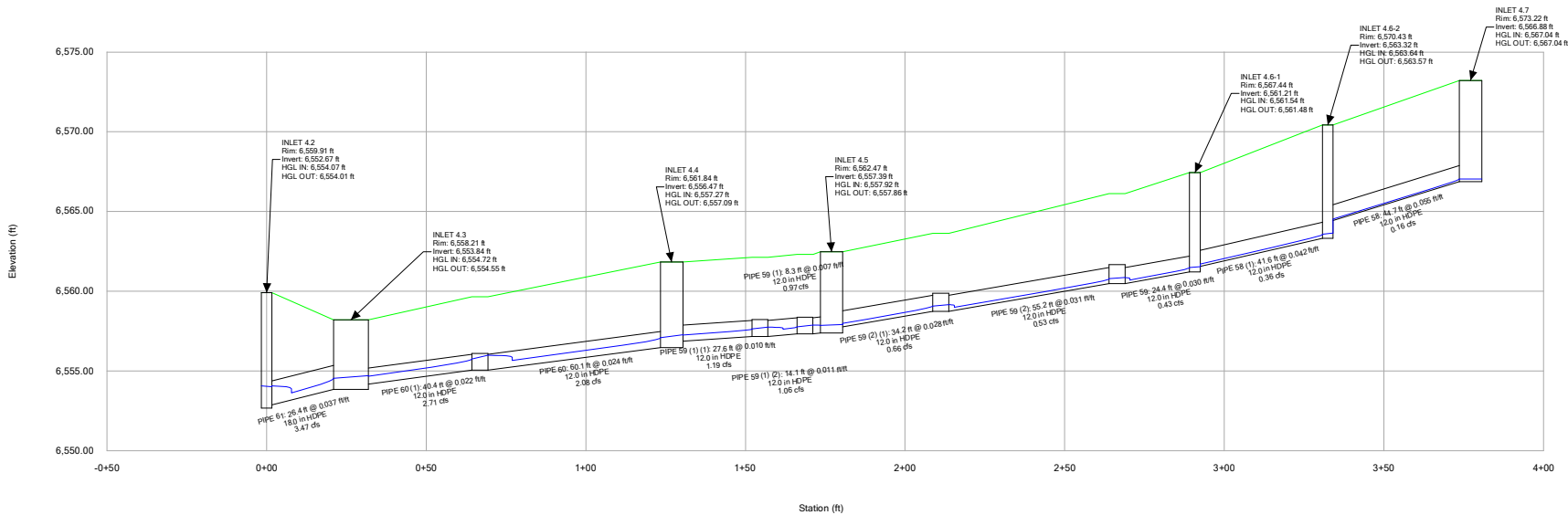


LEGEND:

PROPOSED GRADE

HGL

Profile Report
Engineering Profile - STORM MAIN B (Hockett Gulch - StormCAD Analysis.stsw)



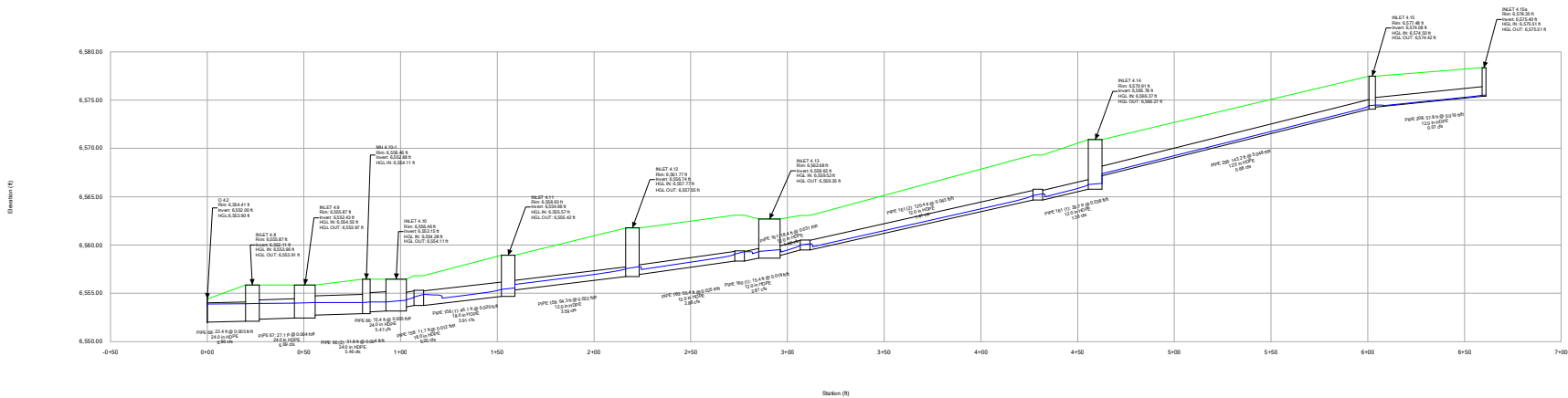
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PROPOSED GRADE ———

HGL ———

25-YEAR

Profile Report
Engineering Profile - STORM MAIN C (Hockett Gulch - StormCAD Analysis.stsw)



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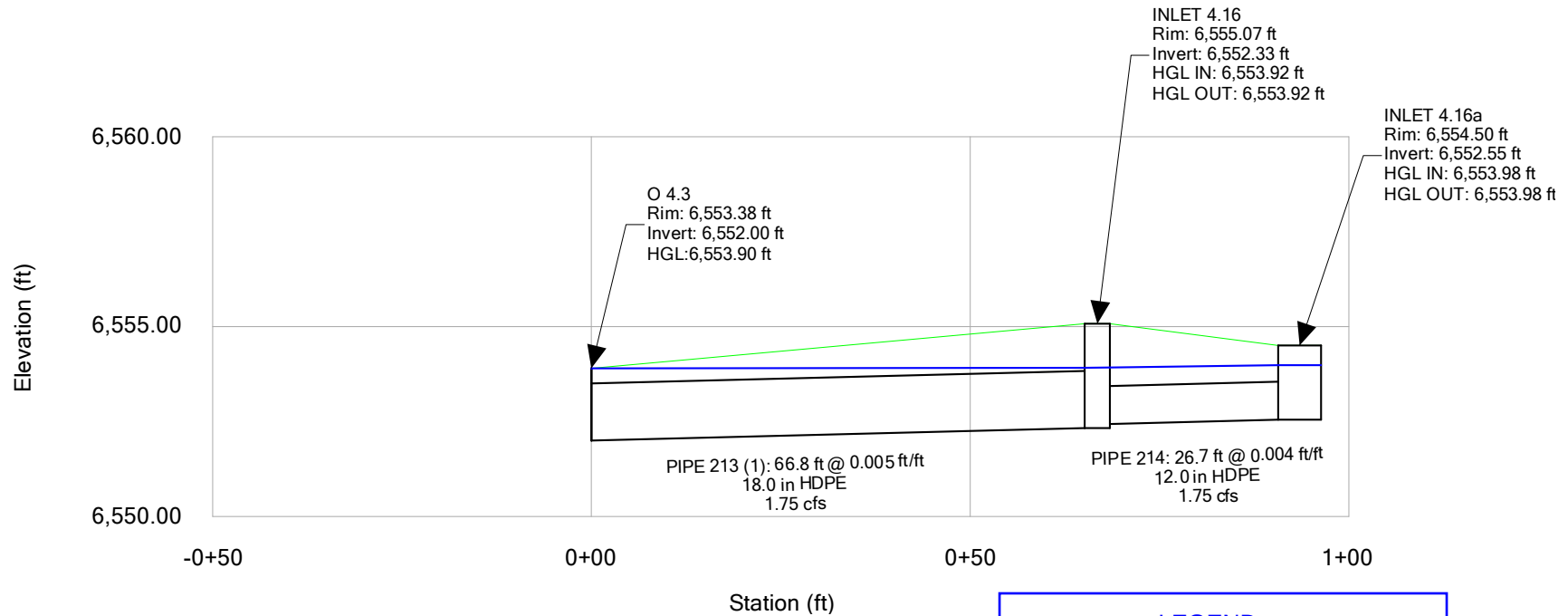
PROPOSED GRADE

HGL

25-YEAR

Profile Report

Engineering Profile - STORM MAIN D (Hockett Gulch - StormCAD Analysis.stsw)



LEGEND:

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HGL ———

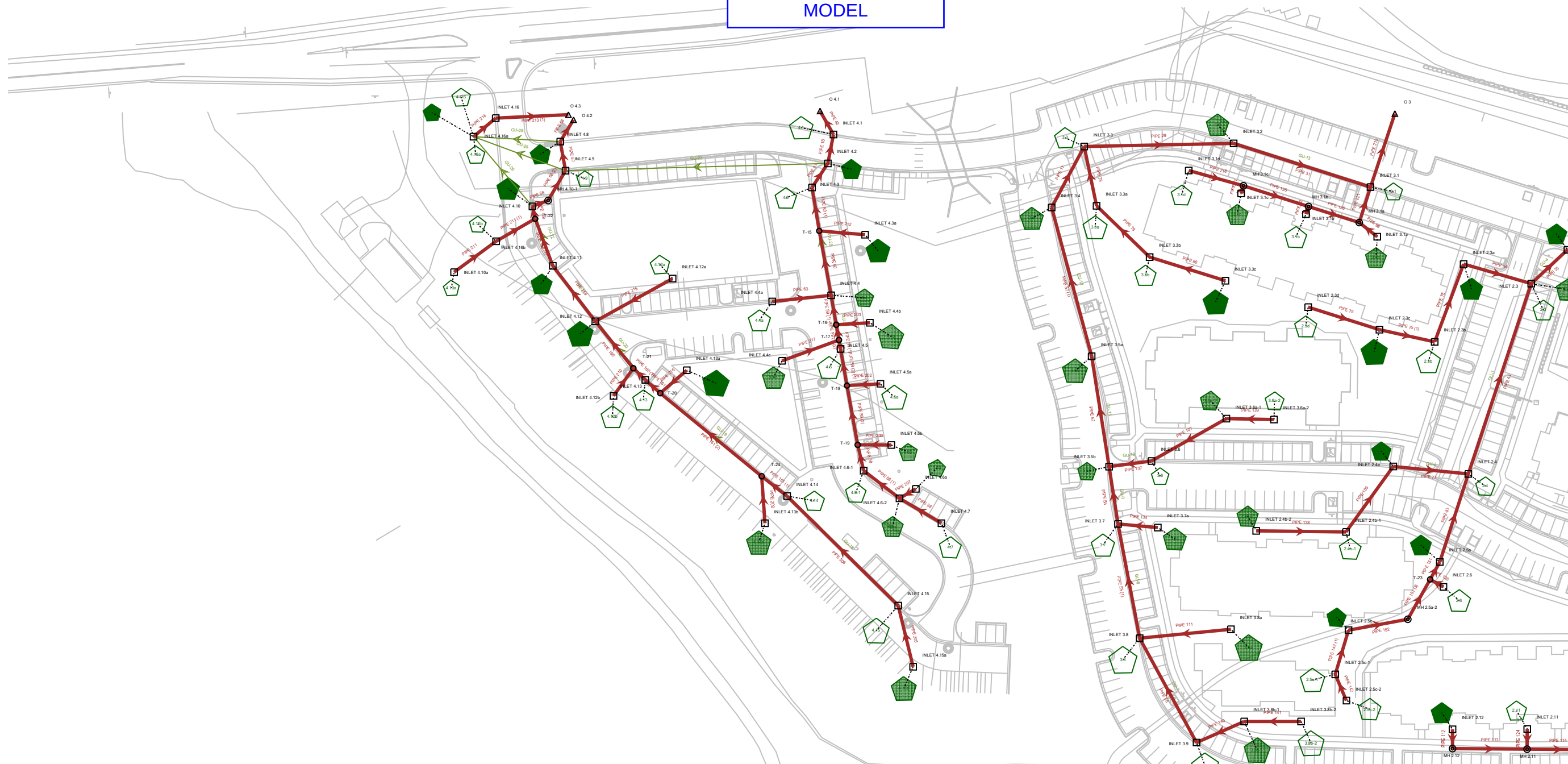


APPENDIX F

StormCAD 100-Year Summary Tables & Hydraulic Profiles

The image displays a complex hydraulic model of a residential sewer system. The network is composed of numerous red pipes, each labeled with a unique identifier (e.g., PIPE 1, PIPE 2, PIPE 3, etc.). Green pentagonal shapes represent inlets and manholes, with labels such as INLET 4.1, INLET 3.3, INLET 2.1, and INLET 1.1. The model is overlaid on a detailed street map showing building footprints, parking lots, and road layouts. A blue box labeled 'MODEL' is positioned at the top center. On the left side, a label 'T-15' is visible. The map illustrates the flow of wastewater through the system, with arrows indicating the direction of flow along the pipes. The system includes various types of structures, including inlets, manholes, and pipes, all interconnected to form a comprehensive network.

STORMCAD NETWORK MODEL



Conduit FlexTable: Combined Pipe/Node Report

Label	Start Node	Stop Node	Diameter (in)	Manning's n	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
PIPE 10	INLET 2.9c	INLET 2.9b	12.0	0.012	152.6	6,570.39	6,567.25	0.021	6,573.94	6,575.75	6,570.67	6,567.59	6,570.59	6,567.39	3.54	0.25	5.54
PIPE 16	INLET 4.2	INLET 4.1	18.0	0.012	27.0	6,552.67	6,552.44	0.009	6,559.91	6,558.34	6,554.96	6,554.89	6,554.80	6,554.73	3.19	5.65	10.50
PIPE 17	INLET 3.4	INLET 3.3	18.0	0.012	63.4	6,557.10	6,556.81	0.005	6,559.72	6,560.88	6,560.84	6,560.38	6,560.38	6,559.92	5.48	9.68	7.69
PIPE 18	INLET 2.9b	INLET 2.9a	12.0	0.012	90.7	6,563.82	6,562.01	0.020	6,575.75	6,566.59	6,564.47	6,563.05	6,564.29	6,563.01	5.61	1.23	5.45
PIPE 29	INLET 3.3	INLET 3.2	18.0	0.012	137.4	6,556.61	6,555.70	0.007	6,560.88	6,560.62	6,560.05	6,558.64	6,559.39	6,557.98	6.52	11.52	9.26
PIPE 31	INLET 3.2	INLET 3.1	18.0	0.012	131.9	6,555.50	6,554.58	0.007	6,560.62	6,558.74	6,558.25	6,556.87	6,557.58	6,556.19	6.60	11.66	9.50
PIPE 34	INLET 2.3a	INLET 2.3	8.0	0.012	64.7	6,556.89	6,556.24	0.010	6,559.43	6,560.56	6,558.03	6,557.25	6,557.77	6,556.99	4.10	1.43	1.31
PIPE 35	INLET 2.3	INLET 2.2	18.0	0.012	45.5	6,554.97	6,554.53	0.010	6,560.56	6,558.78	6,556.99	6,556.86	6,556.80	6,556.66	3.52	6.23	11.19
PIPE 36	INLET 2.2	INLET 2.1	18.0	0.012	91.2	6,554.33	6,553.44	0.010	6,558.78	6,556.92	6,556.77	6,556.40	6,556.51	6,556.14	4.10	7.24	11.24
PIPE 38	MH 2.1	INLET 2.1	18.0	0.012	28.0	6,553.12	6,552.90	0.008	6,558.36	6,556.92	6,556.49	6,556.38	6,556.24	6,556.14	3.98	7.03	10.09
PIPE 41	INLET 2.4	INLET 2.3	18.0	0.012	184.0	6,560.82	6,555.17	0.031	6,565.73	6,560.56	6,561.91	6,557.08	6,561.60	6,556.99	8.92	4.16	19.94
PIPE 42	INLET 4.1	O 4.1	18.0	0.012	25.0	6,552.24	6,552.11	0.005	6,558.34	6,553.67	6,554.80	6,554.73	6,554.63	6,554.57	3.25	5.74	8.21
PIPE 43	INLET 2.5a	INLET 2.4	18.0	0.012	84.9	6,562.72	6,561.02	0.020	6,567.48	6,565.73	6,563.39	6,561.87	6,563.21	6,561.82	5.92	1.70	16.10
PIPE 44	INLET 2.9a	INLET 2.8	18.0	0.012	55.4	6,562.01	6,560.90	0.020	6,566.59	6,567.24	6,563.18	6,562.12	6,562.84	6,561.89	7.91	4.71	16.11
PIPE 45	INLET 2.8	MH 2.4	18.0	0.012	63.3	6,560.70	6,557.70	0.047	6,567.24	6,562.18	6,562.06	6,559.08	6,561.65	6,558.77	11.56	6.03	24.77
PIPE 46	MH 2.4	MH 2.3	18.0	0.012	50.6	6,557.50	6,556.49	0.020	6,562.18	6,560.90	6,558.85	6,558.35	6,558.45	6,558.17	8.44	6.01	16.08
PIPE 47	MH 2.3	INLET 2.7	18.0	0.012	12.4	6,556.29	6,556.16	0.010	6,560.90	6,560.50	6,558.20	6,558.17	6,558.02	6,557.99	3.40	6.00	11.64
PIPE 48	INLET 2.7	MH 2.2	18.0	0.012	86.1	6,555.96	6,555.27	0.008	6,560.50	6,560.17	6,558.12	6,557.77	6,557.86	6,557.51	4.08	7.22	10.19
PIPE 49	MH 2.2	MH 2.1	18.0	0.012	219.1	6,555.07	6,553.32	0.008	6,560.17	6,558.36	6,557.56	6,556.70	6,557.31	6,556.44	4.05	7.16	10.17
PIPE 55	INLET 3.9	INLET 3.8	12.0	0.012	109.2	6,563.73	6,562.72	0.009	6,572.60	6,570.52	6,564.48	6,563.50	6,564.27	6,563.18	4.56	1.61	3.71
PIPE 55 (1)	INLET 3.8	INLET 3.7	18.0	0.012	106.6	6,562.23	6,561.20	0.010	6,570.52	6,567.47	6,563.21	6,562.31	6,562.94	6,562.19	5.57	3.43	11.18
PIPE 56	INLET 3.7	INLET 3.5b	18.0	0.012	53.3	6,561.04	6,560.47	0.011	6,567.47	6,566.54	6,562.30	6,561.80	6,561.93	6,561.57	6.50	5.35	11.77
PIPE 57	INLET 3.5b	INLET 3.5a	18.0	0.012	102.6	6,560.23	6,558.17	0.020	6,566.54	6,563.80	6,561.71	6,560.78	6,561.25	6,560.54	8.79	6.96	16.12
PIPE 57 (1)	INLET 3.5a	INLET 3.4	18.0	0.012	141.5	6,557.84	6,557.13	0.005	6,563.80	6,559.72	6,560.69	6,560.02	6,560.39	6,559.72	4.41	7.80	8.06
PIPE 58	INLET 4.7	INLET 4.6-2	12.0	0.012	44.7	6,566.88	6,564.43	0.055	6,573.22	6,570.43	6,567.13	6,564.88	6,567.07	6,564.53	4.74	0.21	9.03
PIPE 58 (1)	INLET 4.6-2	INLET 4.6-1	12.0	0.012	41.6	6,563.32	6,561.56	0.042	6,570.43	6,567.44	6,563.74	6,562.27	6,563.63	6,561.74	5.83	0.56	7.94
PIPE 59	INLET 4.6-1	T-19	12.0	0.012	24.4	6,561.21	6,560.48	0.030	6,567.44	6,566.13	6,561.67	6,561.00	6,561.55	6,560.95	5.39	0.65	6.68
PIPE 59 (1)	INLET 4.5	T-17	12.0	0.012	8.3	6,557.39	6,557.33	0.007	6,562.47	6,562.31	6,558.10	6,558.09	6,557.99	6,557.99	3.96	1.35	3.27
PIPE 59 (1) (1)	T-16	INLET 4.4	12.0	0.012	27.6	6,557.17	6,556.88	0.010	6,562.13	6,561.84	6,557.94	6,557.69	6,557.72	6,557.34	4.83	1.67	3.95
PIPE 59 (1) (2)	T-17	T-16	12.0	0.012	14.1	6,557.33	6,557.17	0.011	6,562.31	6,562.13	6,558.05	6,557.97	6,557.85	6,557.87	4.82	1.50	4.11
PIPE 59 (2)	T-19	T-18	12.0	0.012	55.2	6,560.48	6,558.74	0.031	6,566.13	6,563.63	6,560.99	6,559.31	6,560.85	6,559.26	5.80	0.78	6.85
PIPE 59 (2) (1)	T-18	INLET 4.5	12.0	0.012	34.2	6,558.74	6,557.77	0.028	6,563.63	6,562.47	6,559.30	6,558.57	6,559.15	6,558.03	5.92	0.95	6.50
PIPE 60	INLET 4.4	T-15	12.0	0.012	60.1	6,556.47	6,555.05	0.024	6,561.84	6,559.66	6,557.53	6,556.41	6,557.19	6,556.21	7.46	2.81	5.93
PIPE 60 (1)	T-15	INLET 4.3	12.0	0.012	40.4	6,555.05	6,554.18	0.022	6,559.66	6,558.21	6,556.35	6,555.68	6,555.88	6,554.80	7.75	3.85	5.66
PIPE 61	INLET 4.3	INLET 4.2	18.0	0.012	26.4	6,553.84	6,552.87	0.037	6,558.21	6,559.91	6,555.06	6,555.01	6,554.81	6,554.89	9.96	4.91	21.81
PIPE 63	INLET 4.4a	INLET 4.4	12.0	0.012	54.3	6,557.64	6,556.88	0.014	6,561.87	6,561.84	6,558.12	6,557.47	6,557.99	6,557.42	4.22	0.71	4.57
PIPE 66	INLET 4.10	MH 4.10-1	24.0	0.012	15.4	6,553.15	6,553.08	0.005	6,556.46	6,556.46	6,555.01	6,555.00	6,554.91	6,554.90	5.15	7.64	16.50
PIPE 66 (2)	MH 4.10-1	INLET 4.9	24.0	0.012	31.8	6,552.88	6,552.74	0.004	6,556.46	6,555.87	6,554.94	6,554.90	6,554.84	6,554.81	5.09	7.63	16.27
PIPE 67	INLET 4.9	INLET 4.8	24.0	0.012	27.1	6,552.43	6,552.31	0.004	6,555.87	6,555.87	6,554.87	6,554.83	6,554.73	6,554.69	2.98	9.35	16.31
PIPE 68	INLET 4.8	O 4.2	24.0	0.012	23.4	6,552.11	6,552.00	0.005	6,555.87	6,554.41	6,554.75	6,554.71	6,554.61	6,554.57	3.03	9.53	16.80
PIPE 75	INLET 2.3d	INLET 2.3c	8.0	0.012	68.7	6,557.87	6,557.53	0.005	6,559.96	6,559.99	6,559.16	6,559.06	6,559.13	6,559.03	1.41	0.49	0.92
PIPE 75 (1)	INLET 2.3c	INLET 2.3b	8.0	0.012	52.1	6,557.53	6,557.27	0.005	6,559.99	6,560.20	6,559.08	6,558.85	6,558.98	6,558.75	2.50	0.87	0.92
PIPE 76	INLET 2.3b	INLET 2.3a	8.0	0.012	76.1	6,557.27	6,556.89	0.005	6,560.20	6,559.43	6,558.79	6,558.12	6,558.60	6,557.92	3.53	1.23	0.92
PIPE 77	INLET 2.4a	INLET 2.4	12.0	0.012	69.4	6,562.51	6,561.52	0.014	6,566.73	6,565.73	6,563.10	6,562.19	6,562.94	6,561.84	4.74	1.04	4.61
PIPE 78	INLET 3.3a	INLET 3.3	12.0	0.012	55.6	6,556.89	6,556.61	0.005	6,559.62	6,560.88	6,560.07	6,559.98	6,560.01	6,559.92	1.98	1.56	2.74

Conduit FlexTable: Combined Pipe/Node Report

Label	Start Node	Stop Node	Diameter (in)	Manning's n	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
PIPE 79	INLET 3.3b	INLET 3.3a	12.0	0.012	67.9	6,557.23	6,556.89	0.005	6,559.78	6,559.62	6,559.75	6,559.67	6,559.71	6,559.62	1.76	1.38	2.73
PIPE 80	INLET 3.3c	INLET 3.3b	12.0	0.012	72.9	6,557.59	6,557.23	0.005	6,559.47	6,559.78	6,559.79	6,559.75	6,559.77	6,559.74	1.05	0.82	2.71
PIPE 81	INLET 3.1c	MH 3.1c	8.0	0.012	7.3	6,557.81	6,557.44	0.050	6,560.29	6,560.95	6,558.15	6,557.86	6,558.06	6,557.83	5.38	0.29	2.94
PIPE 82	INLET 3.1b	MH 3.1b	8.0	0.012	7.3	6,557.18	6,556.81	0.050	6,560.41	6,561.14	6,557.47	6,557.30	6,557.39	6,557.29	4.91	0.22	2.94
PIPE 98	INLET 3.1a	MH 3.1a	8.0	0.012	21.1	6,558.00	6,557.58	0.020	6,560.17	6,561.13	6,558.34	6,557.99	6,558.25	6,557.76	3.87	0.29	1.85
PIPE 107	INLET 3.6a-1	INLET 3.6	12.0	0.012	79.0	6,563.79	6,563.03	0.010	6,566.93	6,566.90	6,564.19	6,563.44	6,564.09	6,563.37	3.36	0.51	3.79
PIPE 109	INLET 2.4b-1	INLET 2.4a	12.0	0.012	74.1	6,563.87	6,562.71	0.016	6,567.74	6,566.73	6,564.29	6,563.13	6,564.18	6,563.04	4.07	0.54	4.83
PIPE 111	INLET 3.8a	INLET 3.8	12.0	0.012	84.3	6,563.26	6,562.43	0.010	6,567.47	6,570.52	6,563.82	6,563.17	6,563.67	6,563.13	4.03	0.94	3.83
PIPE 112	INLET 2.12	MH 2.12	12.0	0.012	17.8	6,575.08	6,574.90	0.010	6,577.51	6,579.27	6,575.37	6,575.21	6,575.30	6,575.18	2.85	0.27	3.88
PIPE 113	MH 2.12	MH 2.11	12.0	0.012	68.6	6,574.90	6,574.22	0.010	6,579.27	6,579.90	6,575.19	6,574.60	6,575.12	6,574.58	2.83	0.27	3.84
PIPE 114	MH 2.11	MH 2.10	12.0	0.012	56.9	6,574.22	6,573.65	0.010	6,579.90	6,579.31	6,574.61	6,574.06	6,574.51	6,573.89	3.36	0.49	3.86
PIPE 121	MH 2.10	MH 2.9b	12.0	0.012	78.1	6,573.45	6,571.89	0.020	6,579.31	6,576.73	6,573.95	6,572.52	6,573.82	6,572.14	4.91	0.77	5.45
PIPE 122	MH 2.9b	INLET 2.9b	12.0	0.012	48.1	6,571.69	6,570.75	0.020	6,576.73	6,575.75	6,572.19	6,571.37	6,572.06	6,571.00	4.86	0.77	5.40
PIPE 124	INLET 2.11	MH 2.11	12.0	0.012	18.6	6,575.15	6,574.22	0.050	6,578.51	6,579.90	6,575.41	6,574.59	6,575.34	6,574.58	4.65	0.22	8.62
PIPE 125	INLET 2.10	MH 2.10	12.0	0.012	19.3	6,574.40	6,574.01	0.020	6,577.01	6,579.31	6,574.70	6,574.38	6,574.62	6,574.17	3.71	0.29	5.48
PIPE 126	INLET 2.6	T-23	12.0	0.012	14.0	6,563.91	6,563.21	0.050	6,568.73	6,567.90	6,564.16	6,563.66	6,564.09	6,563.66	4.55	0.20	8.63
PIPE 134	INLET 3.7a	INLET 3.7	12.0	0.012	36.7	6,564.70	6,564.33	0.010	6,567.39	6,567.47	6,564.95	6,564.59	6,564.88	6,564.48	2.58	0.20	3.88
PIPE 135	MH 3.1c	MH 3.1b	8.0	0.012	62.7	6,557.44	6,556.81	0.010	6,560.95	6,561.14	6,557.87	6,557.33	6,557.75	6,557.29	3.40	0.45	1.31
PIPE 136	MH 3.1b	MH 3.1a	8.0	0.012	48.9	6,556.81	6,556.33	0.010	6,561.14	6,561.13	6,557.35	6,556.88	6,557.19	6,556.67	3.73	0.66	1.30
PIPE 137	INLET 3.6	INLET 3.5b	12.0	0.012	39.3	6,562.83	6,562.14	0.018	6,566.90	6,566.54	6,563.44	6,562.87	6,563.27	6,562.45	5.19	1.10	5.11
PIPE 138	INLET 2.4b-2	INLET 2.4b-1	12.0	0.012	82.5	6,565.36	6,564.07	0.016	6,568.04	6,567.74	6,565.65	6,564.40	6,565.58	6,564.23	3.33	0.27	4.83
PIPE 139	INLET 3.6a-2	INLET 3.6a-1	12.0	0.012	43.8	6,565.00	6,563.99	0.023	6,566.92	6,566.93	6,565.28	6,564.35	6,565.21	6,564.13	3.73	0.26	5.86
PIPE 140	INLET 3.8b-1	INLET 3.9	12.0	0.012	47.8	6,568.77	6,568.32	0.009	6,573.03	6,572.60	6,569.09	6,568.66	6,569.01	6,568.52	2.95	0.34	3.74
PIPE 141	INLET 3.8b-2	INLET 3.8b-1	12.0	0.012	52.2	6,569.49	6,568.97	0.010	6,571.99	6,573.03	6,569.72	6,569.21	6,569.66	6,569.11	2.45	0.17	3.85
PIPE 142	INLET 2.5c-2	INLET 2.5c-1	12.0	0.012	26.2	6,569.70	6,569.30	0.015	6,572.13	6,571.39	6,569.81	6,569.42	6,569.78	6,569.37	1.87	0.04	4.77
PIPE 142 (1)	INLET 2.5c-1	INLET 2.5b	12.0	0.012	42.4	6,569.04	6,565.09	0.093	6,571.39	6,567.59	6,569.20	6,565.29	6,569.16	6,565.28	4.29	0.08	11.79
PIPE 151	T-23	INLET 2.5a	12.0	0.012	18.4	6,563.21	6,562.92	0.016	6,567.90	6,567.48	6,563.69	6,563.41	6,563.56	6,563.30	4.43	0.72	4.85
PIPE 151 (3)	MH 2.5a-2	T-23	12.0	0.012	41.9	6,563.87	6,563.21	0.016	6,568.92	6,567.90	6,564.28	6,563.69	6,564.17	6,563.66	4.04	0.53	4.84
PIPE 152	INLET 2.5b	MH 2.5a-2	12.0	0.012	55.4	6,564.89	6,564.07	0.015	6,567.59	6,568.92	6,565.30	6,564.54	6,565.19	6,564.30	3.96	0.53	4.69
PIPE 158	T-22	INLET 4.10	18.0	0.012	11.7	6,553.74	6,553.60	0.012	6,556.82	6,556.46	6,555.31	6,555.27	6,554.98	6,554.99	7.30	7.26	12.42
PIPE 158 (1)	INLET 4.11	T-22	18.0	0.012	46.1	6,554.66	6,553.74	0.020	6,558.93	6,556.82	6,555.88	6,555.34	6,555.52	6,555.21	8.05	5.05	16.07
PIPE 159	INLET 4.12	INLET 4.11	12.0	0.012	64.3	6,556.74	6,555.33	0.022	6,561.77	6,558.93	6,558.25	6,557.03	6,557.64	6,556.02	8.12	4.68	5.72
PIPE 160	T-21	INLET 4.12	12.0	0.012	55.4	6,558.35	6,556.94	0.025	6,563.08	6,561.77	6,559.62	6,558.29	6,559.17	6,557.95	8.19	3.69	6.16
PIPE 160 (1)	INLET 4.13	T-21	12.0	0.012	15.4	6,558.63	6,558.35	0.018	6,562.68	6,563.08	6,559.95	6,559.81	6,559.61	6,559.48	7.16	3.62	5.21
PIPE 161	T-20	INLET 4.13	12.0	0.012	18.4	6,559.48	6,558.92	0.031	6,563.06	6,562.68	6,560.33	6,559.90	6,560.08	6,559.78	7.45	1.96	6.74
PIPE 161 (1)	INLET 4.14	T-24	12.0	0.012	29.7	6,565.78	6,564.65	0.038	6,570.91	6,569.33	6,566.58	6,565.53	6,566.35	6,565.40	7.87	1.80	7.53
PIPE 161 (2)	T-24	T-20	12.0	0.012	120.4	6,564.65	6,559.48	0.043	6,569.33	6,563.06	6,565.47	6,560.38	6,565.23	6,560.25	8.32	1.88	8.00
PIPE 200	INLET 4.5b	T-19	12.0	0.012	30.9	6,561.29	6,560.48	0.026	6,562.67	6,566.13	6,561.49	6,560.95	6,561.44	6,560.95	3.24	0.14	6.25
PIPE 202	INLET 4.5a	T-18	12.0	0.012	30.7	6,559.99	6,558.74	0.041	6,561.38	6,563.63	6,560.22	6,559.26	6,560.16	6,559.26	4.07	0.18	7.78
PIPE 203	INLET 4.4b	T-16	12.0	0.012	30.9	6,557.97	6,557.17	0.026	6,559.35	6,562.13	6,558.20	6,557.88	6,558.14	6,557.87	3.47	0.18	6.21
PIPE 206	INLET 4.15	INLET 4.14	12.0	0.012	143.2	6,574.08	6,567.18	0.048	6,577.48	6,570.91	6,574.60	6,568.11	6,574.46	6,567.39	6.82	0.82	8.47
PIPE 207	INLET 4.6a	INLET 4.6-2	12.0	0.012	17.5	6,563.69	6,563.52	0.010	6,565.81	6,570.43	6,563.97	6,563.82	6,563.90	6,563.70	2.78	0.26	3.81
PIPE 208	INLET 4.15a	INLET 4.15	12.0	0.012	57.8	6,575.40	6,574.28	0.019	6,578.35	6,577.48	6,575.59	6,574.55	6,575.54	6,574.54	2.82	0.12	5.37
PIPE 209	INLET 4.13b	T-24	12.0	0.012	43.3	6,567.96	6,564.65	0.076	6,570.82	6,569.33	6,568.12	6,565.40	6,568.08	6,565.40	4.05	0.08	10.67
PIPE 210	INLET 4.12b	T-21	12.0	0.012	31.3	6,559.88	6,558.35	0.049	6,563.05	6,563.08	6,560.04	6,559.48	6,560.00	6,559.48	3.46	0.08	8.53
PIPE 211	INLET 4.10a	INLET 4.16b	12.0	0.012	47.8	6,554.93	6,554.70	0.005	6,557.50	6,557.14	6,555.92	6,555.68	6,555.69	6,555.40	3.87	2.49	2.68
PIPE 211 (1)	INLET 4.16b	T-22	12.0	0.012	41.5	6,554.36	6,553.99	0.009	6,557.14	6,556.82	6,555.56	6,555.38	6,555.40	6,555.21	3.27	2.57	3.65
PIPE 212	INLET 4.3a	T-15	12.0	0.012	42.4	6,555.47	6,555.05	0.010	6,557.97	6,559.66	6,556.29	6,556.25	6,556.24	6,556.21	4.32	1.20	3.84

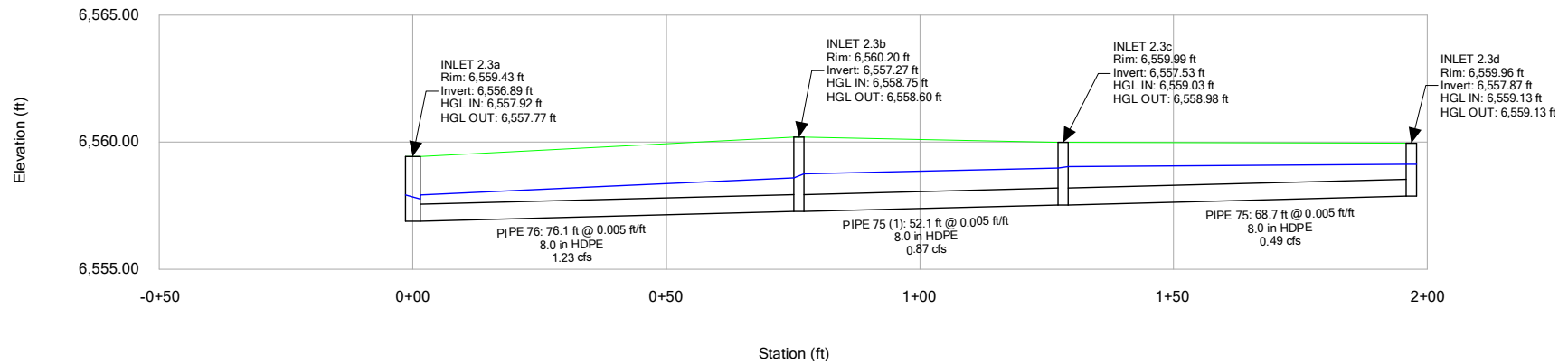
Conduit FlexTable: Combined Pipe/Node Report

Label	Start Node	Stop Node	Diameter (in)	Manning's n	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
PIPE 213 (1)	INLET 4.16	O 4.3	18.0	0.012	66.8	6,552.33	6,552.00	0.005	6,555.07	6,553.90	6,554.64	6,554.60	6,554.60	6,554.57	1.46	2.57	8.00
PIPE 214	INLET 4.16a	INLET 4.16	12.0	0.012	26.7	6,552.55	6,552.43	0.004	6,554.50	6,555.07	6,554.91	6,554.79	6,554.74	6,554.62	3.29	2.58	2.59
PIPE 215	INLET 4.12a	INLET 4.12	12.0	0.012	81.1	6,558.52	6,556.96	0.019	6,561.50	6,561.77	6,558.78	6,557.95	6,558.71	6,557.95	3.33	0.22	5.35
PIPE 216	INLET 4.13a	T-20	12.0	0.012	32.2	6,560.20	6,559.48	0.022	6,563.69	6,563.06	6,560.37	6,560.25	6,560.33	6,560.25	2.76	0.10	5.77
PIPE 217	INLET 4.4c	T-17	12.0	0.012	55.7	6,559.44	6,557.33	0.038	6,563.26	6,562.31	6,559.66	6,557.99	6,559.60	6,557.99	3.80	0.15	7.51
PIPE 218	INLET 3.1d	MH 3.1c	8.0	0.012	52.1	6,557.96	6,557.44	0.010	6,560.13	6,560.95	6,558.21	6,557.83	6,558.14	6,557.83	2.54	0.16	1.31
PIPE 219	INLET 3.1	O 3	24.0	0.012	71.1	6,554.38	6,553.00	0.019	6,558.74	6,555.41	6,556.38	6,555.90	6,555.75	6,555.57	10.43	14.56	34.14
PIPE 221	MH 3.1a	INLET 3.1	8.0	0.012	34.2	6,555.50	6,554.58	0.027	6,561.13	6,558.74	6,556.48	6,556.30	6,556.37	6,556.19	2.70	0.94	2.15
PIPE 223	INLET 2.1	O 2	24.0	0.012	81.9	6,552.70	6,552.00	0.009	6,556.92	6,554.41	6,556.20	6,555.68	6,555.60	6,555.09	6.18	19.41	22.66

100-Year

Profile Report

Engineering Profile - BLDG. 6 - STRM BRANCH 1 (Hockett Gulch - StormCAD Analysis.stsw)



LEGEND:

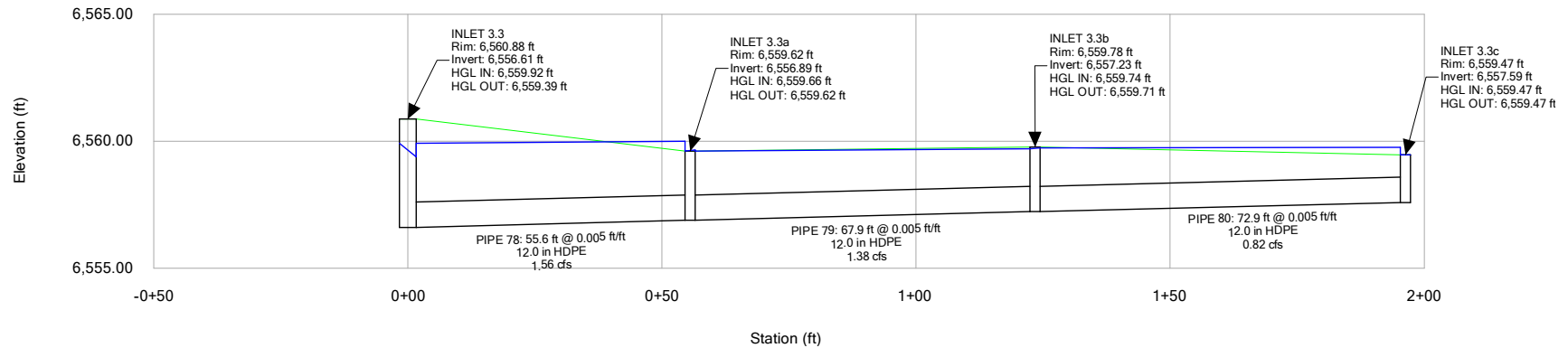
PROPOSED GRADE —

HGL —

100-Year

Profile Report

Engineering Profile - BLDG. 6 - STRM BRANCH 2 (Hockett Gulch - StormCAD Analysis.stsw)



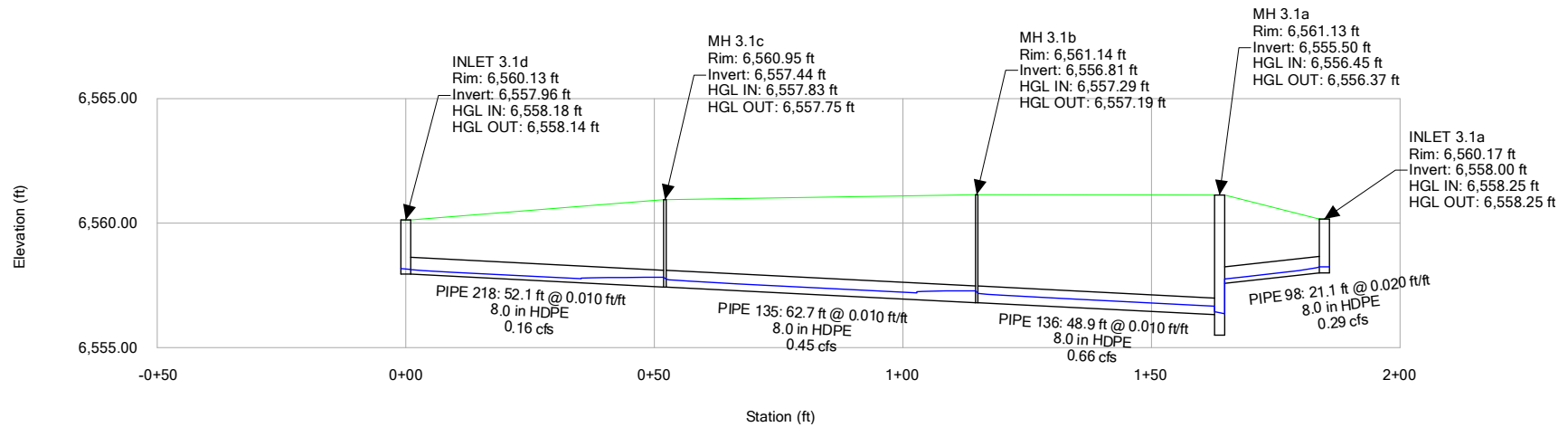
LEGEND:

PROPOSED GRADE —
HGL —

100-Year

Profile Report

Engineering Profile - BLDG. 6 - STRM BRANCH 3 (Hockett Gulch - StormCAD Analysis.stsw)



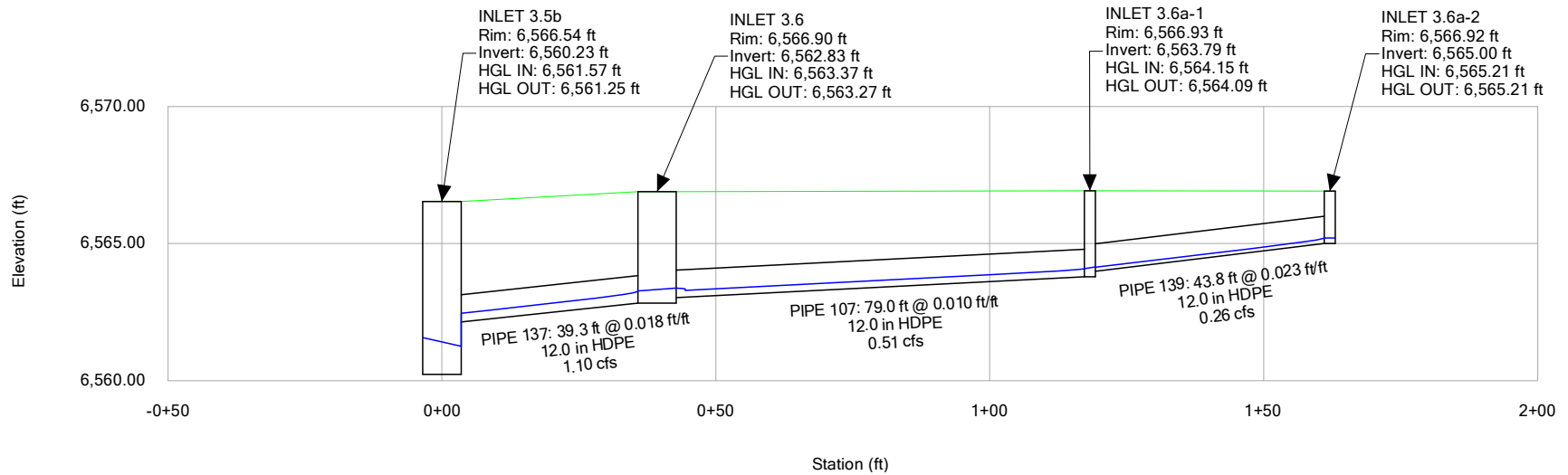
LEGEND:

PROPOSED GRADE —
HGL —

100-Year

Profile Report

Engineering Profile - BLDG. 7 STRM LATERAL 1 (Hockett Gulch - StormCAD Analysis.stsw)



LEGEND:

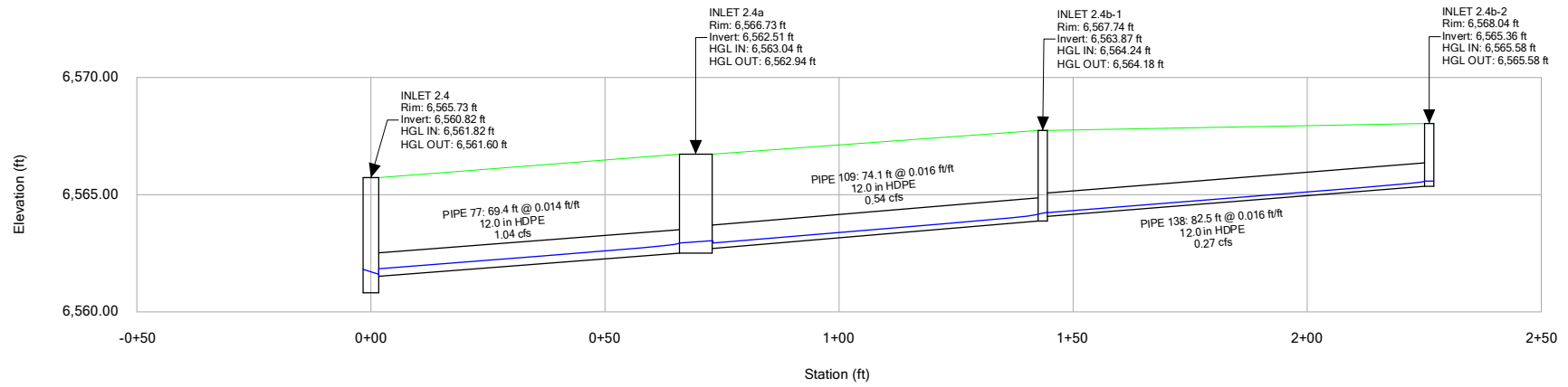
PROPOSED GRADE ———

HGL ———

100-Year

Profile Report

Engineering Profile - BLDG. 8 - STRM BRANCH 1 (Hockett Gulch - StormCAD Analysis.stsw)



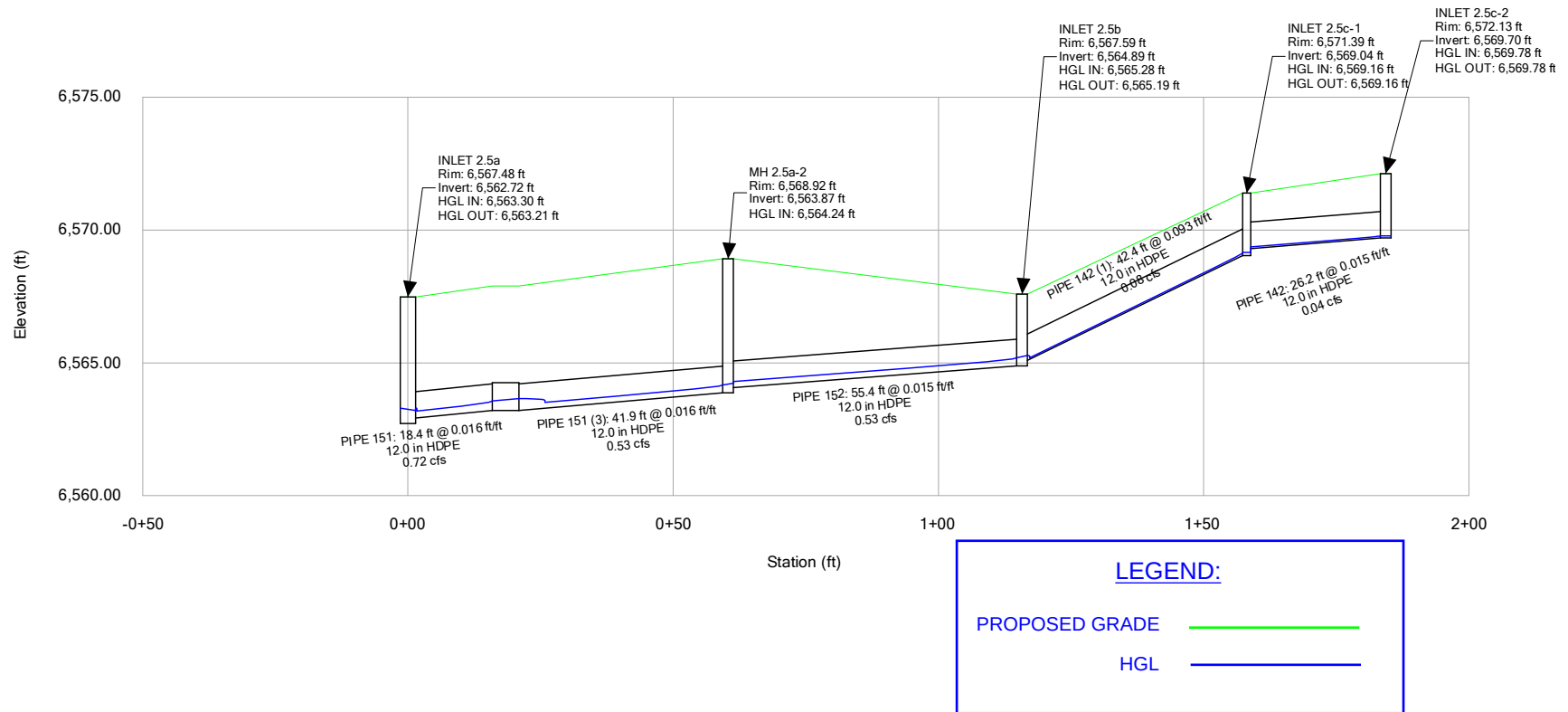
LEGEND:

PROPOSED GRADE —
HGL —

100-Year

Profile Report

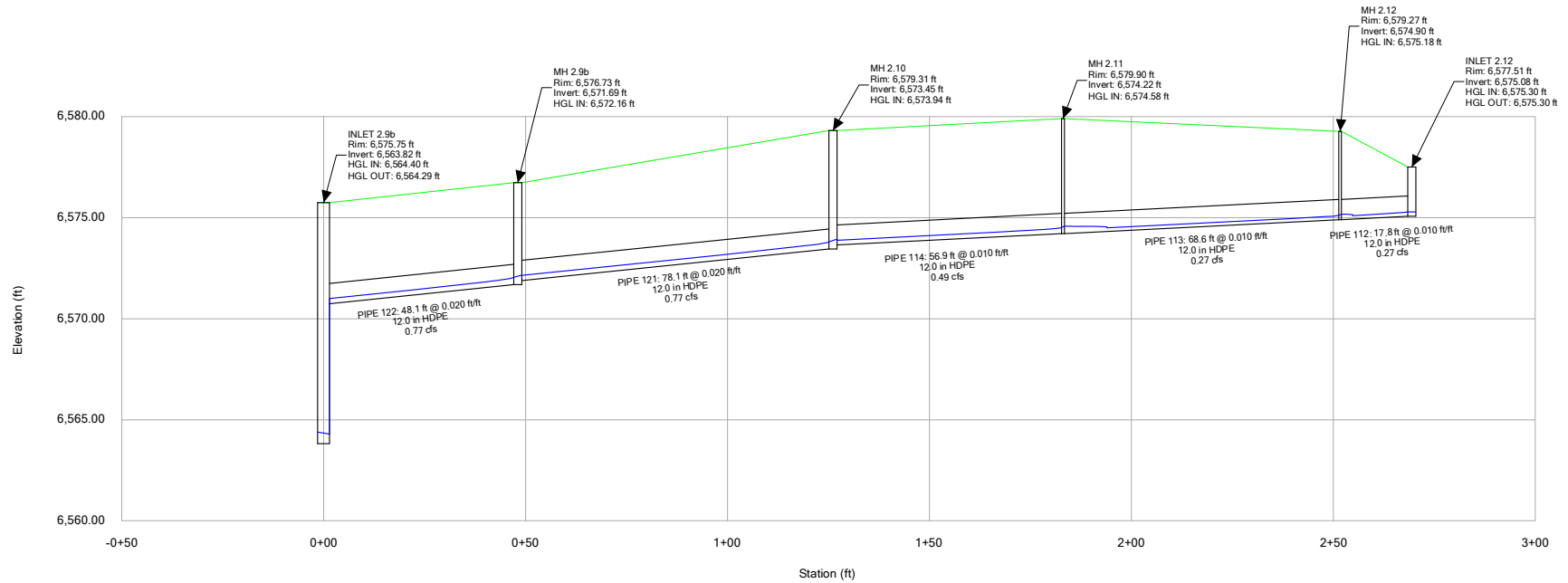
Engineering Profile - BLDG. 8 - STRM BRANCH 2 (Hockett Gulch - StormCAD Analysis.stsw)



100-Year

Profile Report

Engineering Profile - BLDG. 9 - STRM BRANCH (Hockett Gulch - StormCAD Analysis.stsw)



LEGEND:

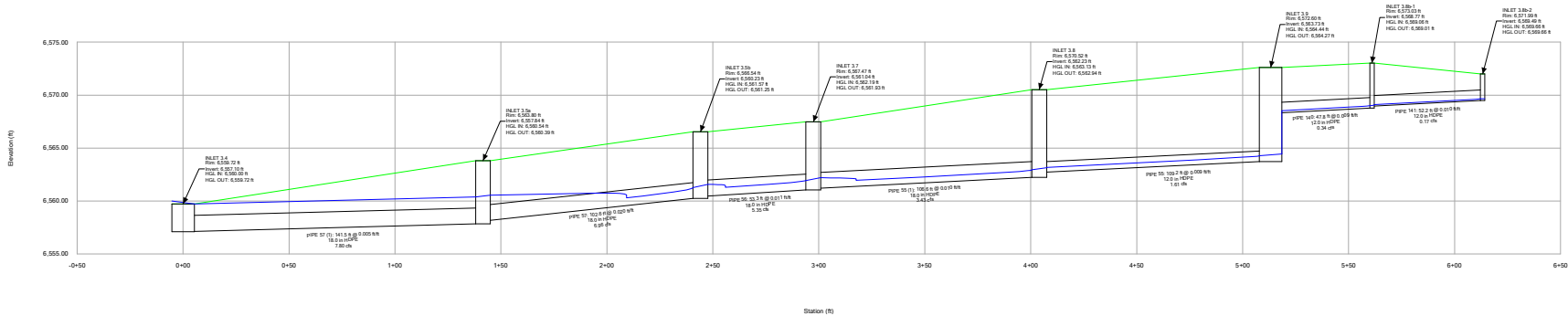
PROPOSED GRADE —

HGL —

100-Year

Profile Report

Engineering Profile - STORM MAIN A (Hockett Gulch - StormCAD Analysis.stsw)



LEGEND:

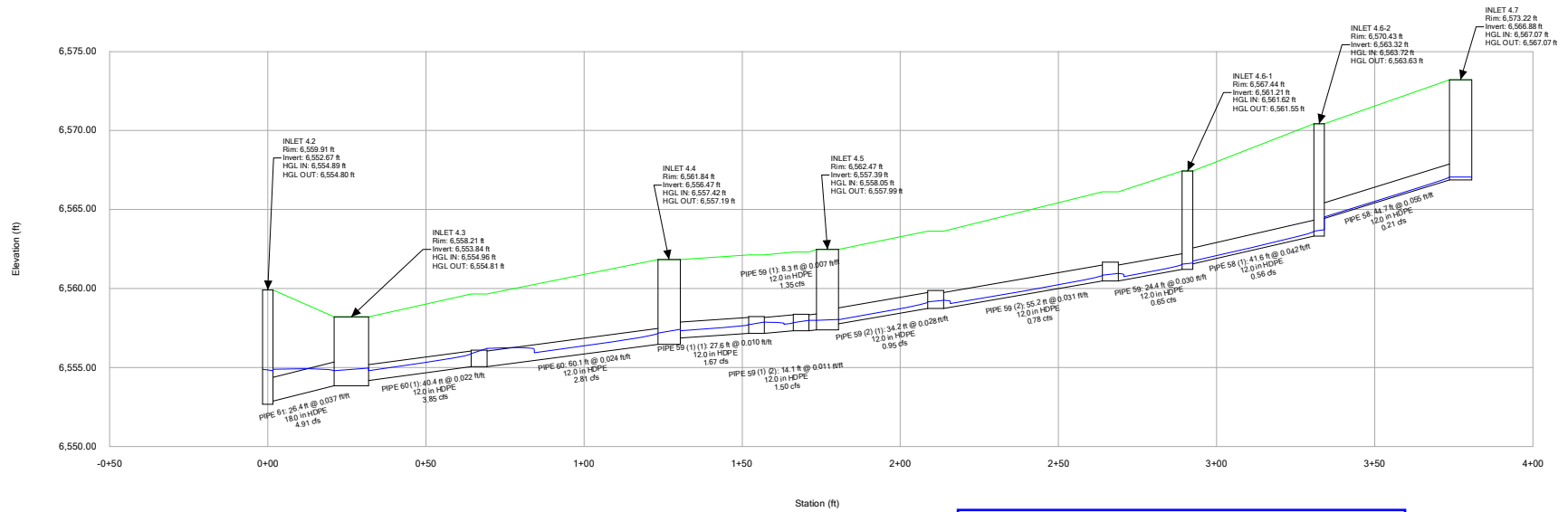
PROPOSED GRADE —

HGL —

100-Year

Profile Report

Engineering Profile - STORM MAIN B (Hockett Gulch - StormCAD Analysis.stsw)

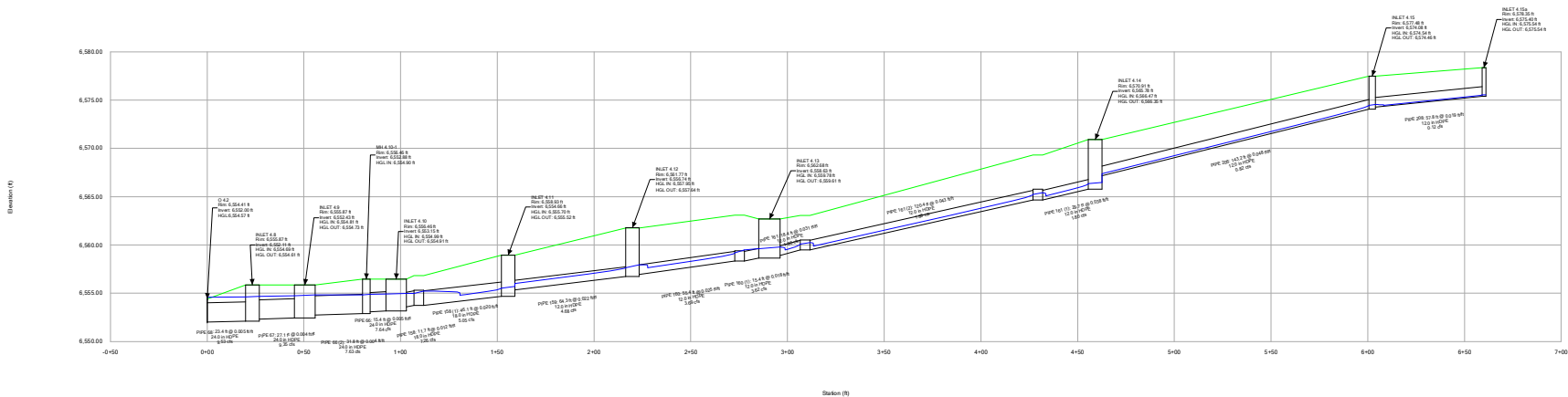


LEGEND:

PROPOSED GRADE ———
HGL ———

100-Year

Profile Report
Engineering Profile - STORM MAIN C (Hockett Gulch - StormCAD Analysis.stsw)



LEGEND:

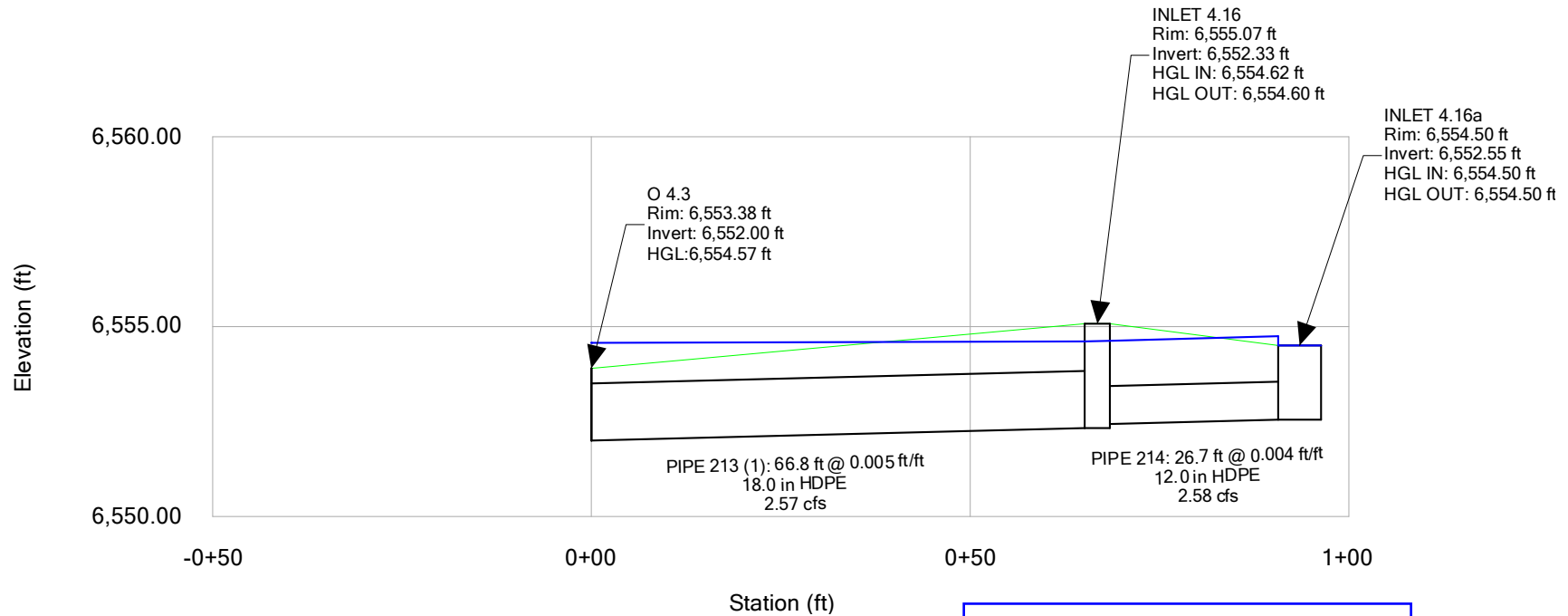
PROPOSED GRADE —

HGL —

100-Year

Profile Report

Engineering Profile - STORM MAIN D (Hockett Gulch - StormCAD Analysis.stsw)





APPENDIX G

Hydraflow Hydrograph Reports for Pond Analyses

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

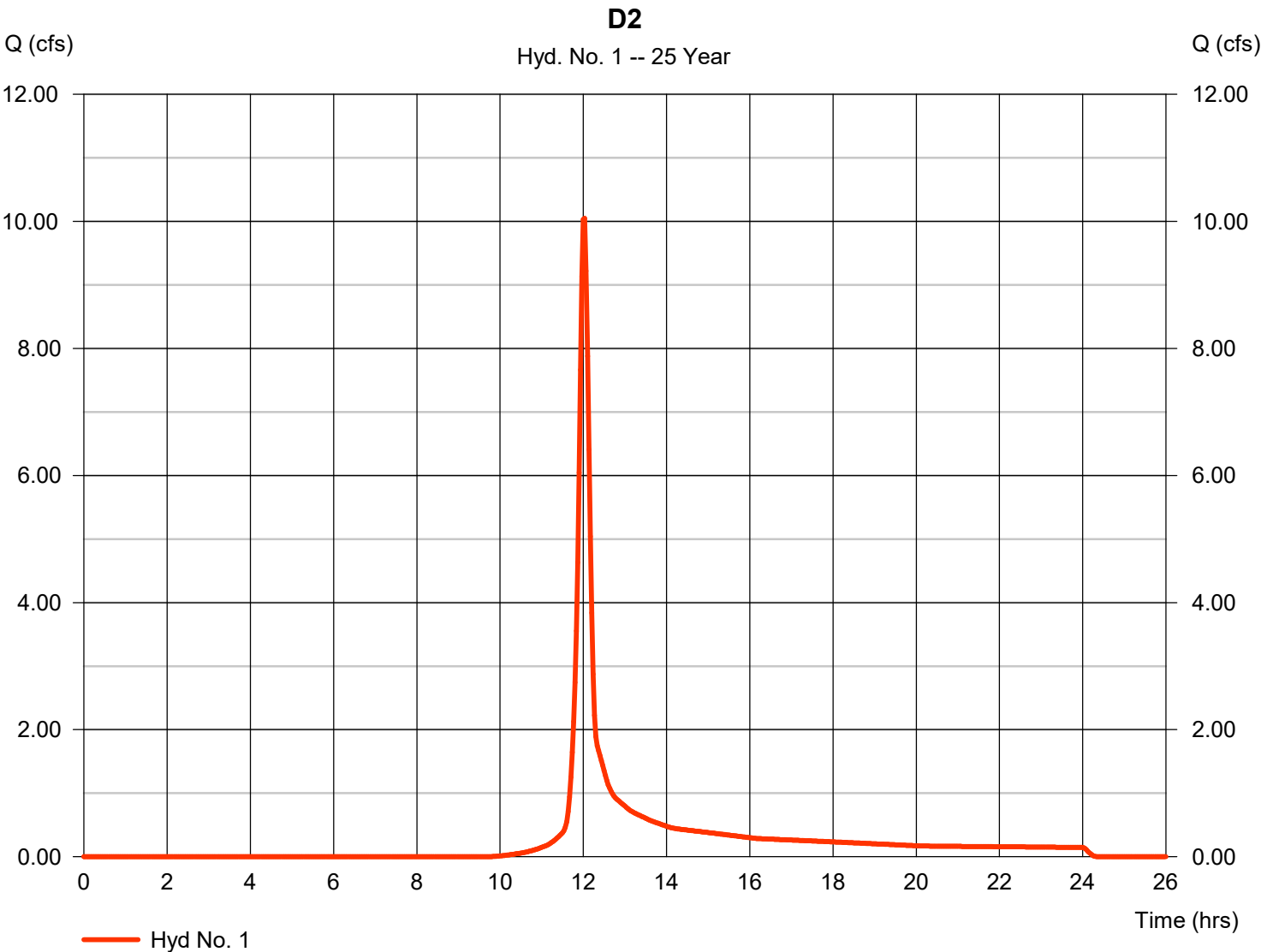
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	10.05	2	722	26,320	-----	-----	-----	D2
2	Reservoir	0.169	2	1208	26,289	1	6554.75	19,159	POND D2
3	SCS Runoff	0.058	2	894	1,987	-----	-----	-----	H2
NEW POND D2.gpw					Return Period: 25 Year			Tuesday, 03 / 19 / 2024	

Hydrograph Report

Hyd. No. 1

D2

Hydrograph type	= SCS Runoff	Peak discharge	= 10.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 26,320 cuft
Drainage area	= 9.440 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.79 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



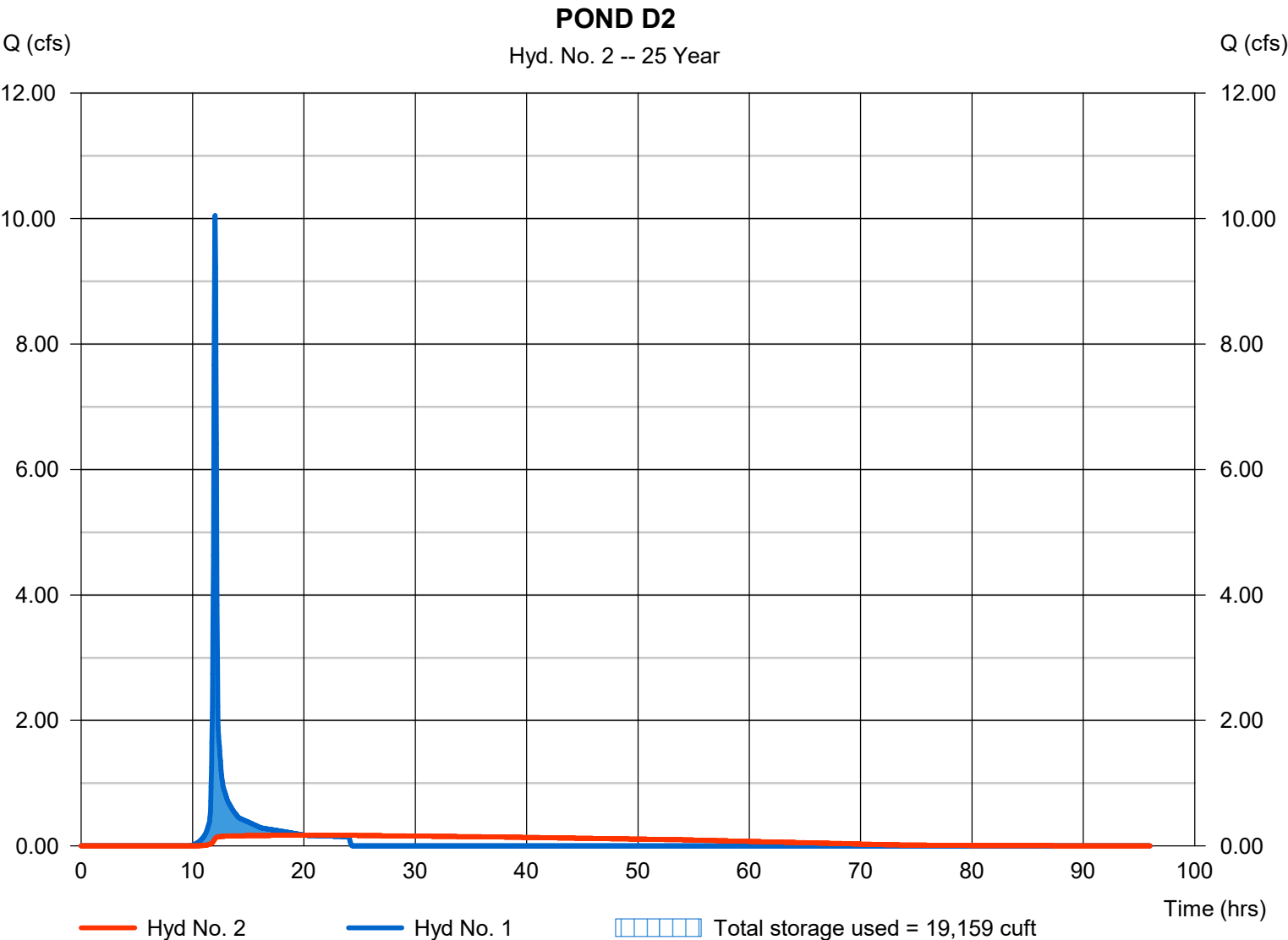
Hydrograph Report

Hyd. No. 2

POND D2

Hydrograph type	= Reservoir	Peak discharge	= 0.169 cfs
Storm frequency	= 25 yrs	Time to peak	= 20.13 hrs
Time interval	= 2 min	Hyd. volume	= 26,289 cuft
Inflow hyd. No.	= 1 - D2	Max. Elevation	= 6554.75 ft
Reservoir name	= P-2	Max. Storage	= 19,159 cuft

Storage Indication method used.



Pond No. 1 - P-2

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 6552.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	6552.00	3,198	0	0
1.00	6553.00	5,619	4,409	4,409
2.00	6554.00	8,713	7,166	11,575
3.00	6555.00	11,571	10,142	21,717
4.00	6556.00	14,520	13,046	34,762

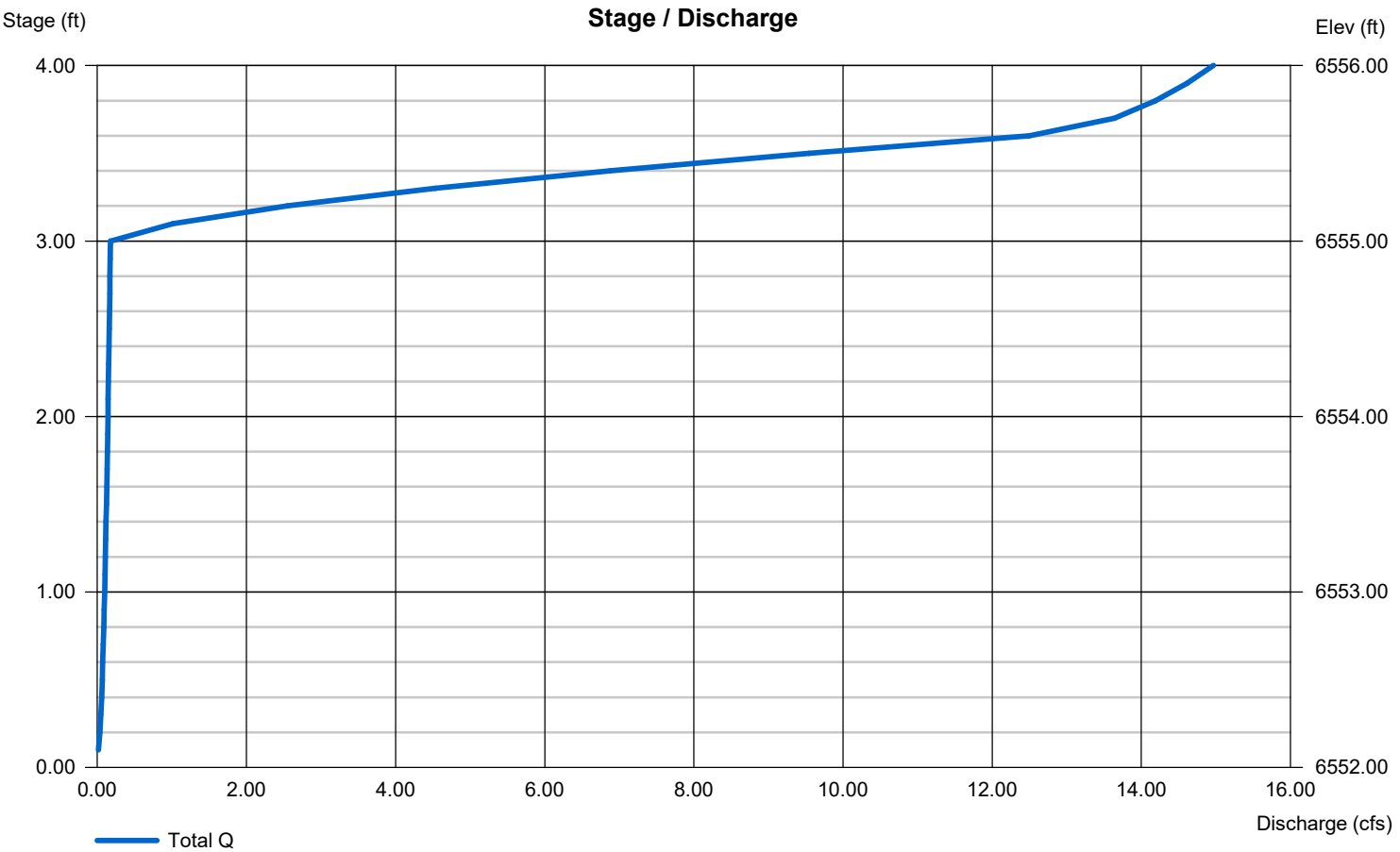
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.00	0.00	0.00
Span (in)	= 18.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 6552.00	6552.00	0.00	0.00
Length (ft)	= 25.00	1.00	0.00	0.00
Slope (%)	= 1.00	0.01	0.00	n/a
N-Value	= .010	.010	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 6555.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

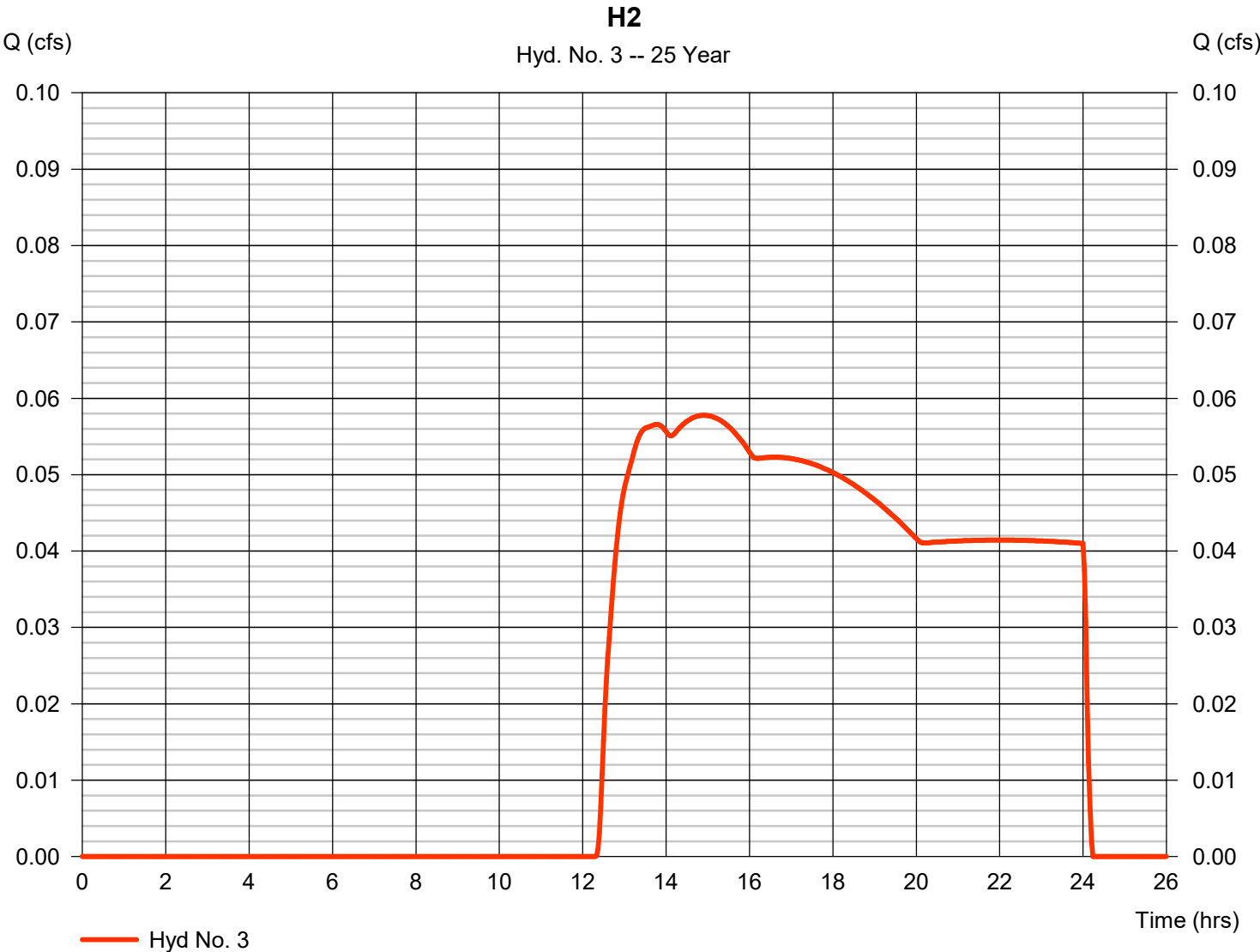
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Tuesday, 03 / 19 / 2024

Hyd. No. 3

H2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.058 cfs
Storm frequency	= 25 yrs	Time to peak	= 14.90 hrs
Time interval	= 2 min	Hyd. volume	= 1,987 cuft
Drainage area	= 14.460 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 1.79 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	15.15	2	720	39,334	-----	-----	-----	D2
2	Reservoir	0.961	2	796	39,281	1	6555.09	22,937	POND D2
3	SCS Runoff	0.749	2	724	6,854	-----	-----	-----	H2
NEW POND D2.gpw					Return Period: 100 Year			Tuesday, 03 / 19 / 2024	

Hydrograph Report

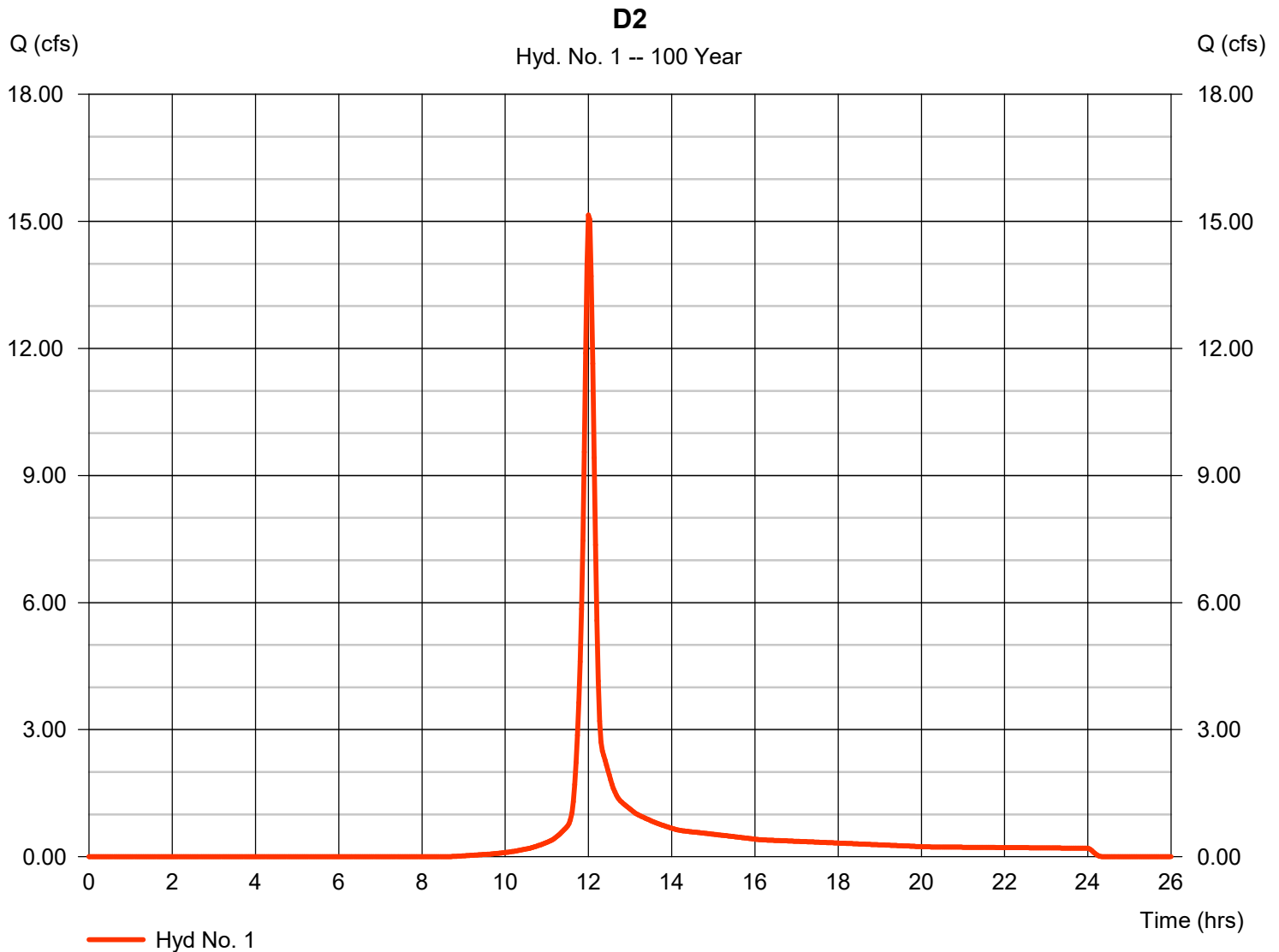
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Tuesday, 03 / 19 / 2024

Hyd. No. 1

D2

Hydrograph type	= SCS Runoff	Peak discharge	= 15.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 39,334 cuft
Drainage area	= 9.440 ac	Curve number	= 87
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



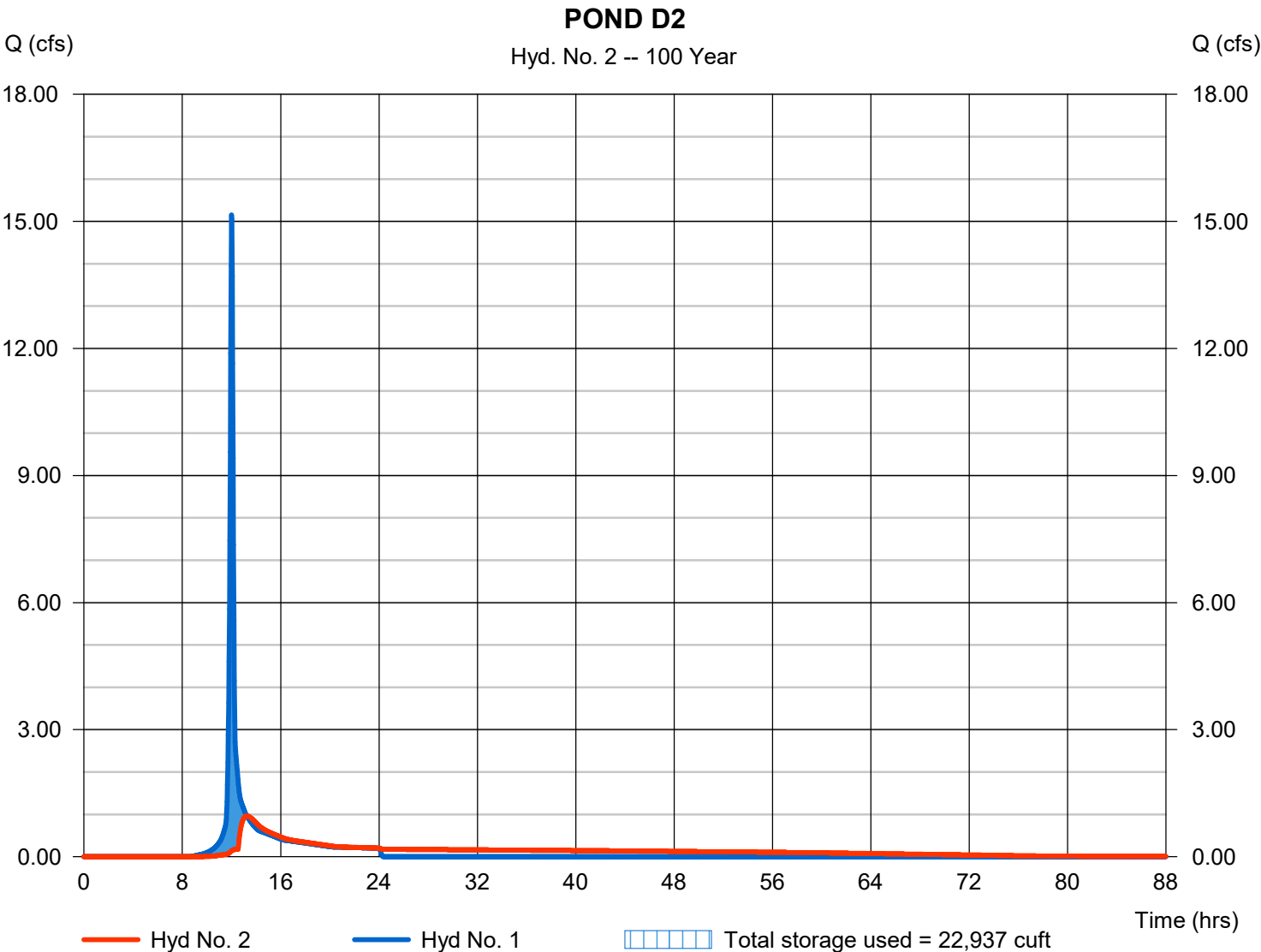
Hydrograph Report

Hyd. No. 2

POND D2

Hydrograph type	= Reservoir	Peak discharge	= 0.961 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.27 hrs
Time interval	= 2 min	Hyd. volume	= 39,281 cuft
Inflow hyd. No.	= 1 - D2	Max. Elevation	= 6555.09 ft
Reservoir name	= P-2	Max. Storage	= 22,937 cuft

Storage Indication method used.

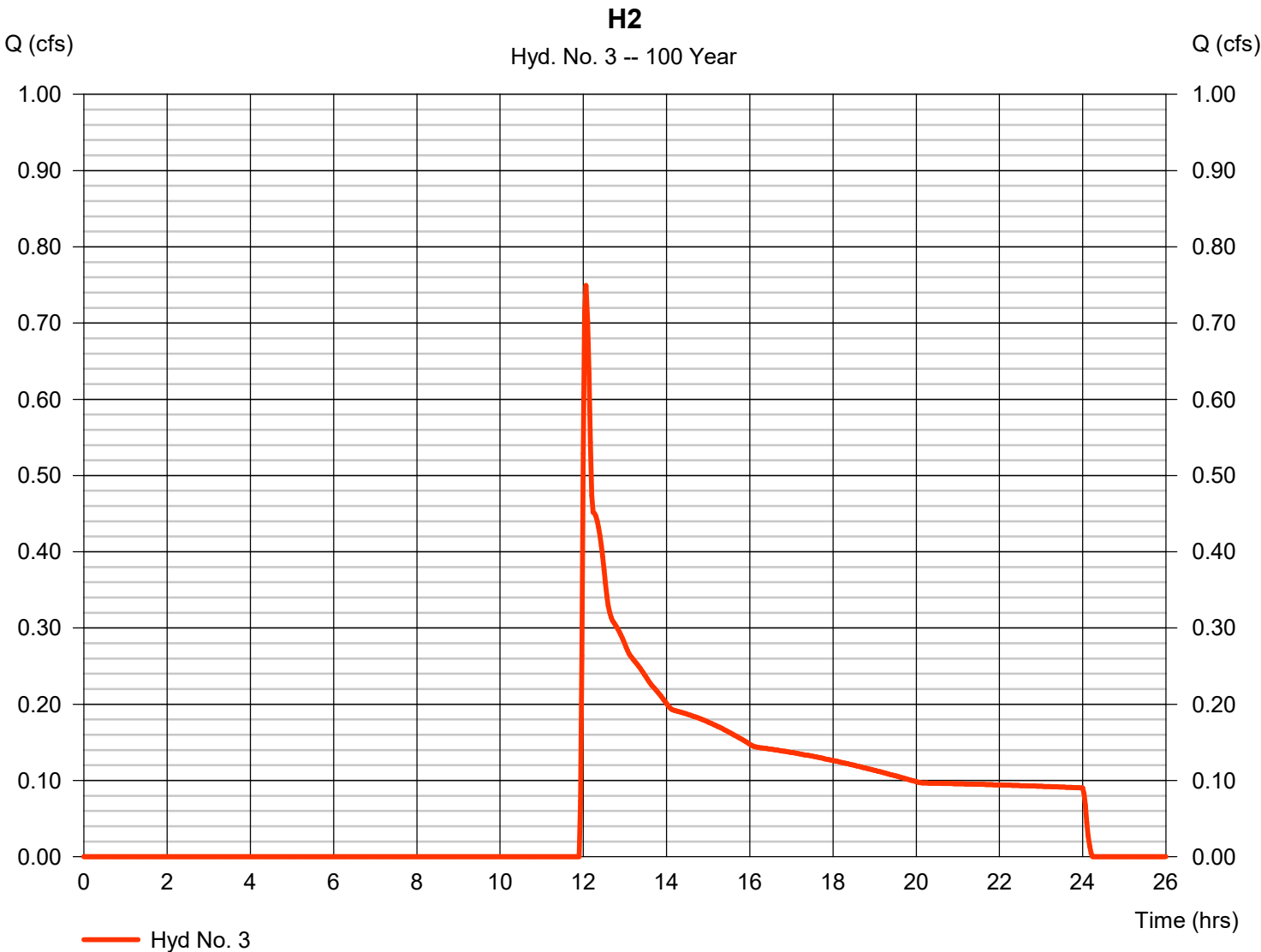


Hydrograph Report

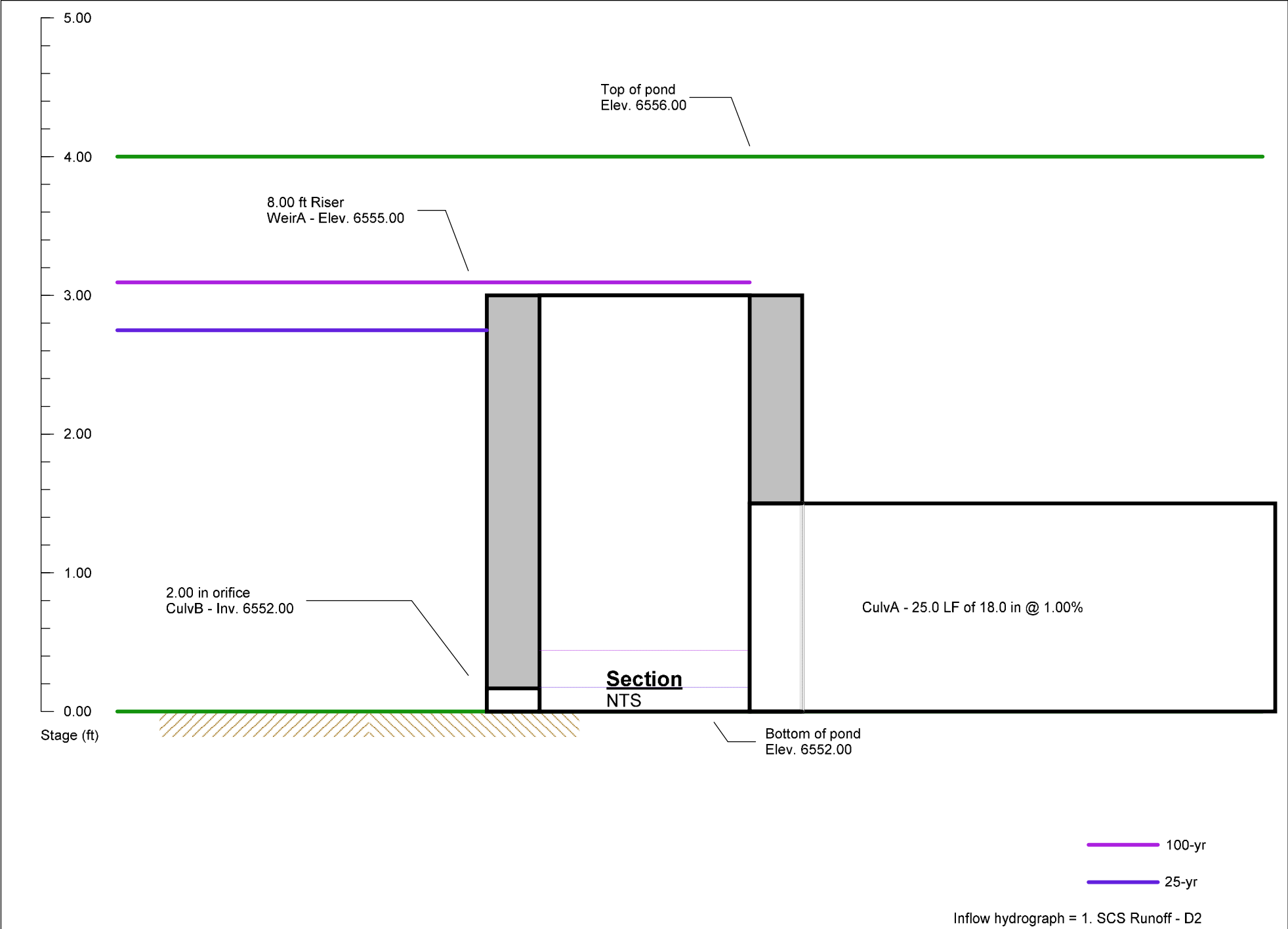
Hyd. No. 3

H2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.749 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 6,854 cuft
Drainage area	= 14.460 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond No. 1 - P-2



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

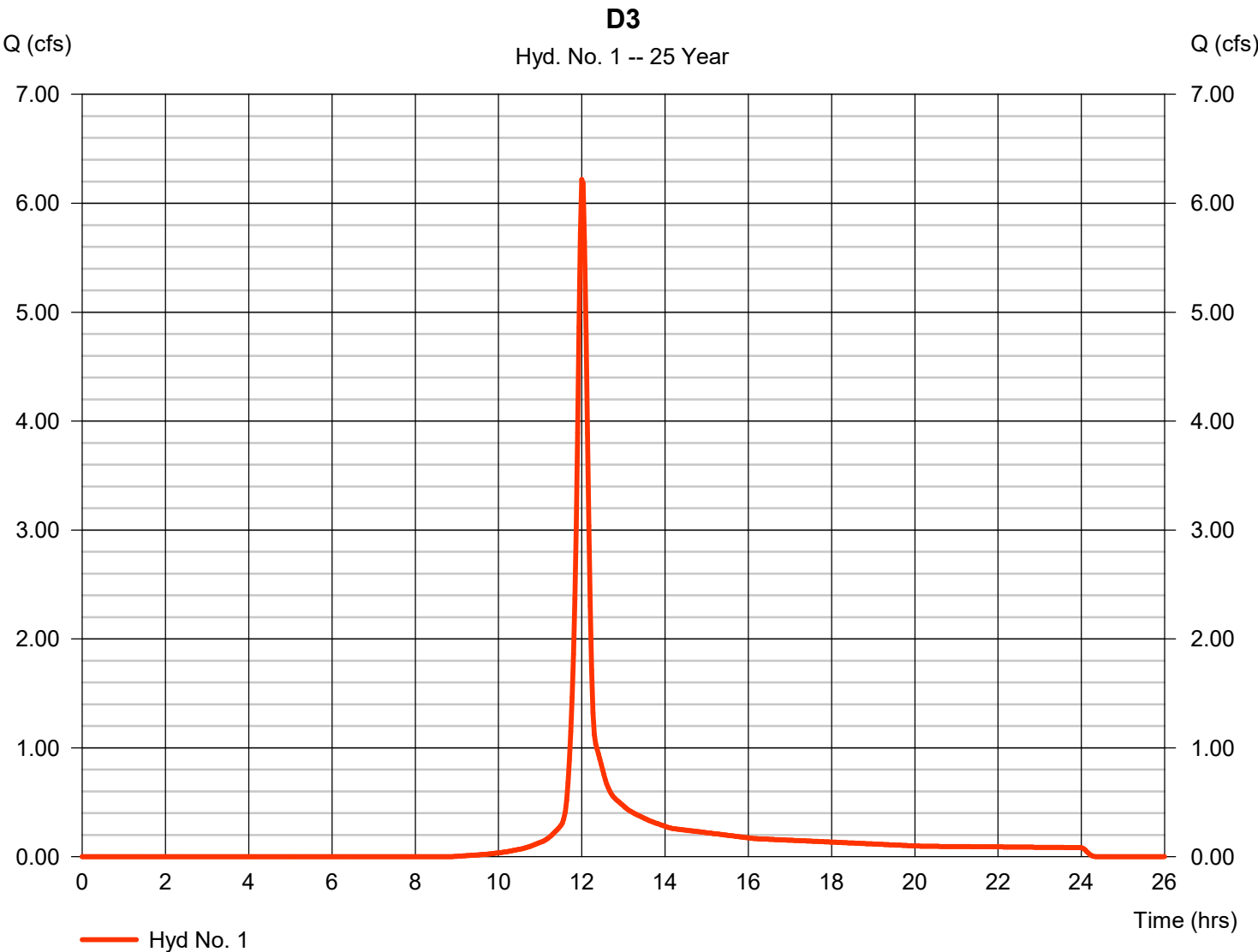
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.219	2	720	16,161	-----	-----	-----	D3
2	Reservoir	0.139	2	1064	16,129	1	6554.90	10,951	POND D3
3	SCS Runoff	0.045	2	742	935	-----	-----	-----	H3
NEW POND D3.gpw					Return Period: 25 Year			Thursday, 03 / 21 / 2024	

Hydrograph Report

Hyd. No. 1

D3

Hydrograph type	= SCS Runoff	Peak discharge	= 6.219 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 16,161 cuft
Drainage area	= 5.040 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.79 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

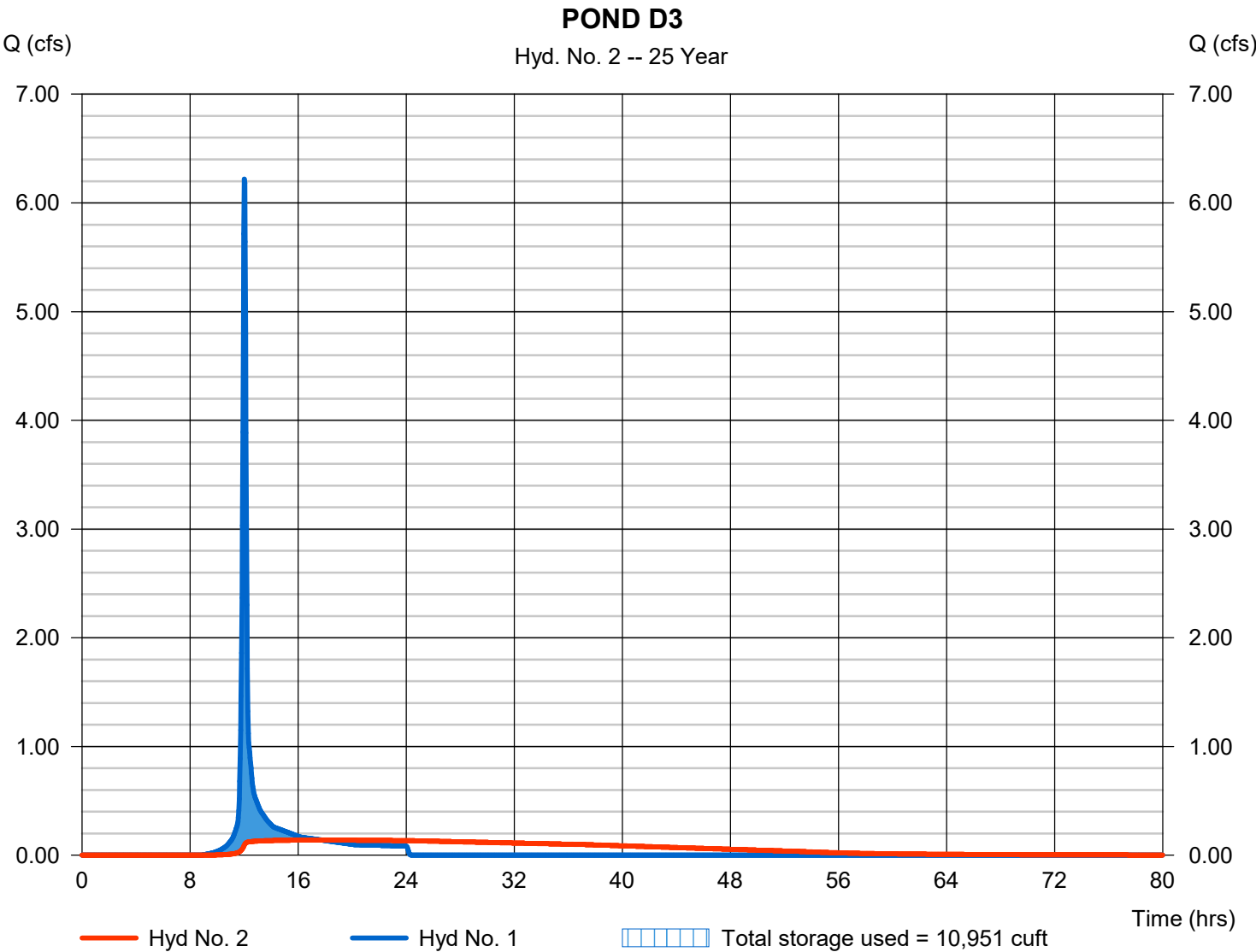
Thursday, 03 / 21 / 2024

Hyd. No. 2

POND D3

Hydrograph type	= Reservoir	Peak discharge	= 0.139 cfs
Storm frequency	= 25 yrs	Time to peak	= 17.73 hrs
Time interval	= 2 min	Hyd. volume	= 16,129 cuft
Inflow hyd. No.	= 1 - D3	Max. Elevation	= 6554.90 ft
Reservoir name	= P-3	Max. Storage	= 10,951 cuft

Storage Indication method used.



Pond No. 1 - P-3

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 6553.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	6553.00	3,626	0	0
1.00	6554.00	5,794	4,710	4,710
2.00	6555.00	8,062	6,928	11,638
3.00	6556.00	10,435	9,249	20,887
4.00	6557.00	12,914	11,675	32,561

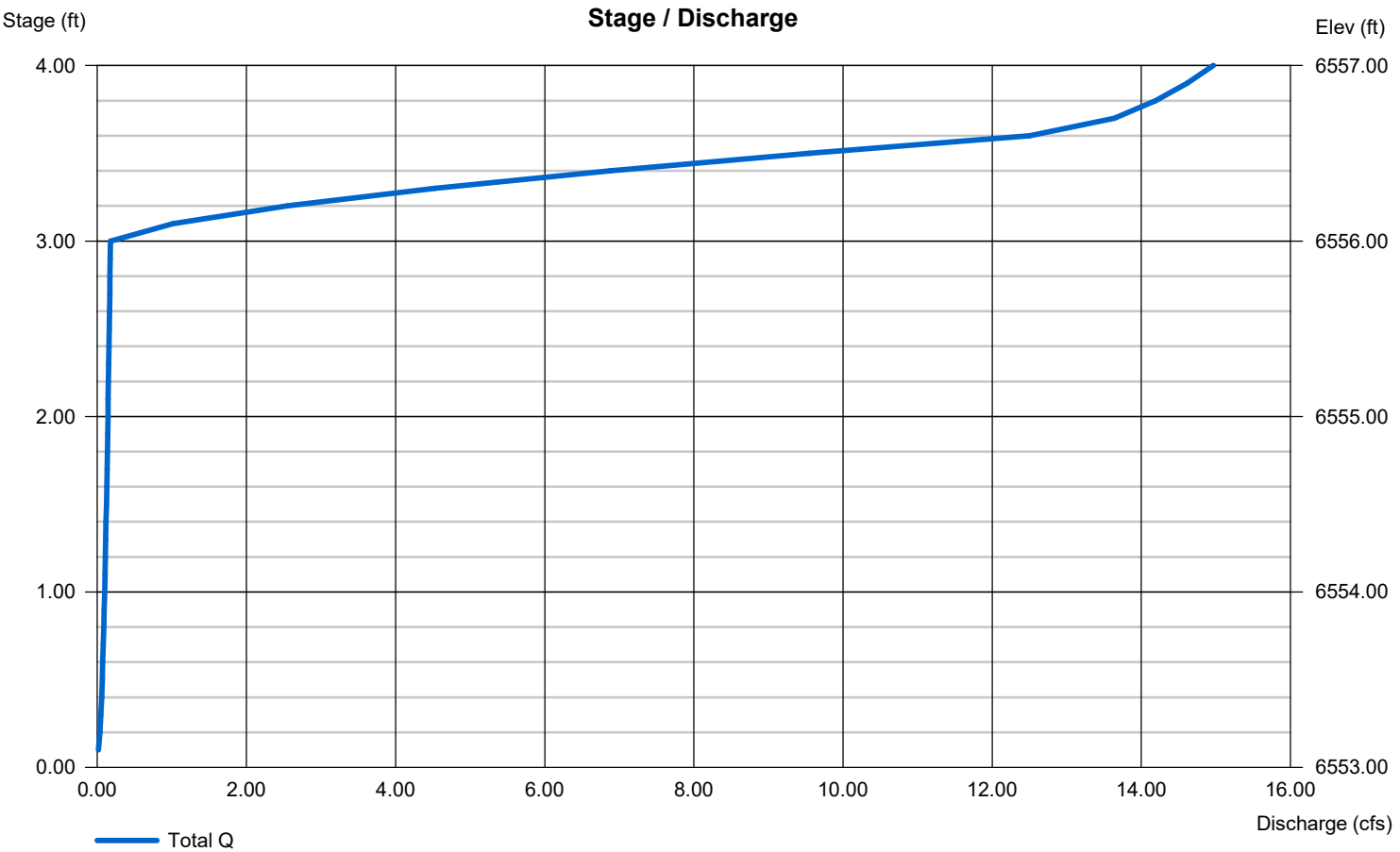
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.00	0.00	0.00
Span (in)	= 18.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 6553.00	6553.00	0.00	0.00
Length (ft)	= 25.00	1.00	0.00	0.00
Slope (%)	= 1.00	0.01	0.00	n/a
N-Value	= .010	.010	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 6556.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

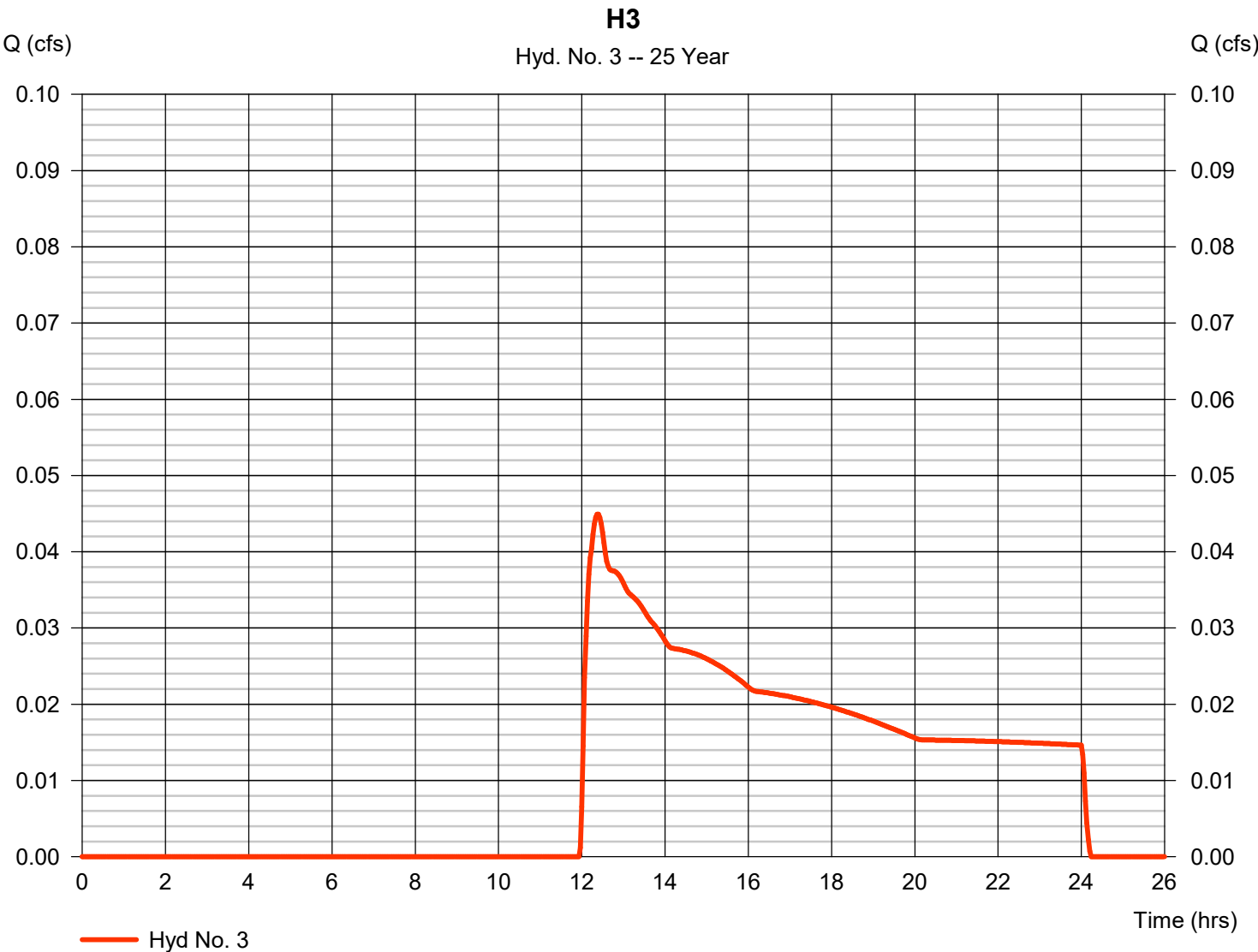
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Thursday, 03 / 21 / 2024

Hyd. No. 3

H3

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.045 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.37 hrs
Time interval	=	2 min	Hyd. volume	=	935 cuft
Drainage area	=	3.670 ac	Curve number	=	64
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	8.20 min
Total precip.	=	1.79 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

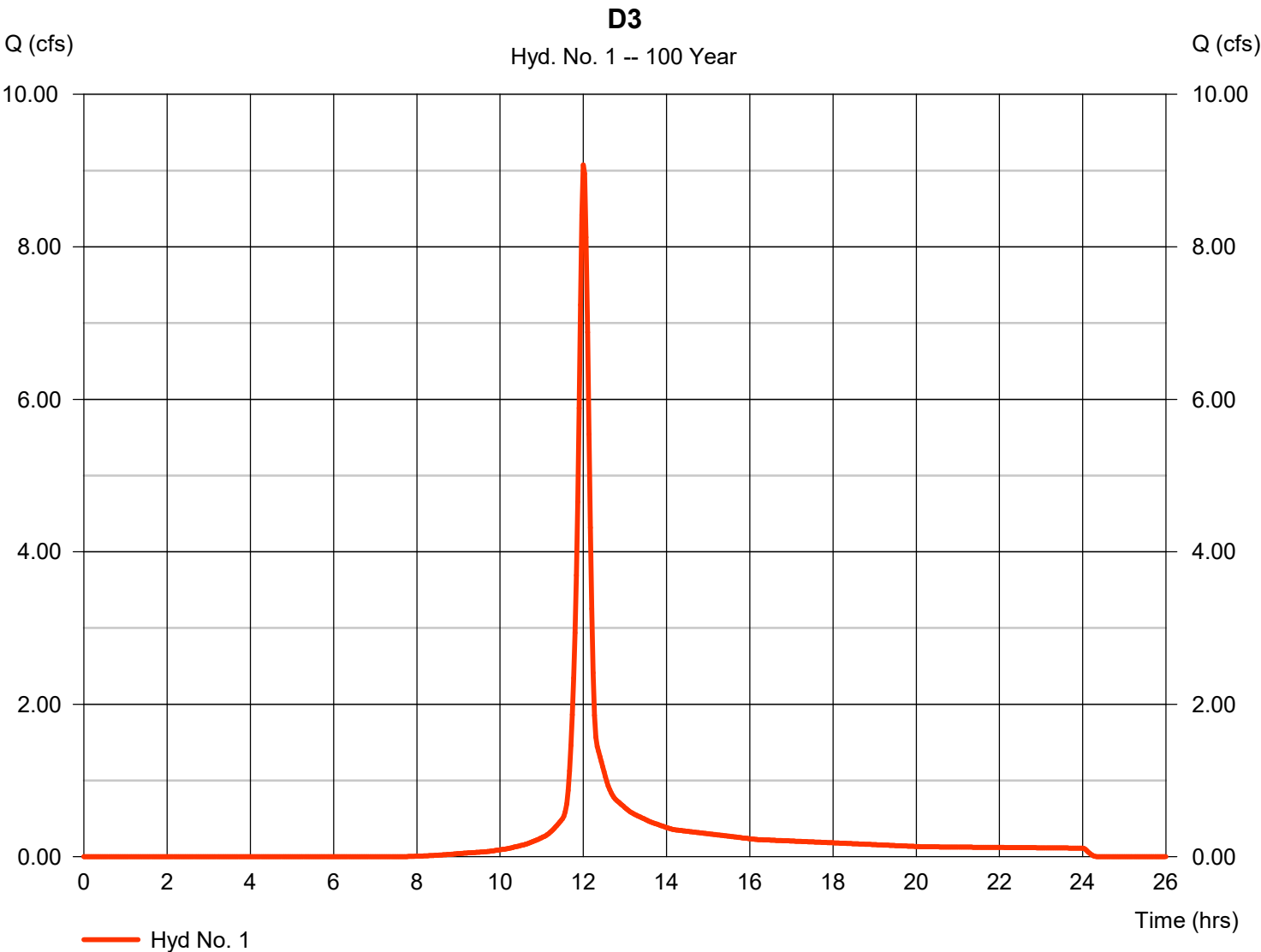
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.074	2	720	23,528	-----	-----	-----	D3
2	Reservoir	0.163	2	1128	23,496	1	6555.57	16,931	POND D3
3	SCS Runoff	0.529	2	722	2,535	-----	-----	-----	H3
NEW POND D3.gpw					Return Period: 100 Year			Thursday, 03 / 21 / 2024	

Hydrograph Report

Hyd. No. 1

D3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.074 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 23,528 cuft
Drainage area	= 5.040 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



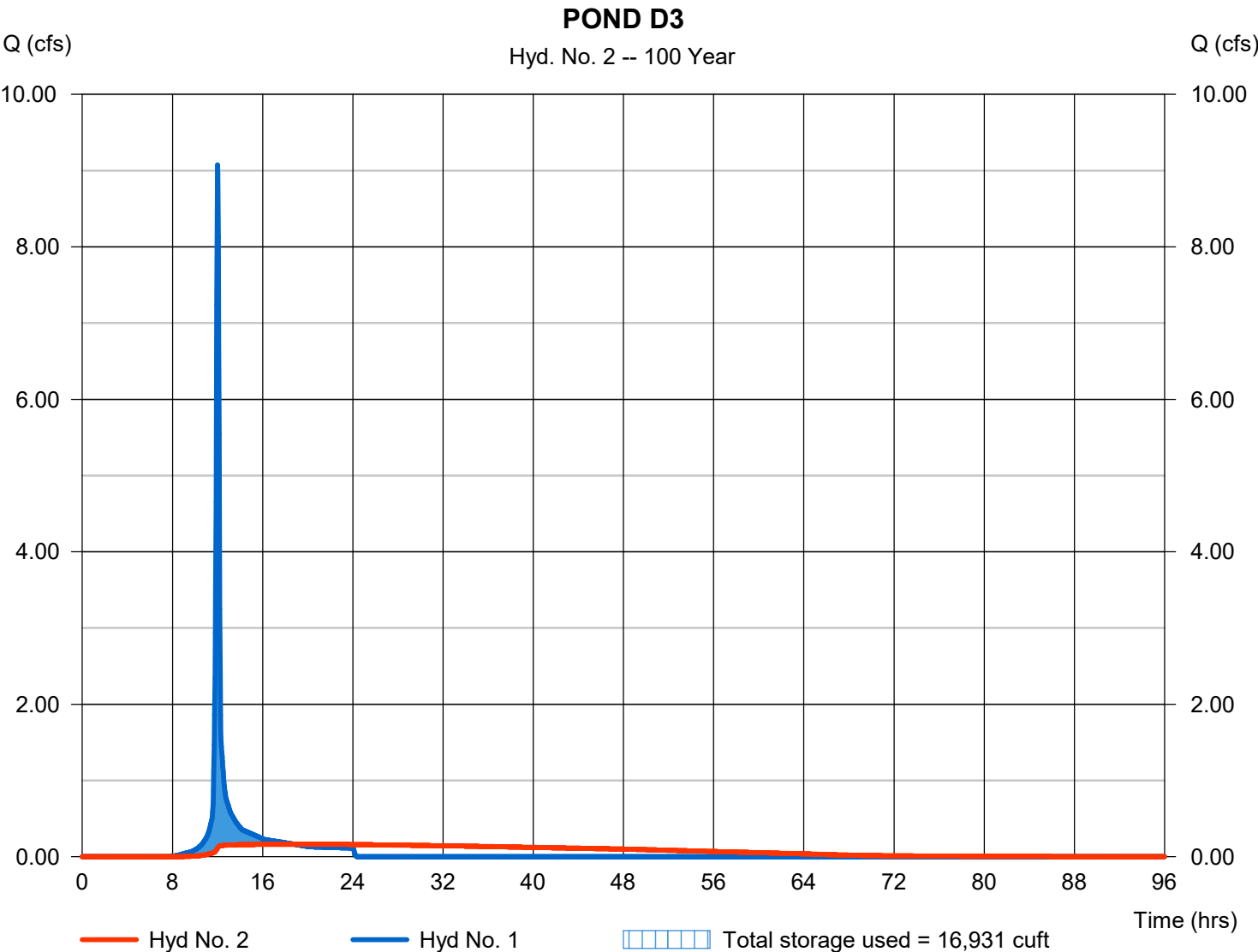
Hydrograph Report

Hyd. No. 2

POND D3

Hydrograph type	= Reservoir	Peak discharge	= 0.163 cfs
Storm frequency	= 100 yrs	Time to peak	= 18.80 hrs
Time interval	= 2 min	Hyd. volume	= 23,496 cuft
Inflow hyd. No.	= 1 - D3	Max. Elevation	= 6555.57 ft
Reservoir name	= P-3	Max. Storage	= 16,931 cuft

Storage Indication method used.

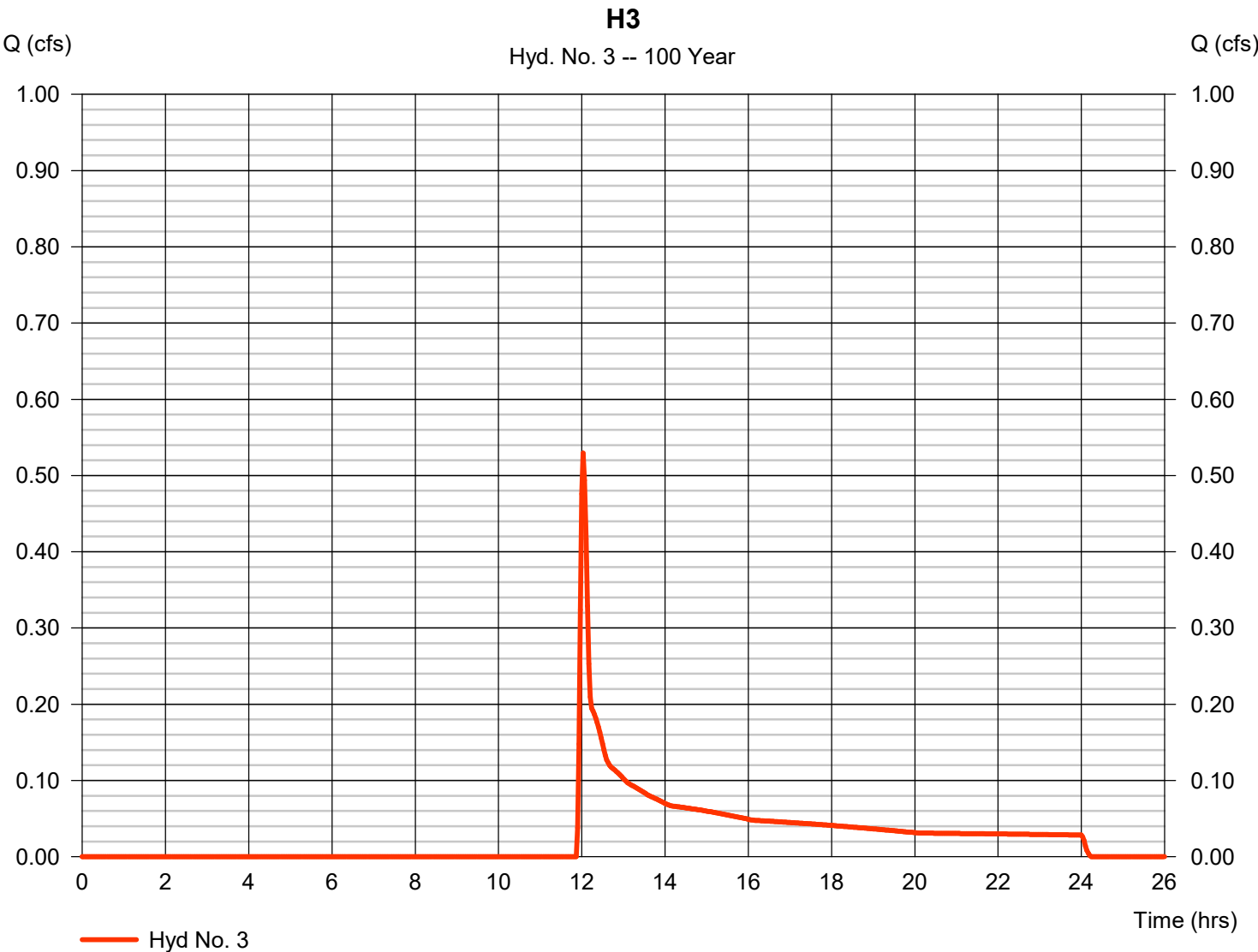


Hydrograph Report

Hyd. No. 3

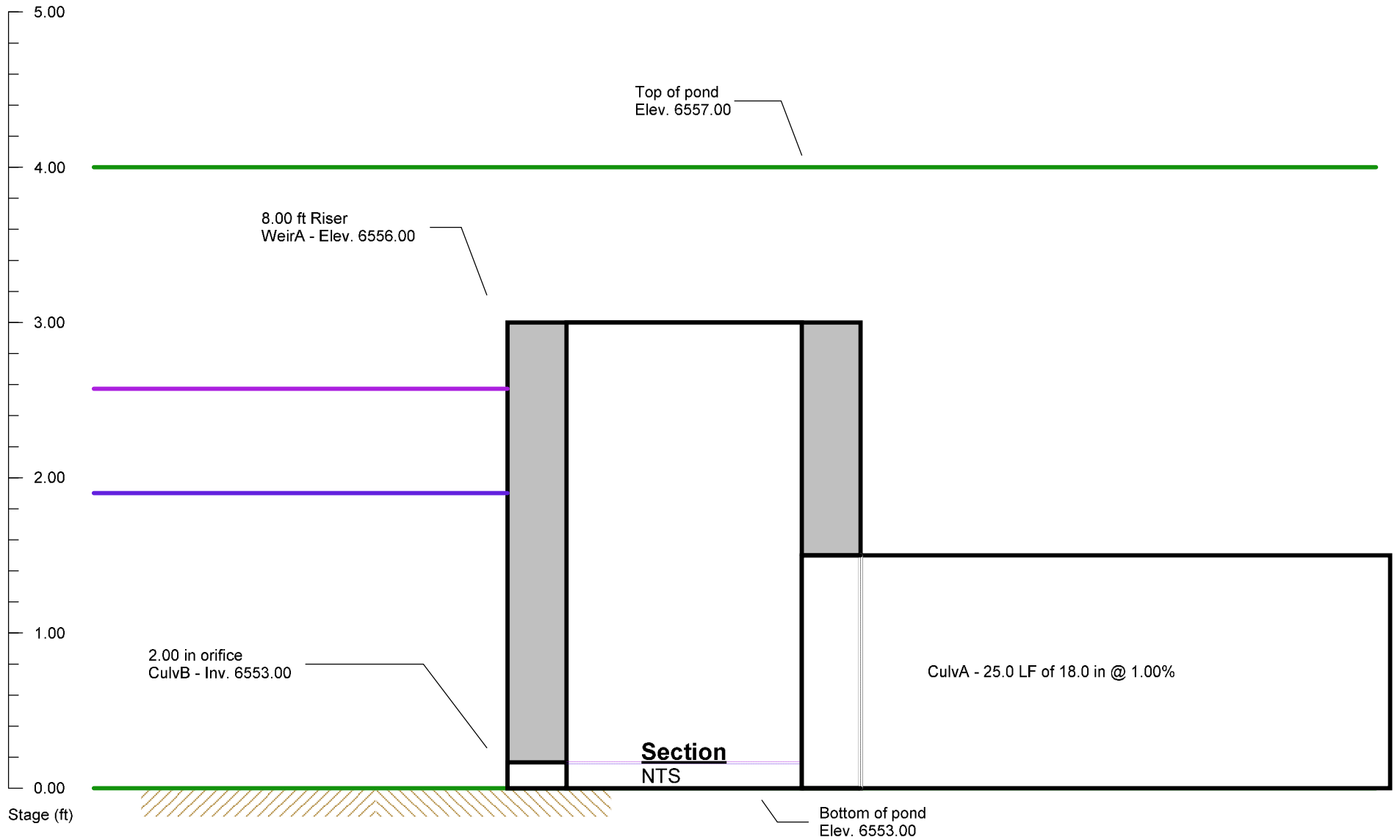
H3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.529 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 2,535 cuft
Drainage area	= 3.670 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.20 min
Total precip.	= 2.26 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond No. 1 - P-3

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024



100-yr

25-yr

Inflow hydrograph = 1. SCS Runoff - D3

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

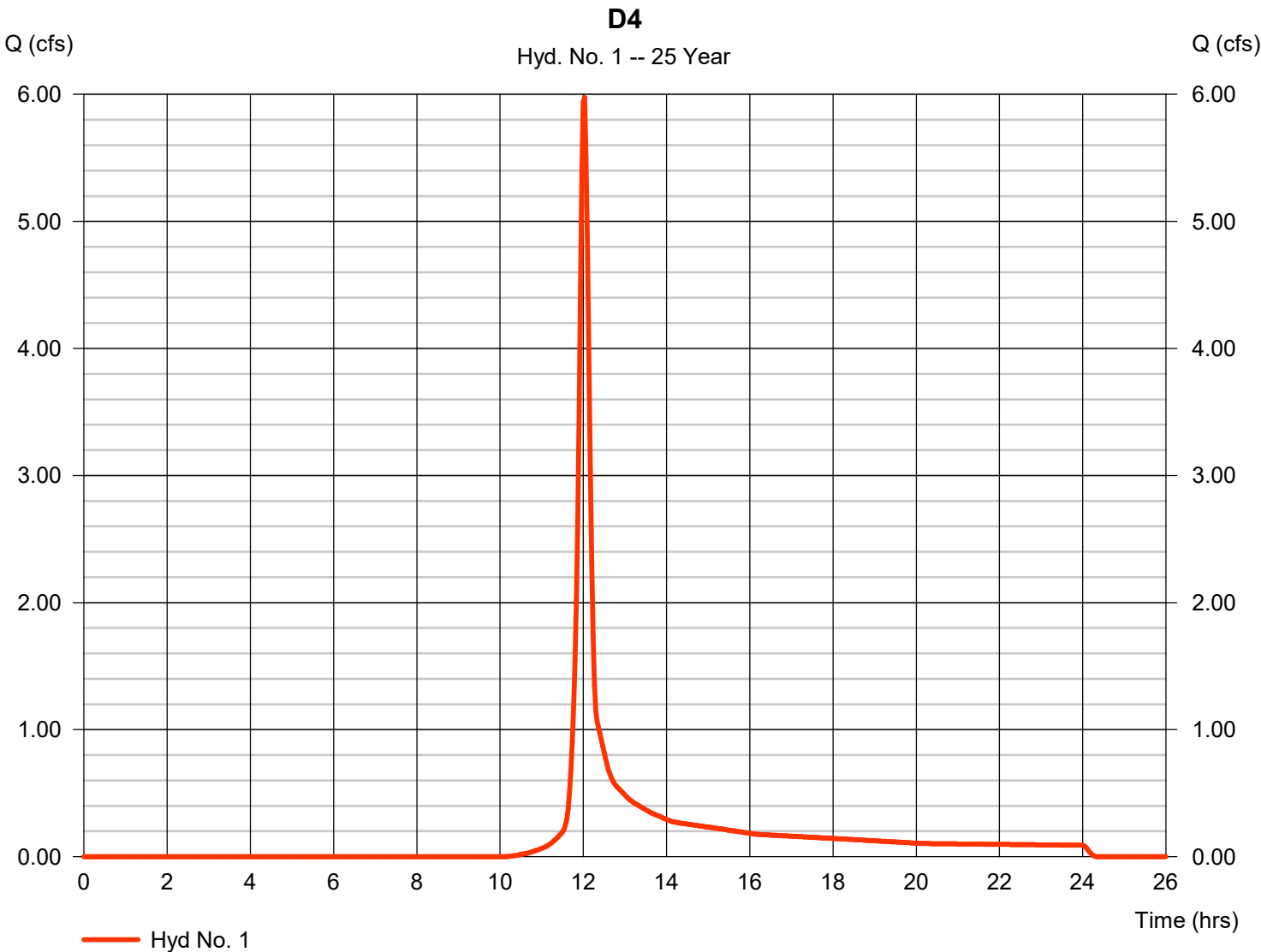
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.975	2	722	15,706	-----	-----	-----	D4
2	Reservoir	0.529	2	772	15,692	1	6553.91	7,082	POND D4
3	SCS Runoff	0.467	2	728	5,846	-----	-----	-----	H4
NEW POND D4.gpw					Return Period: 25 Year			Monday, 07 / 1 / 2024	

Hydrograph Report

Hyd. No. 1

D4

Hydrograph type	= SCS Runoff	Peak discharge	= 5.975 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 15,706 cuft
Drainage area	= 6.050 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.79 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



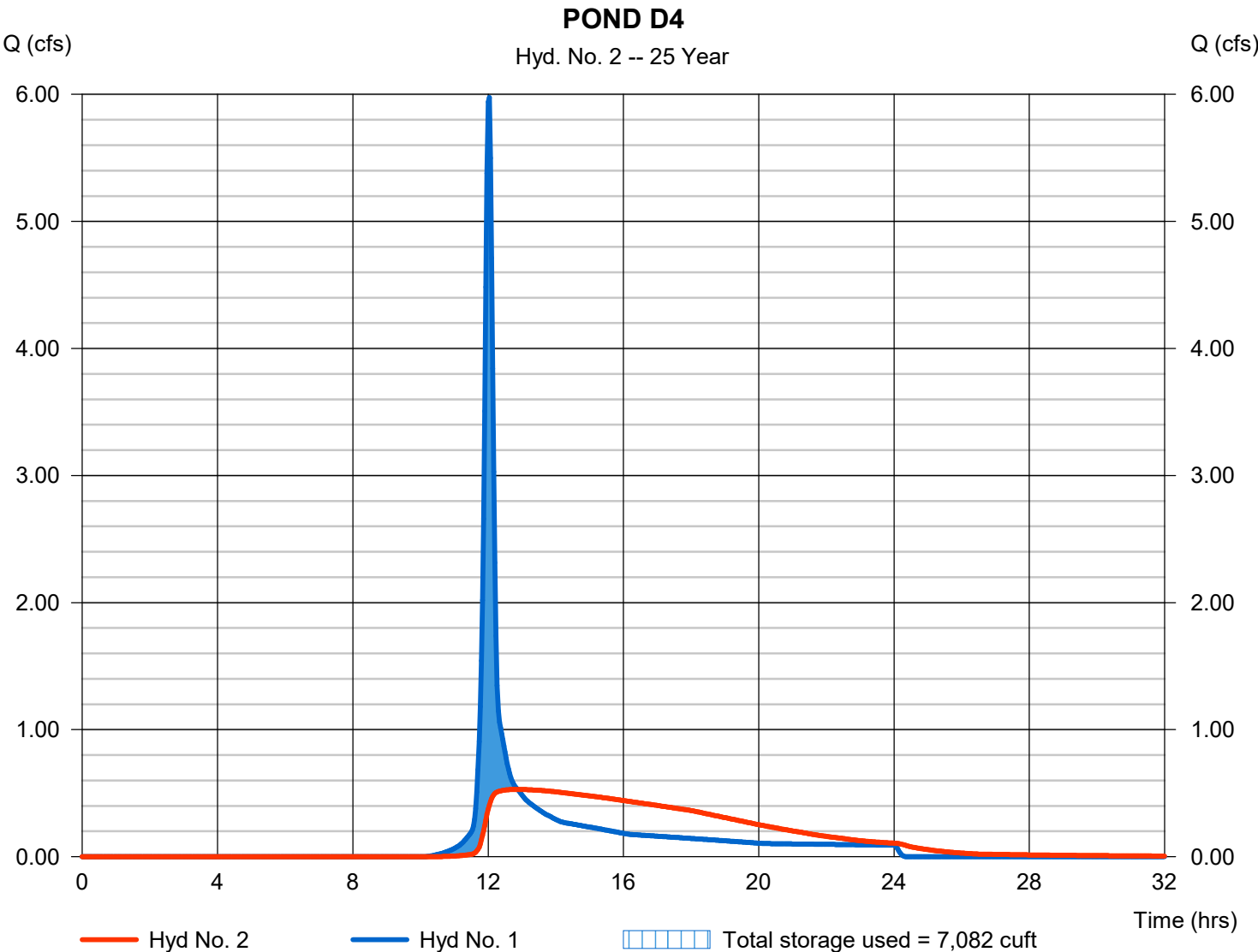
Hydrograph Report

Hyd. No. 2

POND D4

Hydrograph type	= Reservoir	Peak discharge	= 0.529 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.87 hrs
Time interval	= 2 min	Hyd. volume	= 15,692 cuft
Inflow hyd. No.	= 1 - D4	Max. Elevation	= 6553.91 ft
Reservoir name	= P-4	Max. Storage	= 7,082 cuft

Storage Indication method used.



Pond No. 1 - P-4

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 6552.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	6552.00	2,263	0	0
1.00	6553.00	3,740	3,002	3,002
2.00	6554.00	5,274	4,507	7,509
3.00	6555.00	6,866	6,070	13,579
4.00	6556.00	8,512	7,689	21,268

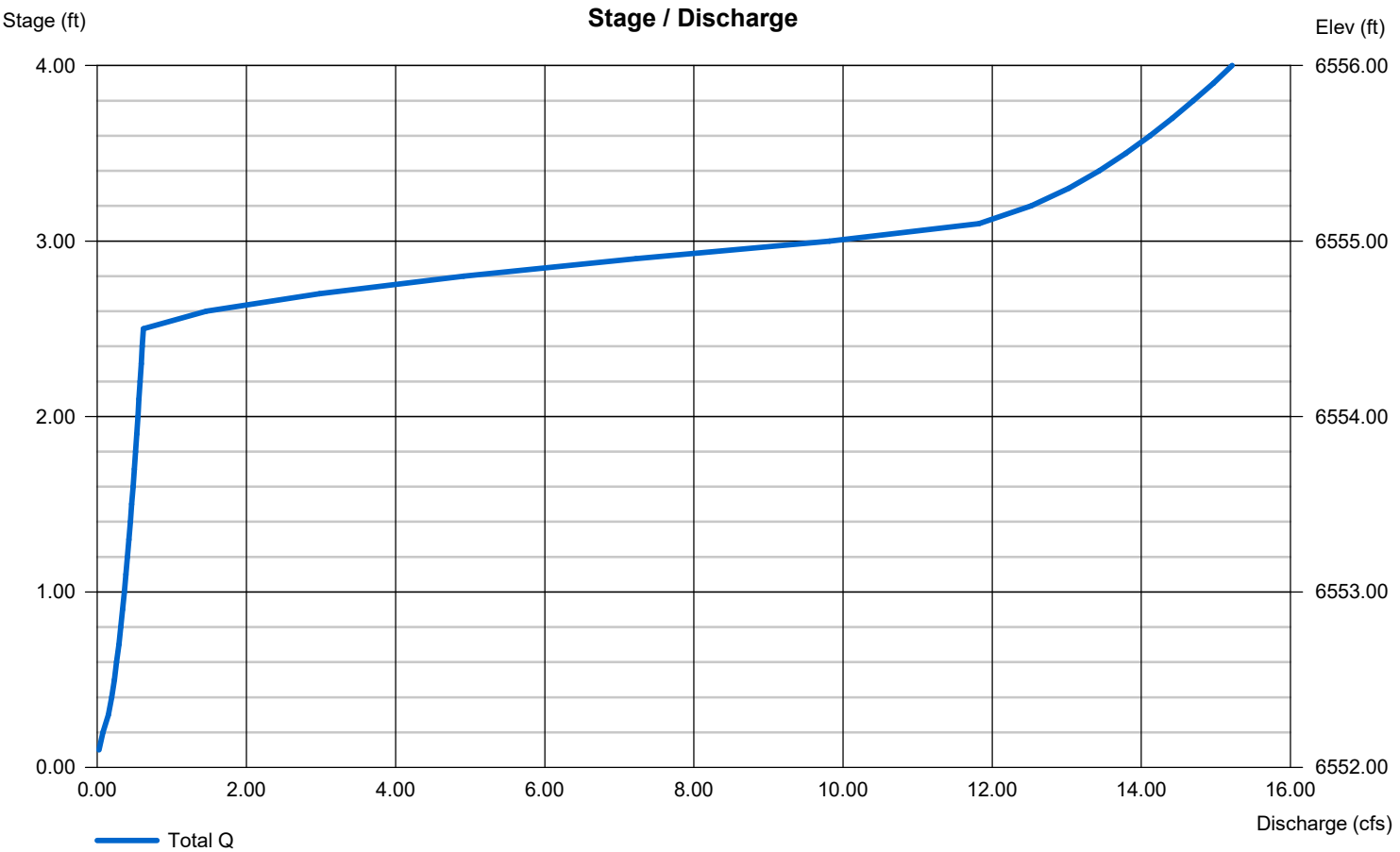
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 6552.00	6552.00	0.00	0.00
Length (ft)	= 25.00	1.00	0.00	0.00
Slope (%)	= 1.00	0.01	0.00	n/a
N-Value	= .010	.010	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 6554.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

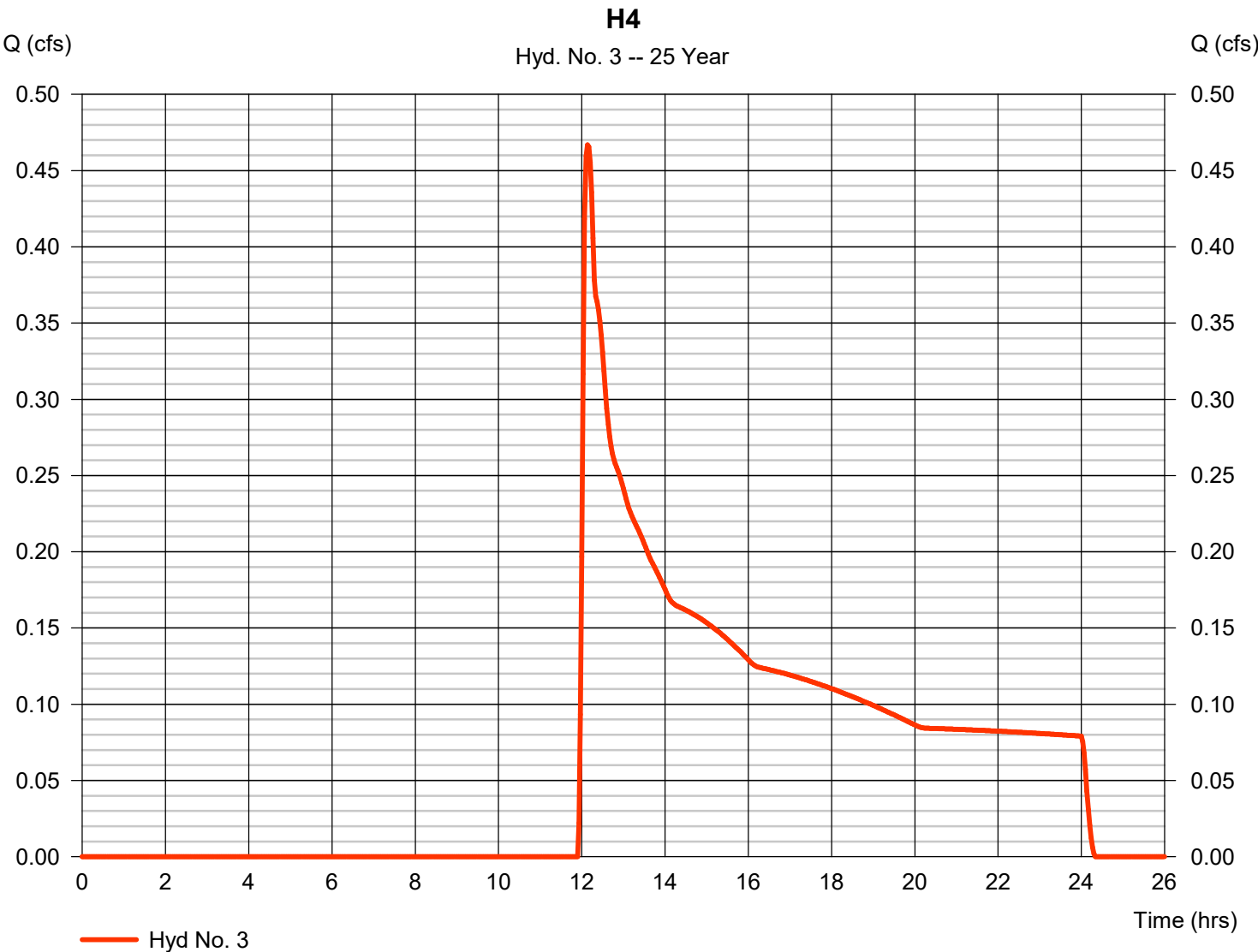


Hydrograph Report

Hyd. No. 3

H4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.467 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 5,846 cuft
Drainage area	= 16.000 ac	Curve number	= 66
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.79 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.142	2	720	23,790	-----	-----	-----	D4
2	Reservoir	1.209	2	750	23,776	1	6554.57	10,970	POND D4
3	SCS Runoff	3.066	2	724	14,183	-----	-----	-----	H4
NEW POND D4.gpw					Return Period: 100 Year			Monday, 07 / 1 / 2024	

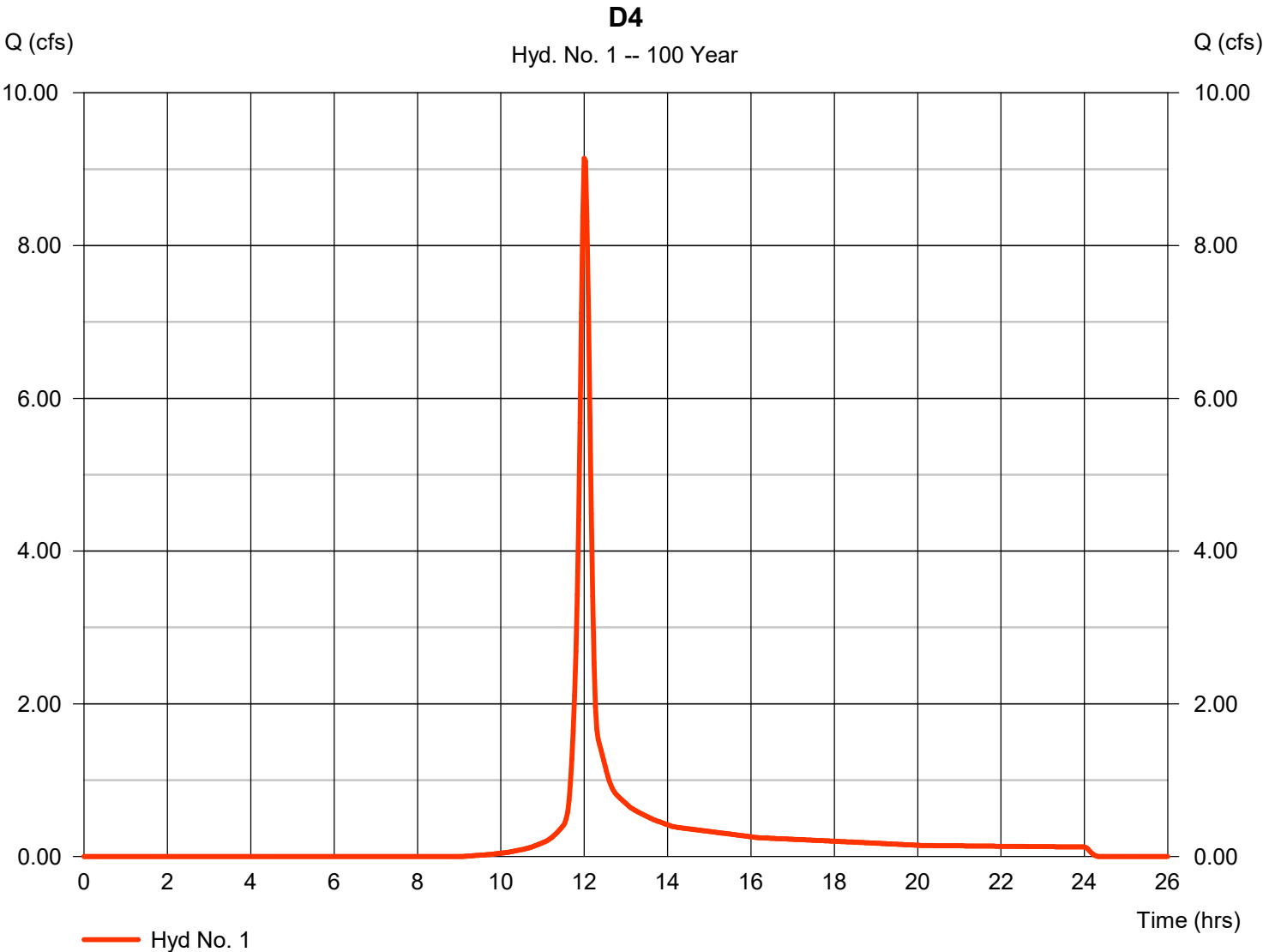
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024
Monday, 07 / 1 / 2024

Hyd. No. 1

D4

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.142 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	23,790 cuft
Drainage area	=	6.050 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.26 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



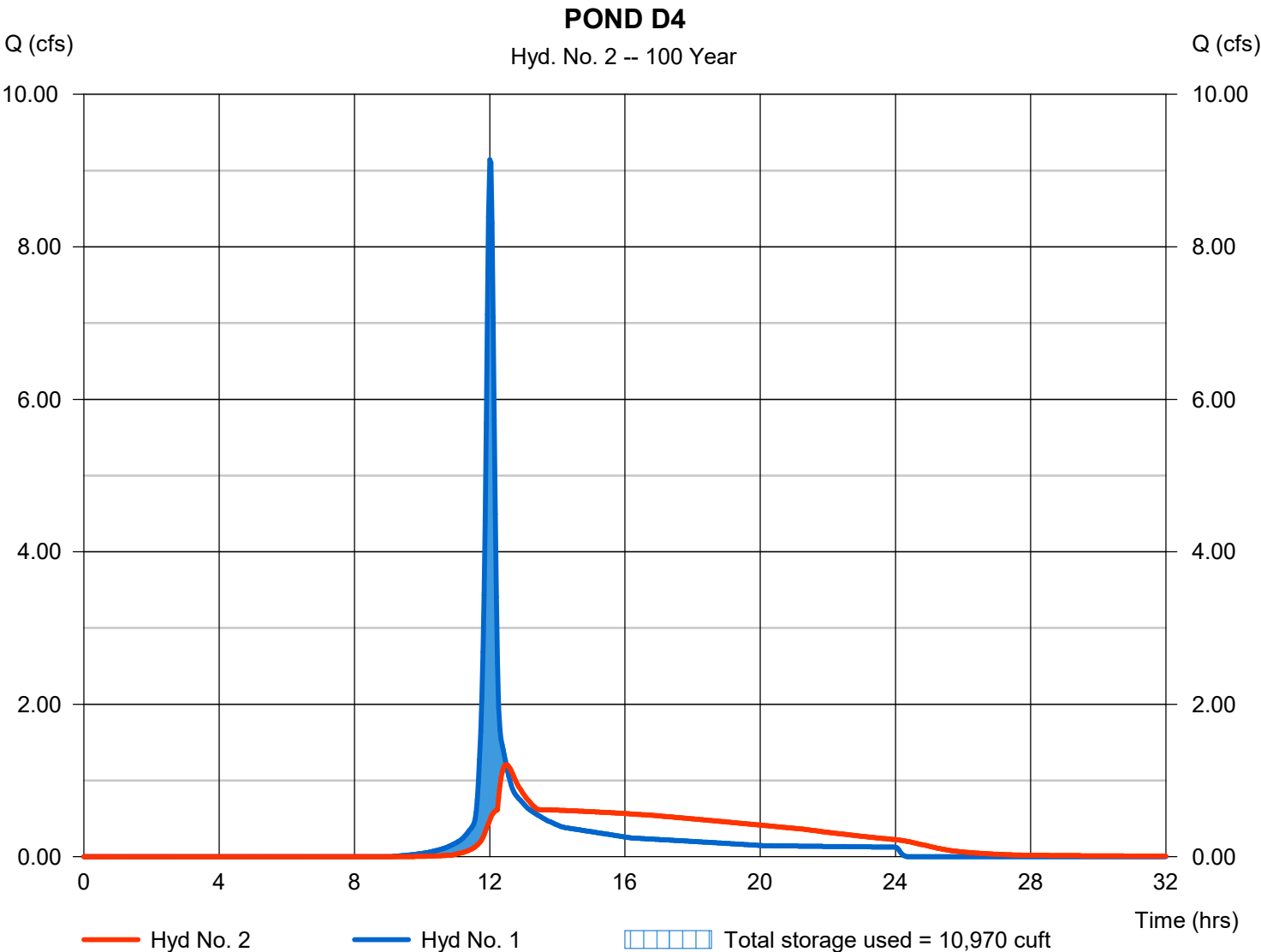
Hydrograph Report

Hyd. No. 2

POND D4

Hydrograph type	= Reservoir	Peak discharge	= 1.209 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.50 hrs
Time interval	= 2 min	Hyd. volume	= 23,776 cuft
Inflow hyd. No.	= 1 - D4	Max. Elevation	= 6554.57 ft
Reservoir name	= P-4	Max. Storage	= 10,970 cuft

Storage Indication method used.

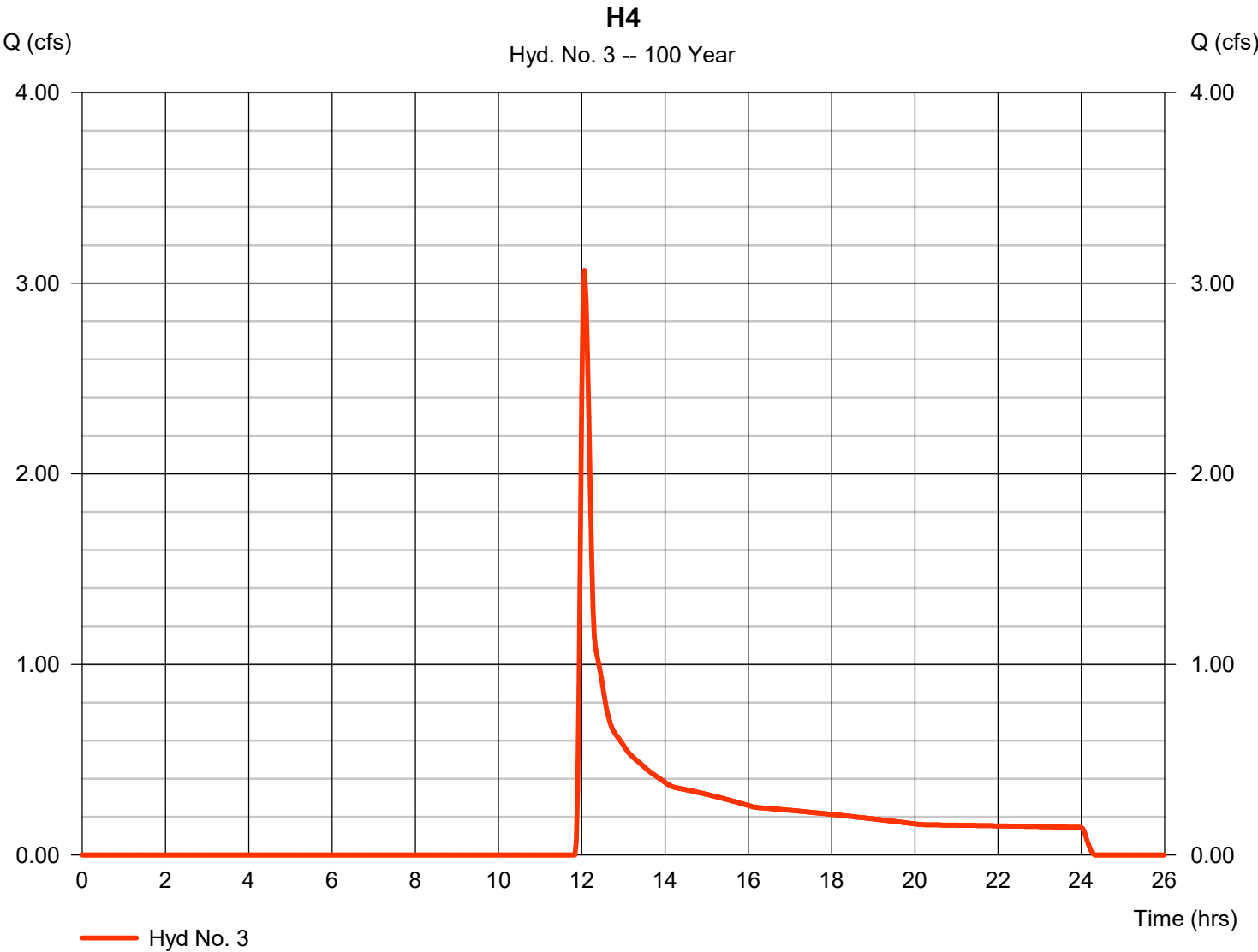


Hydrograph Report

Hyd. No. 3

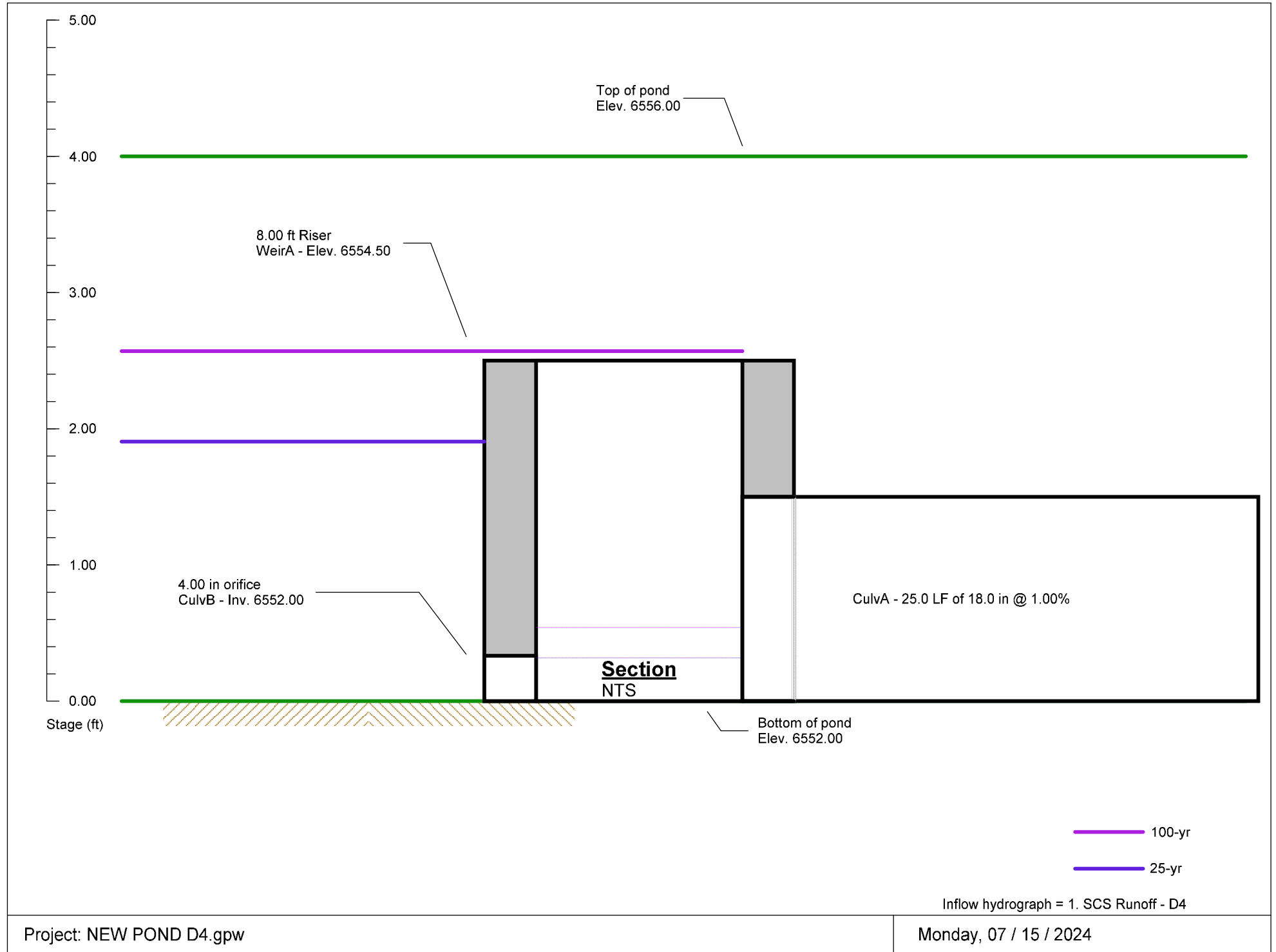
H4

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.066 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	14,183 cuft
Drainage area	=	16.000 ac	Curve number	=	66
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.26 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Pond No. 1 - P-4

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024





APPENDIX H

Offsite Basin Calculations

WinTR-55 Current Data Description

--- Identification Data ---

User: J.Brouse Date: 7/1/2024
 Project: Hockett Gulch Units: English
 SubTitle: AEI Pond Design Comparison Areal Units: Acres
 State: Colorado
 County: Eagle
 Filename: J:\Civil\23.1012-Hockett Gulch\ENG\DRAINAGE\WinTR-55\Offsite Basins.w55

--- Sub-Area Data ---

Name	Description	Reach	Area (ac)	RCN	Tc
OS-4A		Outlet	3.03	79	0.204
OS-H1		Outlet	6.47	79	.221

Total area: 9.50 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.06	1.29	1.5	1.79	2.02	2.26	.91

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type II
 Dimensionless Unit Hydrograph: <standard>

J.Brouse

Hockett Gulch
AEI Pond Design Comparison
Eagle County, Colorado

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
1.06	1.29	1.5	1.79	2.02	2.26	.91

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

J.Brouse

Hockett Gulch
AEI Pond Design Comparison
Eagle County, Colorado

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	25-Yr (cfs)	100-Yr (cfs)

SUBAREAS		
OS-4A	1.47	2.63
OS-H1	3.05	5.47
REACHES		
OUTLET	4.52	8.08

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Hockett Gulch
AEI Pond Design Comparison
Eagle County, Colorado

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow 25-Yr (cfs) (hr)	Peak Time (hr) by Rainfall Return Period 100-Yr (cfs) (hr)
------------------------------------	-------------------------------------	---

SUBAREAS

OS-4A	1.47 12.05	2.63 12.03
-------	---------------	---------------

OS-H1	3.05 12.06	5.47 12.05
-------	---------------	---------------

REACHES

OUTLET	4.52	8.08
--------	------	------

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Hockett Gulch
AEI Pond Design Comparison
Eagle County, Colorado

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
OS-4A	3.03	0.204	79	Outlet	
OS-H1	6.47	0.221	79	Outlet	

Total Area:	9.50 (ac)				

J.Brouse

Hockett Gulch
AEI Pond Design Comparison
Eagle County, Colorado

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

OS-4A							
SHEET	100	0.4100	0.400				0.186
SHALLOW	680	0.4100	0.050				0.018
					Time of Concentration		0.204
							=====
OS-H1							
SHEET	100	0.3800	0.400				0.192
CHANNEL	940					9.000	0.029
					Time of Concentration		.221
							=====

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Hockett Gulch
AEI Pond Design Comparison
Eagle County, Colorado

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
OS-4A	Desert shrub	(good)	C	3.026	79
	Total Area / Weighted Curve Number			3.03 ====	79 ==
OS-H1	Desert shrub	(good)	C	6.474	79
	Total Area / Weighted Curve Number			6.47 ====	79 ==

Worksheet for 10" HDPE Bypass Pipe for Basin OS-4A

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.018 ft/ft
Normal Depth	10.0 in
Diameter	10.0 in
Discharge	3.18 cfs
Results	
Discharge	3.18 cfs
Normal Depth	10.0 in
Flow Area	0.5 ft ²
Wetted Perimeter	2.6 ft
Hydraulic Radius	2.5 in
Top Width	0.00 ft
Critical Depth	9.2 in
Percent Full	100.0 %
Critical Slope	0.016 ft/ft
Velocity	5.84 ft/s
Velocity Head	0.53 ft
Specific Energy	1.36 ft
Froude Number	(N/A)
Maximum Discharge	3.43 cfs
Discharge Full	3.18 cfs
Slope Full	0.018 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.0 in
Critical Depth	9.2 in
Channel Slope	0.018 ft/ft
Critical Slope	0.016 ft/ft

Required 100-yr peak
flow = 2.63 cfs

Worksheet for 18" HDPE Pipe for Basin OS-H1 & H1

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.012
Channel Slope	0.020 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	16.09 cfs

Required 100-yr peak flow = 14.22 cfs

Results	
Discharge	16.09 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft ²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	17.1 in
Percent Full	100.0 %
Critical Slope	0.017 ft/ft
Velocity	9.11 ft/s
Velocity Head	1.29 ft
Specific Energy	2.79 ft
Froude Number	(N/A)
Maximum Discharge	17.31 cfs
Discharge Full	16.09 cfs
Slope Full	0.020 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	17.1 in
Channel Slope	0.020 ft/ft
Critical Slope	0.017 ft/ft

Worksheet for Swale H1

Project Description		
Friction Method	Manning	
	Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coefficient	0.078	
Channel Slope	0.035 ft/ft	
Left Side Slope	3.000 H:V	
Right Side Slope	10.000 H:V	
Discharge	14.22 cfs	
Results		
Normal Depth	11.9 in	
Flow Area	6.4 ft ²	
Wetted Perimeter	13.1 ft	
Hydraulic Radius	5.9 in	
Top Width	12.92 ft	
Critical Depth	9.4 in	
Critical Slope	0.124 ft/ft	
Velocity	2.21 ft/s	
Velocity Head	0.08 ft	
Specific Energy	1.07 ft	
Froude Number	0.554	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.0 in	
Length	0.0 ft	
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.0 in	
Profile Description	N/A	
Profile Headloss	0.00 ft	
Downstream Velocity	0.00 ft/s	
Upstream Velocity	0.00 ft/s	
Normal Depth	11.9 in	
Critical Depth	9.4 in	
Channel Slope	0.035 ft/ft	
Critical Slope	0.124 ft/ft	

Combined 100-yr
flow from Basins
OS-H1 and H1

Bldg. 15 FFE - Swale
100-yr WSEL > 1 foot

SWALE H1

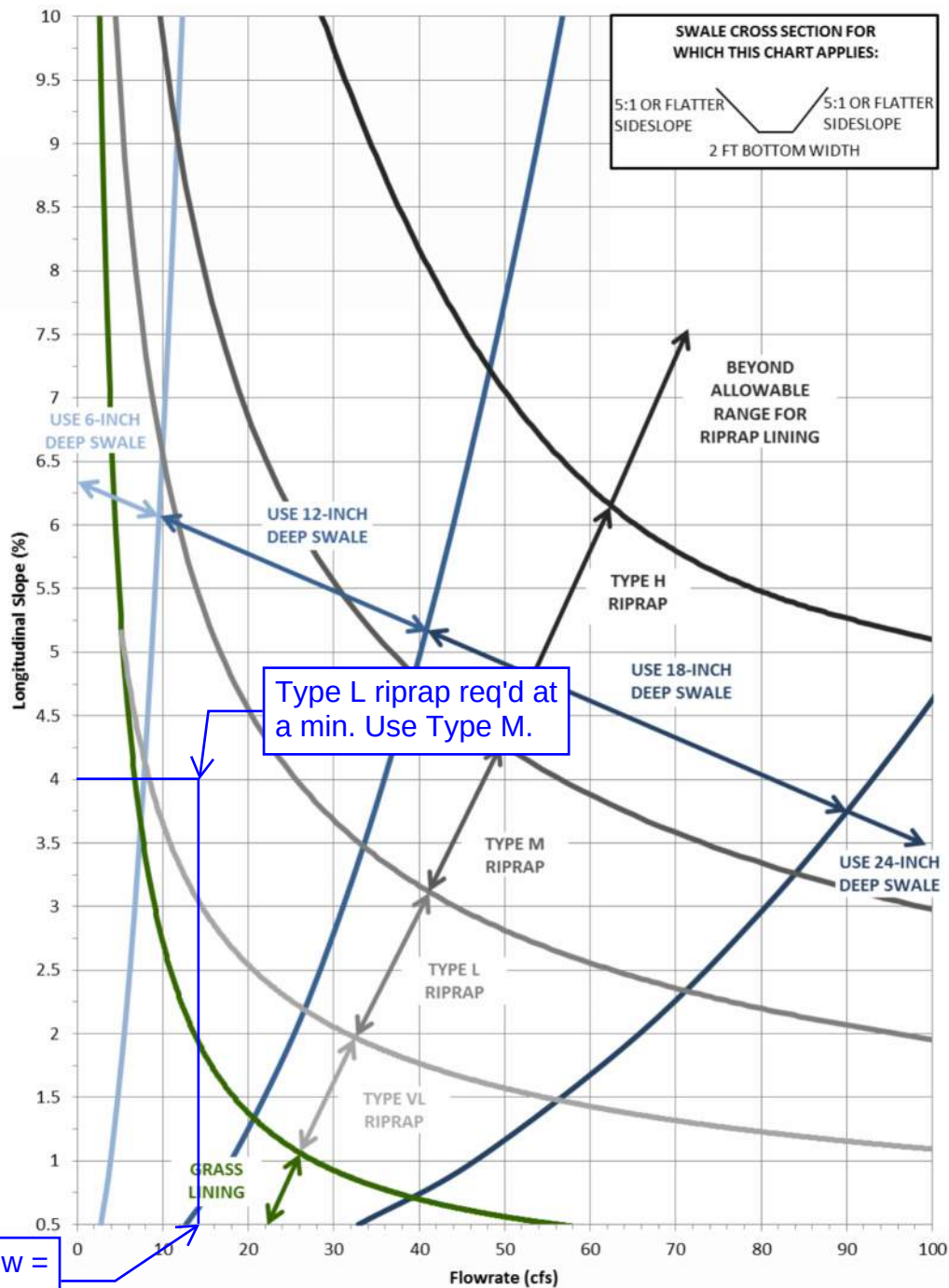


Figure 8-22. Swale stability chart; 2- to 4-foot bottom width and side slopes between 5:1 and 10:1

(Note: Riprap classifications refer to gradation for riprap used in soil riprap or void-filled riprap. See Figure 8-34 for gradations.) (Source: Muller Engineering Company)

Worksheet for Swale 4.10a

Analysis conducted at area with the least elevation difference between the swale flowline and the nearest FFE. This area lies just south of Bldg. 14.

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.030
Channel Slope	0.040 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	10.000 H:V
Discharge	2.77 cfs
Results	
Normal Depth	4.4 in
Flow Area	0.9 ft ²
Wetted Perimeter	4.8 ft
Hydraulic Radius	2.2 in
Top Width	4.77 ft
Critical Depth	4.9 in
Critical Slope	0.023 ft/ft
Velocity	3.16 ft/s
Velocity Head	0.16 ft
Specific Energy	0.52 ft
Froude Number	1.302
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.4 in
Critical Depth	4.9 in
Channel Slope	0.040 ft/ft
Critical Slope	0.023 ft/ft

= 53% of 100-yr flow from Basins OS-4A (2.63 cfs) + 4.10a (2.32 cfs)

Tributary flow percentage at area of concern.

Provides at least 1 foot of freeboard from swale WSEL to nearest Bldg. 14 FFE