Preliminary Drainage Report
for
Barker Industrial
County of Riverside

Prepared for:

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RELIABLE SOLUTIONS IN WATER RESOURCES

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CHAPTER 1 - BACKGROUND

1.1 – Introduction

The purpose of this report is to summarize the hydrologic and hydraulic analyses of the proposed Barker Industrial project (PPT190008) and its associated improvements. This report is prepared in conjunction with the project's preliminary grading plans and environmental impact report (EIR). The Barker Industrial project is a proposed 30-acre light industrial property with a tilt up warehouse building and associated improvements on APN 317-240-001 in the County of Riverside. The site is bound by APNs 317-230-049 and 317-230-038 to the north; APNs 317-240-045, 317-240-017, and 317-240-019 through 317-240-021 to the east; Placentia Avenue to the south, and Patterson Avenue to the west.

This report provides a preliminary analysis of the following:

1. The proposed condition 100-year Rational Method peak flow for onsite storm drain sizing
2. The existing and proposed condition 2-year, 5-year, and 10-year storm frequency hydrographs for the 1-hour, 3-hour, 6-hour, and 24-hour durations
3. The proposed Line H-10.1 and H-11 drop inlet capacities and hydraulic grade lines (HGLs)
4. The proposed Placentia Avenue street flow and inlet capacities

1.2 – Summary of Existing Conditions

The existing undeveloped site features no structures and indirectly discharges to the Perris Valley Master Drainage Plan (MDP) Line H-11. The existing site drains from the southwest to the northeast via overland flow and shallow concentrated flow until reaching an existing easterly offsite detention pond located within APN 317-240-045 and PM 30133 Parcel 1, then directly discharging to Perris Valley MDP Line H-11 via Line K (per RCTD Drawing No. 907-H). Existing land cover consists of pervious cover with scarce vegetation. The existing site receives regional offsite run-on from approximately 185 acres from the southwest. Most of the offsite run-on is predominantly conveyed onsite via 24-inch diameter CMP culvert at the northwestern parcel corner.

1.3 – Summary of Proposed Conditions

The proposed development will feature an onsite warehouse building, paved parking, self-treating LID landscaped areas along the northern and eastern boundaries, and three underground infiltration vaults and one surface infiltration basin sized for volumetric pollutant control and 2, 5, and 10-year increased runoff criteria. The project also proposes offsite half-street improvements along the Placentia Avenue and Patterson Avenue frontages and the corresponding Perris Valley MDP storm drains, Lines H-10.1 and H-11, respectively.

CHAPTER 2 – HYDROLOGIC ANALYSIS

2.1 – Rational Method

The site proposes to extend Perris Valley MDP Line H-11 and directly tie in via a 42-inch diameter storm drain at approximately Station 19+50 per Riverside County Flood Control and Water Conservation District (RCFCWCD) Drawing No. 4-1124. This onsite storm drain system would tie into the final segment of the Line H-11 extension. It is expected that the 100-year storm would be attenuated due to the presence of the infiltration facilities; however, the private onsite storm drain system tributary thereto has been conservatively sized assuming the unattenuated peak flow rates per Rational Method hydrology.

The Line H-11 tie-in segment has upstream and downstream inverts elevated at 1515.66 and 1515.00, respectively. The adjacent finished floor elevation is 1540.88. Therefore, it is intuitive that the twenty feet between the upstream pipe soffit and the finished floor serves as sufficient freeboard at the tie-in location.

The Rational Method criteria set forth in the RCFCWCD Hydrology Manual was used to determine the unattenuated 100-year peak flow. Advanced Engineering Software (AES) was used for computing hydrologic calculations and integrates the RCFCWCD methodology and standards. Rational Method calculations are provided in Appendix 3.

2.2 – Hydrograph Routing Methodology

The existing condition is characterized by a single drainage area, whereas the proposed condition is characterized by four main drainage areas, DMAs D/1, D/2, D/3, and D/4, and two self-treating landscaped LID areas, A/1 and A/2, respectively. Existing and proposed condition hydrology maps are provided in Appendix 1. The existing and proposed drainage area summaries are presented in Table 1:

Table 1: Drainage Area Summaries

Condition	ID	A (ac)	% Imp	Runoff Index
Existing	DMA EX	31.24	0	86
Proposed	DMA D/1	12.92	94	59
	DMA D/2	11.65	100	71
	DMA D/3	1.87	87	75
	DMA D/4	2.40	61	66
	DMA A/1	0.22	0	60
	DMA A/2	0.72	0	67

The Riverside County Hydrology Manual (RCHM) was referenced to construct the unattenuated existing and proposed condition Short Cut Method hydrographs. Antecedent Moisture

Condition (AMC) I was selected for the 2-year and 5-year storms and AMC II was selected for the 10-year storm. The National Resources Conservation Service (NRCS) Web Soil Survey was used to establish the site-wide Hydrologic Soil Groups as Types A, C, and D. The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 was used to determine point precipitation depths at the project site for the 1-hour, 3-hour, 6-hour, and 24-hour durations. Soil Type and Atlas 14 information is provided in Appendix 2. The point precipitation depths are summarized in Table 2:

Table 2: Point Precipitation Depths

Storm Duration	2-Year Depth (in)	5-Year Depth (in)	10-Year Depth (in)
1-hour	0.46	0.64	0.79
3-hour	0.80	1.06	1.27
6-hour	1.12	1.46	1.75
24-hour	2.00	2.66	3.20

The United States Army Corps of Engineers Hydraulic Engineering Center (HEC) Hydrologic Modeling System (HMS) was used to route the post-developed hydrographs through the proposed underground infiltration vaults and infiltration basin to analyze the provided attenuation. The attenuated outflow hydrographs were summed with the DMAs A/1 and A/2 hydrographs for each respective time step to determine the total peak flow at the site discharge point for the 1, 3, 6, and 24-hour storm durations.

The underground infiltration systems have been designed to fully retain the tributary area runoff volume generated from the 85th percentile 24-hour storm to satisfy pollutant control requirements set forth by the Riverside County Santa Ana Region WQMP. Each system will begin to route runoff volume through an internal flow control structure once the maximum allowable 72-hour ponding depth has been exceeded. The underground systems are comprised of modular precast chambers underlain by a one-foot gravel layer extending one foot beyond the modular system footprint. The internal flow control structures have been uniquely configured for each underground system through a combination of orifice and weir flow and shall be constructed within the system module adjacent to the proposed outflow storm drain. The private outflow storm drain system will tie into the proposed Line H-11 segment. Detailed outlet structure specifications are provided in Appendix 4. The general detention system specifications are provided below:

Table 3: Detention System Specifications

BMP	System Type	Gravel Depth (in)	D_{72max} (ft)	A_{gravel} (sf)	A_{module} (sf)	A_{basin}(sf)
D/1	Oldcastle StormCapture SC-6	12	3.65	9,700	7,560	N/A
D/2	Oldcastle StormCapture SC-6	12	2.45	14,500	11,340	N/A
D/3	Oldcastle StormCapture SC-4	12	2.93	1,908	1,365	N/A
D/4	Infiltration Basin	N/A	2.45	N/A	N/A	4,736

Complete hydrograph and detention routing data are provided in Appendices 4 and 5. The hydrograph routing analyses are summarized in the tables below:

Table 4: 2-Year Peak Flow Summary

Storm Event	2-Year Peak Flow Summary (cfs)			
	Existing	Unmitigated	Mitigated	Difference
2-yr, 24-hour	1.71	5.43	1.23	-0.48
2-yr, 6-hour	11.09	17.31	2.61	-8.48
2-yr, 3-hour	14.03	20.08	1.00	-13.03
2-yr, 1-hour	39.34	44.22	0.93	-38.41

Table 5: 5-Year Peak Flow Summary

Storm Event	5-Year Peak Flow Summary (cfs)			
	Existing	Unmitigated	Mitigated	Difference
5-yr, 24-hour	2.18	8.05	2.03	-0.15
5-yr, 6-hour	17.71	23.60	5.92	-11.79
5-yr, 3-hour	22.15	27.83	3.58	-18.57
5-yr, 1-hour	59.14	63.09	1.53	-57.61

Table 6: 10-Year Peak Flow Summary

Storm Event	Peak Flow Summary (cfs)			
	Existing	Unmitigated	Mitigated	Difference
10-yr, 24-hour	8.83	11.03	7.35	-1.48
10-yr, 6-hour	28.40	30.11	15.38	-13.02
10-yr, 3-hour	33.70	35.16	4.41	-29.29
10-yr, 1-hour	81.12	80.37	3.31	-77.81

CHAPTER 3 – OFFSITE HYDRAULIC ANALYSIS

3.1 – Line H-10.1 & H-11 Inlets

The proposed Line H-10.1 portion will extend from the Placentia Avenue and Patterson Avenue intersection to Line H-11 at the Placentia Avenue and Harvill Avenue intersection. The system will be comprised of 30-inch, 36-inch, and 66-inch diameter RCP. The proposed Line H-10.1 headworks will be comprised of a 48-inch diameter CMP riser drop inlet located within the Placentia Avenue southern shoulder, just east of Patterson Avenue. The drop inlet will be located within the public right-of-way and will be sized to convey the MDP design flowrate of 72 cubic feet per second (cfs) from the 45-acre offsite tributary area without overtopping the roadway. The Placentia Avenue improvements will include curb inlets located just upstream of the proposed westerly driveway, sized to intercept local half-street runoff. It should be noted that, due to the concurrent planning and engineering of the separate, easterly adjacent Placentia Logistics Center project (PPT200002), it is anticipated that PPT190008 will only be responsible for the upstream segment of Line H-10.1 contained within the proposed extents of the Placentia Avenue frontage improvements. The Placentia Logistics Center project will be constructed first and will therefore be responsible for the downstream segment extending from the eastern terminus of the Placentia Avenue improvements (discussed herein) to the existing segment of Line H-11 at Harvill Avenue.

The proposed Line H-11 portion will extend from the Patterson Avenue and Walnut Avenue intersection to the current Line H-11, Stage No. 2 Station 19+46 (per RCFCWCD Drawing No. 4-1128). The system will be comprised of a 48-inch diameter RCP. The proposed Line H-11 headworks will be comprised of a dual 60-inch diameter CMP riser drop inlet system located at the current culvert inlet location within the southwestern Patterson Avenue and Walnut Street shoulder. The drop inlet will be sized to convey the 230 cfs MDP design flowrate from the approximate 140-acre offsite tributary area without overtopping the roadway and will replace the existing 24-inch diameter CMP culvert and located within the public right-of-way. The Patterson Avenue improvements will also include a curb inlet located just south of the proposed driveway sized to intercept local half-street runoff. The proposed alignments are provided in Appendix 7.

To determine the proposed inlet capacities, each drop inlet system was analyzed under the following flow control scenarios:

1. The riser operating under weir flow (riser weir flow control)
2. The riser opening operating under horizontal orifice flow (riser orifice flow control)

The results are summarized in Table 9:

Table 9: Riser Maximum Capacities

Scenario	Flowrate (cfs)	
	Line H-10.1	Line H-11
MDP Flowrate	72	230
Riser Weir Flow Control	106	266
Riser Orifice Flow Control	88	276

The drop inlet capacity analysis shows that each drop inlet system is capable of fully intercepting the MDP design flowrate tributary to its headworks into their respective underground storm drain systems without overtopping the adjacent roadway. Supporting calculations are provided in Appendix 8.

3.2 – Line H-10.1 & H-11 HGL

The hydraulic grade lines (HGLs) for the proposed line extensions were considered. The HGLs were computed for each profile using XPWSPG software. Both lines were analyzed using the MDP flowrates, assuming additional flows enter the system as shown on the Perris Valley MDP Exhibit (provided in Appendix 11). Line H-10.1 was assumed to slope at the same rate as the existing street sections, as final street improvement plans will be prepared at the project engineering stage.

The HGL analyses demonstrate that the proposed pipe sizes can convey the design flowrates while maintaining at least one foot of freeboard between the HGL and curb flowline. Supporting calculations are provided in Appendix 9.

3.3 – Placentia Avenue Capacity

Street flow and inlet capacities were analyzed for Placentia Avenue. The proposed drop inlet is expected to fully intercept the 72 cfs tributary to the line headworks; therefore, the incremental increase in flowrates per the Perris Valley MDP were considered when assessing the proposed street section capacities and inlet locations. Street and inlet capacities were calculated using Hydraflow Express Extension for Autodesk AutoCAD Civil 3D software.

Based on the incremental increase between the H-10.1 system headworks (72 cfs) and Tobacco Road (114 cfs), 42 cfs was analyzed upstream of the westerly driveway. Based on existing topography, it is evident that the increase in runoff would enter Placentia Avenue from the south; therefore, the southern improved half-street capacity was considered and found to be approximately 12 cfs. The remaining 30 cfs was assumed to be conveyed within the proposed improved northern half-street until reaching the proposed 21-foot curb inlet just west of the westerly driveway. The proposed curb inlet would intercept approximately 18 cfs, bypassing the remaining 12 cfs downstream across the driveway entrance. The driveway gutter capacity was considered and found to be approximately 13 cfs; therefore, the proposed curb inlet is sized to intercept a sufficient quantity of flow without inundating the downstream driveway cross-gutter capacity.

An additional 21-ft curb inlet is proposed at the eastern terminus of the Placentia improvements. This curb inlet will receive the 12 cfs bypass and capture 10 cfs; the remaining 2 cfs will bypass downstream.

The incremental increase (18 cfs) between Tobacco Road (114 cfs) and midway between Tobacco Road and Harvill Avenue (132 cfs) was analyzed for the next proposed curb inlet per the PERRIS VALLEY MDP. As before, the 12 cfs capacity of the southern half-street was considered. Therefore, 6 cfs is anticipated to reach the northern half-street and was added to the 2 cfs bypass from the upstream inlet for a total of 8 cfs at the next 21-ft curb inlet located just west of the easterly driveway for Placentia Logistics Center project (PPT200002)—approximately midway between the eastern terminus of the PPT190008 Placentia Street improvement and Harvill Avenue. This proposed curb inlet will just nearly intercept the full 8 cfs, bypassing a negligible flowrate to the Placentia/Harvill intersection, where a final 7-foot sump curb inlet is proposed to intercept the remaining bypass and local half-street flow. Supporting calculations are provided in Appendix 10.

CHAPTER 4 – CONCLUSION

Our preliminary analysis demonstrates that the Barker Industrial project will:

1. Provide adequately sized onsite facilities for the 100-year storm
2. Provide adequate attenuation for the 2-year, 5-year, and 10-year storms
3. Provides full interception at the proposed Line H-10.1 and H-11 headworks
4. Provides adequate facilities to convey Placentia Avenue street flow

REFERENCES

1. Riverside County Flood Control and Water Conservation District, *Hydrology Manual,* April 1978.

2. Riverside County Flood Control and Water Conservation District, *Perris Valley Master Drainage Plan Exhibit*, July 1987 (Revised June 1991).

3. County of Riverside, *Drawing No. 907-H*, March 1991.

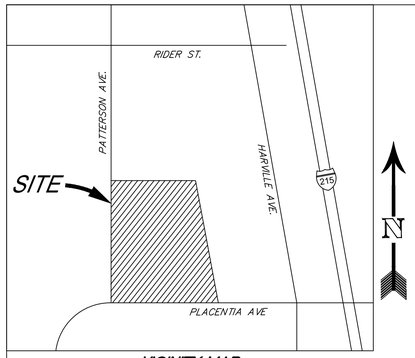
4. Riverside County Flood Control and Water Conservation District, *Drawing No. 4-1124*, March 2019.

5. Riverside County Flood Control and Water Conservation District, *Drawing No. 4-1128*, April 2019.

Appendix 1

Hydrology Exhibits

EXISTING CONDITION HYDROLOGY MAP
SHORT CUT HYDROGRAPH METHOD
BARKER INDUSTRIAL



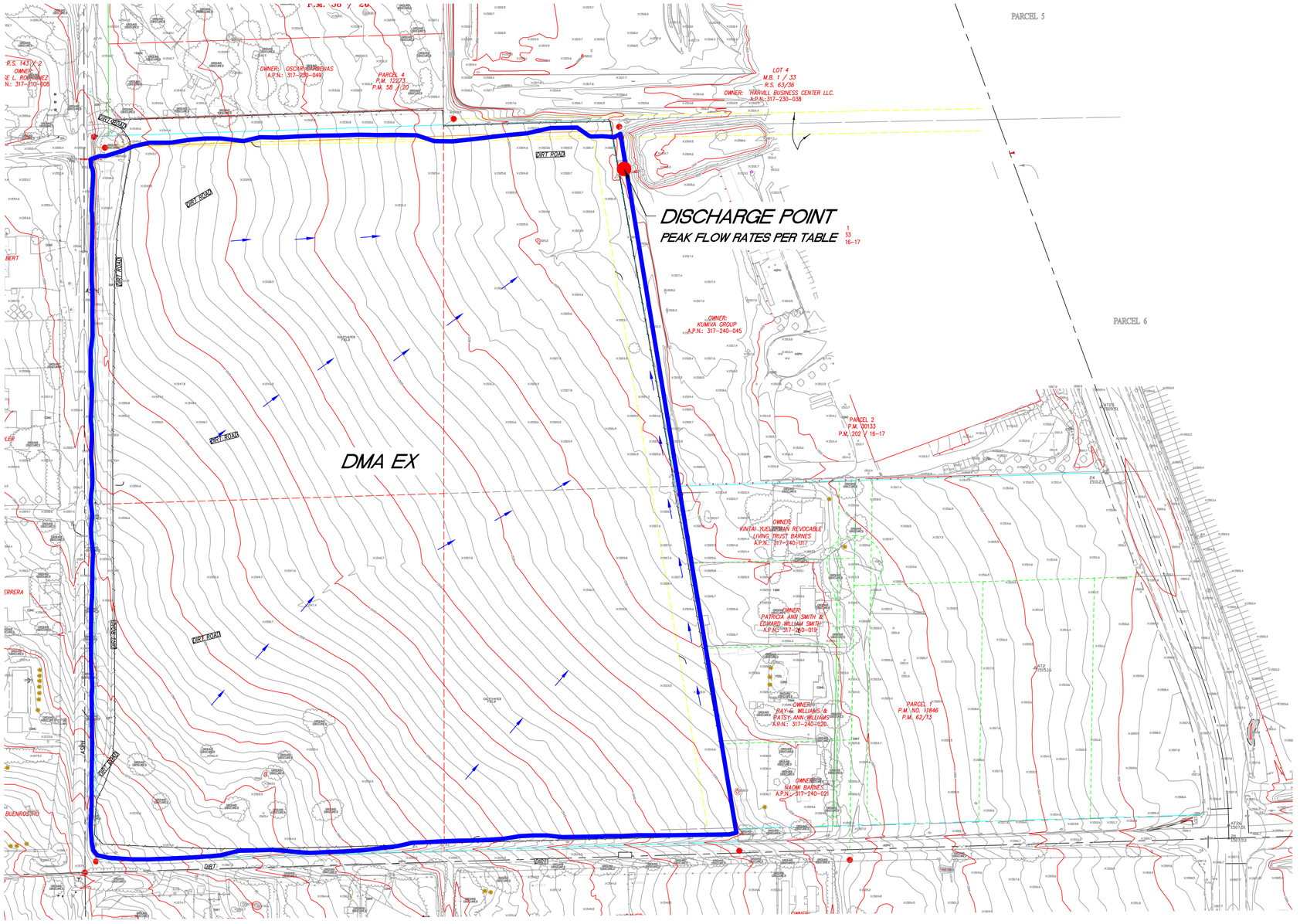
VICINITY MAP
NOT TO SCALE

LEGEND

DRAINAGE AREA

1280 EXISTING CONTOUR LINE

Storm Frequency	Peak Flow (cfs)			
	1-Hour Duration	3-Hour Duration	6-Hour Duration	24-Hour Duration
2-Year	39.34	14.03	11.09	1.71
5-Year	59.14	22.15	17.71	2.18
10-Year	81.12	33.70	28.40	8.83

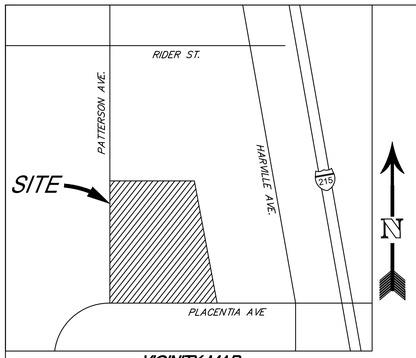


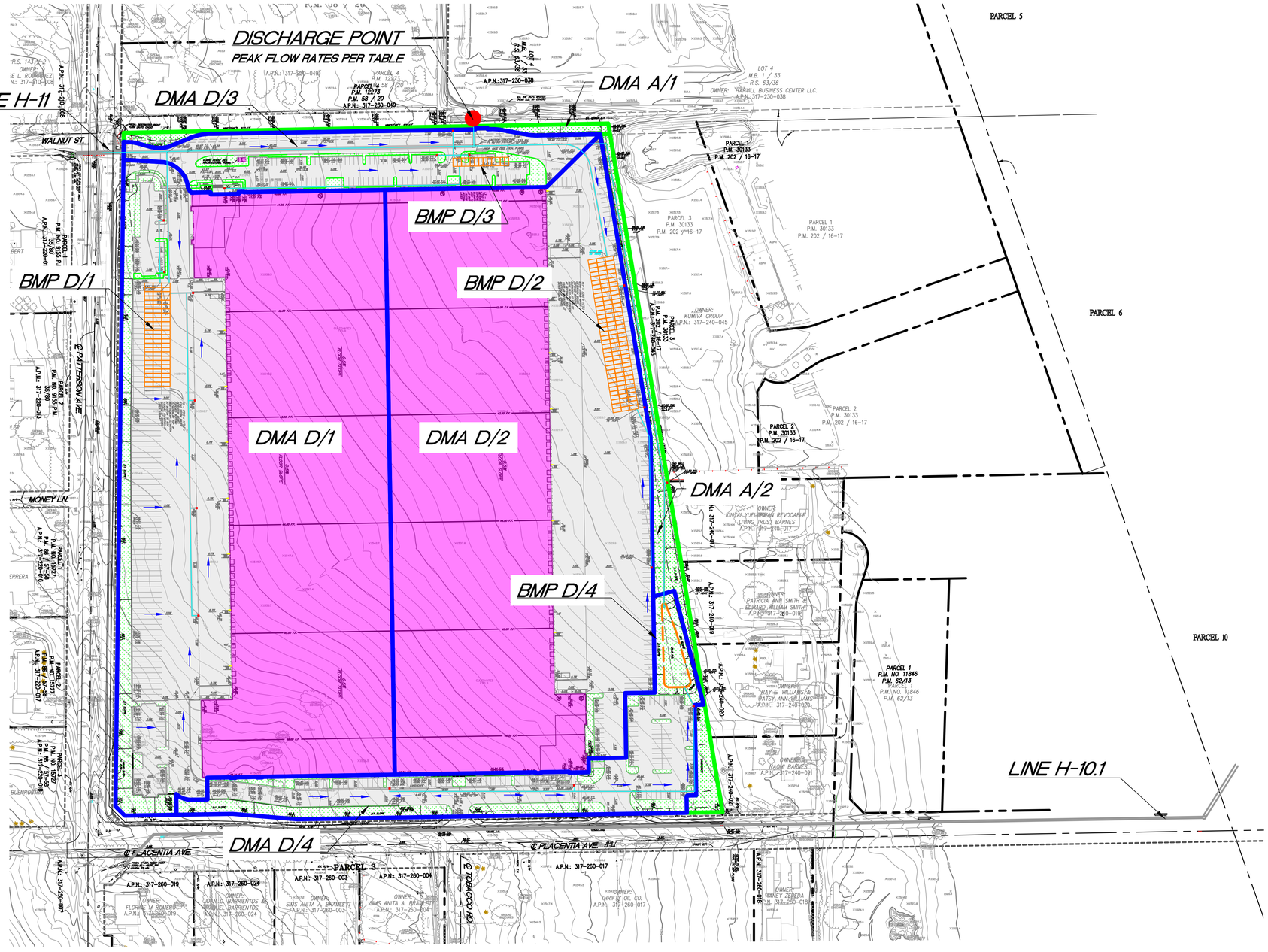
N

0 50 100 200 300 400

SCALE: 1"=50'

COUNTY OF RIVERSIDE	
EXISTING CONDITION HYDROLOGY MAP SHORT CUT HYDROGRAPH METHOD BARKER INDUSTRIAL	1 OF 3 SHEETS





POST-DEVELOPED HYDROLOGY EXHIBIT
SHORT CUT HYDROGRAPH METHOD
BARKER INDUSTRIAL

VICINITY MAP
NOT TO SCALE

LEGEND

━━	DRAINAGE MANAGEMENT AREA (DMA)
- - -	BMP FOOTPRINT
──	PROPOSED STORM DRAIN
═══	CURB AND GUTTER
═══	RIBBON DRAIN
～ 1280 ～	EXISTING CONTOUR LINE
Y Y	SLOPE
▨	STORM DRAIN CATCH BASIN
●	ROOF DOWNSPOUT
●	DISCHARGE POINT (POINT OF COMPLIANCE, POC)
▨	LANDSCAPE/PERVIOUS AREA
▨	CONCRETE/IMPERVIOUS AREA
▨	ROOFS/IMPERVIOUS AREA

Storm Frequency	Undetained Peak Flow (cfs)			
	1-Hour Duration	3-Hour Duration	6-Hour Duration	24-Hour Duration
2-Year	44.22	20.08	17.31	5.43
5-Year	63.09	27.83	23.60	8.05
10-Year	80.37	35.16	30.11	11.03

Storm Frequency	Detained Peak Flow (cfs)			
	1-Hour Duration	3-Hour Duration	6-Hour Duration	24-Hour Duration
2-Year	0.52	0.72	0.83	0.54
5-Year	0.71	0.86	0.95	0.84
10-Year	0.81	0.95	2.53	1.79

Storm Frequency	Pre-to-Post Difference (cfs)			
	1-Hour Duration	3-Hour Duration	6-Hour Duration	24-Hour Duration
2-Year	-38.41	-13.03	-8.48	-0.48
5-Year	-57.61	-18.57	-11.79	-0.15
10-Year	-77.81	-29.29	-13.02	-1.48

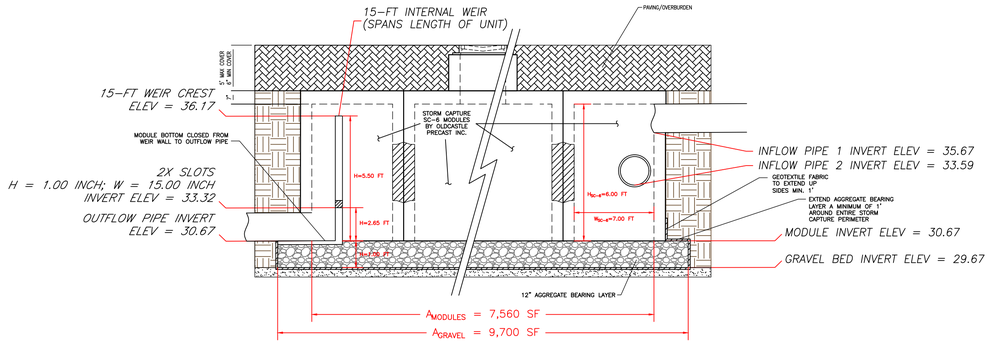
COUNTY OF RIVERSIDE

POST-DEVELOPED HYDROLOGY EXHIBIT
SHOT CUT HYDROGRAPH METHOD
BARKER INDUSTRIAL

2 OF 3 SHEETS

POST-CONSTRUCTION BMP SECTION DETAIL
BARKER INDUSTRIAL
CASE NUMBER PPT190008

BMP D/1



BMP D/1 TYPICAL SYSTEM CROSS SECTION

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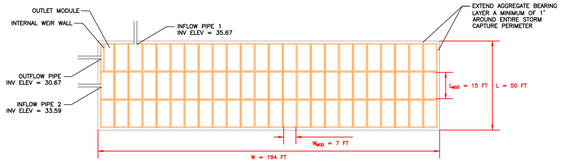

BMP D/1 SYSTEM PLAN VIEW

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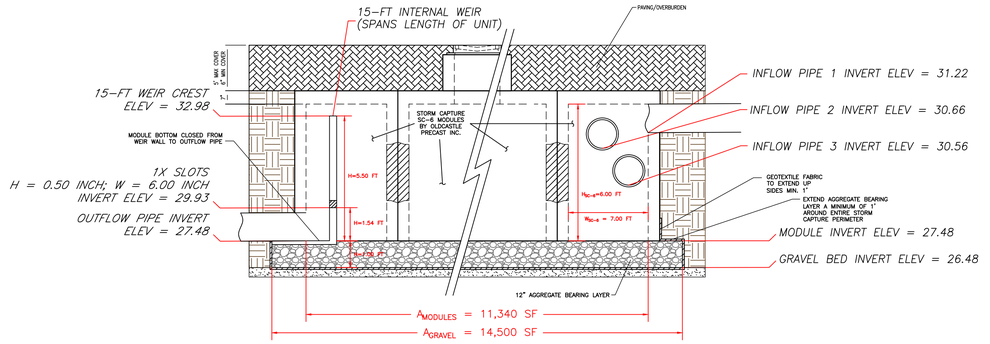
BMP D/2



BMP D/2 TYPICAL SYSTEM CROSS SECTION

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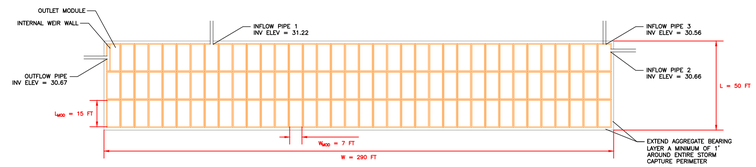

BMP D/2 SYSTEM PLAN VIEW

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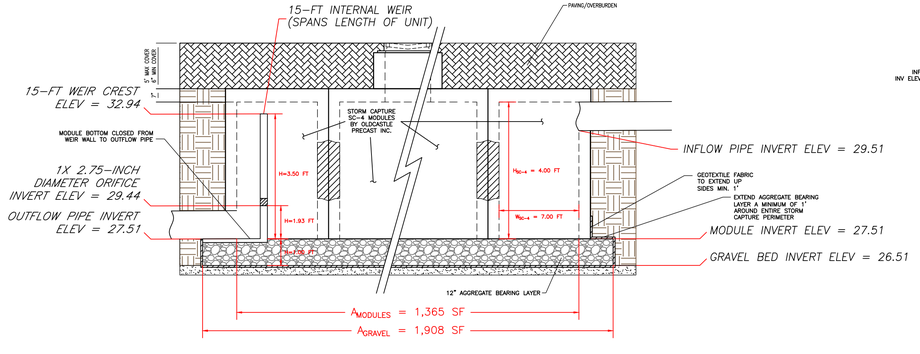
BMP D/3



BMP D/3 TYPICAL SYSTEM CROSS SECTION

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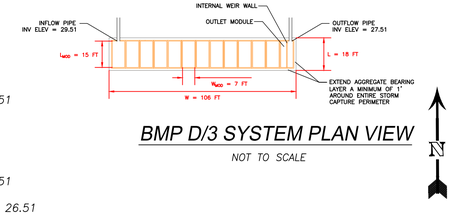
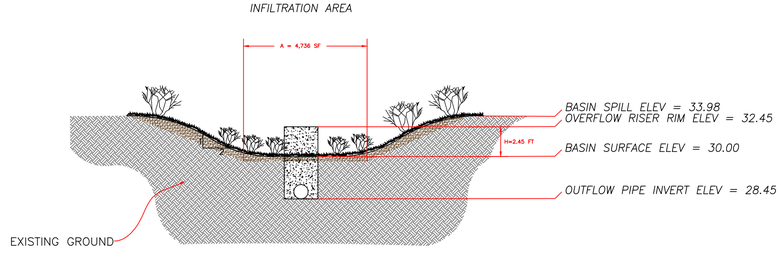


BMP D/3 SYSTEM PLAN VIEW

NOT TO SCALE

N

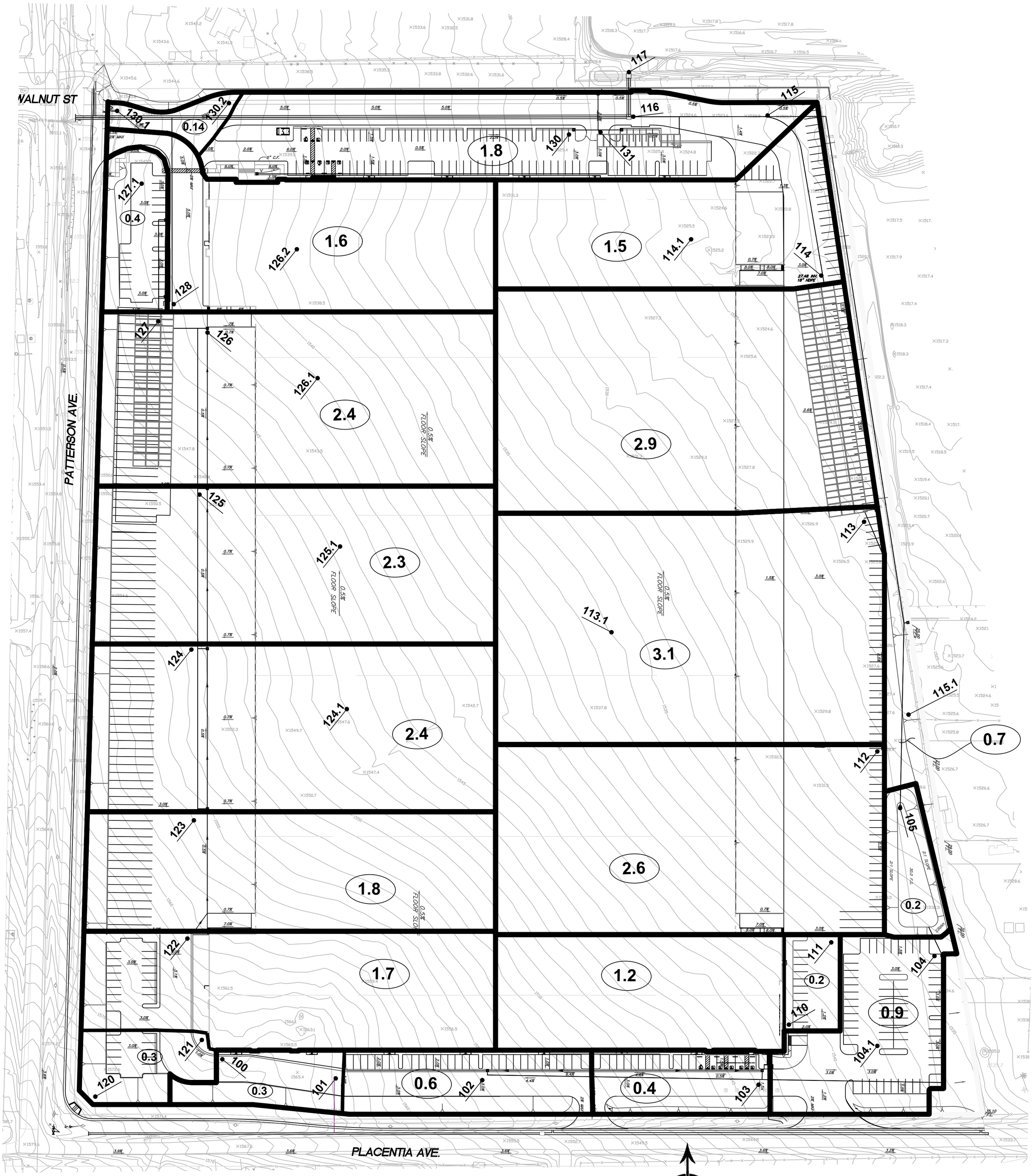
BMP D/4



BMP D/4 BASIN CROSS SECTION

NOT TO SCALE

COUNTY OF RIVERSIDE	3 OF 3 SHEETS
POST-CONSTRUCTION BMP SECTION DETAIL BARKER INDUSTRIAL	



LEGEND

- DRAINAGE BOUNDARY
- 1280 — EXISTING CONTOUR LINE
- 147.0 — NODE
- (0.36) — AREA (AC)

SCALE: 1"=80'

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COUNTY OF RIVERSIDE

DEVELOPED CONDITIONS HYDROLOGY MAP
BARKER INDUSTRIAL

Appendix 2

Hydrologic Parameters

NOAA Atlas 14, Volume 6, Version 2
Location name: Perris, California, USA*
Latitude: 33.8246°, Longitude: -117.2506°
Elevation: 1540.92 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

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	**0.087** (0.073-0.105)	**0.122** (0.102-0.148)	**0.170** (0.142-0.207)	**0.212** (0.175-0.259)	**0.272** (0.217-0.345)	**0.321** (0.250-0.416)	**0.373** (0.284-0.496)	**0.430** (0.318-0.589)	**0.513** (0.363-0.733)	**0.581** (0.396-0.861)
10-min	**0.125** (0.105-0.151)	**0.175** (0.146-0.212)	**0.244** (0.203-0.296)	**0.304** (0.251-0.372)	**0.390** (0.311-0.494)	**0.460** (0.359-0.596)	**0.535** (0.407-0.711)	**0.617** (0.455-0.844)	**0.735** (0.520-1.05)	**0.833** (0.568-1.23)
15-min	**0.151** (0.127-0.183)	**0.212** (0.177-0.256)	**0.295** (0.246-0.358)	**0.367** (0.303-0.450)	**0.471** (0.376-0.597)	**0.556** (0.434-0.721)	**0.647** (0.492-0.860)	**0.746** (0.551-1.02)	**0.889** (0.629-1.27)	**1.01** (0.687-1.49)
30-min	**0.242** (0.202-0.292)	**0.339** (0.283-0.410)	**0.473** (0.394-0.573)	**0.588** (0.485-0.719)	**0.754** (0.601-0.955)	**0.890** (0.694-1.15)	**1.03** (0.787-1.38)	**1.19** (0.881-1.63)	**1.42** (1.00-2.03)	**1.61** (1.10-2.39)
60-min	**0.325** (0.272-0.393)	**0.455** (0.380-0.550)	**0.635** (0.529-0.770)	**0.789** (0.652-0.966)	**1.01** (0.807-1.28)	**1.20** (0.932-1.55)	**1.39** (1.06-1.85)	**1.60** (1.18-2.19)	**1.91** (1.35-2.73)	**2.17** (1.48-3.21)
2-hr	**0.490** (0.410-0.592)	**0.656** (0.548-0.794)	**0.882** (0.734-1.07)	**1.07** (0.884-1.31)	**1.34** (1.07-1.70)	**1.55** (1.21-2.01)	**1.77** (1.35-2.35)	**2.01** (1.48-2.75)	**2.34** (1.65-3.34)	**2.60** (1.78-3.86)
3-hr	**0.605** (0.506-0.731)	**0.798** (0.666-0.965)	**1.06** (0.880-1.28)	**1.27** (1.05-1.56)	**1.57** (1.25-1.99)	**1.81** (1.41-2.34)	**2.05** (1.56-2.73)	**2.31** (1.71-3.16)	**2.67** (1.89-3.81)	**2.95** (2.01-4.37)
6-hr	**0.858** (0.718-1.04)	**1.12** (0.934-1.35)	**1.46** (1.22-1.78)	**1.75** (1.44-2.14)	**2.14** (1.70-2.71)	**2.44** (1.90-3.16)	**2.75** (2.09-3.65)	**3.07** (2.27-4.20)	**3.51** (2.48-5.01)	**3.86** (2.63-5.71)
12-hr	**1.14** (0.956-1.38)	**1.50** (1.25-1.81)	**1.97** (1.64-2.39)	**2.35** (1.94-2.87)	**2.87** (2.29-3.63)	**3.27** (2.55-4.23)	**3.67** (2.79-4.88)	**4.09** (3.02-5.60)	**4.66** (3.30-6.66)	**5.11** (3.48-7.56)
24-hr	**1.50** (1.33-1.73)	**2.00** (1.77-2.32)	**2.66** (2.35-3.08)	**3.20** (2.80-3.73)	**3.93** (3.32-4.73)	**4.49** (3.72-5.52)	**5.05** (4.10-6.37)	**5.64** (4.45-7.30)	**6.44** (4.87-8.67)	**7.05** (5.17-9.83)
2-day	**1.73** (1.53-1.99)	**2.35** (2.08-2.72)	**3.18** (2.80-3.68)	**3.86** (3.37-4.50)	**4.79** (4.06-5.78)	**5.52** (4.58-6.79)	**6.27** (5.08-7.90)	**7.05** (5.56-9.12)	**8.12** (6.15-10.9)	**8.96** (6.56-12.5)
3-day	**1.83** (1.62-2.12)	**2.53** (2.23-2.92)	**3.45** (3.04-4.00)	**4.22** (3.69-4.93)	**5.29** (4.48-6.38)	**6.14** (5.09-7.55)	**7.01** (5.68-8.83)	**7.93** (6.25-10.3)	**9.20** (6.97-12.4)	**10.2** (7.48-14.2)
4-day	**1.96** (1.73-2.26)	**2.72** (2.40-3.14)	**3.75** (3.30-4.34)	**4.61** (4.03-5.38)	**5.80** (4.91-7.00)	**6.75** (5.60-8.30)	**7.74** (6.27-9.74)	**8.78** (6.92-11.4)	**10.2** (7.75-13.8)	**11.4** (8.35-15.9)
7-day	**2.14** (1.89-2.47)	**3.00** (2.65-3.47)	**4.18** (3.68-4.84)	**5.16** (4.51-6.03)	**6.55** (5.54-7.89)	**7.65** (6.34-9.40)	**8.79** (7.12-11.1)	**10.0** (7.89-13.0)	**11.7** (8.87-15.8)	**13.1** (9.58-18.2)
10-day	**2.22** (1.96-2.56)	**3.14** (2.78-3.63)	**4.40** (3.88-5.09)	**5.46** (4.77-6.37)	**6.95** (5.88-8.38)	**8.14** (6.75-10.0)	**9.39** (7.61-11.8)	**10.7** (8.45-13.9)	**12.6** (9.53-16.9)	**14.1** (10.3-19.6)
20-day	**2.58** (2.28-2.97)	**3.70** (3.27-4.27)	**5.25** (4.63-6.08)	**6.58** (5.76-7.68)	**8.50** (7.19-10.2)	**10.1** (8.34-12.4)	**11.7** (9.48-14.7)	**13.5** (10.6-17.5)	**16.0** (12.1-21.6)	**18.1** (13.3-25.2)
30-day	**2.94** (2.60-3.39)	**4.22** (3.73-4.87)	**6.03** (5.31-6.98)	**7.60** (6.65-8.87)	**9.90** (8.38-11.9)	**11.8** (9.78-14.5)	**13.8** (11.2-17.4)	**16.1** (12.7-20.8)	**19.3** (14.6-26.0)	**22.0** (16.1-30.6)
45-day	**3.41** (3.01-3.93)	**4.85** (4.29-5.61)	**6.94** (6.12-8.04)	**8.79** (7.68-10.3)	**11.5** (9.77-13.9)	**13.9** (11.5-17.1)	**16.4** (13.3-20.7)	**19.2** (15.2-24.9)	**23.4** (17.7-31.6)	**27.0** (19.7-37.6)
60-day	**3.85** (3.41-4.44)	**5.42** (4.79-6.26)	**7.72** (6.80-8.94)	**9.79** (8.56-11.4)	**12.9** (10.9-15.6)	**15.6** (13.0-19.2)	**18.6** (15.1-23.4)	**22.0** (17.3-28.4)	**27.0** (20.5-36.4)	**31.4** (23.0-43.8)

[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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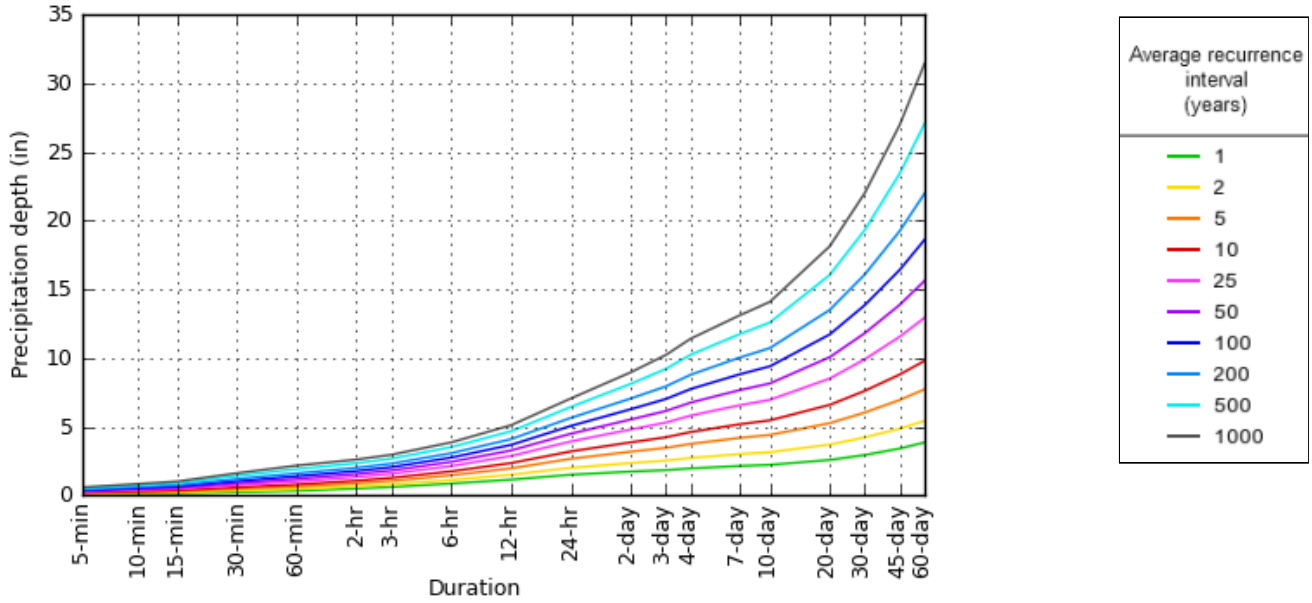
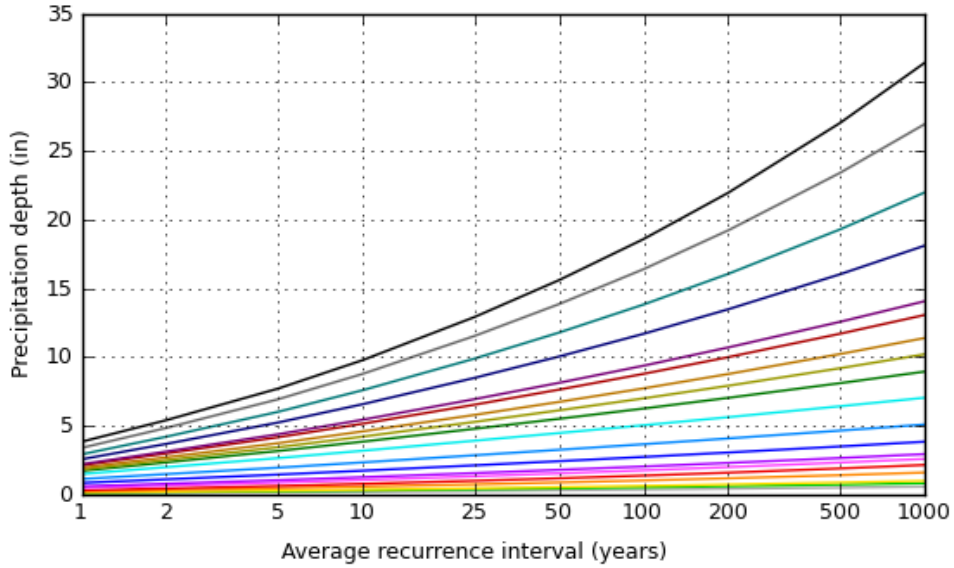
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.8246°, Longitude: -117.2506°





NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Feb 12 17:26:12 2020

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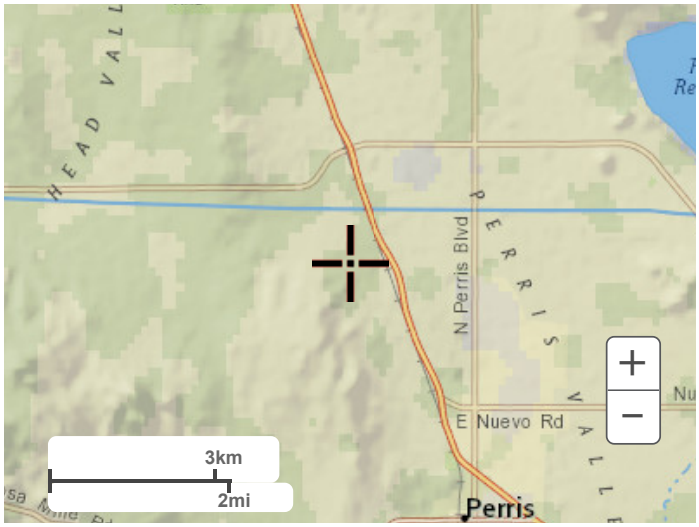
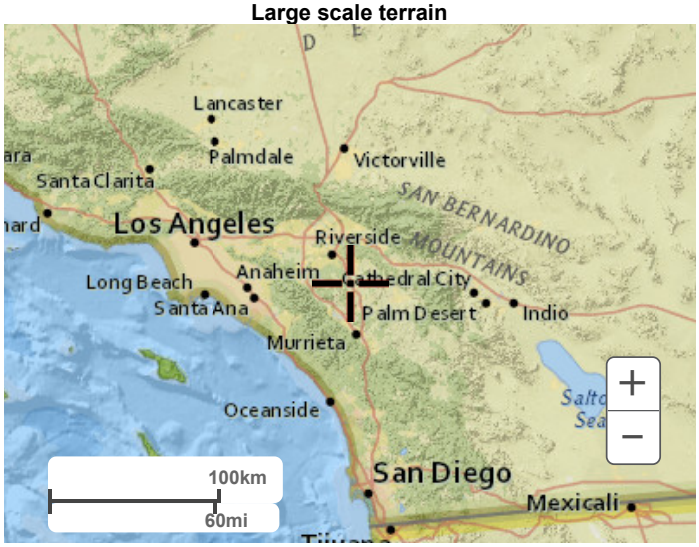
Maps & aerials

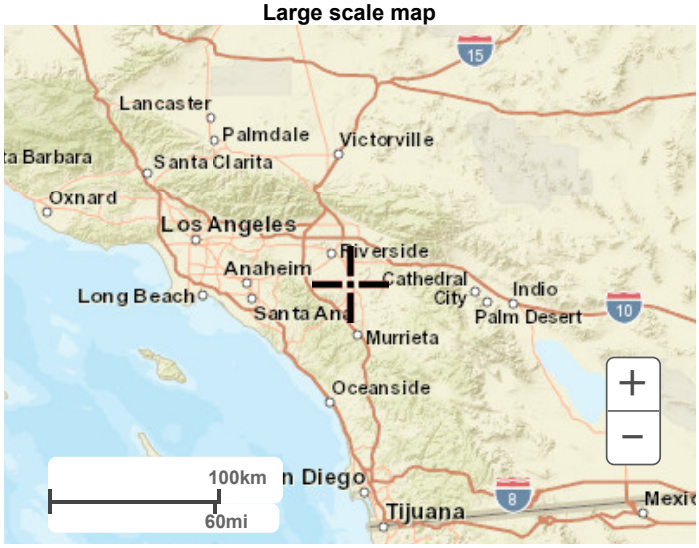
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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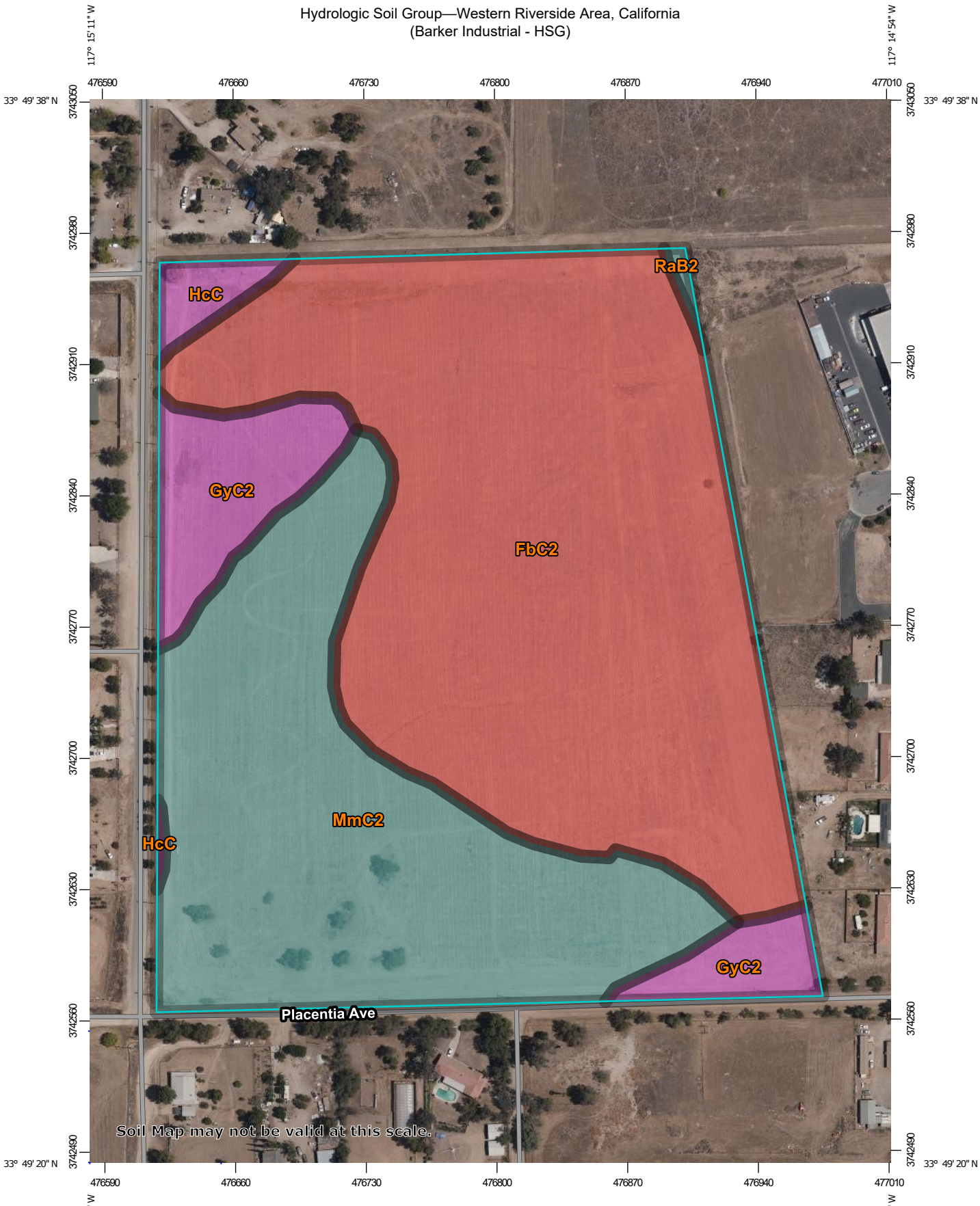
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Hydrologic Soil Group—Western Riverside Area, California
(Barker Industrial - HSG)



Map Scale: 1:2,770 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 12, Sep 16, 2019

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

Date(s) aerial images were photographed: May 25, 2019—Jun 25, 2019

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
FbC2	Fallbrook sandy loam, shallow, 5 to 8 percent slopes, eroded	D	17.5	55.3%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	A	2.7	8.6%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	A	0.5	1.6%
MmC2	Monserate sandy loam, 5 to 8 percent slopes, eroded	C	10.9	34.3%
RaB2	Ramona sandy loam, 2 to 5 percent slopes, eroded	C	0.1	0.3%
Totals for Area of Interest			**31.7**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix 3

AES Rational Method Output

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
         RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                       (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                       (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1532

                            Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BARKER INDUSTRIAL                                                     *
* 100-YEAR RATIONAL METHOD                                              *
* PROPOSED CONDITION                                                    *
 ************************************************************************

  FILE NAME: BARKP100.DAT
  TIME/DATE OF STUDY: 10:52 01/02/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.500
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.300
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.300
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  UPSTREAM ELEVATION(FEET) =     45.20
  DOWNSTREAM ELEVATION(FEET) =     44.40
```

```
  ELEVATION DIFFERENCE(FEET) =      0.80
  TC = 0.303*[(  150.00**3)/(     0.80)]**.2 =    6.407
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.978
  USER-SPECIFIED RUNOFF COEFFICIENT = .8882
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      1.06

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     44.40  DOWNSTREAM(FEET) =     43.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   170.00   CHANNEL SLOPE =  0.0053
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  30.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.524
  USER-SPECIFIED RUNOFF COEFFICIENT = .8869
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.61
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =    8.16
  SUBAREA AREA(ACRES) =     0.60       SUBAREA RUNOFF(CFS) =    1.88
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       2.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    39.95  DOWNSTREAM(FEET) =    35.00
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.94
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =    9.14
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.10 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.330
  USER-SPECIFIED RUNOFF COEFFICIENT = .8863
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.12
  TC(MIN.) =    9.14

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    35.00  DOWNSTREAM(FEET) =    30.10
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.09
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.12
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.10 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  USER-SPECIFIED RUNOFF COEFFICIENT = .8889
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    2.53
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       6.64
  TC(MIN.) =   10.16

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     29.10  DOWNSTREAM(FEET) =     29.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0007
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  50.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.539
  USER-SPECIFIED RUNOFF COEFFICIENT = .4253
  SOIL CLASSIFICATION IS "A"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.45
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   5.58
  Tc(MIN.) =   15.73
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =       6.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   0.45
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    1180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    28.50  DOWNSTREAM(FEET) =    20.50
  FLOW LENGTH(FEET) =   920.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   3.37    Tc(MIN.) =   19.11
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    2100.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    115.10 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.304
 USER-SPECIFIED RUNOFF COEFFICIENT = .7544
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    1.22
 TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =      8.18
 TC(MIN.) =   19.11

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   19.11
 RAINFALL INTENSITY(INCH/HR) =   2.30
 TOTAL STREAM AREA(ACRES) =     3.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.18

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =     42.00
 DOWNSTREAM ELEVATION(FEET) =     39.70
 ELEVATION DIFFERENCE(FEET) =      2.30
 TC = 0.303*[(   80.00**3)/(     2.30)]**.2 =    3.557
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.503
 USER-SPECIFIED RUNOFF COEFFICIENT = .8894
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    111.10 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.503
 USER-SPECIFIED RUNOFF COEFFICIENT = .8894
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.20   SUBAREA RUNOFF(CFS) =    4.81
 TOTAL AREA(ACRES) =       1.4   TOTAL RUNOFF(CFS) =      5.61
 TC(MIN.) =    5.00

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =     39.80  DOWNSTREAM(FEET) =     35.75
 CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0156
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.236
 USER-SPECIFIED RUNOFF COEFFICIENT = .8915
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.52
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.64
 AVERAGE FLOW DEPTH(FEET) =   0.67   TRAVEL TIME(MIN.) =   0.65
 Tc(MIN.) =    5.65
 SUBAREA AREA(ACRES) =     2.60       SUBAREA RUNOFF(CFS) =    9.82
 TOTAL AREA(ACRES) =        4.0         PEAK FLOW RATE(CFS) =      15.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   7.33
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    32.15  DOWNSTREAM(FEET) =    30.66
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.42
 PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    6.50
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =     630.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.10 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.951
 USER-SPECIFIED RUNOFF COEFFICIENT = .8909
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    3.10   SUBAREA RUNOFF(CFS) =   10.91
 TOTAL AREA(ACRES) =        7.1   TOTAL RUNOFF(CFS) =      26.34
 TC(MIN.) =    6.50

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     27.54  DOWNSTREAM(FEET) =     27.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   290.00   CHANNEL SLOPE =  0.0001
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   0.100
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.615
 USER-SPECIFIED RUNOFF COEFFICIENT = .8869
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.72
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.58
 AVERAGE FLOW DEPTH(FEET) =   1.70   TRAVEL TIME(MIN.) =   8.33
 Tc(MIN.) =   14.83
 SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    6.73
```

```
 TOTAL AREA(ACRES) =       10.0         PEAK FLOW RATE(CFS) =      33.06

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.81   FLOW VELOCITY(FEET/SEC.) =   0.60
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    27.40  DOWNSTREAM(FEET) =    20.50
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.44
 (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
  AT DEPTH = 0.82 * DIAMETER)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      33.06
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   15.16
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    1150.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.10 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.586
 USER-SPECIFIED RUNOFF COEFFICIENT = .8868
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    1.50   SUBAREA RUNOFF(CFS) =    3.44
 TOTAL AREA(ACRES) =       11.5   TOTAL RUNOFF(CFS) =      36.50
 TC(MIN.) =   15.16

****************************************************************************
 FLOW PROCESS FROM NODE    115.10 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   15.16
 RAINFALL INTENSITY(INCH/HR) =   2.59
 TOTAL STREAM AREA(ACRES) =    11.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.50

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.18    19.11        2.304          3.20
     2       36.50    15.16        2.586         11.50

**********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       43.00    15.16       2.586
     2       40.70    19.11       2.304

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      43.00   Tc(MIN.) =   15.16
 TOTAL AREA(ACRES) =       14.7
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    115.00 =    2100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    20.40  DOWNSTREAM(FEET) =    17.50
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.24
 (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
  AT DEPTH = 0.82 * DIAMETER)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      43.00
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   15.31
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    116.00 =    2200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
 UPSTREAM ELEVATION(FEET) =     48.10
 DOWNSTREAM ELEVATION(FEET) =     45.70
 ELEVATION DIFFERENCE(FEET) =      2.40
 TC = 0.303*[(  130.00**3)/(     2.40)]**.2 =    4.720
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.503
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7500
 SUBAREA RUNOFF(CFS) =      1.01
 TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      1.01

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   44.70  DOWNSTREAM ELEVATION(FEET) =   41.30
 STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.24
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   10.27
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
 STREET FLOW TRAVEL TIME(MIN.) =   0.54   Tc(MIN.) =    5.54
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.280
 USER-SPECIFIED RUNOFF COEFFICIENT = .8889
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    6.47
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.48

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.24
 FLOW VELOCITY(FEET/SEC.) =  4.25   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     41.30  DOWNSTREAM(FEET) =     40.40
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0056
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.941
 USER-SPECIFIED RUNOFF COEFFICIENT = .8881
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.64
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.68
 AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.99
 Tc(MIN.) =    6.53
 SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    6.30
 TOTAL AREA(ACRES) =        3.8         PEAK FLOW RATE(CFS) =      13.78

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   2.92
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =     410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    38.00  DOWNSTREAM(FEET) =    37.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      13.78
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    7.08
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.10 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.784
  USER-SPECIFIED RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    8.06
  TOTAL AREA(ACRES) =        6.2   TOTAL RUNOFF(CFS) =      21.84
  TC(MIN.) =    7.08

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    37.00  DOWNSTREAM(FEET) =    35.50
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.69
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.84
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    7.47
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.10 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.684
  USER-SPECIFIED RUNOFF COEFFICIENT = .8874
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    2.30   SUBAREA RUNOFF(CFS) =    7.52
  TOTAL AREA(ACRES) =        8.5   TOTAL RUNOFF(CFS) =      29.36
  TC(MIN.) =    7.47

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    35.50  DOWNSTREAM(FEET) =    33.90
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.36
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    7.85
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =     970.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.10 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.593
 USER-SPECIFIED RUNOFF COEFFICIENT = .8871
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    7.65
 TOTAL AREA(ACRES) =       10.9   TOTAL RUNOFF(CFS) =      37.01
 TC(MIN.) =    7.85

****************************************************************************
 FLOW PROCESS FROM NODE    126.20 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.593
 USER-SPECIFIED RUNOFF COEFFICIENT = .8871
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.60   SUBAREA RUNOFF(CFS) =    5.10
 TOTAL AREA(ACRES) =       12.5   TOTAL RUNOFF(CFS) =      42.11
 TC(MIN.) =    7.85

****************************************************************************
 FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    33.90  DOWNSTREAM(FEET) =    33.60
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.07
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      42.11
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.92
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    1005.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    127.10 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.578
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .6300
 SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.90
 TOTAL AREA(ACRES) =       12.9   TOTAL RUNOFF(CFS) =      43.01
 TC(MIN.) =    7.92

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     30.68  DOWNSTREAM(FEET) =     30.67
 CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0001
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   0.100
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.831
 USER-SPECIFIED RUNOFF COEFFICIENT = .8843
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.02
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.53
 AVERAGE FLOW DEPTH(FEET) =   2.69   TRAVEL TIME(MIN.) =   4.73
 Tc(MIN.) =   12.65
```

```
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.03
  TOTAL AREA(ACRES) =       12.9         PEAK FLOW RATE(CFS) =      43.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.69   FLOW VELOCITY(FEET/SEC.) =   0.53
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    1155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    30.67  DOWNSTREAM(FEET) =    25.18
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.99
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.82 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.04
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   13.05
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    129.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    116.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.18  DOWNSTREAM(FEET) =    15.66
  FLOW LENGTH(FEET) =   570.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.82 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.04
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    116.00 =    1965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.16
  RAINFALL INTENSITY(INCH/HR) =   2.68
  TOTAL STREAM AREA(ACRES) =    12.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.04

****************************************************************************
  FLOW PROCESS FROM NODE    130.10 TO NODE    130.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  UPSTREAM ELEVATION(FEET) =     53.20
```

```
 DOWNSTREAM ELEVATION(FEET) =     48.00
 ELEVATION DIFFERENCE(FEET) =      5.20
 TC = 0.303*[(  130.00**3)/(     5.20)]**.2 =    4.043
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.503
 USER-SPECIFIED RUNOFF COEFFICIENT = .8919
 SOIL CLASSIFICATION IS "D"
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE    130.20 TO NODE    130.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =   40.00  DOWNSTREAM ELEVATION(FEET) =   35.00
 STREET LENGTH(FEET) =   440.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.45
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   11.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
 STREET FLOW TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =    7.93
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.575
 USER-SPECIFIED RUNOFF COEFFICIENT = .8900
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    5.73
 TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.29

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
 FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
 LONGEST FLOWPATH FROM NODE    130.10 TO NODE    130.00 =     570.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =     27.52  DOWNSTREAM(FEET) =     27.51
 CHANNEL LENGTH THRU SUBAREA(FEET) =   110.00   CHANNEL SLOPE =  0.0001
 CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   0.100
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.734
 USER-SPECIFIED RUNOFF COEFFICIENT = .8874
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.33
 AVERAGE FLOW DEPTH(FEET) =   0.96   TRAVEL TIME(MIN.) =   5.64
```

```
 Tc(MIN.) =   13.57
 SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.02
 TOTAL AREA(ACRES) =        1.9         PEAK FLOW RATE(CFS) =       6.31

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   0.33
 LONGEST FLOWPATH FROM NODE    130.10 TO NODE    131.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   13.57
 RAINFALL INTENSITY(INCH/HR) =   2.73
 TOTAL STREAM AREA(ACRES) =     1.95
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       43.04    14.16        2.676         12.91
     2        6.31    13.57        2.734          1.95

 ********************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       47.54    13.57       2.734
     2       49.22    14.16       2.676

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      49.22   Tc(MIN.) =   14.16
 TOTAL AREA(ACRES) =       14.9
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    116.00 =    1965.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       49.22    14.16       2.676        14.86
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    116.00 =    1965.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       43.00    15.31       2.573        14.70
```

```
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    116.00 =    2200.00 FEET.

 ****************************************WARNING****************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      88.99      14.16        2.676
     2      90.34      15.31        2.573

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      88.99   Tc(MIN.) =   14.16
 TOTAL AREA(ACRES) =       29.6

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    15.66  DOWNSTREAM(FEET) =    14.00
 FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.88
 (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
  AT DEPTH = 0.82 * DIAMETER)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      88.99
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   14.22
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    117.00 =    2248.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       29.6  TC(MIN.) =     14.22
 PEAK FLOW RATE(CFS)   =      88.99
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Appendix 4

Basin Storage and Discharge Curves

Stage-Area-Storage for BMP D/1

Depth (ft)	Area (ft^2)	Volume (ft^3)
0.00	9,700	0
0.08	9,700	323
0.17	9,700	647
0.25	9,700	970
0.33	9,700	1,293
0.42	9,700	1,617
0.50	9,700	1,940
0.58	9,700	2,263
0.67	9,700	2,587
0.75	9,700	2,910
0.83	9,700	3,233
0.92	9,700	3,557
1.00	9,700	3,880
1.08	7,560	4,597
1.17	7,560	5,227
1.25	7,560	5,857
1.33	7,560	6,487
1.42	7,560	7,117
1.50	7,560	7,747
1.58	7,560	8,377
1.67	7,560	9,007
1.75	7,560	9,637
1.83	7,560	10,267
1.92	7,560	10,897
2.00	7,560	11,527
2.08	7,560	12,157
2.17	7,560	12,787
2.25	7,560	13,417
2.33	7,560	14,047
2.42	7,560	14,677
2.50	7,560	15,307
2.58	7,560	15,937
2.67	7,560	16,567
2.75	7,560	17,197
2.83	7,560	17,827
2.92	7,560	18,457
3.00	7,560	19,087
3.08	7,560	19,717
3.17	7,560	20,347
3.25	7,560	20,977
3.33	7,560	21,607
3.42	7,560	22,237
3.50	7,560	22,867

Depth (ft)	Area (ft^2)	Volume (ft^3)
3.58	7,560	23,497
3.67	7,560	24,127
3.75	7,560	24,757
3.83	7,560	25,387
3.92	7,560	26,017
4.00	7,560	26,647
4.08	7,560	27,277
4.17	7,560	27,907
4.25	7,560	28,537
4.33	7,560	29,167
4.42	7,560	29,797
4.50	7,560	30,427
4.58	7,560	31,057
4.67	7,560	31,687
4.75	7,560	32,317
4.83	7,560	32,947
4.92	7,560	33,577
5.00	7,560	34,207
5.08	7,560	34,837
5.17	7,560	35,467
5.25	7,560	36,097
5.33	7,560	36,727
5.42	7,560	37,357
5.50	7,560	37,987
5.58	7,560	38,617
5.67	7,560	39,247
5.75	7,560	39,877
5.83	7,560	40,507
5.92	7,560	41,137
6.00	7,560	41,767
6.08	7,560	42,397
6.17	7,560	43,027
6.25	7,560	43,657
6.33	7,560	44,287
6.42	7,560	44,917
6.50	7,560	45,547
6.58	7,560	46,177
6.67	7,560	46,807
6.75	7,560	47,437
6.83	7,560	48,067
6.92	7,560	48,697
7.00	7,560	49,327

Stage-Area-Storage for BMP D/2

Depth (ft)	Area (ft^2)	Volume (ft^3)
0.00	14,500	0
0.08	14,500	483
0.17	14,500	967
0.25	14,500	1,450
0.33	14,500	1,933
0.42	14,500	2,417
0.50	14,500	2,900
0.58	14,500	3,383
0.67	14,500	3,867
0.75	14,500	4,350
0.83	14,500	4,833
0.92	14,500	5,317
1.00	14,500	5,800
1.08	11,340	6,874
1.17	11,340	7,819
1.25	11,340	8,764
1.33	11,340	9,709
1.42	11,340	10,654
1.50	11,340	11,599
1.58	11,340	12,544
1.67	11,340	13,489
1.75	11,340	14,434
1.83	11,340	15,379
1.92	11,340	16,324
2.00	11,340	17,269
2.08	11,340	18,214
2.17	11,340	19,159
2.25	11,340	20,104
2.33	11,340	21,049
2.42	11,340	21,994
2.50	11,340	22,939
2.58	11,340	23,884
2.67	11,340	24,829
2.75	11,340	25,774
2.83	11,340	26,719
2.92	11,340	27,664
3.00	11,340	28,609
3.08	11,340	29,554
3.17	11,340	30,499
3.25	11,340	31,444
3.33	11,340	32,389
3.42	11,340	33,334
3.50	11,340	34,279

Depth (ft)	Area (ft^2)	Volume (ft^3)
3.58	11,340	35,224
3.67	11,340	36,169
3.75	11,340	37,114
3.83	11,340	38,059
3.92	11,340	39,004
4.00	11,340	39,949
4.08	11,340	40,894
4.17	11,340	41,839
4.25	11,340	42,784
4.33	11,340	43,729
4.42	11,340	44,674
4.50	11,340	45,619
4.58	11,340	46,564
4.67	11,340	47,509
4.75	11,340	48,454
4.83	11,340	49,399
4.92	11,340	50,344
5.00	11,340	51,289
5.08	11,340	52,234
5.17	11,340	53,179
5.25	11,340	54,124
5.33	11,340	55,069
5.42	11,340	56,014
5.50	11,340	56,959
5.58	11,340	57,904
5.67	11,340	58,849
5.75	11,340	59,794
5.83	11,340	60,739
5.92	11,340	61,684
6.00	11,340	62,629
6.08	11,340	63,574
6.17	11,340	64,519
6.25	11,340	65,464
6.33	11,340	66,409
6.42	11,340	67,354
6.50	11,340	68,299
6.58	11,340	69,244
6.67	11,340	70,189
6.75	11,340	71,134
6.83	11,340	72,079
6.92	11,340	73,024
7.00	11,340	73,969

Stage-Area-Storage for BMP D/3

Depth (ft)	Area (ft^2)	Volume (ft^3)
0.00	1,908	0
0.08	1,908	64
0.17	1,908	127
0.25	1,908	191
0.33	1,908	254
0.42	1,908	318
0.50	1,908	382
0.58	1,908	445
0.67	1,908	509
0.75	1,908	572
0.83	1,908	636
0.92	1,908	700
1.00	1,908	763
1.08	1,365	899
1.17	1,365	1,013
1.25	1,365	1,126
1.33	1,365	1,240
1.42	1,365	1,354
1.50	1,365	1,468
1.58	1,365	1,581
1.67	1,365	1,695
1.75	1,365	1,809
1.83	1,365	1,923
1.92	1,365	2,036
2.00	1,365	2,150
2.08	1,365	2,264
2.17	1,365	2,378
2.25	1,365	2,491
2.33	1,365	2,605
2.42	1,365	2,719
2.50	1,365	2,833
2.58	1,365	2,946
2.67	1,365	3,060
2.75	1,365	3,174
2.83	1,365	3,288
2.92	1,365	3,401
3.00	1,365	3,515
3.08	1,365	3,629
3.17	1,365	3,743
3.25	1,365	3,856
3.33	1,365	3,970
3.42	1,365	4,084
3.50	1,365	4,198

Depth (ft)	Area (ft^2)	Volume (ft^3)
3.58	1,365	4,311
3.67	1,365	4,425
3.75	1,365	4,539
3.83	1,365	4,653
3.92	1,365	4,766
4.00	1,365	4,880
4.08	1,365	4,994
4.17	1,365	5,108
4.25	1,365	5,221
4.33	1,365	5,335
4.42	1,365	5,449
4.50	1,365	5,563
4.58	1,365	5,676
4.67	1,365	5,790
4.75	1,365	5,904
4.83	1,365	6,018
4.92	1,365	6,131
5.00	1,365	6,245

Stage-Area-Storage for BMP D/4

Depth (ft)	Area (ft^2)	Volume (ft^3)
0.00	4,736	0
0.08	4,801	397
0.17	4,865	800
0.25	4,930	1,208
0.33	4,995	1,622
0.42	5,059	2,041
0.50	5,124	2,465
0.58	5,188	2,895
0.67	5,253	3,330
0.75	5,317	3,770
0.83	5,382	4,216
0.92	5,447	4,667
1.00	5,511	5,124
1.08	5,576	5,586
1.17	5,640	6,053
1.25	5,705	6,526
1.33	5,769	7,004
1.42	5,834	7,487
1.50	5,899	7,976
1.58	5,963	8,470
1.67	6,028	8,970
1.75	6,092	9,475
1.83	6,157	9,985
1.92	6,222	10,501
2.00	6,286	11,022
2.08	6,351	11,549
2.17	6,415	12,081
2.25	6,480	12,618
2.33	6,544	13,161
2.42	6,609	13,709
2.50	6,674	14,262
2.58	6,738	14,821
2.67	6,803	15,385
2.75	6,867	15,955
2.83	6,932	16,530
2.92	6,996	17,110
3.00	7,061	17,696
3.08	7,126	18,287
3.17	7,190	18,883
3.25	7,255	19,485
3.33	7,319	20,092
3.42	7,384	20,705
3.50	7,448	21,323

Depth (ft)	Area (ft^2)	Volume (ft^3)
3.58	7,513	21,947
3.67	7,578	22,575
3.75	7,642	23,209
3.83	7,707	23,849
3.92	7,771	24,494
4.00	7,836	25,144

BMP D/1 Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	0.000	"	Lower slot			Lower Weir		Infiltration	
Number of orif:	0		Number of slots:	2		Number of weirs:	0	Surface Area	9,700 sf
Cg-low:	0.62		Invert:	3.650	ft	Invert:	0.00	Rate	1.825 in/hr
			B	1.25	ft	B:	0.00	FS	3
			h_{slot}	1.00	in			Qinf	0.137 cfs
Middle orifice	0	"		0.083	ft				
Number of orif:	0								
Cg-middle:	0.62		Upper slot			Emergency weir			
invert elev:	0.000	ft	Number of slots:	0		Invert:	6.50 ft		
			Invert:	0.00	ft	B:	15.00 ft		
			B:	0.00	ft				
			h_{slot}	0.0	in				
				0.000	ft				

*Note: h = head above the invert of the lowest surface discharge opening.

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000
0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
2.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
3.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.000	0.000	0.000	0.137	0.154
3.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.246	0.000	0.000	0.000	0.137	0.383
3.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.384	0.000	0.000	0.000	0.137	0.520
3.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.484	0.000	0.000	0.000	0.137	0.620
4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.566	0.000	0.000	0.000	0.137	0.703
4.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.638	0.000	0.000	0.000	0.137	0.775
4.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.703	0.000	0.000	0.000	0.137	0.839
4.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.762	0.000	0.000	0.000	0.137	0.899
4.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.817	0.000	0.000	0.000	0.137	0.954
4.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.868	0.000	0.000	0.000	0.137	1.005
4.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.917	0.000	0.000	0.000	0.137	1.054
4.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.963	0.000	0.000	0.000	0.137	1.100
4.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.007	0.000	0.000	0.000	0.137	1.144
4.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.049	0.000	0.000	0.000	0.137	1.186
4.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.090	0.000	0.000	0.000	0.137	1.226
4.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.129	0.000	0.000	0.000	0.137	1.265
5.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.167	0.000	0.000	0.000	0.137	1.303
5.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.203	0.000	0.000	0.000	0.137	1.340
5.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.239	0.000	0.000	0.000	0.137	1.375
5.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.273	0.000	0.000	0.000	0.137	1.410
5.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.307	0.000	0.000	0.000	0.137	1.443
5.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.339	0.000	0.000	0.000	0.137	1.476
5.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.371	0.000	0.000	0.000	0.137	1.508
5.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.403	0.000	0.000	0.000	0.137	1.539

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
5.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.433	0.000	0.000	0.000	0.137	1.570
5.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.463	0.000	0.000	0.000	0.137	1.600
5.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.492	0.000	0.000	0.000	0.137	1.629
5.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.521	0.000	0.000	0.000	0.137	1.658
6.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.549	0.000	0.000	0.000	0.137	1.686
6.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.577	0.000	0.000	0.000	0.137	1.714
6.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.604	0.000	0.000	0.000	0.137	1.741
6.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.631	0.000	0.000	0.000	0.137	1.768
6.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.658	0.000	0.000	0.000	0.137	1.794
6.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.684	0.000	0.000	0.000	0.137	1.820
6.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.709	0.000	0.000	0.000	0.137	1.846
6.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.734	0.000	0.000	1.182	0.137	3.053
6.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.759	0.000	0.000	3.348	0.137	5.244
6.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.784	0.000	0.000	6.160	0.137	8.080
6.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.808	0.000	0.000	9.499	0.137	11.443
6.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.831	0.000	0.000	13.296	0.137	15.264
7.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.855	0.000	0.000	17.505	0.137	19.497

BMP D/2 Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	0.000	"	Lower slot			Lower Weir		Infiltration	
Number of orif:	0		Number of slots:	1		Number of weirs:	0	Surface Area	14,500 sf
Cg-low:	0.62		Invert:	2.453	ft	Invert:	0.00	Rate	1.227 in/hr
			B	0.50	ft	B:	0.00	FS	3
			h_{slot}	0.50	in			Qinf	0.137 cfs
Middle orifice	0	"		0.042	ft				
Number of orif:	0								
Cg-middle:	0.62		Upper slot			Emergency weir			
invert elev:	0.000	ft	Number of slots:	0		Invert:	6.50 ft		
			Invert:	0.00	ft	B:	15.00 ft		
			B:	0.00	ft				
			h_{slot}	0.0	in				
				0.000	ft				

*Note: h = head above the invert of the lowest surface discharge opening.

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000
0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
2.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.137
2.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.137	0.154
2.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.000	0.137	0.171
2.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.000	0.000	0.137	0.182
2.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.054	0.000	0.000	0.000	0.137	0.191
2.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.000	0.000	0.000	0.137	0.198
2.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.000	0.000	0.137	0.205
3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.074	0.000	0.000	0.000	0.137	0.211
3.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.000	0.000	0.000	0.137	0.217
3.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.085	0.000	0.000	0.000	0.137	0.222
3.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.000	0.000	0.137	0.227
3.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.095	0.000	0.000	0.000	0.137	0.232
3.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.099	0.000	0.000	0.000	0.137	0.236
3.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.103	0.000	0.000	0.000	0.137	0.241
3.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.107	0.000	0.000	0.000	0.137	0.245
3.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111	0.000	0.000	0.000	0.137	0.249
3.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115	0.000	0.000	0.000	0.137	0.252
3.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.119	0.000	0.000	0.000	0.137	0.256
3.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.122	0.000	0.000	0.000	0.137	0.260
4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.000	0.137	0.263
4.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.129	0.000	0.000	0.000	0.137	0.267
4.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133	0.000	0.000	0.000	0.137	0.270
4.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.136	0.000	0.000	0.000	0.137	0.273
4.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.139	0.000	0.000	0.000	0.137	0.276
4.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.142	0.000	0.000	0.000	0.137	0.279
4.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.145	0.000	0.000	0.000	0.137	0.282
4.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.148	0.000	0.000	0.000	0.137	0.285
4.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151	0.000	0.000	0.000	0.137	0.288
4.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.154	0.000	0.000	0.000	0.137	0.291
4.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.157	0.000	0.000	0.000	0.137	0.294
4.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.159	0.000	0.000	0.000	0.137	0.297
5.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.162	0.000	0.000	0.000	0.137	0.299
5.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.165	0.000	0.000	0.000	0.137	0.302
5.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.000	0.000	0.000	0.137	0.305
5.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.170	0.000	0.000	0.000	0.137	0.307
5.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.000	0.000	0.137	0.310
5.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.000	0.000	0.000	0.137	0.312
5.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.177	0.000	0.000	0.000	0.137	0.315
5.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.180	0.000	0.000	0.000	0.137	0.317

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
5.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.000	0.000	0.000	0.137	0.319
5.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.185	0.000	0.000	0.000	0.137	0.322
5.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.187	0.000	0.000	0.000	0.137	0.324
5.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.000	0.000	0.000	0.137	0.326
6.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.000	0.000	0.000	0.137	0.329
6.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.194	0.000	0.000	0.000	0.137	0.331
6.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.196	0.000	0.000	0.000	0.137	0.333
6.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.198	0.000	0.000	0.000	0.137	0.335
6.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.000	0.000	0.000	0.137	0.338
6.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.202	0.000	0.000	0.000	0.137	0.340
6.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.205	0.000	0.000	0.000	0.137	0.342
6.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.207	0.000	0.000	1.182	0.137	1.526
6.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.000	3.348	0.137	3.694
6.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.211	0.000	0.000	6.160	0.137	6.508
6.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.213	0.000	0.000	9.499	0.137	9.849
6.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.215	0.000	0.000	13.296	0.137	13.648
7.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.217	0.000	0.000	17.505	0.137	17.859

BMP D/3 Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	0.000	"	Lower slot			Lower Weir		Infiltration	
Number of orif:	0		Number of slots:	0		Number of weirs:	0	Surface Area	1,908 sf
Cg-low:	0.62		Invert:	0.000	ft	Invert:	0.00	Rate	1.466 in/hr
			B	0.00	ft	B:	0.00	FS	3
			h_{slot}	0.0	in			Qinf	0.022 cfs
Middle orifice	2.75	"		0.000	ft				
Number of orif:	1								
Cg-middle:	0.62		Upper slot			Emergency weir			
invert elev:	2.932	ft	Number of slots:	0		Invert:	3.50 ft		
			Invert:	0.00	ft	B:	15.00 ft		
			B:	0.00	ft				
			h_{slot}	0.0	in				
				0.000	ft				

*Note: h = head above the invert of the lowest surface discharge opening.

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000
0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
2.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
2.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022
3.000	0.000	0.297	0.000	0.000	0.000	0.000	0.007	0.007	0.000	0.000	0.000	0.000	0.022	0.029
3.083	0.000	0.660	0.000	0.000	0.000	0.039	0.032	0.032	0.000	0.000	0.000	0.000	0.022	0.054
3.167	0.000	1.024	0.000	0.000	0.000	0.071	0.068	0.068	0.000	0.000	0.000	0.000	0.022	0.089
3.250	0.000	1.388	0.000	0.000	0.000	0.093	0.106	0.093	0.000	0.000	0.000	0.000	0.022	0.114
3.333	0.000	1.751	0.000	0.000	0.000	0.110	0.140	0.110	0.000	0.000	0.000	0.000	0.022	0.131
3.417	0.000	2.115	0.000	0.000	0.000	0.125	0.163	0.125	0.000	0.000	0.000	0.000	0.022	0.146
3.500	0.000	2.479	0.000	0.000	0.000	0.138	0.174	0.138	0.000	0.000	0.000	0.000	0.022	0.160
3.583	0.000	2.842	0.000	0.000	0.000	0.150	0.177	0.150	0.000	0.000	0.000	1.183	0.022	1.355
3.667	0.000	3.206	0.000	0.000	0.000	0.162	0.181	0.162	0.000	0.000	0.000	3.357	0.022	3.540
3.750	0.000	3.569	0.000	0.000	0.000	0.172	0.204	0.172	0.000	0.000	0.000	6.185	0.022	6.379
3.833	0.000	3.933	0.000	0.000	0.000	0.182	0.276	0.182	0.000	0.000	0.000	9.550	0.022	9.753
3.917	0.000	4.297	0.000	0.000	0.000	0.191	0.434	0.191	0.000	0.000	0.000	13.384	0.022	13.597
4.000	0.000	4.660	0.000	0.000	0.000	0.200	0.733	0.200	0.000	0.000	0.000	17.645	0.022	17.867
4.083	0.000	5.024	0.000	0.000	0.000	0.209	1.238	0.209	0.000	0.000	0.000	22.299	0.022	22.529
4.167	0.000	5.388	0.000	0.000	0.000	0.217	2.032	0.217	0.000	0.000	0.000	27.322	0.022	27.560
4.250	0.000	5.751	0.000	0.000	0.000	0.225	3.216	0.225	0.000	0.000	0.000	32.694	0.022	32.941
4.333	0.000	6.115	0.000	0.000	0.000	0.233	4.909	0.233	0.000	0.000	0.000	38.400	0.022	38.655
4.417	0.000	6.479	0.000	0.000	0.000	0.240	7.250	0.240	0.000	0.000	0.000	44.427	0.022	44.689
4.500	0.000	6.842	0.000	0.000	0.000	0.247	10.401	0.247	0.000	0.000	0.000	50.764	0.022	51.033
4.583	0.000	7.206	0.000	0.000	0.000	0.254	14.548	0.254	0.000	0.000	0.000	57.401	0.022	57.677
4.667	0.000	7.569	0.000	0.000	0.000	0.261	19.902	0.261	0.000	0.000	0.000	64.330	0.022	64.613
4.750	0.000	7.933	0.000	0.000	0.000	0.268	26.699	0.268	0.000	0.000	0.000	71.544	0.022	71.834
4.833	0.000	8.297	0.000	0.000	0.000	0.274	35.206	0.274	0.000	0.000	0.000	79.037	0.022	79.332
4.917	0.000	8.660	0.000	0.000	0.000	0.281	45.717	0.281	0.000	0.000	0.000	86.802	0.022	87.104
5.000	0.000	9.024	0.000	0.000	0.000	0.287	58.559	0.287	0.000	0.000	0.000	94.835	0.022	95.143

BMP D/4 Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	0.000 "	Lower slot		Lower Weir		Infiltration	
Number of orif:	0	Number of slots:	0	Number of weirs:	0	Surface Area	4,736 sf
Cg-low:	0.62	Invert:	0.00 ft	Invert:	0.00	Rate	1.227 in/hr
		B	0.00 ft	B:	0.00	FS	3
		h_{slot}	0.0 in			Qinf	0.045 cfs
Middle orifice	0 "		0.000 ft				
Number of orif:	0						
Cg-middle:	0.62	Upper slot		Emergency weir			
invert elev:	0.00 ft	Number of slots:	0	Invert:	2.45 ft		
		Invert:	0.00 ft	B:	12.00 ft		
		B:	0.00 ft				
*Note: h = head above the invert of the lowest surface discharge opening.		h_{slot}	0.0 in				
			0.000 ft				

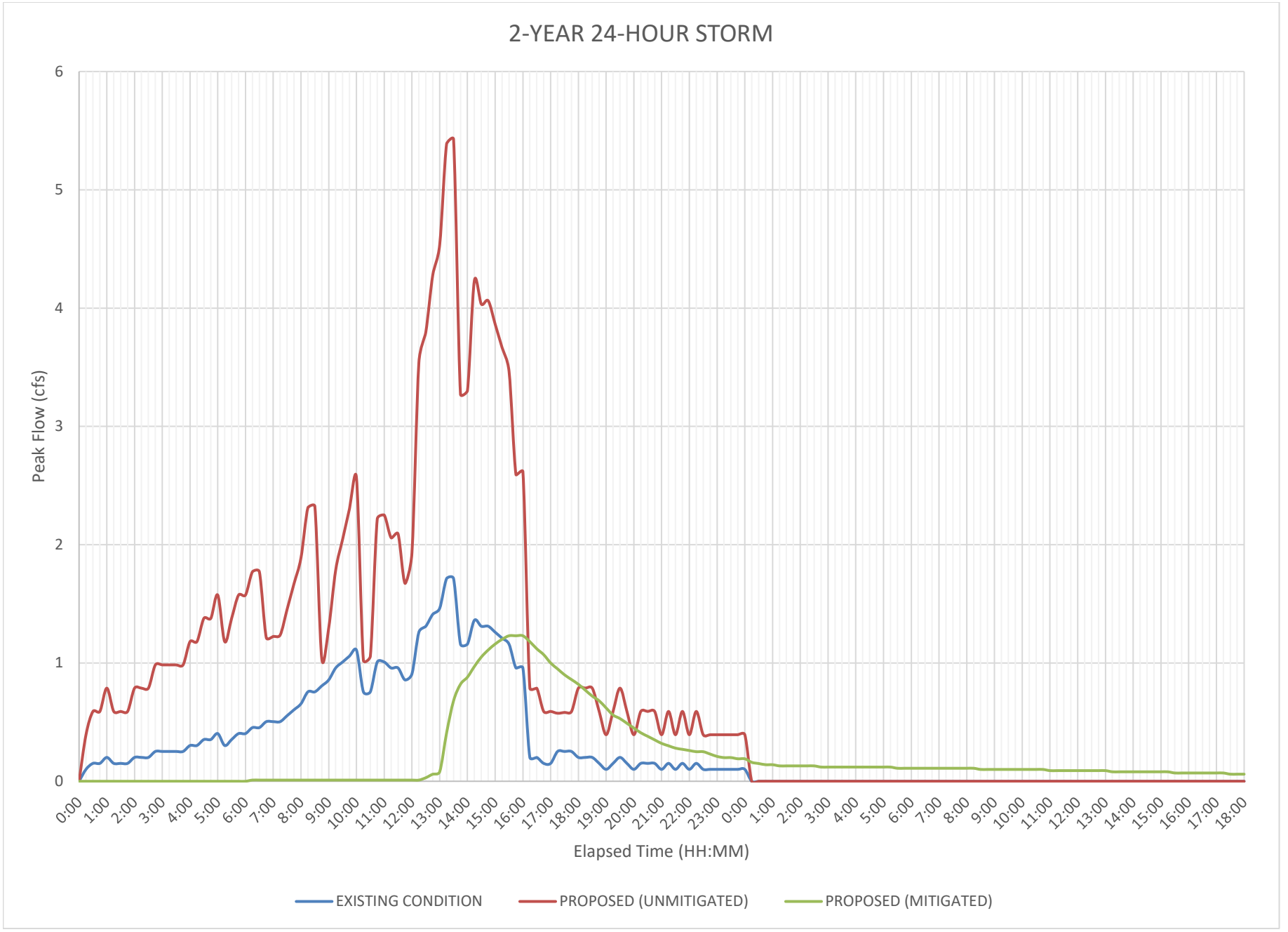
h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qinf (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000
0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
2.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045

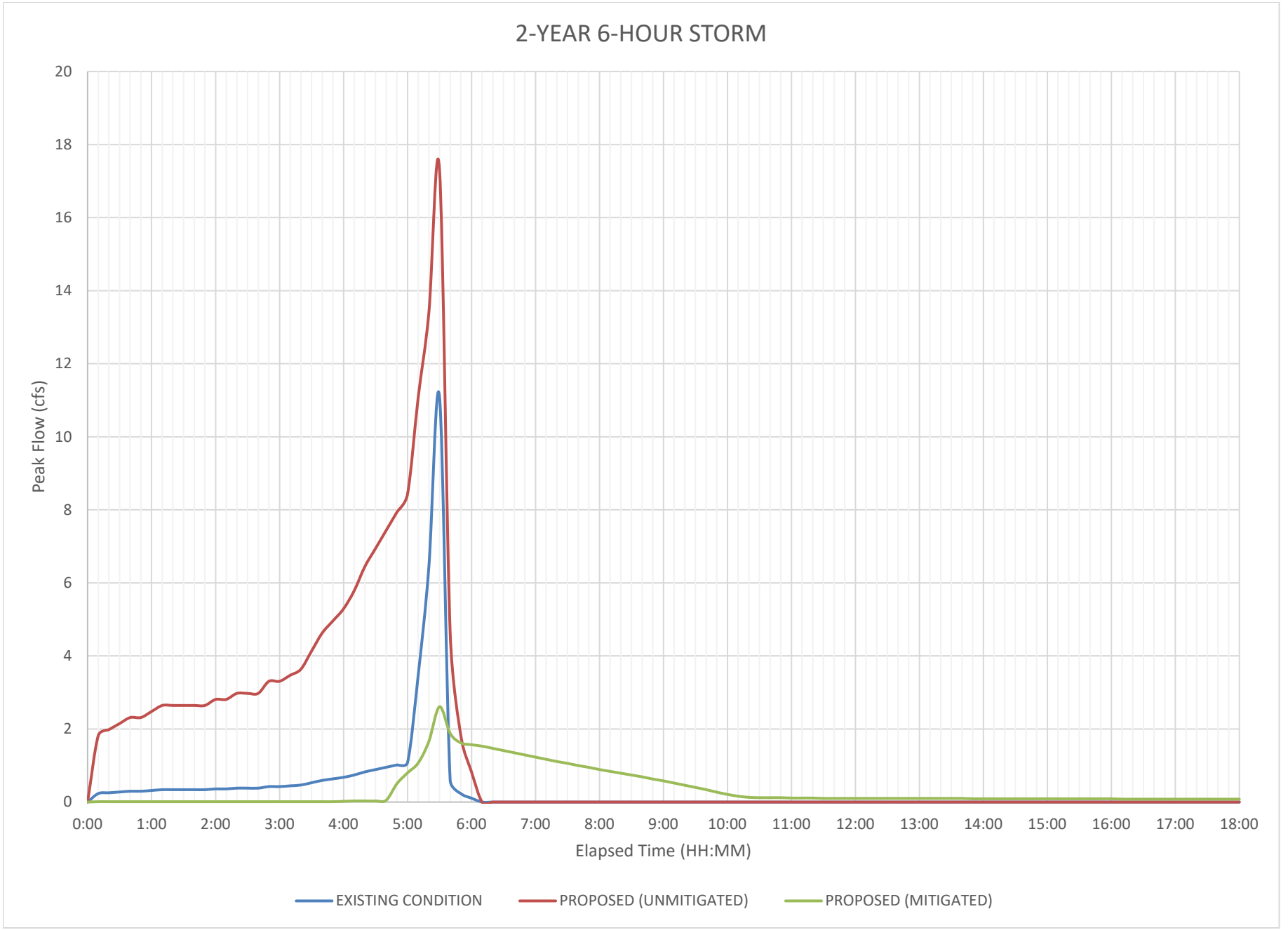
2.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
2.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
2.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
2.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.045
2.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.397	0.045	0.441
2.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.851	0.045	1.896
2.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.908	0.045	3.952
2.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.434	0.045	6.479
2.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.366	0.045	9.411
2.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.662	0.045	12.706
3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.293	0.045	16.337
3.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.238	0.045	20.283
3.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.482	0.045	24.527
3.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.011	0.045	29.056
3.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.814	0.045	33.859
3.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	38.884	0.045	38.929
3.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	44.211	0.045	44.256
3.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	49.791	0.045	49.836
3.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	55.617	0.045	55.662
3.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	61.685	0.045	61.730
3.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	67.990	0.045	68.035
3.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74.530	0.045	74.574
4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81.299	0.045	81.344

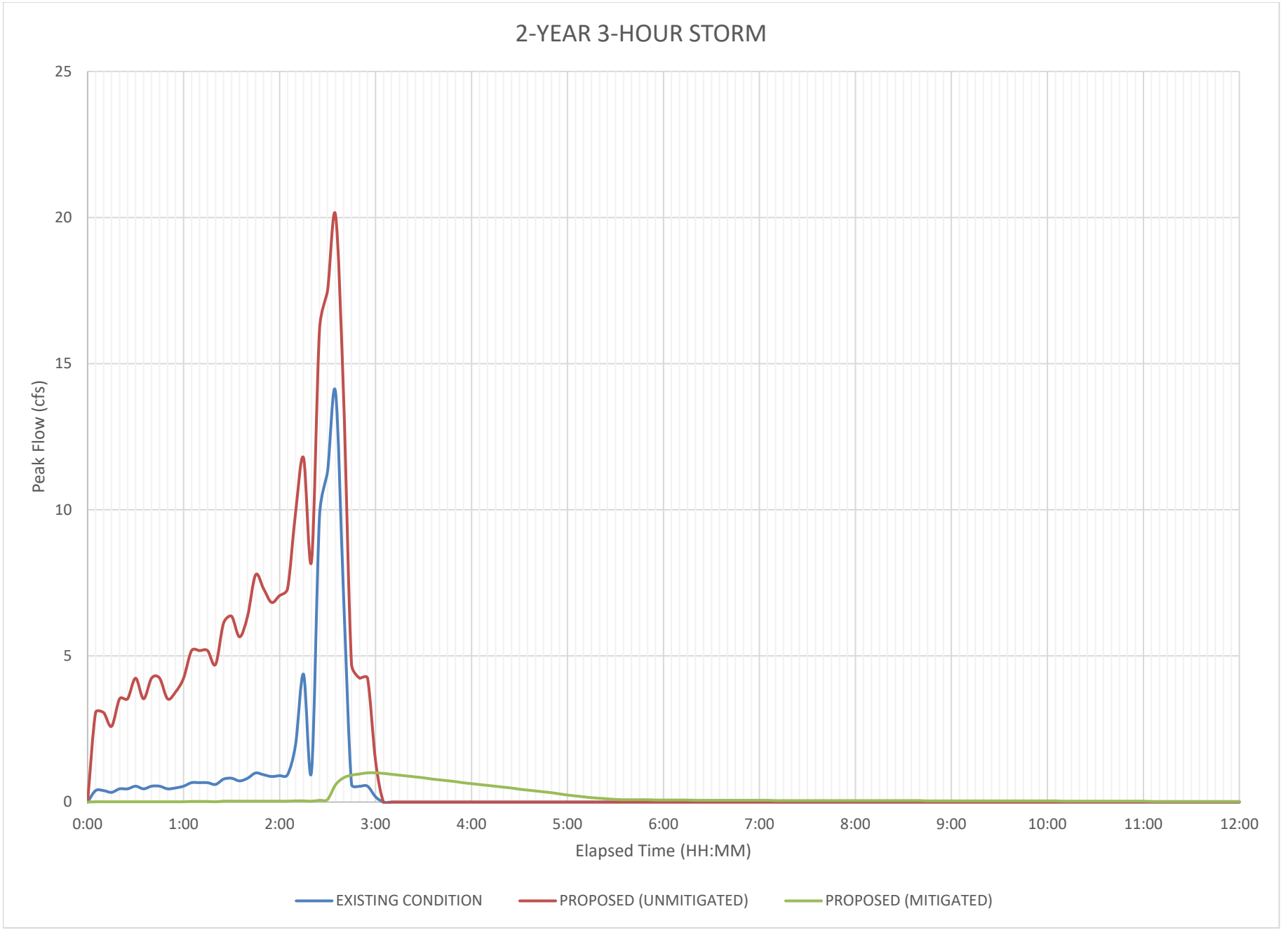
Appendix 5

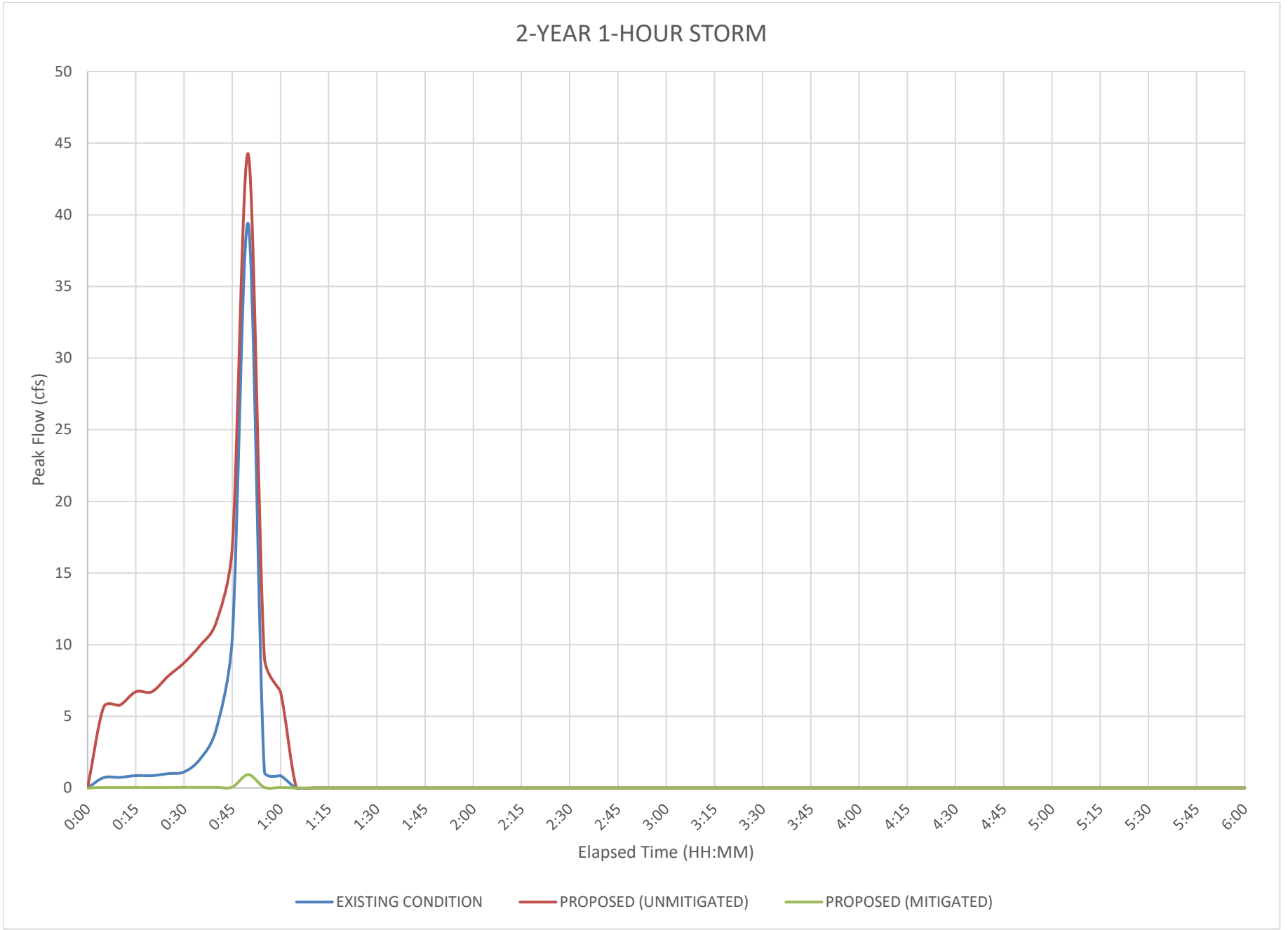
Short Cut Method Hydrographs

Storm Event	Peak Flow Summary (cfs)			
	Existing	Unmitigated	Mitigated	Difference
2-yr, 24-hour	1.71	5.43	1.23	-0.48
2-yr, 6-hour	11.09	17.31	2.61	-8.48
2-yr, 3-hour	14.03	20.08	1.00	-13.03
2-yr, 1-hour	39.34	44.22	0.93	-38.41


2-YEAR 24-HOUR STORM
Peak Flow (cfs)
0
1
2
3
4
5
6
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


2-YEAR 6-HOUR STORM
Peak Flow (cfs)
20
18
16
14
12
10
8
6
4
2
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


2-YEAR 3-HOUR STORM
25
20
15
10
5
0
Peak Flow (cfs)
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


2-YEAR 1-HOUR STORM
Peak Flow (cfs)
50
45
40
35
30
25
20
15
10
5
0
0:00
0:15
0:30
0:45
1:00
1:15
1:30
1:45
2:00
2:15
2:30
2:45
3:00
3:15
3:30
3:45
4:00
4:15
4:30
4:45
5:00
5:15
5:30
5:45
6:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)

Storm Event	Precip (inches)	Reference
2-yr, 24-hour	2.00	NOAA Atlas 14
2-yr, 6-hour	1.12	
2-yr, 3-hour	0.80	
2-yr, 1-hour	0.46	

PROJECT SITE EXISTING

Drainage Area	1360848	sf		
	31.24	ac		
A_i	0	sf		
	0%	imp		
Runoff Index	86		Note:	Plate E-6.1: Grass (Poor); Soil Types A (10%), C (34%) & D (56%); Area-Weighted
F_p	0.34	in/hr	Note:	Plate E-6.2: AMC I

$F = F_p(1 - 0.9A_i)$ **$F_$ = 0.340 in/hr**

For 24-hr storms, F_T is variable loss rate

$F_T = C[24 - (T/60)]^{1.55} + F_M$ **F_T = 0.600**

$C = (F - F_M)/54$ **C = 0.0031**

$T = \text{Unit Time}/2$ **T = 7.5**

$F_M = 0.5F$ **F_M = 0.170**

DMA D/1: PROPOSED

Drainage Area	562726	sf		
	12.92	ac		
A_i	526,512	sf		
	94%	imp		
Runoff Index	59		Note:	Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (29%), C (59%) & D (12%); Area-Weighted
F_p	0.67	in/hr	Note:	Plate E-6.2: AMC I

$F = F_p(1 - 0.9A_i)$ **$F_$ = 0.106 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ **F_T = 0.187**

$$C = (F - F_M)/54$$ **C = 0.0010**

$$T = \text{Unit Time}/2$$ **T = 7.5**

$$F_M = 0.5F$$ **F_M = 0.053**

DMA D/2: PROPOSED

Drainage Area	507634	sf		
	11.65	ac		
A_i	505,692	sf		
	100%	imp		
Runoff Index	71		Note:	Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types C (73%) & D (27%); Area-Weighted
F_p	0.55	in/hr	Note:	Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$ **F = 0.057 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ **F_T = 0.100**

$$C = (F - F_M)/54$$ **C = 0.0005**

$$T = \text{Unit Time}/2$$ **T = 7.5**

$$F_M = 0.5F$$ **F_M = 0.028**

DMA D/3: PROPOSED

Drainage Area	81313	sf		
	1.87	ac		
A_i	70,342	sf		
	87%	imp		
Runoff Index	75		Note:	Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Type D
F_p	0.50	in/hr	Note:	Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$ **F = 0.111 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ ***F*** $_T$ **= 0.196**

$$C = (F - F_M)/54$$ ***C =*** **0.0010**

$$T = \text{Unit Time}/2$$ ***T =*** **7.5**

$$F_M = 0.5F$$ ***F*** $_M$ **= 0.055**

DMA D/4: PROPOSED

Drainage Area	104529	sf	
	2.40	ac	
A_i	63,506	sf	
	61%	imp	
Runoff Index	66		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (13%), C (53%) & D (34%); Area-Weighted
F_p	0.60	in/hr	Note: Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.272 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ ***F*** $_T$ **= 0.480**

$$C = (F - F_M)/54$$ ***C =*** **0.0025**

$$T = \text{Unit Time}/2$$ ***T =*** **7.5**

$$F_M = 0.5F$$ ***F*** $_M$ **= 0.136**

DMA A/1: PROPOSED

Drainage Area	9610	sf	
	0.22	ac	
A_i	0	sf	
	0%	imp	
Runoff Index	60		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (34%), C (8%) & D (58%); Area-Weighted
F_p	0.66	in/hr	Note: Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.660 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$T =$ Unit Time$/2$

$$F_M = 0.5F$$

F $_T$ **= 1.165**

C **= 0.0061**

T **= 7.5**

F $_M$ **= 0.330**

DMA A/2: PROPOSED

Drainage Area	31529	sf	
	0.72	ac	
A_i	0	sf	
	0%	imp	
Runoff Index	67		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (17%), C (7%) & D (76%); Area-Weighted
F_p	0.60	in/hr	Note: Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$

F **= 0.600 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$T =$ Unit Time$/2$

$$F_M = 0.5F$$

F $_T$ **= 1.060**

C **= 0.0056**

T **= 7.5**

F $_M$ **= 0.300**

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition; By; Date 11/17/16; Checked; Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.340	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.170
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	0.600	0.013	0.003	0.10
2					0.3	0.024	0.593	0.019	0.005	0.15
3					0.3	0.024	0.587	0.019	0.005	0.15
4					0.4	0.032	0.580	0.026	0.006	0.20
5					0.3	0.024	0.573	0.019	0.005	0.15
6					0.3	0.024	0.566	0.019	0.005	0.15
7					0.3	0.024	0.559	0.019	0.005	0.15
8					0.4	0.032	0.552	0.026	0.006	0.20
9					0.4	0.032	0.546	0.026	0.006	0.20
10					0.4	0.032	0.539	0.026	0.006	0.20
11					0.5	0.040	0.533	0.032	0.008	0.25
12					0.5	0.040	0.526	0.032	0.008	0.25
13					0.5	0.040	0.520	0.032	0.008	0.25
14					0.5	0.040	0.513	0.032	0.008	0.25
15					0.5	0.040	0.507	0.032	0.008	0.25
16					0.6	0.048	0.500	0.038	0.010	0.30
17					0.6	0.048	0.494	0.038	0.010	0.30
18					0.7	0.056	0.488	0.045	0.011	0.35
19					0.7	0.056	0.481	0.045	0.011	0.35
20					0.8	0.064	0.475	0.051	0.013	0.40
21					0.6	0.048	0.469	0.038	0.010	0.30
22					0.7	0.056	0.463	0.045	0.011	0.35
23					0.8	0.064	0.457	0.051	0.013	0.40
24					0.8	0.064	0.451	0.051	0.013	0.40
25					0.9	0.072	0.445	0.058	0.014	0.45
26					0.9	0.072	0.439	0.058	0.014	0.45
27					1.0	0.080	0.433	0.064	0.016	0.50
28					1.0	0.080	0.427	0.064	0.016	0.50
29					1.0	0.080	0.421	0.064	0.016	0.50
30					1.1	0.088	0.416	0.070	0.018	0.55
31					1.2	0.096	0.410	0.077	0.019	0.60
32					1.3	0.104	0.404	0.083	0.021	0.66
33					1.5	0.120	0.399	0.096	0.024	0.76
34					1.5	0.120	0.393	0.096	0.024	0.76
35					1.6	0.128	0.388	0.102	0.026	0.81
36					1.7	0.136	0.382	0.109	0.027	0.86
37					1.9	0.152	0.377	0.122	0.030	0.96
38					2.0	0.160	0.371	0.128	0.032	1.01
39					2.1	0.168	0.366	0.134	0.034	1.06
40					2.2	0.176	0.361	0.141	0.035	1.11
41					1.5	0.120	0.356	0.096	0.024	0.76
42					1.5	0.120	0.350	0.096	0.024	0.76
43					2.0	0.160	0.345	0.128	0.032	1.01
44					2.0	0.160	0.340	0.128	0.032	1.01
45					1.9	0.152	0.335	0.122	0.030	0.96
46					1.9	0.152	0.330	0.122	0.030	0.96
47					1.7	0.136	0.325	0.109	0.027	0.86
48					1.8	0.144	0.321	0.115	0.029	0.91
49					2.5	0.200	0.316	0.160	0.040	1.26
50					2.6	0.208	0.311	0.166	0.042	1.31
51					2.8	0.224	0.306	0.179	0.045	1.41
52					2.9	0.232	0.302	0.186	0.046	1.46
53					3.4	0.272	0.297	0.218	0.054	1.71
54					3.4	0.272	0.293	0.218	0.054	**1.71**
55					2.3	0.184	0.288	0.147	0.037	1.16
56					2.3	0.184	0.284	0.147	0.037	1.16
57					2.7	0.216	0.280	0.173	0.043	1.36
58					2.6	0.208	0.275	0.166	0.042	1.31
59					2.6	0.208	0.271	0.166	0.042	1.31
60					2.5	0.200	0.267	0.160	0.040	1.26
61					2.4	0.192	0.263	0.154	0.038	1.21
62					2.3	0.184	0.259	0.147	0.037	1.16
63					1.9	0.152	0.255	0.122	0.030	0.96
64					1.9	0.152	0.251	0.122	0.030	0.96
65					0.4	0.032	0.247	0.026	0.006	0.20

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By: Date: 11/17/16 Checked: Date:	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.340	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.170
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.243	0.026	0.006	0.20
67					0.3	0.024	0.240	0.019	0.005	0.15
68					0.3	0.024	0.236	0.019	0.005	0.15
69					0.5	0.040	0.232	0.032	0.008	0.25
70					0.5	0.040	0.229	0.032	0.008	0.25
71					0.5	0.040	0.226	0.032	0.008	0.25
72					0.4	0.032	0.222	0.026	0.006	0.20
73					0.4	0.032	0.219	0.026	0.006	0.20
74					0.4	0.032	0.216	0.026	0.006	0.20
75					0.3	0.024	0.213	0.019	0.005	0.15
76					0.2	0.016	0.210	0.013	0.003	0.10
77					0.3	0.024	0.207	0.019	0.005	0.15
78					0.4	0.032	0.204	0.026	0.006	0.20
79					0.3	0.024	0.201	0.019	0.005	0.15
80					0.2	0.016	0.198	0.013	0.003	0.10
81					0.3	0.024	0.196	0.019	0.005	0.15
82					0.3	0.024	0.193	0.019	0.005	0.15
83					0.3	0.024	0.191	0.019	0.005	0.15
84					0.2	0.016	0.188	0.013	0.003	0.10
85					0.3	0.024	0.186	0.019	0.005	0.15
86					0.2	0.016	0.184	0.013	0.003	0.10
87					0.3	0.024	0.182	0.019	0.005	0.15
88					0.2	0.016	0.180	0.013	0.003	0.10
89					0.3	0.024	0.178	0.019	0.005	0.15
90					0.2	0.016	0.177	0.013	0.003	0.10
91					0.2	0.016	0.175	0.013	0.003	0.10
92					0.2	0.016	0.174	0.013	0.003	0.10
93					0.2	0.016	0.173	0.013	0.003	0.10
94					0.2	0.016	0.172	0.013	0.003	0.10
95					0.2	0.016	0.171	0.013	0.003	0.10
96					0.2	0.016	0.170	0.013	0.003	0.10
TOTALS					100.0				1.60	50.40

EFFECTIVE RAIN = 0.40 INCHES
TOTAL RUNOFF VOLUME = 1.04 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.106	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.053
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	0.187	0.002	0.014	0.18
2					0.3	0.024	0.185	0.004	0.020	0.27
3					0.3	0.024	0.183	0.004	0.020	0.27
4					0.4	0.032	0.180	0.005	0.027	0.35
5					0.3	0.024	0.178	0.004	0.020	0.27
6					0.3	0.024	0.176	0.004	0.020	0.27
7					0.3	0.024	0.174	0.004	0.020	0.27
8					0.4	0.032	0.172	0.005	0.027	0.35
9					0.4	0.032	0.170	0.005	0.027	0.35
10					0.4	0.032	0.168	0.005	0.027	0.35
11					0.5	0.040	0.166	0.006	0.034	0.44
12					0.5	0.040	0.164	0.006	0.034	0.44
13					0.5	0.040	0.162	0.006	0.034	0.44
14					0.5	0.040	0.160	0.006	0.034	0.44
15					0.5	0.040	0.158	0.006	0.034	0.44
16					0.6	0.048	0.156	0.007	0.041	0.53
17					0.6	0.048	0.154	0.007	0.041	0.53
18					0.7	0.056	0.152	0.008	0.048	0.62
19					0.7	0.056	0.150	0.008	0.048	0.62
20					0.8	0.064	0.148	0.010	0.054	0.71
21					0.6	0.048	0.146	0.007	0.041	0.53
22					0.7	0.056	0.144	0.008	0.048	0.62
23					0.8	0.064	0.142	0.010	0.054	0.71
24					0.8	0.064	0.140	0.010	0.054	0.71
25					0.9	0.072	0.138	0.011	0.061	0.80
26					0.9	0.072	0.137	0.011	0.061	0.80
27					1.0	0.080	0.135	0.012	0.068	0.88
28					1.0	0.080	0.133	0.012	0.068	0.88
29					1.0	0.080	0.131	0.012	0.068	0.88
30					1.1	0.088	0.129	0.013	0.075	0.97
31					1.2	0.096	0.128	0.015	0.081	1.06
32					1.3	0.104	0.126	0.016	0.088	1.15
33					1.5	0.120	0.124	0.018	0.102	1.33
34					1.5	0.120	0.122	0.018	0.102	1.33
35					1.6	0.128	0.121	0.019	0.007	0.10
36					1.7	0.136	0.119	0.021	0.017	0.22
37					1.9	0.152	0.117	0.023	0.035	0.45
38					2.0	0.160	0.116	0.024	0.044	0.58
39					2.1	0.168	0.114	0.025	0.054	0.70
40					2.2	0.176	0.112	0.027	0.064	0.83
41					1.5	0.120	0.111	0.018	0.009	0.12
42					1.5	0.120	0.109	0.018	0.011	0.14
43					2.0	0.160	0.107	0.024	0.053	0.68
44					2.0	0.160	0.106	0.024	0.054	0.70
45					1.9	0.152	0.104	0.023	0.048	0.62
46					1.9	0.152	0.103	0.023	0.049	0.64
47					1.7	0.136	0.101	0.021	0.035	0.45
48					1.8	0.144	0.100	0.022	0.044	0.58
49					2.5	0.200	0.098	0.030	0.102	1.33
50					2.6	0.208	0.097	0.032	0.111	1.45
51					2.8	0.224	0.095	0.034	0.129	1.68
52					2.9	0.232	0.094	0.035	0.138	1.80
53					3.4	0.272	0.092	0.041	0.180	2.34
54					3.4	0.272	0.091	0.041	0.181	**2.36**
55					2.3	0.184	0.090	0.028	0.094	1.23
56					2.3	0.184	0.088	0.028	0.096	1.25
57					2.7	0.216	0.087	0.033	0.129	1.68
58					2.6	0.208	0.086	0.032	0.122	1.59
59					2.6	0.208	0.084	0.032	0.124	1.61
60					2.5	0.200	0.083	0.030	0.117	1.52
61					2.4	0.192	0.082	0.029	0.110	1.44
62					2.3	0.184	0.081	0.028	0.103	1.35
63					1.9	0.152	0.079	0.023	0.073	0.95
64					1.9	0.152	0.078	0.023	0.074	0.96
65					0.4	0.032	0.077	0.005	0.027	0.35

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.106	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.053
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.076	0.005	0.027	0.35
67					0.3	0.024	0.075	0.004	0.020	0.27
68					0.3	0.024	0.073	0.004	0.020	0.27
69					0.5	0.040	0.072	0.006	0.034	0.44
70					0.5	0.040	0.071	0.006	0.034	0.44
71					0.5	0.040	0.070	0.006	0.034	0.44
72					0.4	0.032	0.069	0.005	0.027	0.35
73					0.4	0.032	0.068	0.005	0.027	0.35
74					0.4	0.032	0.067	0.005	0.027	0.35
75					0.3	0.024	0.066	0.004	0.020	0.27
76					0.2	0.016	0.065	0.002	0.014	0.18
77					0.3	0.024	0.064	0.004	0.020	0.27
78					0.4	0.032	0.063	0.005	0.027	0.35
79					0.3	0.024	0.063	0.004	0.020	0.27
80					0.2	0.016	0.062	0.002	0.014	0.18
81					0.3	0.024	0.061	0.004	0.020	0.27
82					0.3	0.024	0.060	0.004	0.020	0.27
83					0.3	0.024	0.059	0.004	0.020	0.27
84					0.2	0.016	0.059	0.002	0.014	0.18
85					0.3	0.024	0.058	0.004	0.020	0.27
86					0.2	0.016	0.057	0.002	0.014	0.18
87					0.3	0.024	0.057	0.004	0.020	0.27
88					0.2	0.016	0.056	0.002	0.014	0.18
89					0.3	0.024	0.055	0.004	0.020	0.27
90					0.2	0.016	0.055	0.002	0.014	0.18
91					0.2	0.016	0.055	0.002	0.014	0.18
92					0.2	0.016	0.054	0.002	0.014	0.18
93					0.2	0.016	0.054	0.002	0.014	0.18
94					0.2	0.016	0.053	0.002	0.014	0.18
95					0.2	0.016	0.053	0.002	0.014	0.18
96					0.2	0.016	0.053	0.002	0.014	0.18
TOTALS					100.0				4.65	60.62

EFFECTIVE RAIN = 1.16 INCHES
TOTAL RUNOFF VOLUME = 1.25 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.057	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.028
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	0.100	0.002	0.014	0.17
2					0.3	0.024	0.099	0.002	0.022	0.25
3					0.3	0.024	0.098	0.002	0.022	0.25
4					0.4	0.032	0.097	0.003	0.029	0.34
5					0.3	0.024	0.096	0.002	0.022	0.25
6					0.3	0.024	0.095	0.002	0.022	0.25
7					0.3	0.024	0.094	0.002	0.022	0.25
8					0.4	0.032	0.092	0.003	0.029	0.34
9					0.4	0.032	0.091	0.003	0.029	0.34
10					0.4	0.032	0.090	0.003	0.029	0.34
11					0.5	0.040	0.089	0.004	0.036	0.42
12					0.5	0.040	0.088	0.004	0.036	0.42
13					0.5	0.040	0.087	0.004	0.036	0.42
14					0.5	0.040	0.086	0.004	0.036	0.42
15					0.5	0.040	0.085	0.004	0.036	0.42
16					0.6	0.048	0.084	0.005	0.043	0.51
17					0.6	0.048	0.083	0.005	0.043	0.51
18					0.7	0.056	0.082	0.006	0.050	0.59
19					0.7	0.056	0.081	0.006	0.050	0.59
20					0.8	0.064	0.080	0.007	0.057	0.67
21					0.6	0.048	0.078	0.005	0.043	0.51
22					0.7	0.056	0.077	0.006	0.050	0.59
23					0.8	0.064	0.076	0.007	0.057	0.67
24					0.8	0.064	0.075	0.007	0.057	0.67
25					0.9	0.072	0.074	0.007	0.065	0.76
26					0.9	0.072	0.073	0.007	0.065	0.76
27					1.0	0.080	0.072	0.008	0.008	0.09
28					1.0	0.080	0.071	0.008	0.009	0.10
29					1.0	0.080	0.071	0.008	0.009	0.11
30					1.1	0.088	0.070	0.009	0.018	0.22
31					1.2	0.096	0.069	0.010	0.027	0.32
32					1.3	0.104	0.068	0.011	0.036	0.43
33					1.5	0.120	0.067	0.012	0.053	0.63
34					1.5	0.120	0.066	0.012	0.054	0.64
35					1.6	0.128	0.065	0.013	0.063	0.74
36					1.7	0.136	0.064	0.014	0.072	0.85
37					1.9	0.152	0.063	0.016	0.089	1.05
38					2.0	0.160	0.062	0.016	0.098	1.15
39					2.1	0.168	0.061	0.017	0.107	1.25
40					2.2	0.176	0.060	0.018	0.116	1.36
41					1.5	0.120	0.059	0.012	0.061	0.71
42					1.5	0.120	0.059	0.012	0.061	0.72
43					2.0	0.160	0.058	0.016	0.102	1.20
44					2.0	0.160	0.057	0.016	0.103	1.21
45					1.9	0.152	0.056	0.016	0.096	1.13
46					1.9	0.152	0.055	0.016	0.097	1.14
47					1.7	0.136	0.054	0.014	0.082	0.96
48					1.8	0.144	0.054	0.015	0.090	1.06
49					2.5	0.200	0.053	0.021	0.147	1.73
50					2.6	0.208	0.052	0.021	0.156	1.83
51					2.8	0.224	0.051	0.023	0.173	2.03
52					2.9	0.232	0.050	0.024	0.182	2.13
53					3.4	0.272	0.050	0.028	0.222	2.61
54					3.4	0.272	0.049	0.028	0.223	**2.62**
55					2.3	0.184	0.048	0.019	0.136	1.60
56					2.3	0.184	0.048	0.019	0.136	1.60
57					2.7	0.216	0.047	0.022	0.169	1.99
58					2.6	0.208	0.046	0.021	0.162	1.90
59					2.6	0.208	0.045	0.021	0.163	1.91
60					2.5	0.200	0.045	0.021	0.155	1.83
61					2.4	0.192	0.044	0.020	0.148	1.74
62					2.3	0.184	0.043	0.019	0.141	1.65
63					1.9	0.152	0.043	0.016	0.109	1.28
64					1.9	0.152	0.042	0.016	0.110	1.29
65					0.4	0.032	0.041	0.003	0.029	0.34

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.057	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.028
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.041	0.003	0.029	0.34
67					0.3	0.024	0.040	0.002	0.022	0.25
68					0.3	0.024	0.039	0.002	0.022	0.25
69					0.5	0.040	0.039	0.004	0.001	0.01
70					0.5	0.040	0.038	0.004	0.002	0.02
71					0.5	0.040	0.038	0.004	0.002	0.03
72					0.4	0.032	0.037	0.003	0.029	0.34
73					0.4	0.032	0.037	0.003	0.029	0.34
74					0.4	0.032	0.036	0.003	0.029	0.34
75					0.3	0.024	0.036	0.002	0.022	0.25
76					0.2	0.016	0.035	0.002	0.014	0.17
77					0.3	0.024	0.035	0.002	0.022	0.25
78					0.4	0.032	0.034	0.003	0.029	0.34
79					0.3	0.024	0.034	0.002	0.022	0.25
80					0.2	0.016	0.033	0.002	0.014	0.17
81					0.3	0.024	0.033	0.002	0.022	0.25
82					0.3	0.024	0.032	0.002	0.022	0.25
83					0.3	0.024	0.032	0.002	0.022	0.25
84					0.2	0.016	0.032	0.002	0.014	0.17
85					0.3	0.024	0.031	0.002	0.022	0.25
86					0.2	0.016	0.031	0.002	0.014	0.17
87					0.3	0.024	0.030	0.002	0.022	0.25
88					0.2	0.016	0.030	0.002	0.014	0.17
89					0.3	0.024	0.030	0.002	0.022	0.25
90					0.2	0.016	0.030	0.002	0.014	0.17
91					0.2	0.016	0.029	0.002	0.014	0.17
92					0.2	0.016	0.029	0.002	0.014	0.17
93					0.2	0.016	0.029	0.002	0.014	0.17
94					0.2	0.016	0.029	0.002	0.014	0.17
95					0.2	0.016	0.029	0.002	0.014	0.17
96					0.2	0.016	0.028	0.002	0.014	0.17
TOTALS					100.0				5.57	65.42

EFFECTIVE RAIN = 1.39 INCHES
TOTAL RUNOFF VOLUME = 1.35 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.111	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.055
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	0.196	0.003	0.013	0.02
2					0.3	0.024	0.193	0.005	0.019	0.04
3					0.3	0.024	0.191	0.005	0.019	0.04
4					0.4	0.032	0.189	0.007	0.025	0.05
5					0.3	0.024	0.187	0.005	0.019	0.04
6					0.3	0.024	0.184	0.005	0.019	0.04
7					0.3	0.024	0.182	0.005	0.019	0.04
8					0.4	0.032	0.180	0.007	0.025	0.05
9					0.4	0.032	0.178	0.007	0.025	0.05
10					0.4	0.032	0.176	0.007	0.025	0.05
11					0.5	0.040	0.173	0.008	0.032	0.06
12					0.5	0.040	0.171	0.008	0.032	0.06
13					0.5	0.040	0.169	0.008	0.032	0.06
14					0.5	0.040	0.167	0.008	0.032	0.06
15					0.5	0.040	0.165	0.008	0.032	0.06
16					0.6	0.048	0.163	0.010	0.038	0.07
17					0.6	0.048	0.161	0.010	0.038	0.07
18					0.7	0.056	0.159	0.012	0.044	0.08
19					0.7	0.056	0.157	0.012	0.044	0.08
20					0.8	0.064	0.155	0.013	0.051	0.10
21					0.6	0.048	0.153	0.010	0.038	0.07
22					0.7	0.056	0.151	0.012	0.044	0.08
23					0.8	0.064	0.149	0.013	0.051	0.10
24					0.8	0.064	0.147	0.013	0.051	0.10
25					0.9	0.072	0.145	0.015	0.057	0.11
26					0.9	0.072	0.143	0.015	0.057	0.11
27					1.0	0.080	0.141	0.017	0.063	0.12
28					1.0	0.080	0.139	0.017	0.063	0.12
29					1.0	0.080	0.137	0.017	0.063	0.12
30					1.1	0.088	0.135	0.018	0.070	0.13
31					1.2	0.096	0.133	0.020	0.076	0.14
32					1.3	0.104	0.132	0.022	0.082	0.16
33					1.5	0.120	0.130	0.025	0.095	0.18
34					1.5	0.120	0.128	0.025	0.095	0.18
35					1.6	0.128	0.126	0.027	0.002	0.00
36					1.7	0.136	0.124	0.028	0.012	0.02
37					1.9	0.152	0.123	0.032	0.029	0.06
38					2.0	0.160	0.121	0.033	0.039	0.07
39					2.1	0.168	0.119	0.035	0.049	0.09
40					2.2	0.176	0.117	0.037	0.059	0.11
41					1.5	0.120	0.116	0.025	0.004	0.01
42					1.5	0.120	0.114	0.025	0.006	0.01
43					2.0	0.160	0.112	0.033	0.048	0.09
44					2.0	0.160	0.111	0.033	0.049	0.09
45					1.9	0.152	0.109	0.032	0.043	0.08
46					1.9	0.152	0.108	0.032	0.044	0.08
47					1.7	0.136	0.106	0.028	0.030	0.06
48					1.8	0.144	0.104	0.030	0.040	0.07
49					2.5	0.200	0.103	0.042	0.097	0.18
50					2.6	0.208	0.101	0.043	0.107	0.20
51					2.8	0.224	0.100	0.047	0.124	0.23
52					2.9	0.232	0.098	0.048	0.134	0.25
53					3.4	0.272	0.097	0.057	0.175	0.33
54					3.4	0.272	0.095	0.057	0.177	**0.33**
55					2.3	0.184	0.094	0.038	0.090	0.17
56					2.3	0.184	0.092	0.038	0.092	0.17
57					2.7	0.216	0.091	0.045	0.125	0.24
58					2.6	0.208	0.090	0.043	0.118	0.22
59					2.6	0.208	0.088	0.043	0.120	0.23
60					2.5	0.200	0.087	0.042	0.113	0.21
61					2.4	0.192	0.086	0.040	0.106	0.20
62					2.3	0.184	0.084	0.038	0.100	0.19
63					1.9	0.152	0.083	0.032	0.069	0.13
64					1.9	0.152	0.082	0.032	0.070	0.13
65					0.4	0.032	0.080	0.007	0.025	0.05

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.111	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.055
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.079	0.007	0.025	0.05
67					0.3	0.024	0.078	0.005	0.019	0.04
68					0.3	0.024	0.077	0.005	0.019	0.04
69					0.5	0.040	0.076	0.008	0.032	0.06
70					0.5	0.040	0.075	0.008	0.032	0.06
71					0.5	0.040	0.073	0.008	0.032	0.06
72					0.4	0.032	0.072	0.007	0.025	0.05
73					0.4	0.032	0.071	0.007	0.025	0.05
74					0.4	0.032	0.070	0.007	0.025	0.05
75					0.3	0.024	0.069	0.005	0.019	0.04
76					0.2	0.016	0.068	0.003	0.013	0.02
77					0.3	0.024	0.067	0.005	0.019	0.04
78					0.4	0.032	0.066	0.007	0.025	0.05
79					0.3	0.024	0.065	0.005	0.019	0.04
80					0.2	0.016	0.065	0.003	0.013	0.02
81					0.3	0.024	0.064	0.005	0.019	0.04
82					0.3	0.024	0.063	0.005	0.019	0.04
83					0.3	0.024	0.062	0.005	0.019	0.04
84					0.2	0.016	0.061	0.003	0.013	0.02
85					0.3	0.024	0.061	0.005	0.019	0.04
86					0.2	0.016	0.060	0.003	0.013	0.02
87					0.3	0.024	0.059	0.005	0.019	0.04
88					0.2	0.016	0.059	0.003	0.013	0.02
89					0.3	0.024	0.058	0.005	0.019	0.04
90					0.2	0.016	0.058	0.003	0.013	0.02
91					0.2	0.016	0.057	0.003	0.013	0.02
92					0.2	0.016	0.057	0.003	0.013	0.02
93					0.2	0.016	0.056	0.003	0.013	0.02
94					0.2	0.016	0.056	0.003	0.013	0.02
95					0.2	0.016	0.056	0.003	0.013	0.02
96					0.2	0.016	0.055	0.003	0.013	0.02
TOTALS					100.0				4.37	8.22

EFFECTIVE RAIN = 1.09 INCHES
TOTAL RUNOFF VOLUME = 0.17 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.272	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.136
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	0.480	0.007	0.009	0.02
2					0.3	0.024	0.475	0.010	0.014	0.03
3					0.3	0.024	0.469	0.010	0.014	0.03
4					0.4	0.032	0.464	0.013	0.019	0.05
5					0.3	0.024	0.458	0.010	0.014	0.03
6					0.3	0.024	0.453	0.010	0.014	0.03
7					0.3	0.024	0.447	0.010	0.014	0.03
8					0.4	0.032	0.442	0.013	0.019	0.05
9					0.4	0.032	0.437	0.013	0.019	0.05
10					0.4	0.032	0.431	0.013	0.019	0.05
11					0.5	0.040	0.426	0.017	0.023	0.06
12					0.5	0.040	0.421	0.017	0.023	0.06
13					0.5	0.040	0.416	0.017	0.023	0.06
14					0.5	0.040	0.410	0.017	0.023	0.06
15					0.5	0.040	0.405	0.017	0.023	0.06
16					0.6	0.048	0.400	0.020	0.028	0.07
17					0.6	0.048	0.395	0.020	0.028	0.07
18					0.7	0.056	0.390	0.023	0.033	0.08
19					0.7	0.056	0.385	0.023	0.033	0.08
20					0.8	0.064	0.380	0.026	0.038	0.09
21					0.6	0.048	0.375	0.020	0.028	0.07
22					0.7	0.056	0.370	0.023	0.033	0.08
23					0.8	0.064	0.365	0.026	0.038	0.09
24					0.8	0.064	0.361	0.026	0.038	0.09
25					0.9	0.072	0.356	0.030	0.042	0.10
26					0.9	0.072	0.351	0.030	0.042	0.10
27					1.0	0.080	0.346	0.033	0.047	0.11
28					1.0	0.080	0.342	0.033	0.047	0.11
29					1.0	0.080	0.337	0.033	0.047	0.11
30					1.1	0.088	0.332	0.036	0.052	0.12
31					1.2	0.096	0.328	0.040	0.056	0.14
32					1.3	0.104	0.323	0.043	0.061	0.15
33					1.5	0.120	0.319	0.050	0.070	0.17
34					1.5	0.120	0.314	0.050	0.070	0.17
35					1.6	0.128	0.310	0.053	0.075	0.18
36					1.7	0.136	0.306	0.056	0.080	0.19
37					1.9	0.152	0.301	0.063	0.089	0.22
38					2.0	0.160	0.297	0.066	0.094	0.23
39					2.1	0.168	0.293	0.070	0.098	0.24
40					2.2	0.176	0.289	0.073	0.103	0.25
41					1.5	0.120	0.284	0.050	0.070	0.17
42					1.5	0.120	0.280	0.050	0.070	0.17
43					2.0	0.160	0.276	0.066	0.094	0.23
44					2.0	0.160	0.272	0.066	0.094	0.23
45					1.9	0.152	0.268	0.063	0.089	0.22
46					1.9	0.152	0.264	0.063	0.089	0.22
47					1.7	0.136	0.260	0.056	0.080	0.19
48					1.8	0.144	0.256	0.060	0.084	0.20
49					2.5	0.200	0.253	0.083	0.117	0.28
50					2.6	0.208	0.249	0.086	0.122	0.29
51					2.8	0.224	0.245	0.093	0.131	0.32
52					2.9	0.232	0.241	0.096	0.136	**0.33**
53					3.4	0.272	0.238	0.113	0.034	0.08
54					3.4	0.272	0.234	0.113	0.038	0.09
55					2.3	0.184	0.231	0.076	0.108	0.26
56					2.3	0.184	0.227	0.076	0.108	0.26
57					2.7	0.216	0.224	0.089	0.127	0.31
58					2.6	0.208	0.220	0.086	0.122	0.29
59					2.6	0.208	0.217	0.086	0.122	0.29
60					2.5	0.200	0.213	0.083	0.117	0.28
61					2.4	0.192	0.210	0.079	0.113	0.27
62					2.3	0.184	0.207	0.076	0.108	0.26
63					1.9	0.152	0.204	0.063	0.089	0.22
64					1.9	0.152	0.201	0.063	0.089	0.22
65					0.4	0.032	0.198	0.013	0.019	0.05

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.272	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.136
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.195	0.013	0.019	0.05
67					0.3	0.024	0.192	0.010	0.014	0.03
68					0.3	0.024	0.189	0.010	0.014	0.03
69					0.5	0.040	0.186	0.017	0.023	0.06
70					0.5	0.040	0.183	0.017	0.023	0.06
71					0.5	0.040	0.180	0.017	0.023	0.06
72					0.4	0.032	0.178	0.013	0.019	0.05
73					0.4	0.032	0.175	0.013	0.019	0.05
74					0.4	0.032	0.173	0.013	0.019	0.05
75					0.3	0.024	0.170	0.010	0.014	0.03
76					0.2	0.016	0.168	0.007	0.009	0.02
77					0.3	0.024	0.165	0.010	0.014	0.03
78					0.4	0.032	0.163	0.013	0.019	0.05
79					0.3	0.024	0.161	0.010	0.014	0.03
80					0.2	0.016	0.159	0.007	0.009	0.02
81					0.3	0.024	0.157	0.010	0.014	0.03
82					0.3	0.024	0.154	0.010	0.014	0.03
83					0.3	0.024	0.153	0.010	0.014	0.03
84					0.2	0.016	0.151	0.007	0.009	0.02
85					0.3	0.024	0.149	0.010	0.014	0.03
86					0.2	0.016	0.147	0.007	0.009	0.02
87					0.3	0.024	0.146	0.010	0.014	0.03
88					0.2	0.016	0.144	0.007	0.009	0.02
89					0.3	0.024	0.143	0.010	0.014	0.03
90					0.2	0.016	0.141	0.007	0.009	0.02
91					0.2	0.016	0.140	0.007	0.009	0.02
92					0.2	0.016	0.139	0.007	0.009	0.02
93					0.2	0.016	0.138	0.007	0.009	0.02
94					0.2	0.016	0.137	0.007	0.009	0.02
95					0.2	0.016	0.137	0.007	0.009	0.02
96					0.2	0.016	0.136	0.007	0.009	0.02
TOTALS					100.0				4.44	10.75

EFFECTIVE RAIN = 1.11 INCHES
TOTAL RUNOFF VOLUME = 0.22 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.660	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.330
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	1.165	0.014	0.002	0.00
2					0.3	0.024	1.152	0.022	0.002	0.00
3					0.3	0.024	1.139	0.022	0.002	0.00
4					0.4	0.032	1.125	0.029	0.003	0.00
5					0.3	0.024	1.112	0.022	0.002	0.00
6					0.3	0.024	1.099	0.022	0.002	0.00
7					0.3	0.024	1.086	0.022	0.002	0.00
8					0.4	0.032	1.072	0.029	0.003	0.00
9					0.4	0.032	1.060	0.029	0.003	0.00
10					0.4	0.032	1.047	0.029	0.003	0.00
11					0.5	0.040	1.034	0.036	0.004	0.00
12					0.5	0.040	1.021	0.036	0.004	0.00
13					0.5	0.040	1.008	0.036	0.004	0.00
14					0.5	0.040	0.996	0.036	0.004	0.00
15					0.5	0.040	0.983	0.036	0.004	0.00
16					0.6	0.048	0.971	0.043	0.005	0.00
17					0.6	0.048	0.959	0.043	0.005	0.00
18					0.7	0.056	0.947	0.050	0.006	0.00
19					0.7	0.056	0.934	0.050	0.006	0.00
20					0.8	0.064	0.922	0.058	0.006	0.00
21					0.6	0.048	0.910	0.043	0.005	0.00
22					0.7	0.056	0.899	0.050	0.006	0.00
23					0.8	0.064	0.887	0.058	0.006	0.00
24					0.8	0.064	0.875	0.058	0.006	0.00
25					0.9	0.072	0.863	0.065	0.007	0.00
26					0.9	0.072	0.852	0.065	0.007	0.00
27					1.0	0.080	0.841	0.072	0.008	0.00
28					1.0	0.080	0.829	0.072	0.008	0.00
29					1.0	0.080	0.818	0.072	0.008	0.00
30					1.1	0.088	0.807	0.079	0.009	0.00
31					1.2	0.096	0.796	0.086	0.010	0.00
32					1.3	0.104	0.785	0.094	0.010	0.00
33					1.5	0.120	0.774	0.108	0.012	0.00
34					1.5	0.120	0.763	0.108	0.012	0.00
35					1.6	0.128	0.752	0.115	0.013	0.00
36					1.7	0.136	0.742	0.122	0.014	0.00
37					1.9	0.152	0.731	0.137	0.015	0.00
38					2.0	0.160	0.721	0.144	0.016	0.00
39					2.1	0.168	0.711	0.151	0.017	0.00
40					2.2	0.176	0.700	0.158	0.018	0.00
41					1.5	0.120	0.690	0.108	0.012	0.00
42					1.5	0.120	0.680	0.108	0.012	0.00
43					2.0	0.160	0.670	0.144	0.016	0.00
44					2.0	0.160	0.661	0.144	0.016	0.00
45					1.9	0.152	0.651	0.137	0.015	0.00
46					1.9	0.152	0.641	0.137	0.015	0.00
47					1.7	0.136	0.632	0.122	0.014	0.00
48					1.8	0.144	0.622	0.130	0.014	0.00
49					2.5	0.200	0.613	0.180	0.020	0.00
50					2.6	0.208	0.604	0.187	0.021	0.00
51					2.8	0.224	0.595	0.202	0.022	0.00
52					2.9	0.232	0.586	0.209	0.023	0.01
53					3.4	0.272	0.577	0.245	0.027	0.01
54					3.4	0.272	0.568	0.245	0.027	**0.01**
55					2.3	0.184	0.560	0.166	0.018	0.00
56					2.3	0.184	0.551	0.166	0.018	0.00
57					2.7	0.216	0.543	0.194	0.022	0.00
58					2.6	0.208	0.534	0.187	0.021	0.00
59					2.6	0.208	0.526	0.187	0.021	0.00
60					2.5	0.200	0.518	0.180	0.020	0.00
61					2.4	0.192	0.510	0.173	0.019	0.00
62					2.3	0.184	0.502	0.166	0.018	0.00
63					1.9	0.152	0.495	0.137	0.015	0.00
64					1.9	0.152	0.487	0.137	0.015	0.00
65					0.4	0.032	0.480	0.029	0.003	0.00

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.00
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.660	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.330
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.472	0.029	0.003	0.00
67					0.3	0.024	0.465	0.022	0.002	0.00
68					0.3	0.024	0.458	0.022	0.002	0.00
69					0.5	0.040	0.451	0.036	0.004	0.00
70					0.5	0.040	0.445	0.036	0.004	0.00
71					0.5	0.040	0.438	0.036	0.004	0.00
72					0.4	0.032	0.431	0.029	0.003	0.00
73					0.4	0.032	0.425	0.029	0.003	0.00
74					0.4	0.032	0.419	0.029	0.003	0.00
75					0.3	0.024	0.413	0.022	0.002	0.00
76					0.2	0.016	0.407	0.014	0.002	0.00
77					0.3	0.024	0.401	0.022	0.002	0.00
78					0.4	0.032	0.396	0.029	0.003	0.00
79					0.3	0.024	0.390	0.022	0.002	0.00
80					0.2	0.016	0.385	0.014	0.002	0.00
81					0.3	0.024	0.380	0.022	0.002	0.00
82					0.3	0.024	0.375	0.022	0.002	0.00
83					0.3	0.024	0.370	0.022	0.002	0.00
84					0.2	0.016	0.366	0.014	0.002	0.00
85					0.3	0.024	0.361	0.022	0.002	0.00
86					0.2	0.016	0.357	0.014	0.002	0.00
87					0.3	0.024	0.353	0.022	0.002	0.00
88					0.2	0.016	0.350	0.014	0.002	0.00
89					0.3	0.024	0.346	0.022	0.002	0.00
90					0.2	0.016	0.343	0.014	0.002	0.00
91					0.2	0.016	0.340	0.014	0.002	0.00
92					0.2	0.016	0.337	0.014	0.002	0.00
93					0.2	0.016	0.335	0.014	0.002	0.00
94					0.2	0.016	0.333	0.014	0.002	0.00
95					0.2	0.016	0.331	0.014	0.002	0.00
96					0.2	0.016	0.330	0.014	0.002	0.00
TOTALS					100.0				0.80	0.18

EFFECTIVE RAIN = 0.20 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.600	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.300
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.016	1.060	0.014	0.002	0.00
2					0.3	0.024	1.047	0.022	0.002	0.00
3					0.3	0.024	1.035	0.022	0.002	0.00
4					0.4	0.032	1.023	0.029	0.003	0.00
5					0.3	0.024	1.011	0.022	0.002	0.00
6					0.3	0.024	0.999	0.022	0.002	0.00
7					0.3	0.024	0.987	0.022	0.002	0.00
8					0.4	0.032	0.975	0.029	0.003	0.00
9					0.4	0.032	0.963	0.029	0.003	0.00
10					0.4	0.032	0.951	0.029	0.003	0.00
11					0.5	0.040	0.940	0.036	0.004	0.00
12					0.5	0.040	0.928	0.036	0.004	0.00
13					0.5	0.040	0.917	0.036	0.004	0.00
14					0.5	0.040	0.905	0.036	0.004	0.00
15					0.5	0.040	0.894	0.036	0.004	0.00
16					0.6	0.048	0.883	0.043	0.005	0.00
17					0.6	0.048	0.872	0.043	0.005	0.00
18					0.7	0.056	0.861	0.050	0.006	0.00
19					0.7	0.056	0.849	0.050	0.006	0.00
20					0.8	0.064	0.839	0.058	0.006	0.00
21					0.6	0.048	0.828	0.043	0.005	0.00
22					0.7	0.056	0.817	0.050	0.006	0.00
23					0.8	0.064	0.806	0.058	0.006	0.00
24					0.8	0.064	0.796	0.058	0.006	0.00
25					0.9	0.072	0.785	0.065	0.007	0.01
26					0.9	0.072	0.774	0.065	0.007	0.01
27					1.0	0.080	0.764	0.072	0.008	0.01
28					1.0	0.080	0.754	0.072	0.008	0.01
29					1.0	0.080	0.744	0.072	0.008	0.01
30					1.1	0.088	0.733	0.079	0.009	0.01
31					1.2	0.096	0.723	0.086	0.010	0.01
32					1.3	0.104	0.713	0.094	0.010	0.01
33					1.5	0.120	0.703	0.108	0.012	0.01
34					1.5	0.120	0.694	0.108	0.012	0.01
35					1.6	0.128	0.684	0.115	0.013	0.01
36					1.7	0.136	0.674	0.122	0.014	0.01
37					1.9	0.152	0.665	0.137	0.015	0.01
38					2.0	0.160	0.655	0.144	0.016	0.01
39					2.1	0.168	0.646	0.151	0.017	0.01
40					2.2	0.176	0.637	0.158	0.018	0.01
41					1.5	0.120	0.627	0.108	0.012	0.01
42					1.5	0.120	0.618	0.108	0.012	0.01
43					2.0	0.160	0.609	0.144	0.016	0.01
44					2.0	0.160	0.600	0.144	0.016	0.01
45					1.9	0.152	0.592	0.137	0.015	0.01
46					1.9	0.152	0.583	0.137	0.015	0.01
47					1.7	0.136	0.574	0.122	0.014	0.01
48					1.8	0.144	0.566	0.130	0.014	0.01
49					2.5	0.200	0.557	0.180	0.020	0.01
50					2.6	0.208	0.549	0.187	0.021	0.02
51					2.8	0.224	0.541	0.202	0.022	0.02
52					2.9	0.232	0.533	0.209	0.023	0.02
53					3.4	0.272	0.524	0.245	0.027	0.02
54					3.4	0.272	0.517	0.245	0.027	**0.02**
55					2.3	0.184	0.509	0.166	0.018	0.01
56					2.3	0.184	0.501	0.166	0.018	0.01
57					2.7	0.216	0.493	0.194	0.022	0.02
58					2.6	0.208	0.486	0.187	0.021	0.02
59					2.6	0.208	0.478	0.187	0.021	0.02
60					2.5	0.200	0.471	0.180	0.020	0.01
61					2.4	0.192	0.464	0.173	0.019	0.01
62					2.3	0.184	0.457	0.166	0.018	0.01
63					1.9	0.152	0.450	0.137	0.015	0.01
64					1.9	0.152	0.443	0.137	0.015	0.01
65					0.4	0.032	0.436	0.029	0.003	0.00

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	2-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.600	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.300
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.032	0.429	0.029	0.003	0.00
67					0.3	0.024	0.423	0.022	0.002	0.00
68					0.3	0.024	0.417	0.022	0.002	0.00
69					0.5	0.040	0.410	0.036	0.004	0.00
70					0.5	0.040	0.404	0.036	0.004	0.00
71					0.5	0.040	0.398	0.036	0.004	0.00
72					0.4	0.032	0.392	0.029	0.003	0.00
73					0.4	0.032	0.386	0.029	0.003	0.00
74					0.4	0.032	0.381	0.029	0.003	0.00
75					0.3	0.024	0.375	0.022	0.002	0.00
76					0.2	0.016	0.370	0.014	0.002	0.00
77					0.3	0.024	0.365	0.022	0.002	0.00
78					0.4	0.032	0.360	0.029	0.003	0.00
79					0.3	0.024	0.355	0.022	0.002	0.00
80					0.2	0.016	0.350	0.014	0.002	0.00
81					0.3	0.024	0.345	0.022	0.002	0.00
82					0.3	0.024	0.341	0.022	0.002	0.00
83					0.3	0.024	0.337	0.022	0.002	0.00
84					0.2	0.016	0.332	0.014	0.002	0.00
85					0.3	0.024	0.329	0.022	0.002	0.00
86					0.2	0.016	0.325	0.014	0.002	0.00
87					0.3	0.024	0.321	0.022	0.002	0.00
88					0.2	0.016	0.318	0.014	0.002	0.00
89					0.3	0.024	0.315	0.022	0.002	0.00
90					0.2	0.016	0.312	0.014	0.002	0.00
91					0.2	0.016	0.309	0.014	0.002	0.00
92					0.2	0.016	0.307	0.014	0.002	0.00
93					0.2	0.016	0.305	0.014	0.002	0.00
94					0.2	0.016	0.303	0.014	0.002	0.00
95					0.2	0.016	0.301	0.014	0.002	0.00
96					0.2	0.016	0.300	0.014	0.002	0.00
TOTALS					100.0				0.80	0.58

EFFECTIVE RAIN = 0.20 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	80%	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.340	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.340	0.067	0.007	0.23
2					1.2	0.081	0.340	0.073	0.008	0.25
3					1.3	0.087	0.340	0.079	0.009	0.28
4					1.4	0.094	0.340	0.085	0.009	0.30
5					1.4	0.094	0.340	0.085	0.009	0.30
6					1.5	0.101	0.340	0.091	0.010	0.32
7					1.6	0.108	0.340	0.097	0.011	0.34
8					1.6	0.108	0.340	0.097	0.011	0.34
9					1.6	0.108	0.340	0.097	0.011	0.34
10					1.6	0.108	0.340	0.097	0.011	0.34
11					1.6	0.108	0.340	0.097	0.011	0.34
12					1.7	0.114	0.340	0.103	0.011	0.36
13					1.7	0.114	0.340	0.103	0.011	0.36
14					1.8	0.121	0.340	0.109	0.012	0.38
15					1.8	0.121	0.340	0.109	0.012	0.38
16					1.8	0.121	0.340	0.109	0.012	0.38
17					2.0	0.134	0.340	0.121	0.013	0.42
18					2.0	0.134	0.340	0.121	0.013	0.42
19					2.1	0.141	0.340	0.127	0.014	0.44
20					2.2	0.148	0.340	0.133	0.015	0.47
21					2.5	0.168	0.340	0.151	0.017	0.53
22					2.8	0.188	0.340	0.169	0.019	0.59
23					3.0	0.202	0.340	0.181	0.020	0.64
24					3.2	0.215	0.340	0.194	0.022	0.68
25					3.5	0.235	0.340	0.212	0.024	0.74
26					3.9	0.262	0.340	0.236	0.026	0.83
27					4.2	0.282	0.340	0.254	0.028	0.89
28					4.5	0.302	0.340	0.272	0.030	0.95
29					4.8	0.323	0.340	0.290	0.032	1.02
30					5.1	0.343	0.340	0.308	0.034	1.08
31					6.7	0.450	0.340	0.405	0.110	3.47
32					8.1	0.544	0.340	0.490	0.204	6.44
33					10.3	0.692	0.340	0.623	0.352	**11.09**
34					2.8	0.188	0.340	0.169	0.019	0.59
35					1.1	0.074	0.340	0.067	0.007	0.23
36					0.5	0.034	0.340	0.030	0.003	0.11
TOTALS					100.0				1.17	36.86

EFFECTIVE RAIN = 0.20 INCHES
TOTAL RUNOFF VOLUME = 0.51 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.106	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.106	0.011	0.063	0.82
2					1.2	0.081	0.106	0.012	0.068	0.89
3					1.3	0.087	0.106	0.013	0.074	0.97
4					1.4	0.094	0.106	0.014	0.080	1.04
5					1.4	0.094	0.106	0.014	0.080	1.04
6					1.5	0.101	0.106	0.015	0.086	1.11
7					1.6	0.108	0.106	0.016	0.091	1.19
8					1.6	0.108	0.106	0.016	0.091	1.19
9					1.6	0.108	0.106	0.016	0.091	1.19
10					1.6	0.108	0.106	0.016	0.091	1.19
11					1.6	0.108	0.106	0.016	0.091	1.19
12					1.7	0.114	0.106	0.017	0.097	1.26
13					1.7	0.114	0.106	0.017	0.097	1.26
14					1.8	0.121	0.106	0.018	0.103	1.34
15					1.8	0.121	0.106	0.018	0.103	1.34
16					1.8	0.121	0.106	0.018	0.103	1.34
17					2.0	0.134	0.106	0.020	0.114	1.49
18					2.0	0.134	0.106	0.020	0.114	1.49
19					2.1	0.141	0.106	0.021	0.120	1.56
20					2.2	0.148	0.106	0.022	0.125	1.63
21					2.5	0.168	0.106	0.025	0.143	1.86
22					2.8	0.188	0.106	0.029	0.160	2.08
23					3.0	0.202	0.106	0.031	0.171	2.23
24					3.2	0.215	0.106	0.033	0.182	2.38
25					3.5	0.235	0.106	0.036	0.200	2.60
26					3.9	0.262	0.106	0.040	0.222	2.90
27					4.2	0.282	0.106	0.043	0.239	3.12
28					4.5	0.302	0.106	0.046	0.257	3.34
29					4.8	0.323	0.106	0.049	0.274	3.57
30					5.1	0.343	0.106	0.052	0.291	3.79
31					6.7	0.450	0.106	0.068	0.382	4.98
32					8.1	0.544	0.106	0.082	0.462	6.02
33					10.3	0.692	0.106	0.105	0.587	**7.65**
34					2.8	0.188	0.106	0.029	0.160	2.08
35					1.1	0.074	0.106	0.011	0.063	0.82
36					0.5	0.034	0.106	0.005	0.029	0.37
TOTALS					100.0				5.70	74.27

EFFECTIVE RAIN = 0.95 INCHES
TOTAL RUNOFF VOLUME = 1.02 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.057	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.057	0.008	0.066	0.78
2					1.2	0.081	0.057	0.008	0.072	0.85
3					1.3	0.087	0.057	0.009	0.078	0.92
4					1.4	0.094	0.057	0.010	0.084	0.99
5					1.4	0.094	0.057	0.010	0.084	0.99
6					1.5	0.101	0.057	0.010	0.090	1.06
7					1.6	0.108	0.057	0.011	0.096	1.13
8					1.6	0.108	0.057	0.011	0.096	1.13
9					1.6	0.108	0.057	0.011	0.096	1.13
10					1.6	0.108	0.057	0.011	0.096	1.13
11					1.6	0.108	0.057	0.011	0.096	1.13
12					1.7	0.114	0.057	0.012	0.102	1.20
13					1.7	0.114	0.057	0.012	0.102	1.20
14					1.8	0.121	0.057	0.012	0.108	1.27
15					1.8	0.121	0.057	0.012	0.108	1.27
16					1.8	0.121	0.057	0.012	0.108	1.27
17					2.0	0.134	0.057	0.014	0.121	1.42
18					2.0	0.134	0.057	0.014	0.121	1.42
19					2.1	0.141	0.057	0.015	0.127	1.49
20					2.2	0.148	0.057	0.015	0.133	1.56
21					2.5	0.168	0.057	0.017	0.151	1.77
22					2.8	0.188	0.057	0.019	0.169	1.98
23					3.0	0.202	0.057	0.021	0.181	2.12
24					3.2	0.215	0.057	0.022	0.193	2.27
25					3.5	0.235	0.057	0.024	0.211	2.48
26					3.9	0.262	0.057	0.027	0.235	2.76
27					4.2	0.282	0.057	0.029	0.253	2.97
28					4.5	0.302	0.057	0.031	0.271	3.19
29					4.8	0.323	0.057	0.033	0.289	3.40
30					5.1	0.343	0.057	0.035	0.307	3.61
31					6.7	0.450	0.057	0.046	0.404	4.75
32					8.1	0.544	0.057	0.056	0.488	5.74
33					10.3	0.692	0.057	0.071	0.635	**7.46**
34					2.8	0.188	0.057	0.019	0.169	1.98
35					1.1	0.074	0.057	0.008	0.066	0.78
36					0.5	0.034	0.057	0.003	0.030	0.35
TOTALS					100.0				6.04	71.00

EFFECTIVE RAIN = 1.01 INCHES
TOTAL RUNOFF VOLUME = 0.98 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.111	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.111	0.015	0.059	0.11
2					1.2	0.081	0.111	0.017	0.064	0.12
3					1.3	0.087	0.111	0.018	0.069	0.13
4					1.4	0.094	0.111	0.020	0.075	0.14
5					1.4	0.094	0.111	0.020	0.075	0.14
6					1.5	0.101	0.111	0.021	0.080	0.15
7					1.6	0.108	0.111	0.022	0.085	0.16
8					1.6	0.108	0.111	0.022	0.085	0.16
9					1.6	0.108	0.111	0.022	0.085	0.16
10					1.6	0.108	0.111	0.022	0.085	0.16
11					1.6	0.108	0.111	0.022	0.085	0.16
12					1.7	0.114	0.111	0.024	0.090	0.17
13					1.7	0.114	0.111	0.024	0.090	0.17
14					1.8	0.121	0.111	0.025	0.096	0.18
15					1.8	0.121	0.111	0.025	0.096	0.18
16					1.8	0.121	0.111	0.025	0.096	0.18
17					2.0	0.134	0.111	0.028	0.106	0.20
18					2.0	0.134	0.111	0.028	0.106	0.20
19					2.1	0.141	0.111	0.029	0.112	0.21
20					2.2	0.148	0.111	0.031	0.117	0.22
21					2.5	0.168	0.111	0.035	0.133	0.25
22					2.8	0.188	0.111	0.039	0.149	0.28
23					3.0	0.202	0.111	0.042	0.160	0.30
24					3.2	0.215	0.111	0.045	0.170	0.32
25					3.5	0.235	0.111	0.049	0.186	0.35
26					3.9	0.262	0.111	0.054	0.208	0.39
27					4.2	0.282	0.111	0.059	0.224	0.42
28					4.5	0.302	0.111	0.063	0.240	0.45
29					4.8	0.323	0.111	0.067	0.255	0.48
30					5.1	0.343	0.111	0.071	0.271	0.51
31					6.7	0.450	0.111	0.094	0.357	0.67
32					8.1	0.544	0.111	0.113	0.434	0.82
33					10.3	0.692	0.111	0.144	0.581	**1.09**
34					2.8	0.188	0.111	0.039	0.149	0.28
35					1.1	0.074	0.111	0.015	0.059	0.11
36					0.5	0.034	0.111	0.007	0.027	0.05
TOTALS					100.0				5.36	10.09

EFFECTIVE RAIN = 0.89 INCHES
TOTAL RUNOFF VOLUME = 0.14 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.272	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.272	0.031	0.043	0.10
2					1.2	0.081	0.272	0.033	0.047	0.11
3					1.3	0.087	0.272	0.036	0.051	0.12
4					1.4	0.094	0.272	0.039	0.055	0.13
5					1.4	0.094	0.272	0.039	0.055	0.13
6					1.5	0.101	0.272	0.042	0.059	0.14
7					1.6	0.108	0.272	0.045	0.063	0.15
8					1.6	0.108	0.272	0.045	0.063	0.15
9					1.6	0.108	0.272	0.045	0.063	0.15
10					1.6	0.108	0.272	0.045	0.063	0.15
11					1.6	0.108	0.272	0.045	0.063	0.15
12					1.7	0.114	0.272	0.047	0.067	0.16
13					1.7	0.114	0.272	0.047	0.067	0.16
14					1.8	0.121	0.272	0.050	0.071	0.17
15					1.8	0.121	0.272	0.050	0.071	0.17
16					1.8	0.121	0.272	0.050	0.071	0.17
17					2.0	0.134	0.272	0.056	0.079	0.19
18					2.0	0.134	0.272	0.056	0.079	0.19
19					2.1	0.141	0.272	0.058	0.083	0.20
20					2.2	0.148	0.272	0.061	0.087	0.21
21					2.5	0.168	0.272	0.070	0.098	0.24
22					2.8	0.188	0.272	0.078	0.110	0.27
23					3.0	0.202	0.272	0.083	0.118	0.29
24					3.2	0.215	0.272	0.089	0.126	0.30
25					3.5	0.235	0.272	0.097	0.138	0.33
26					3.9	0.262	0.272	0.108	0.154	0.37
27					4.2	0.282	0.272	0.117	0.165	0.40
28					4.5	0.302	0.272	0.125	0.177	0.43
29					4.8	0.323	0.272	0.134	0.189	0.46
30					5.1	0.343	0.272	0.142	0.201	0.49
31					6.7	0.450	0.272	0.186	0.264	0.64
32					8.1	0.544	0.272	0.225	0.319	0.77
33					10.3	0.692	0.272	0.287	0.420	**1.02**
34					2.8	0.188	0.272	0.078	0.110	0.27
35					1.1	0.074	0.272	0.031	0.043	0.10
36					0.5	0.034	0.272	0.014	0.020	0.05
TOTALS					100.0				3.95	9.56

EFFECTIVE RAIN = 0.66 INCHES
TOTAL RUNOFF VOLUME = 0.13 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.660	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.660	0.067	0.007	0.00
2					1.2	0.081	0.660	0.073	0.008	0.00
3					1.3	0.087	0.660	0.079	0.009	0.00
4					1.4	0.094	0.660	0.085	0.009	0.00
5					1.4	0.094	0.660	0.085	0.009	0.00
6					1.5	0.101	0.660	0.091	0.010	0.00
7					1.6	0.108	0.660	0.097	0.011	0.00
8					1.6	0.108	0.660	0.097	0.011	0.00
9					1.6	0.108	0.660	0.097	0.011	0.00
10					1.6	0.108	0.660	0.097	0.011	0.00
11					1.6	0.108	0.660	0.097	0.011	0.00
12					1.7	0.114	0.660	0.103	0.011	0.00
13					1.7	0.114	0.660	0.103	0.011	0.00
14					1.8	0.121	0.660	0.109	0.012	0.00
15					1.8	0.121	0.660	0.109	0.012	0.00
16					1.8	0.121	0.660	0.109	0.012	0.00
17					2.0	0.134	0.660	0.121	0.013	0.00
18					2.0	0.134	0.660	0.121	0.013	0.00
19					2.1	0.141	0.660	0.127	0.014	0.00
20					2.2	0.148	0.660	0.133	0.015	0.00
21					2.5	0.168	0.660	0.151	0.017	0.00
22					2.8	0.188	0.660	0.169	0.019	0.00
23					3.0	0.202	0.660	0.181	0.020	0.00
24					3.2	0.215	0.660	0.194	0.022	0.00
25					3.5	0.235	0.660	0.212	0.024	0.01
26					3.9	0.262	0.660	0.236	0.026	0.01
27					4.2	0.282	0.660	0.254	0.028	0.01
28					4.5	0.302	0.660	0.272	0.030	0.01
29					4.8	0.323	0.660	0.290	0.032	0.01
30					5.1	0.343	0.660	0.308	0.034	0.01
31					6.7	0.450	0.660	0.405	0.045	0.01
32					8.1	0.544	0.660	0.490	0.054	0.01
33					10.3	0.692	0.660	0.623	0.069	**0.02**
34					2.8	0.188	0.660	0.169	0.019	0.00
35					1.1	0.074	0.660	0.067	0.007	0.00
36					0.5	0.034	0.660	0.030	0.003	0.00
TOTALS					100.0				0.67	0.15

EFFECTIVE RAIN = 0.11 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.12
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.600	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.074	0.600	0.067	0.007	0.01
2					1.2	0.081	0.600	0.073	0.008	0.01
3					1.3	0.087	0.600	0.079	0.009	0.01
4					1.4	0.094	0.600	0.085	0.009	0.01
5					1.4	0.094	0.600	0.085	0.009	0.01
6					1.5	0.101	0.600	0.091	0.010	0.01
7					1.6	0.108	0.600	0.097	0.011	0.01
8					1.6	0.108	0.600	0.097	0.011	0.01
9					1.6	0.108	0.600	0.097	0.011	0.01
10					1.6	0.108	0.600	0.097	0.011	0.01
11					1.6	0.108	0.600	0.097	0.011	0.01
12					1.7	0.114	0.600	0.103	0.011	0.01
13					1.7	0.114	0.600	0.103	0.011	0.01
14					1.8	0.121	0.600	0.109	0.012	0.01
15					1.8	0.121	0.600	0.109	0.012	0.01
16					1.8	0.121	0.600	0.109	0.012	0.01
17					2.0	0.134	0.600	0.121	0.013	0.01
18					2.0	0.134	0.600	0.121	0.013	0.01
19					2.1	0.141	0.600	0.127	0.014	0.01
20					2.2	0.148	0.600	0.133	0.015	0.01
21					2.5	0.168	0.600	0.151	0.017	0.01
22					2.8	0.188	0.600	0.169	0.019	0.01
23					3.0	0.202	0.600	0.181	0.020	0.01
24					3.2	0.215	0.600	0.194	0.022	0.02
25					3.5	0.235	0.600	0.212	0.024	0.02
26					3.9	0.262	0.600	0.236	0.026	0.02
27					4.2	0.282	0.600	0.254	0.028	0.02
28					4.5	0.302	0.600	0.272	0.030	0.02
29					4.8	0.323	0.600	0.290	0.032	0.02
30					5.1	0.343	0.600	0.308	0.034	0.03
31					6.7	0.450	0.600	0.405	0.045	0.03
32					8.1	0.544	0.600	0.490	0.054	0.04
33					10.3	0.692	0.600	0.623	0.092	**0.07**
34					2.8	0.188	0.600	0.169	0.019	0.01
35					1.1	0.074	0.600	0.067	0.007	0.01
36					0.5	0.034	0.600	0.030	0.003	0.00
TOTALS					100.0				0.69	0.51

EFFECTIVE RAIN = 0.12 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.340	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.340	0.112	0.012	0.39
2					1.3	0.124	0.340	0.112	0.012	0.39
3					1.1	0.105	0.340	0.095	0.011	0.33
4					1.5	0.144	0.340	0.129	0.014	0.45
5					1.5	0.144	0.340	0.129	0.014	0.45
6					1.8	0.172	0.340	0.155	0.017	0.54
7					1.5	0.144	0.340	0.129	0.014	0.45
8					1.8	0.172	0.340	0.155	0.017	0.54
9					1.8	0.172	0.340	0.155	0.017	0.54
10					1.5	0.144	0.340	0.129	0.014	0.45
11					1.6	0.153	0.340	0.138	0.015	0.48
12					1.8	0.172	0.340	0.155	0.017	0.54
13					2.2	0.211	0.340	0.190	0.021	0.66
14					2.2	0.211	0.340	0.190	0.021	0.66
15					2.2	0.211	0.340	0.190	0.021	0.66
16					2.0	0.192	0.340	0.172	0.019	0.60
17					2.6	0.249	0.340	0.224	0.025	0.78
18					2.7	0.259	0.340	0.233	0.026	0.81
19					2.4	0.230	0.340	0.207	0.023	0.72
20					2.7	0.259	0.340	0.233	0.026	0.81
21					3.3	0.316	0.340	0.284	0.032	1.00
22					3.1	0.297	0.340	0.267	0.030	0.94
23					2.9	0.278	0.340	0.250	0.028	0.87
24					3.0	0.287	0.340	0.259	0.029	0.90
25					3.1	0.297	0.340	0.267	0.030	0.94
26					4.2	0.402	0.340	0.362	0.062	1.96
27					5.0	0.479	0.340	0.431	0.139	4.37
28					3.5	0.335	0.340	0.302	0.034	1.06
29					6.8	0.651	0.340	0.586	0.311	9.80
30					7.3	0.699	0.340	0.629	0.359	11.31
31					8.2	0.785	0.340	0.707	0.445	**14.03**
32					5.9	0.565	0.340	0.508	0.225	7.09
33					2.0	0.192	0.340	0.172	0.019	0.60
34					1.8	0.172	0.340	0.155	0.017	0.54
35					1.8	0.172	0.340	0.155	0.017	0.54
36					0.6	0.057	0.340	0.052	0.006	0.18
TOTALS					100.0				2.14	67.44

EFFECTIVE RAIN = 0.18 INCHES
TOTAL RUNOFF VOLUME = 0.46 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.106	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.106	0.019	0.106	1.38
2					1.3	0.124	0.106	0.019	0.106	1.38
3					1.1	0.105	0.106	0.016	0.089	1.16
4					1.5	0.144	0.106	0.022	0.122	1.59
5					1.5	0.144	0.106	0.022	0.122	1.59
6					1.8	0.172	0.106	0.026	0.146	1.91
7					1.5	0.144	0.106	0.022	0.122	1.59
8					1.8	0.172	0.106	0.026	0.146	1.91
9					1.8	0.172	0.106	0.026	0.146	1.91
10					1.5	0.144	0.106	0.022	0.122	1.59
11					1.6	0.153	0.106	0.023	0.130	1.69
12					1.8	0.172	0.106	0.026	0.146	1.91
13					2.2	0.211	0.106	0.032	0.179	2.33
14					2.2	0.211	0.106	0.032	0.179	2.33
15					2.2	0.211	0.106	0.032	0.179	2.33
16					2.0	0.192	0.106	0.029	0.163	2.12
17					2.6	0.249	0.106	0.038	0.211	2.75
18					2.7	0.259	0.106	0.039	0.219	2.86
19					2.4	0.230	0.106	0.035	0.195	2.54
20					2.7	0.259	0.106	0.039	0.219	2.86
21					3.3	0.316	0.106	0.048	0.268	3.49
22					3.1	0.297	0.106	0.045	0.252	3.28
23					2.9	0.278	0.106	0.042	0.236	3.07
24					3.0	0.287	0.106	0.044	0.244	3.18
25					3.1	0.297	0.106	0.045	0.252	3.28
26					4.2	0.402	0.106	0.061	0.341	4.45
27					5.0	0.479	0.106	0.073	0.406	5.29
28					3.5	0.335	0.106	0.051	0.284	3.70
29					6.8	0.651	0.106	0.099	0.553	7.20
30					7.3	0.699	0.106	0.106	0.593	7.73
31					8.2	0.785	0.106	0.119	0.679	**8.85**
32					5.9	0.565	0.106	0.086	0.479	6.24
33					2.0	0.192	0.106	0.029	0.163	2.12
34					1.8	0.172	0.106	0.026	0.146	1.91
35					1.8	0.172	0.106	0.026	0.146	1.91
36					0.6	0.057	0.106	0.009	0.049	0.64
TOTALS					100.0				8.14	106.01

EFFECTIVE RAIN = 0.68 INCHES
TOTAL RUNOFF VOLUME = 0.73 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.057	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.057	0.013	0.112	1.31
2					1.3	0.124	0.057	0.013	0.112	1.31
3					1.1	0.105	0.057	0.011	0.094	1.11
4					1.5	0.144	0.057	0.015	0.129	1.51
5					1.5	0.144	0.057	0.015	0.129	1.51
6					1.8	0.172	0.057	0.018	0.155	1.82
7					1.5	0.144	0.057	0.015	0.129	1.51
8					1.8	0.172	0.057	0.018	0.155	1.82
9					1.8	0.172	0.057	0.018	0.155	1.82
10					1.5	0.144	0.057	0.015	0.129	1.51
11					1.6	0.153	0.057	0.016	0.137	1.61
12					1.8	0.172	0.057	0.018	0.155	1.82
13					2.2	0.211	0.057	0.022	0.189	2.22
14					2.2	0.211	0.057	0.022	0.189	2.22
15					2.2	0.211	0.057	0.022	0.189	2.22
16					2.0	0.192	0.057	0.020	0.172	2.02
17					2.6	0.249	0.057	0.026	0.223	2.62
18					2.7	0.259	0.057	0.027	0.232	2.73
19					2.4	0.230	0.057	0.024	0.206	2.42
20					2.7	0.259	0.057	0.027	0.232	2.73
21					3.3	0.316	0.057	0.033	0.283	3.33
22					3.1	0.297	0.057	0.031	0.266	3.13
23					2.9	0.278	0.057	0.029	0.249	2.93
24					3.0	0.287	0.057	0.030	0.258	3.03
25					3.1	0.297	0.057	0.031	0.266	3.13
26					4.2	0.402	0.057	0.041	0.361	4.24
27					5.0	0.479	0.057	0.049	0.429	5.05
28					3.5	0.335	0.057	0.035	0.301	3.53
29					6.8	0.651	0.057	0.067	0.594	6.98
30					7.3	0.699	0.057	0.072	0.642	7.55
31					8.2	0.785	0.057	0.081	0.728	**8.56**
32					5.9	0.565	0.057	0.058	0.508	5.97
33					2.0	0.192	0.057	0.020	0.172	2.02
34					1.8	0.172	0.057	0.018	0.155	1.82
35					1.8	0.172	0.057	0.018	0.155	1.82
36					0.6	0.057	0.057	0.006	0.052	0.61
TOTALS					100.0				8.64	101.52

EFFECTIVE RAIN = 0.72 INCHES
TOTAL RUNOFF VOLUME = 0.70 AC-FT

R C F C & W C D HYDROLOGY MANUAL

"SHORTCUT METHOD"
SYNTHETIC UNIT HYDROGRAPH METHOD
Unit Hydrograph and Effective Rain Calculation Form

Project: Barker Industrial: DMA D/3 Proposed Condition

By _____ Date 11/17/16

Checked _____ Date _____

Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.111	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.111	0.026	0.099	0.19
2					1.3	0.124	0.111	0.026	0.099	0.19
3					1.1	0.105	0.111	0.022	0.083	0.16
4					1.5	0.144	0.111	0.030	0.114	0.21
5					1.5	0.144	0.111	0.030	0.114	0.21
6					1.8	0.172	0.111	0.036	0.137	0.26
7					1.5	0.144	0.111	0.030	0.114	0.21
8					1.8	0.172	0.111	0.036	0.137	0.26
9					1.8	0.172	0.111	0.036	0.137	0.26
10					1.5	0.144	0.111	0.030	0.114	0.21
11					1.6	0.153	0.111	0.032	0.121	0.23
12					1.8	0.172	0.111	0.036	0.137	0.26
13					2.2	0.211	0.111	0.044	0.167	0.31
14					2.2	0.211	0.111	0.044	0.167	0.31
15					2.2	0.211	0.111	0.044	0.167	0.31
16					2.0	0.192	0.111	0.040	0.152	0.29
17					2.6	0.249	0.111	0.052	0.197	0.37
18					2.7	0.259	0.111	0.054	0.205	0.39
19					2.4	0.230	0.111	0.048	0.182	0.34
20					2.7	0.259	0.111	0.054	0.205	0.39
21					3.3	0.316	0.111	0.066	0.250	0.47
22					3.1	0.297	0.111	0.062	0.235	0.44
23					2.9	0.278	0.111	0.058	0.220	0.41
24					3.0	0.287	0.111	0.060	0.228	0.43
25					3.1	0.297	0.111	0.062	0.235	0.44
26					4.2	0.402	0.111	0.084	0.319	0.60
27					5.0	0.479	0.111	0.100	0.379	0.71
28					3.5	0.335	0.111	0.070	0.265	0.50
29					6.8	0.651	0.111	0.135	0.540	1.02
30					7.3	0.699	0.111	0.145	0.588	1.11
31					8.2	0.785	0.111	0.163	0.675	**1.27**
32					5.9	0.565	0.111	0.117	0.454	0.86
33					2.0	0.192	0.111	0.040	0.152	0.29
34					1.8	0.172	0.111	0.036	0.137	0.26
35					1.8	0.172	0.111	0.036	0.137	0.26
36					0.6	0.057	0.111	0.012	0.046	0.09
TOTALS					100.0				7.70	14.50

EFFECTIVE RAIN = 0.64 INCHES

TOTAL RUNOFF VOLUME = 0.10 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.272	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.272	0.052	0.073	0.18
2					1.3	0.124	0.272	0.052	0.073	0.18
3					1.1	0.105	0.272	0.044	0.062	0.15
4					1.5	0.144	0.272	0.059	0.084	0.20
5					1.5	0.144	0.272	0.059	0.084	0.20
6					1.8	0.172	0.272	0.071	0.101	0.24
7					1.5	0.144	0.272	0.059	0.084	0.20
8					1.8	0.172	0.272	0.071	0.101	0.24
9					1.8	0.172	0.272	0.071	0.101	0.24
10					1.5	0.144	0.272	0.059	0.084	0.20
11					1.6	0.153	0.272	0.063	0.090	0.22
12					1.8	0.172	0.272	0.071	0.101	0.24
13					2.2	0.211	0.272	0.087	0.123	0.30
14					2.2	0.211	0.272	0.087	0.123	0.30
15					2.2	0.211	0.272	0.087	0.123	0.30
16					2.0	0.192	0.272	0.079	0.112	0.27
17					2.6	0.249	0.272	0.103	0.146	0.35
18					2.7	0.259	0.272	0.107	0.152	0.37
19					2.4	0.230	0.272	0.095	0.135	0.33
20					2.7	0.259	0.272	0.107	0.152	0.37
21					3.3	0.316	0.272	0.131	0.185	0.45
22					3.1	0.297	0.272	0.123	0.174	0.42
23					2.9	0.278	0.272	0.115	0.163	0.39
24					3.0	0.287	0.272	0.119	0.168	0.41
25					3.1	0.297	0.272	0.123	0.174	0.42
26					4.2	0.402	0.272	0.166	0.236	0.57
27					5.0	0.479	0.272	0.198	0.281	0.68
28					3.5	0.335	0.272	0.139	0.196	0.48
29					6.8	0.651	0.272	0.270	0.382	0.92
30					7.3	0.699	0.272	0.289	0.427	1.03
31					8.2	0.785	0.272	0.325	0.513	**1.24**
32					5.9	0.565	0.272	0.234	0.331	0.80
33					2.0	0.192	0.272	0.079	0.112	0.27
34					1.8	0.172	0.272	0.071	0.101	0.24
35					1.8	0.172	0.272	0.071	0.101	0.24
36					0.6	0.057	0.272	0.024	0.034	0.08
TOTALS					100.0				5.68	13.75

EFFECTIVE RAIN = 0.47 INCHES
TOTAL RUNOFF VOLUME = 0.09 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.660	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.660	0.112	0.012	0.00
2					1.3	0.124	0.660	0.112	0.012	0.00
3					1.1	0.105	0.660	0.095	0.011	0.00
4					1.5	0.144	0.660	0.129	0.014	0.00
5					1.5	0.144	0.660	0.129	0.014	0.00
6					1.8	0.172	0.660	0.155	0.017	0.00
7					1.5	0.144	0.660	0.129	0.014	0.00
8					1.8	0.172	0.660	0.155	0.017	0.00
9					1.8	0.172	0.660	0.155	0.017	0.00
10					1.5	0.144	0.660	0.129	0.014	0.00
11					1.6	0.153	0.660	0.138	0.015	0.00
12					1.8	0.172	0.660	0.155	0.017	0.00
13					2.2	0.211	0.660	0.190	0.021	0.00
14					2.2	0.211	0.660	0.190	0.021	0.00
15					2.2	0.211	0.660	0.190	0.021	0.00
16					2.0	0.192	0.660	0.172	0.019	0.00
17					2.6	0.249	0.660	0.224	0.025	0.01
18					2.7	0.259	0.660	0.233	0.026	0.01
19					2.4	0.230	0.660	0.207	0.023	0.01
20					2.7	0.259	0.660	0.233	0.026	0.01
21					3.3	0.316	0.660	0.284	0.032	0.01
22					3.1	0.297	0.660	0.267	0.030	0.01
23					2.9	0.278	0.660	0.250	0.028	0.01
24					3.0	0.287	0.660	0.259	0.029	0.01
25					3.1	0.297	0.660	0.267	0.030	0.01
26					4.2	0.402	0.660	0.362	0.040	0.01
27					5.0	0.479	0.660	0.431	0.048	0.01
28					3.5	0.335	0.660	0.302	0.034	0.01
29					6.8	0.651	0.660	0.586	0.065	0.01
30					7.3	0.699	0.660	0.629	0.070	0.02
31					8.2	0.785	0.660	0.707	0.125	**0.03**
32					5.9	0.565	0.660	0.508	0.056	0.01
33					2.0	0.192	0.660	0.172	0.019	0.00
34					1.8	0.172	0.660	0.155	0.017	0.00
35					1.8	0.172	0.660	0.155	0.017	0.00
36					0.6	0.057	0.660	0.052	0.006	0.00
TOTALS					100.0				1.00	0.22

EFFECTIVE RAIN = 0.08 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.798
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.600	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.124	0.600	0.112	0.012	0.01
2					1.3	0.124	0.600	0.112	0.012	0.01
3					1.1	0.105	0.600	0.095	0.011	0.01
4					1.5	0.144	0.600	0.129	0.014	0.01
5					1.5	0.144	0.600	0.129	0.014	0.01
6					1.8	0.172	0.600	0.155	0.017	0.01
7					1.5	0.144	0.600	0.129	0.014	0.01
8					1.8	0.172	0.600	0.155	0.017	0.01
9					1.8	0.172	0.600	0.155	0.017	0.01
10					1.5	0.144	0.600	0.129	0.014	0.01
11					1.6	0.153	0.600	0.138	0.015	0.01
12					1.8	0.172	0.600	0.155	0.017	0.01
13					2.2	0.211	0.600	0.190	0.021	0.02
14					2.2	0.211	0.600	0.190	0.021	0.02
15					2.2	0.211	0.600	0.190	0.021	0.02
16					2.0	0.192	0.600	0.172	0.019	0.01
17					2.6	0.249	0.600	0.224	0.025	0.02
18					2.7	0.259	0.600	0.233	0.026	0.02
19					2.4	0.230	0.600	0.207	0.023	0.02
20					2.7	0.259	0.600	0.233	0.026	0.02
21					3.3	0.316	0.600	0.284	0.032	0.02
22					3.1	0.297	0.600	0.267	0.030	0.02
23					2.9	0.278	0.600	0.250	0.028	0.02
24					3.0	0.287	0.600	0.259	0.029	0.02
25					3.1	0.297	0.600	0.267	0.030	0.02
26					4.2	0.402	0.600	0.362	0.040	0.03
27					5.0	0.479	0.600	0.431	0.048	0.03
28					3.5	0.335	0.600	0.302	0.034	0.02
29					6.8	0.651	0.600	0.586	0.065	0.05
30					7.3	0.699	0.600	0.629	0.099	0.07
31					8.2	0.785	0.600	0.707	0.185	**0.14**
32					5.9	0.565	0.600	0.508	0.056	0.04
33					2.0	0.192	0.600	0.172	0.019	0.01
34					1.8	0.172	0.600	0.155	0.017	0.01
35					1.8	0.172	0.600	0.155	0.017	0.01
36					0.6	0.057	0.600	0.052	0.006	0.00
TOTALS					100.0				1.09	0.80

EFFECTIVE RAIN = 0.09 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.340	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.340	0.206	0.023	0.72
2					4.3	0.235	0.340	0.211	0.023	0.74
3					5.0	0.273	0.340	0.246	0.027	0.86
4					5.0	0.273	0.340	0.246	0.027	0.86
5					5.8	0.317	0.340	0.285	0.032	1.00
6					6.5	0.355	0.340	0.319	0.035	1.12
7					7.4	0.404	0.340	0.364	0.064	2.02
8					8.6	0.470	0.340	0.423	0.130	4.08
9					12.3	0.672	0.340	0.604	0.332	10.45
10					29.1	1.589	0.340	1.430	1.249	**39.34**
11					6.8	0.371	0.340	0.334	0.037	1.17
12					5.0	0.273	0.340	0.246	0.027	0.86
TOTALS					100.0				2.01	63.21

EFFECTIVE RAIN = 0.17 INCHES
TOTAL RUNOFF VOLUME = 0.44 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.106	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.106	0.035	0.195	2.53
2					4.3	0.235	0.106	0.036	0.199	2.59
3					5.0	0.273	0.106	0.041	0.232	3.02
4					5.0	0.273	0.106	0.041	0.232	3.02
5					5.8	0.317	0.106	0.048	0.269	3.50
6					6.5	0.355	0.106	0.054	0.301	3.92
7					7.4	0.404	0.106	0.061	0.343	4.47
8					8.6	0.470	0.106	0.071	0.398	5.19
9					12.3	0.672	0.106	0.102	0.570	7.42
10					29.1	1.589	0.106	0.241	1.483	**19.32**
11					6.8	0.371	0.106	0.056	0.315	4.10
12					5.0	0.273	0.106	0.041	0.232	3.02
TOTALS					100.0				4.77	62.11

EFFECTIVE RAIN = 0.40 INCHES
TOTAL RUNOFF VOLUME = 0.43 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.057	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.057	0.024	0.206	2.42
2					4.3	0.235	0.057	0.024	0.211	2.47
3					5.0	0.273	0.057	0.028	0.245	2.88
4					5.0	0.273	0.057	0.028	0.245	2.88
5					5.8	0.317	0.057	0.033	0.284	3.34
6					6.5	0.355	0.057	0.037	0.318	3.74
7					7.4	0.404	0.057	0.042	0.362	4.26
8					8.6	0.470	0.057	0.048	0.421	4.95
9					12.3	0.672	0.057	0.069	0.615	7.22
10					29.1	1.589	0.057	0.164	1.532	**18.00**
11					6.8	0.371	0.057	0.038	0.333	3.91
12					5.0	0.273	0.057	0.028	0.245	2.88
TOTALS					100.0				5.02	58.95

EFFECTIVE RAIN = 0.42 INCHES
TOTAL RUNOFF VOLUME = 0.41 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.111	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.111	0.048	0.182	0.34
2					4.3	0.235	0.111	0.049	0.186	0.35
3					5.0	0.273	0.111	0.057	0.216	0.41
4					5.0	0.273	0.111	0.057	0.216	0.41
5					5.8	0.317	0.111	0.066	0.251	0.47
6					6.5	0.355	0.111	0.074	0.281	0.53
7					7.4	0.404	0.111	0.084	0.320	0.60
8					8.6	0.470	0.111	0.098	0.372	0.70
9					12.3	0.672	0.111	0.140	0.561	1.06
10					29.1	1.589	0.111	0.330	1.478	**2.78**
11					6.8	0.371	0.111	0.077	0.294	0.55
12					5.0	0.273	0.111	0.057	0.216	0.41
TOTALS					100.0				4.57	8.61

EFFECTIVE RAIN = 0.38 INCHES
TOTAL RUNOFF VOLUME = 0.06 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.272	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.272	0.095	0.134	0.33
2					4.3	0.235	0.272	0.097	0.138	0.33
3					5.0	0.273	0.272	0.113	0.160	0.39
4					5.0	0.273	0.272	0.113	0.160	0.39
5					5.8	0.317	0.272	0.131	0.186	0.45
6					6.5	0.355	0.272	0.147	0.208	0.50
7					7.4	0.404	0.272	0.167	0.237	0.57
8					8.6	0.470	0.272	0.194	0.275	0.67
9					12.3	0.672	0.272	0.278	0.400	0.97
10					29.1	1.589	0.272	0.658	1.317	**3.19**
11					6.8	0.371	0.272	0.154	0.218	0.53
12					5.0	0.273	0.272	0.113	0.160	0.39
TOTALS					100.0				3.59	8.69

EFFECTIVE RAIN = 0.30 INCHES
TOTAL RUNOFF VOLUME = 0.06 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.660	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.660	0.206	0.023	0.01
2					4.3	0.235	0.660	0.211	0.023	0.01
3					5.0	0.273	0.660	0.246	0.027	0.01
4					5.0	0.273	0.660	0.246	0.027	0.01
5					5.8	0.317	0.660	0.285	0.032	0.01
6					6.5	0.355	0.660	0.319	0.035	0.01
7					7.4	0.404	0.660	0.364	0.040	0.01
8					8.6	0.470	0.660	0.423	0.047	0.01
9					12.3	0.672	0.660	0.604	0.067	0.01
10					29.1	1.589	0.660	1.430	0.929	**0.21**
11					6.8	0.371	0.660	0.334	0.037	0.01
12					5.0	0.273	0.660	0.246	0.027	0.01
TOTALS					100.0				1.32	0.29

EFFECTIVE RAIN = 0.11 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

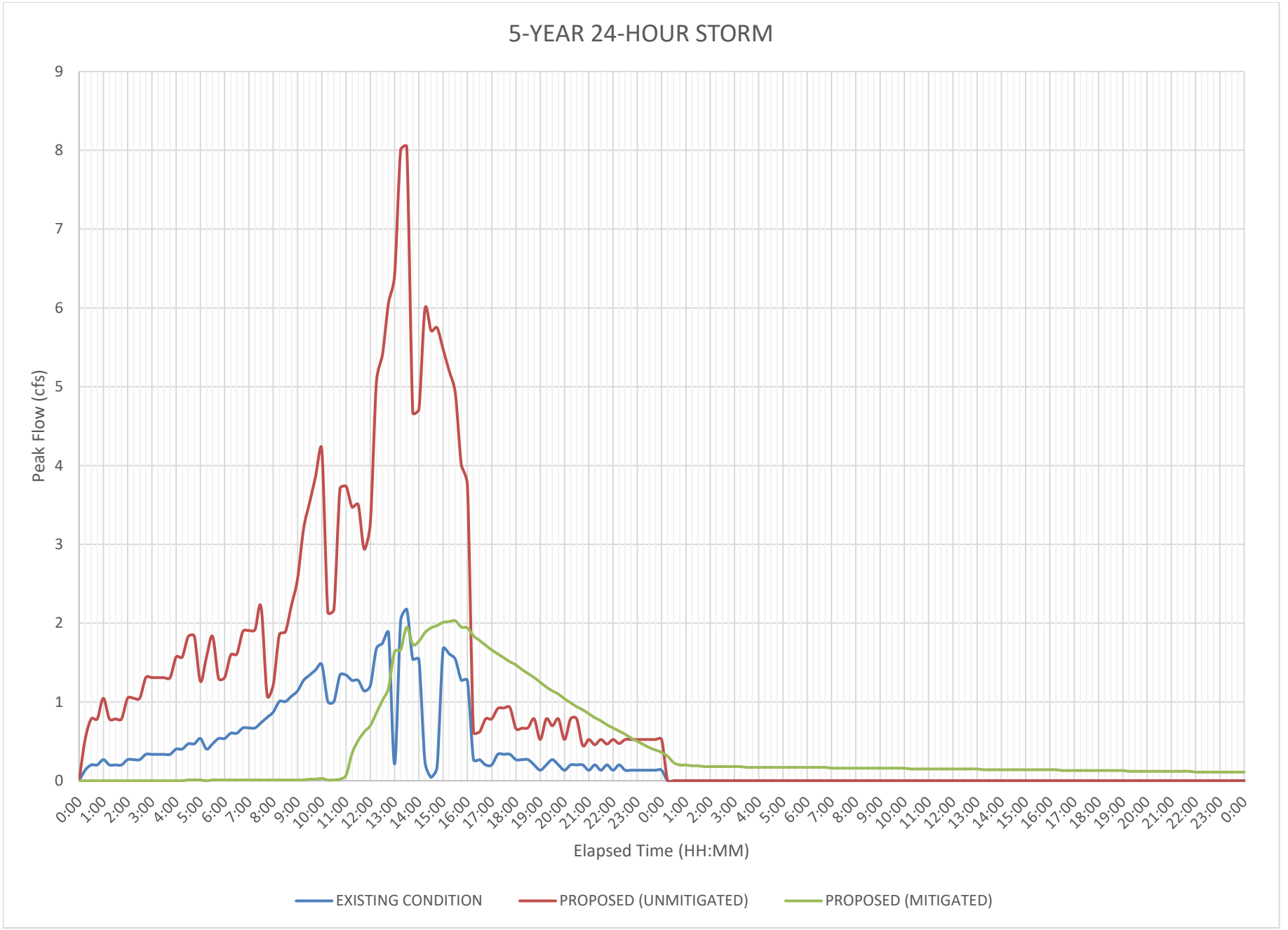
R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

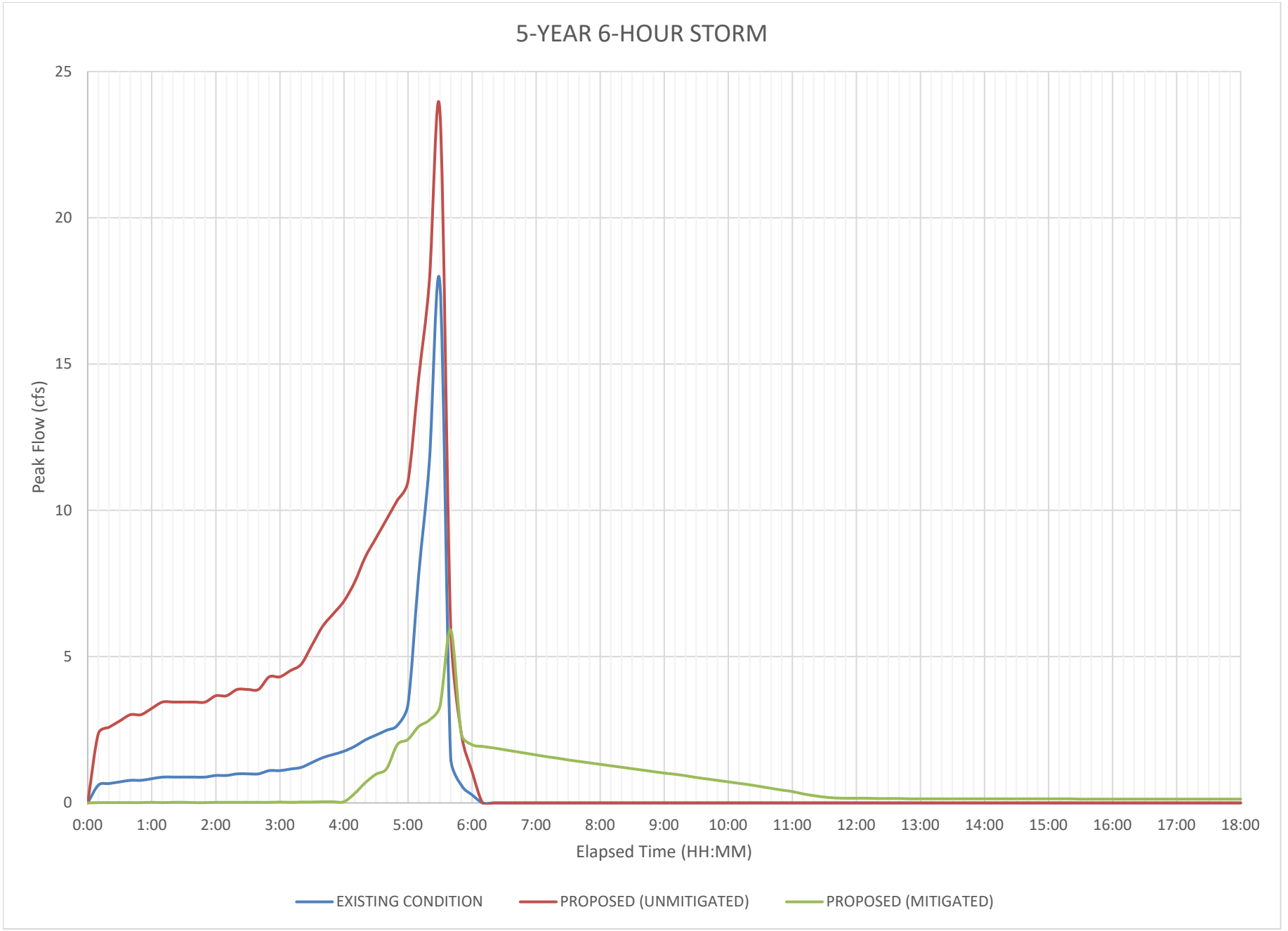
[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	2-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.455
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.600	[14] LOW LOSS RATE-PERCENT	90%

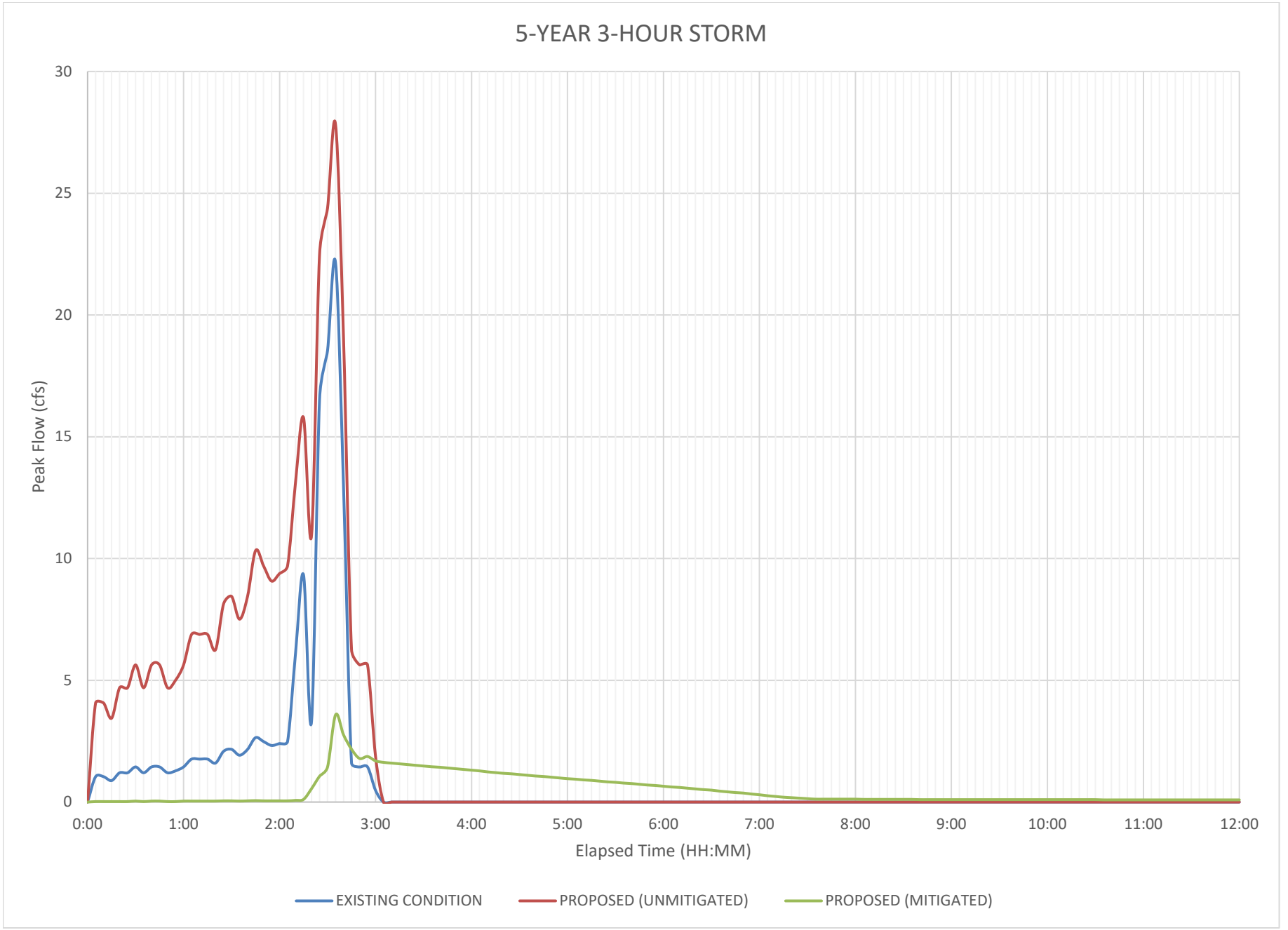
	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.229	0.600	0.206	0.023	0.02
2					4.3	0.235	0.600	0.211	0.023	0.02
3					5.0	0.273	0.600	0.246	0.027	0.02
4					5.0	0.273	0.600	0.246	0.027	0.02
5					5.8	0.317	0.600	0.285	0.032	0.02
6					6.5	0.355	0.600	0.319	0.035	0.03
7					7.4	0.404	0.600	0.364	0.040	0.03
8					8.6	0.470	0.600	0.423	0.047	0.03
9					12.3	0.672	0.600	0.604	0.072	0.05
10					29.1	1.589	0.600	1.430	0.989	**0.72**
11					6.8	0.371	0.600	0.334	0.037	0.03
12					5.0	0.273	0.600	0.246	0.027	0.02
TOTALS					100.0				1.38	1.01

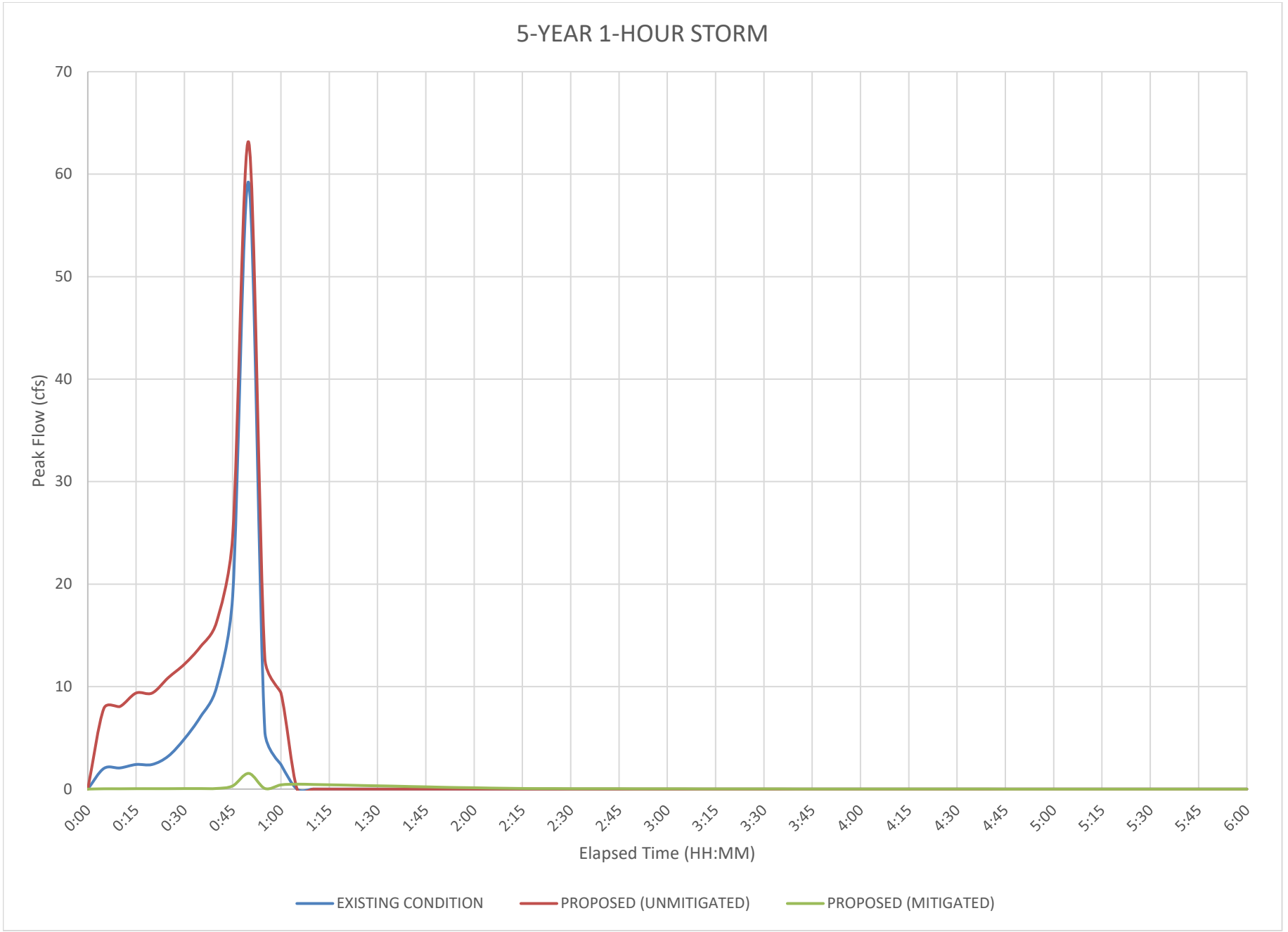
EFFECTIVE RAIN = 0.12 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

Storm Event	Peak Flow Summary (cfs)			
	Existing	Unmitigated	Mitigated	Difference
5-yr, 24-hour	2.18	8.05	2.03	-0.15
5-yr, 6-hour	17.71	23.60	5.92	-11.79
5-yr, 3-hour	22.15	27.83	3.58	-18.57
5-yr, 1-hour	59.14	63.09	1.53	-57.61


5-YEAR 24-HOUR STORM
Peak Flow (cfs)
0
1
2
3
4
5
6
7
8
9
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


5-YEAR 6-HOUR STORM
Peak Flow (cfs)
25
20
15
10
5
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


5-YEAR 3-HOUR STORM
Peak Flow (cfs)
30
25
20
15
10
5
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


5-YEAR 1-HOUR STORM
Peak Flow (cfs)
70
60
50
40
30
20
10
0
0:00
0:15
0:30
0:45
1:00
1:15
1:30
1:45
2:00
2:15
2:30
2:45
3:00
3:15
3:30
3:45
4:00
4:15
4:30
4:45
5:00
5:15
5:30
5:45
6:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)

Storm Event	Precip (inches)	Reference
5-yr, 24-hour	2.66	NOAA Atlas 14
5-yr, 6-hour	1.46	
5-yr, 3-hour	1.06	
5-yr, 1-hour	0.64	

PROJECT SITE EXISTING

Drainage Area	1360848	sf		
	31.24	ac		
A_i	0	sf		
	0%	imp		
Runoff Index	86		Note:	Plate E-6.1: Grass (Poor); Soil Types A (10%), C (34%) & D (56%); Area-Weighted
F_p	0.34	in/hr	Note:	Plate E-6.2: AMC I

$F = F_p(1 - 0.9A_i)$ **F = 0.340 in/hr**

For 24-hr storms, F_T is variable loss rate

$F_T = C[24 - (T/60)]^{1.55} + F_M$ **F_T = 0.600**

$C = (F - F_M)/54$ **C = 0.0031**

$T = \text{Unit Time}/2$ **T = 7.5**

$F_M = 0.5F$ **F_M = 0.170**

DMA D/1: PROPOSED

Drainage Area	562726	sf		
	12.92	ac		
A_i	526,512	sf		
	94%	imp		
Runoff Index	59		Note:	Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (13%), C (54%) & D (33%); Area-Weighted
F_p	0.67	in/hr	Note:	Plate E-6.2: AMC I

$F = F_p(1 - 0.9A_i)$ **F = 0.106 in/hr**

For 24-hr storms, F_T is variable loss rate

$F_T = C[24 - (T/60)]^{1.55} + F_M$ **F_T = 0.187**

$C = (F - F_M)/54$ **C = 0.0010**

$T = \text{Unit Time}/2$ **T = 7.5**

$F_M = 0.5F$ **F_M = 0.053**

DMA D/2: PROPOSED

Drainage Area	507634	sf		
	11.65	ac		
A_i	505,692	sf		
	100%	imp		
Runoff Index	71		Note:	Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types C (14%) & D (86%); Area-Weighted
F_p	0.55	in/hr	Note:	Plate E-6.2: AMC I

$F = F_p(1 - 0.9A_i)$ **F = 0.057 in/hr**

For 24-hr storms, F_T is variable loss rate

$F_T = C[24 - (T/60)]^{1.55} + F_M$ **F_T = 0.100**

$C = (F - F_M)/54$ **C = 0.0005**

$T = \text{Unit Time}/2$ **T = 7.5**

$F_M = 0.5F$ **F_M = 0.028**

DMA D/3: PROPOSED

Drainage Area	81313	sf		
	1.87	ac		
A_i	70,342	sf		
	87%	imp		
Runoff Index	75		Note:	Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (8%) & D (92%); Area-Weighted
F_p	0.50	in/hr	Note:	Plate E-6.2: AMC I

$F = F_p(1 - 0.9A_i)$ **F = 0.111 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ ***F*** $_T$ **= 0.196**

$$C = (F - F_M)/54$$ ***C =*** **0.0010**

$$T = \text{Unit Time}/2$$ ***T =*** **7.5**

$$F_M = 0.5F$$ ***F*** $_M$ **= 0.055**

DMA D/4: PROPOSED

Drainage Area	104529	sf	
	2.40	ac	
A_i	63,506	sf	
	61%	imp	
Runoff Index	66		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (18%), C (55%) & D (27%); Area-Weighted
F_p	0.60	in/hr	Note: Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.272 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$ ***F*** $_T$ **= 0.480**

$$C = (F - F_M)/54$$ ***C =*** **0.0025**

$$T = \text{Unit Time}/2$$ ***T =*** **7.5**

$$F_M = 0.5F$$ ***F*** $_M$ **= 0.136**

DMA A/1: PROPOSED

Drainage Area	9610	sf	
	0.22	ac	
A_i	0	sf	
	0%	imp	
Runoff Index	60		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (34%), C (8%) & D (58%); Area-Weighted
F_p	0.66	in/hr	Note: Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$ ***F =*** **0.660 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$T =$ Unit Time$/2$

$$F_M = 0.5F$$

F $_T$ **= 1.165**

C **= 0.0061**

T **= 7.5**

F $_M$ **= 0.330**

DMA A/2: PROPOSED

Drainage Area	31529	sf	
	0.72	ac	
A_i	0	sf	
	0%	imp	
Runoff Index	67		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (17%), C (7%) & D (76%); Area-Weighted
F_p	0.60	in/hr	Note: Plate E-6.2: AMC I

$$F = F_p(1 - 0.9A_i)$$

F **= 0.600 in/hr**

For 24-hr storms, F_T is variable loss rate

$$F_T = C[24 - (T/60)]^{1.55} + F_M$$

$$C = (F - F_M)/54$$

$T =$ Unit Time$/2$

$$F_M = 0.5F$$

F $_T$ **= 1.060**

C **= 0.0056**

T **= 7.5**

F $_M$ **= 0.300**

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition; By; Date 11/17/16; Checked; Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.340	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.170
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.021	0.600	0.017	0.004	0.13
2					0.3	0.032	0.593	0.026	0.006	0.20
3					0.3	0.032	0.587	0.026	0.006	0.20
4					0.4	0.043	0.580	0.034	0.009	0.27
5					0.3	0.032	0.573	0.026	0.006	0.20
6					0.3	0.032	0.566	0.026	0.006	0.20
7					0.3	0.032	0.559	0.026	0.006	0.20
8					0.4	0.043	0.552	0.034	0.009	0.27
9					0.4	0.043	0.546	0.034	0.009	0.27
10					0.4	0.043	0.539	0.034	0.009	0.27
11					0.5	0.053	0.533	0.043	0.011	0.34
12					0.5	0.053	0.526	0.043	0.011	0.34
13					0.5	0.053	0.520	0.043	0.011	0.34
14					0.5	0.053	0.513	0.043	0.011	0.34
15					0.5	0.053	0.507	0.043	0.011	0.34
16					0.6	0.064	0.500	0.051	0.013	0.40
17					0.6	0.064	0.494	0.051	0.013	0.40
18					0.7	0.074	0.488	0.060	0.015	0.47
19					0.7	0.074	0.481	0.060	0.015	0.47
20					0.8	0.085	0.475	0.068	0.017	0.54
21					0.6	0.064	0.469	0.051	0.013	0.40
22					0.7	0.074	0.463	0.060	0.015	0.47
23					0.8	0.085	0.457	0.068	0.017	0.54
24					0.8	0.085	0.451	0.068	0.017	0.54
25					0.9	0.096	0.445	0.077	0.019	0.60
26					0.9	0.096	0.439	0.077	0.019	0.60
27					1.0	0.106	0.433	0.085	0.021	0.67
28					1.0	0.106	0.427	0.085	0.021	0.67
29					1.0	0.106	0.421	0.085	0.021	0.67
30					1.1	0.117	0.416	0.094	0.023	0.74
31					1.2	0.128	0.410	0.102	0.026	0.80
32					1.3	0.138	0.404	0.111	0.028	0.87
33					1.5	0.160	0.399	0.128	0.032	1.01
34					1.5	0.160	0.393	0.128	0.032	1.01
35					1.6	0.170	0.388	0.136	0.034	1.07
36					1.7	0.181	0.382	0.145	0.036	1.14
37					1.9	0.202	0.377	0.162	0.040	1.27
38					2.0	0.213	0.371	0.170	0.043	1.34
39					2.1	0.223	0.366	0.179	0.045	1.41
40					2.2	0.234	0.361	0.187	0.047	1.47
41					1.5	0.160	0.356	0.128	0.032	1.01
42					1.5	0.160	0.350	0.128	0.032	1.01
43					2.0	0.213	0.345	0.170	0.043	1.34
44					2.0	0.213	0.340	0.170	0.043	1.34
45					1.9	0.202	0.335	0.162	0.040	1.27
46					1.9	0.202	0.330	0.162	0.040	1.27
47					1.7	0.181	0.325	0.145	0.036	1.14
48					1.8	0.192	0.321	0.153	0.038	1.21
49					2.5	0.266	0.316	0.213	0.053	1.68
50					2.6	0.277	0.311	0.221	0.055	1.74
51					2.8	0.298	0.306	0.238	0.060	1.88
52					2.9	0.309	0.302	0.247	0.007	0.21
53					3.4	0.362	0.297	0.289	0.065	2.03
54					3.4	0.362	0.293	0.289	0.069	**2.18**
55					2.3	0.245	0.288	0.196	0.049	1.54
56					2.3	0.245	0.284	0.196	0.049	1.54
57					2.7	0.287	0.280	0.230	0.008	0.24
58					2.6	0.277	0.275	0.221	0.001	0.04
59					2.6	0.277	0.271	0.221	0.006	0.18
60					2.5	0.266	0.267	0.213	0.053	1.68
61					2.4	0.255	0.263	0.204	0.051	1.61
62					2.3	0.245	0.259	0.196	0.049	1.54
63					1.9	0.202	0.255	0.162	0.040	1.27
64					1.9	0.202	0.251	0.162	0.040	1.27
65					0.4	0.043	0.247	0.034	0.009	0.27

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.340	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.170
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.243	0.034	0.009	0.27
67					0.3	0.032	0.240	0.026	0.006	0.20
68					0.3	0.032	0.236	0.026	0.006	0.20
69					0.5	0.053	0.232	0.043	0.011	0.34
70					0.5	0.053	0.229	0.043	0.011	0.34
71					0.5	0.053	0.226	0.043	0.011	0.34
72					0.4	0.043	0.222	0.034	0.009	0.27
73					0.4	0.043	0.219	0.034	0.009	0.27
74					0.4	0.043	0.216	0.034	0.009	0.27
75					0.3	0.032	0.213	0.026	0.006	0.20
76					0.2	0.021	0.210	0.017	0.004	0.13
77					0.3	0.032	0.207	0.026	0.006	0.20
78					0.4	0.043	0.204	0.034	0.009	0.27
79					0.3	0.032	0.201	0.026	0.006	0.20
80					0.2	0.021	0.198	0.017	0.004	0.13
81					0.3	0.032	0.196	0.026	0.006	0.20
82					0.3	0.032	0.193	0.026	0.006	0.20
83					0.3	0.032	0.191	0.026	0.006	0.20
84					0.2	0.021	0.188	0.017	0.004	0.13
85					0.3	0.032	0.186	0.026	0.006	0.20
86					0.2	0.021	0.184	0.017	0.004	0.13
87					0.3	0.032	0.182	0.026	0.006	0.20
88					0.2	0.021	0.180	0.017	0.004	0.13
89					0.3	0.032	0.178	0.026	0.006	0.20
90					0.2	0.021	0.177	0.017	0.004	0.13
91					0.2	0.021	0.175	0.017	0.004	0.13
92					0.2	0.021	0.174	0.017	0.004	0.13
93					0.2	0.021	0.173	0.017	0.004	0.13
94					0.2	0.021	0.172	0.017	0.004	0.13
95					0.2	0.021	0.171	0.017	0.004	0.13
96					0.2	0.021	0.170	0.017	0.004	0.13
TOTALS					100.0				1.91	60.12

EFFECTIVE RAIN = 0.48 INCHES
TOTAL RUNOFF VOLUME = 1.24 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.106	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.053
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.021	0.187	0.003	0.018	0.24
2					0.3	0.032	0.185	0.005	0.027	0.35
3					0.3	0.032	0.183	0.005	0.027	0.35
4					0.4	0.043	0.180	0.006	0.036	0.47
5					0.3	0.032	0.178	0.005	0.027	0.35
6					0.3	0.032	0.176	0.005	0.027	0.35
7					0.3	0.032	0.174	0.005	0.027	0.35
8					0.4	0.043	0.172	0.006	0.036	0.47
9					0.4	0.043	0.170	0.006	0.036	0.47
10					0.4	0.043	0.168	0.006	0.036	0.47
11					0.5	0.053	0.166	0.008	0.045	0.59
12					0.5	0.053	0.164	0.008	0.045	0.59
13					0.5	0.053	0.162	0.008	0.045	0.59
14					0.5	0.053	0.160	0.008	0.045	0.59
15					0.5	0.053	0.158	0.008	0.045	0.59
16					0.6	0.064	0.156	0.010	0.054	0.71
17					0.6	0.064	0.154	0.010	0.054	0.71
18					0.7	0.074	0.152	0.011	0.063	0.82
19					0.7	0.074	0.150	0.011	0.063	0.82
20					0.8	0.085	0.148	0.013	0.072	0.94
21					0.6	0.064	0.146	0.010	0.054	0.71
22					0.7	0.074	0.144	0.011	0.063	0.82
23					0.8	0.085	0.142	0.013	0.072	0.94
24					0.8	0.085	0.140	0.013	0.072	0.94
25					0.9	0.096	0.138	0.015	0.081	1.06
26					0.9	0.096	0.137	0.015	0.081	1.06
27					1.0	0.106	0.135	0.016	0.090	1.18
28					1.0	0.106	0.133	0.016	0.090	1.18
29					1.0	0.106	0.131	0.016	0.090	1.18
30					1.1	0.117	0.129	0.018	0.099	1.29
31					1.2	0.128	0.128	0.019	0.000	0.00
32					1.3	0.138	0.126	0.021	0.013	0.16
33					1.5	0.160	0.124	0.024	0.036	0.46
34					1.5	0.160	0.122	0.024	0.037	0.49
35					1.6	0.170	0.121	0.026	0.050	0.65
36					1.7	0.181	0.119	0.027	0.062	0.81
37					1.9	0.202	0.117	0.031	0.085	1.11
38					2.0	0.213	0.116	0.032	0.097	1.27
39					2.1	0.223	0.114	0.034	0.110	1.43
40					2.2	0.234	0.112	0.035	0.122	1.59
41					1.5	0.160	0.111	0.024	0.049	0.64
42					1.5	0.160	0.109	0.024	0.051	0.66
43					2.0	0.213	0.107	0.032	0.105	1.37
44					2.0	0.213	0.106	0.032	0.107	1.39
45					1.9	0.202	0.104	0.031	0.098	1.27
46					1.9	0.202	0.103	0.031	0.099	1.29
47					1.7	0.181	0.101	0.027	0.080	1.04
48					1.8	0.192	0.100	0.029	0.092	1.20
49					2.5	0.266	0.098	0.040	0.168	2.18
50					2.6	0.277	0.097	0.042	0.180	2.34
51					2.8	0.298	0.095	0.045	0.203	2.64
52					2.9	0.309	0.094	0.047	0.215	2.80
53					3.4	0.362	0.092	0.055	0.269	3.51
54					3.4	0.362	0.091	0.055	0.271	**3.53**
55					2.3	0.245	0.090	0.037	0.155	2.02
56					2.3	0.245	0.088	0.037	0.156	2.04
57					2.7	0.287	0.087	0.044	0.200	2.61
58					2.6	0.277	0.086	0.042	0.191	2.49
59					2.6	0.277	0.084	0.042	0.192	2.50
60					2.5	0.266	0.083	0.040	0.183	2.38
61					2.4	0.255	0.082	0.039	0.174	2.26
62					2.3	0.245	0.081	0.037	0.164	2.14
63					1.9	0.202	0.079	0.031	0.123	1.60
64					1.9	0.202	0.078	0.031	0.124	1.62
65					0.4	0.043	0.077	0.006	0.036	0.47

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.106	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.053
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.076	0.006	0.036	0.47
67					0.3	0.032	0.075	0.005	0.027	0.35
68					0.3	0.032	0.073	0.005	0.027	0.35
69					0.5	0.053	0.072	0.008	0.045	0.59
70					0.5	0.053	0.071	0.008	0.045	0.59
71					0.5	0.053	0.070	0.008	0.045	0.59
72					0.4	0.043	0.069	0.006	0.036	0.47
73					0.4	0.043	0.068	0.006	0.036	0.47
74					0.4	0.043	0.067	0.006	0.036	0.47
75					0.3	0.032	0.066	0.005	0.027	0.35
76					0.2	0.021	0.065	0.003	0.018	0.24
77					0.3	0.032	0.064	0.005	0.027	0.35
78					0.4	0.043	0.063	0.006	0.036	0.47
79					0.3	0.032	0.063	0.005	0.027	0.35
80					0.2	0.021	0.062	0.003	0.018	0.24
81					0.3	0.032	0.061	0.005	0.027	0.35
82					0.3	0.032	0.060	0.005	0.027	0.35
83					0.3	0.032	0.059	0.005	0.027	0.35
84					0.2	0.021	0.059	0.003	0.018	0.24
85					0.3	0.032	0.058	0.005	0.027	0.35
86					0.2	0.021	0.057	0.003	0.018	0.24
87					0.3	0.032	0.057	0.005	0.027	0.35
88					0.2	0.021	0.056	0.003	0.018	0.24
89					0.3	0.032	0.055	0.005	0.027	0.35
90					0.2	0.021	0.055	0.003	0.018	0.24
91					0.2	0.021	0.055	0.003	0.018	0.24
92					0.2	0.021	0.054	0.003	0.018	0.24
93					0.2	0.021	0.054	0.003	0.018	0.24
94					0.2	0.021	0.053	0.003	0.018	0.24
95					0.2	0.021	0.053	0.003	0.018	0.24
96					0.2	0.021	0.053	0.003	0.018	0.24
TOTALS					100.0				6.75	87.93

EFFECTIVE RAIN = 1.69 INCHES
TOTAL RUNOFF VOLUME = 1.82 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.057	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.028
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.021	0.100	0.002	0.019	0.22
2					0.3	0.032	0.099	0.003	0.029	0.34
3					0.3	0.032	0.098	0.003	0.029	0.34
4					0.4	0.043	0.097	0.004	0.038	0.45
5					0.3	0.032	0.096	0.003	0.029	0.34
6					0.3	0.032	0.095	0.003	0.029	0.34
7					0.3	0.032	0.094	0.003	0.029	0.34
8					0.4	0.043	0.092	0.004	0.038	0.45
9					0.4	0.043	0.091	0.004	0.038	0.45
10					0.4	0.043	0.090	0.004	0.038	0.45
11					0.5	0.053	0.089	0.005	0.048	0.56
12					0.5	0.053	0.088	0.005	0.048	0.56
13					0.5	0.053	0.087	0.005	0.048	0.56
14					0.5	0.053	0.086	0.005	0.048	0.56
15					0.5	0.053	0.085	0.005	0.048	0.56
16					0.6	0.064	0.084	0.007	0.057	0.67
17					0.6	0.064	0.083	0.007	0.057	0.67
18					0.7	0.074	0.082	0.008	0.067	0.78
19					0.7	0.074	0.081	0.008	0.067	0.78
20					0.8	0.085	0.080	0.009	0.006	0.07
21					0.6	0.064	0.078	0.007	0.057	0.67
22					0.7	0.074	0.077	0.008	0.067	0.78
23					0.8	0.085	0.076	0.009	0.009	0.10
24					0.8	0.085	0.075	0.009	0.010	0.11
25					0.9	0.096	0.074	0.010	0.021	0.25
26					0.9	0.096	0.073	0.010	0.022	0.26
27					1.0	0.106	0.072	0.011	0.034	0.40
28					1.0	0.106	0.071	0.011	0.035	0.41
29					1.0	0.106	0.071	0.011	0.036	0.42
30					1.1	0.117	0.070	0.012	0.047	0.56
31					1.2	0.128	0.069	0.013	0.059	0.69
32					1.3	0.138	0.068	0.014	0.071	0.83
33					1.5	0.160	0.067	0.016	0.093	1.09
34					1.5	0.160	0.066	0.016	0.094	1.10
35					1.6	0.170	0.065	0.018	0.105	1.24
36					1.7	0.181	0.064	0.019	0.117	1.37
37					1.9	0.202	0.063	0.021	0.139	1.63
38					2.0	0.213	0.062	0.022	0.151	1.77
39					2.1	0.223	0.061	0.023	0.162	1.91
40					2.2	0.234	0.060	0.024	0.174	2.04
41					1.5	0.160	0.059	0.016	0.100	1.18
42					1.5	0.160	0.059	0.016	0.101	1.19
43					2.0	0.213	0.058	0.022	0.155	1.82
44					2.0	0.213	0.057	0.022	0.156	1.83
45					1.9	0.202	0.056	0.021	0.146	1.72
46					1.9	0.202	0.055	0.021	0.147	1.73
47					1.7	0.181	0.054	0.019	0.126	1.49
48					1.8	0.192	0.054	0.020	0.138	1.62
49					2.5	0.266	0.053	0.027	0.213	2.50
50					2.6	0.277	0.052	0.029	0.225	2.64
51					2.8	0.298	0.051	0.031	0.247	2.90
52					2.9	0.309	0.050	0.032	0.258	3.03
53					3.4	0.362	0.050	0.037	0.312	3.67
54					3.4	0.362	0.049	0.037	0.313	**3.68**
55					2.3	0.245	0.048	0.025	0.196	2.31
56					2.3	0.245	0.048	0.025	0.197	2.32
57					2.7	0.287	0.047	0.030	0.241	2.83
58					2.6	0.277	0.046	0.029	0.231	2.71
59					2.6	0.277	0.045	0.029	0.231	2.72
60					2.5	0.266	0.045	0.027	0.221	2.60
61					2.4	0.255	0.044	0.026	0.211	2.48
62					2.3	0.245	0.043	0.025	0.201	2.37
63					1.9	0.202	0.043	0.021	0.160	1.87
64					1.9	0.202	0.042	0.021	0.160	1.88
65					0.4	0.043	0.041	0.004	0.001	0.01

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.057	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.028
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.041	0.004	0.002	0.02
67					0.3	0.032	0.040	0.003	0.029	0.34
68					0.3	0.032	0.039	0.003	0.029	0.34
69					0.5	0.053	0.039	0.005	0.014	0.17
70					0.5	0.053	0.038	0.005	0.015	0.17
71					0.5	0.053	0.038	0.005	0.015	0.18
72					0.4	0.043	0.037	0.004	0.005	0.06
73					0.4	0.043	0.037	0.004	0.006	0.07
74					0.4	0.043	0.036	0.004	0.006	0.08
75					0.3	0.032	0.036	0.003	0.029	0.34
76					0.2	0.021	0.035	0.002	0.019	0.22
77					0.3	0.032	0.035	0.003	0.029	0.34
78					0.4	0.043	0.034	0.004	0.008	0.10
79					0.3	0.032	0.034	0.003	0.029	0.34
80					0.2	0.021	0.033	0.002	0.019	0.22
81					0.3	0.032	0.033	0.003	0.029	0.34
82					0.3	0.032	0.032	0.003	0.029	0.34
83					0.3	0.032	0.032	0.003	0.000	0.00
84					0.2	0.021	0.032	0.002	0.019	0.22
85					0.3	0.032	0.031	0.003	0.001	0.01
86					0.2	0.021	0.031	0.002	0.019	0.22
87					0.3	0.032	0.030	0.003	0.001	0.02
88					0.2	0.021	0.030	0.002	0.019	0.22
89					0.3	0.032	0.030	0.003	0.002	0.02
90					0.2	0.021	0.030	0.002	0.019	0.22
91					0.2	0.021	0.029	0.002	0.019	0.22
92					0.2	0.021	0.029	0.002	0.019	0.22
93					0.2	0.021	0.029	0.002	0.019	0.22
94					0.2	0.021	0.029	0.002	0.019	0.22
95					0.2	0.021	0.029	0.002	0.019	0.22
96					0.2	0.021	0.028	0.002	0.019	0.22
TOTALS					100.0				7.50	88.18

EFFECTIVE RAIN = 1.88 INCHES
TOTAL RUNOFF VOLUME = 1.82 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.111	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.055
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.021	0.196	0.004	0.017	0.03
2					0.3	0.032	0.193	0.007	0.025	0.05
3					0.3	0.032	0.191	0.007	0.025	0.05
4					0.4	0.043	0.189	0.009	0.034	0.06
5					0.3	0.032	0.187	0.007	0.025	0.05
6					0.3	0.032	0.184	0.007	0.025	0.05
7					0.3	0.032	0.182	0.007	0.025	0.05
8					0.4	0.043	0.180	0.009	0.034	0.06
9					0.4	0.043	0.178	0.009	0.034	0.06
10					0.4	0.043	0.176	0.009	0.034	0.06
11					0.5	0.053	0.173	0.011	0.042	0.08
12					0.5	0.053	0.171	0.011	0.042	0.08
13					0.5	0.053	0.169	0.011	0.042	0.08
14					0.5	0.053	0.167	0.011	0.042	0.08
15					0.5	0.053	0.165	0.011	0.042	0.08
16					0.6	0.064	0.163	0.013	0.051	0.10
17					0.6	0.064	0.161	0.013	0.051	0.10
18					0.7	0.074	0.159	0.015	0.059	0.11
19					0.7	0.074	0.157	0.015	0.059	0.11
20					0.8	0.085	0.155	0.018	0.067	0.13
21					0.6	0.064	0.153	0.013	0.051	0.10
22					0.7	0.074	0.151	0.015	0.059	0.11
23					0.8	0.085	0.149	0.018	0.067	0.13
24					0.8	0.085	0.147	0.018	0.067	0.13
25					0.9	0.096	0.145	0.020	0.076	0.14
26					0.9	0.096	0.143	0.020	0.076	0.14
27					1.0	0.106	0.141	0.022	0.084	0.16
28					1.0	0.106	0.139	0.022	0.084	0.16
29					1.0	0.106	0.137	0.022	0.084	0.16
30					1.1	0.117	0.135	0.024	0.093	0.17
31					1.2	0.128	0.133	0.027	0.101	0.19
32					1.3	0.138	0.132	0.029	0.007	0.01
33					1.5	0.160	0.130	0.033	0.030	0.06
34					1.5	0.160	0.128	0.033	0.032	0.06
35					1.6	0.170	0.126	0.035	0.044	0.08
36					1.7	0.181	0.124	0.038	0.056	0.11
37					1.9	0.202	0.123	0.042	0.079	0.15
38					2.0	0.213	0.121	0.044	0.092	0.17
39					2.1	0.223	0.119	0.046	0.104	0.20
40					2.2	0.234	0.117	0.049	0.117	0.22
41					1.5	0.160	0.116	0.033	0.044	0.08
42					1.5	0.160	0.114	0.033	0.045	0.09
43					2.0	0.213	0.112	0.044	0.100	0.19
44					2.0	0.213	0.111	0.044	0.102	0.19
45					1.9	0.202	0.109	0.042	0.093	0.18
46					1.9	0.202	0.108	0.042	0.095	0.18
47					1.7	0.181	0.106	0.038	0.075	0.14
48					1.8	0.192	0.104	0.040	0.087	0.16
49					2.5	0.266	0.103	0.055	0.163	0.31
50					2.6	0.277	0.101	0.058	0.175	0.33
51					2.8	0.298	0.100	0.062	0.198	0.37
52					2.9	0.309	0.098	0.064	0.210	0.40
53					3.4	0.362	0.097	0.075	0.265	0.50
54					3.4	0.362	0.095	0.075	0.266	**0.50**
55					2.3	0.245	0.094	0.051	0.151	0.28
56					2.3	0.245	0.092	0.051	0.152	0.29
57					2.7	0.287	0.091	0.060	0.196	0.37
58					2.6	0.277	0.090	0.058	0.187	0.35
59					2.6	0.277	0.088	0.058	0.188	0.35
60					2.5	0.266	0.087	0.055	0.179	0.34
61					2.4	0.255	0.086	0.053	0.170	0.32
62					2.3	0.245	0.084	0.051	0.160	0.30
63					1.9	0.202	0.083	0.042	0.119	0.22
64					1.9	0.202	0.082	0.042	0.120	0.23
65					0.4	0.043	0.080	0.009	0.034	0.06

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.111	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.055
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.079	0.009	0.034	0.06
67					0.3	0.032	0.078	0.007	0.025	0.05
68					0.3	0.032	0.077	0.007	0.025	0.05
69					0.5	0.053	0.076	0.011	0.042	0.08
70					0.5	0.053	0.075	0.011	0.042	0.08
71					0.5	0.053	0.073	0.011	0.042	0.08
72					0.4	0.043	0.072	0.009	0.034	0.06
73					0.4	0.043	0.071	0.009	0.034	0.06
74					0.4	0.043	0.070	0.009	0.034	0.06
75					0.3	0.032	0.069	0.007	0.025	0.05
76					0.2	0.021	0.068	0.004	0.017	0.03
77					0.3	0.032	0.067	0.007	0.025	0.05
78					0.4	0.043	0.066	0.009	0.034	0.06
79					0.3	0.032	0.065	0.007	0.025	0.05
80					0.2	0.021	0.065	0.004	0.017	0.03
81					0.3	0.032	0.064	0.007	0.025	0.05
82					0.3	0.032	0.063	0.007	0.025	0.05
83					0.3	0.032	0.062	0.007	0.025	0.05
84					0.2	0.021	0.061	0.004	0.017	0.03
85					0.3	0.032	0.061	0.007	0.025	0.05
86					0.2	0.021	0.060	0.004	0.017	0.03
87					0.3	0.032	0.059	0.007	0.025	0.05
88					0.2	0.021	0.059	0.004	0.017	0.03
89					0.3	0.032	0.058	0.007	0.025	0.05
90					0.2	0.021	0.058	0.004	0.017	0.03
91					0.2	0.021	0.057	0.004	0.017	0.03
92					0.2	0.021	0.057	0.004	0.017	0.03
93					0.2	0.021	0.056	0.004	0.017	0.03
94					0.2	0.021	0.056	0.004	0.017	0.03
95					0.2	0.021	0.056	0.004	0.017	0.03
96					0.2	0.021	0.055	0.004	0.017	0.03
TOTALS					100.0				6.53	12.29

EFFECTIVE RAIN = 1.63 INCHES
TOTAL RUNOFF VOLUME = 0.25 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.272	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.136
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.021	0.480	0.009	0.012	0.03
2					0.3	0.032	0.475	0.013	0.019	0.05
3					0.3	0.032	0.469	0.013	0.019	0.05
4					0.4	0.043	0.464	0.018	0.025	0.06
5					0.3	0.032	0.458	0.013	0.019	0.05
6					0.3	0.032	0.453	0.013	0.019	0.05
7					0.3	0.032	0.447	0.013	0.019	0.05
8					0.4	0.043	0.442	0.018	0.025	0.06
9					0.4	0.043	0.437	0.018	0.025	0.06
10					0.4	0.043	0.431	0.018	0.025	0.06
11					0.5	0.053	0.426	0.022	0.031	0.08
12					0.5	0.053	0.421	0.022	0.031	0.08
13					0.5	0.053	0.416	0.022	0.031	0.08
14					0.5	0.053	0.410	0.022	0.031	0.08
15					0.5	0.053	0.405	0.022	0.031	0.08
16					0.6	0.064	0.400	0.026	0.037	0.09
17					0.6	0.064	0.395	0.026	0.037	0.09
18					0.7	0.074	0.390	0.031	0.044	0.11
19					0.7	0.074	0.385	0.031	0.044	0.11
20					0.8	0.085	0.380	0.035	0.050	0.12
21					0.6	0.064	0.375	0.026	0.037	0.09
22					0.7	0.074	0.370	0.031	0.044	0.11
23					0.8	0.085	0.365	0.035	0.050	0.12
24					0.8	0.085	0.361	0.035	0.050	0.12
25					0.9	0.096	0.356	0.040	0.056	0.14
26					0.9	0.096	0.351	0.040	0.056	0.14
27					1.0	0.106	0.346	0.044	0.062	0.15
28					1.0	0.106	0.342	0.044	0.062	0.15
29					1.0	0.106	0.337	0.044	0.062	0.15
30					1.1	0.117	0.332	0.048	0.069	0.17
31					1.2	0.128	0.328	0.053	0.075	0.18
32					1.3	0.138	0.323	0.057	0.081	0.20
33					1.5	0.160	0.319	0.066	0.094	0.23
34					1.5	0.160	0.314	0.066	0.094	0.23
35					1.6	0.170	0.310	0.070	0.100	0.24
36					1.7	0.181	0.306	0.075	0.106	0.26
37					1.9	0.202	0.301	0.084	0.118	0.29
38					2.0	0.213	0.297	0.088	0.125	0.30
39					2.1	0.223	0.293	0.092	0.131	0.32
40					2.2	0.234	0.289	0.097	0.137	0.33
41					1.5	0.160	0.284	0.066	0.094	0.23
42					1.5	0.160	0.280	0.066	0.094	0.23
43					2.0	0.213	0.276	0.088	0.125	0.30
44					2.0	0.213	0.272	0.088	0.125	0.30
45					1.9	0.202	0.268	0.084	0.118	0.29
46					1.9	0.202	0.264	0.084	0.118	0.29
47					1.7	0.181	0.260	0.075	0.106	0.26
48					1.8	0.192	0.256	0.079	0.112	0.27
49					2.5	0.266	0.253	0.110	0.013	0.03
50					2.6	0.277	0.249	0.115	0.028	0.07
51					2.8	0.298	0.245	0.123	0.053	0.13
52					2.9	0.309	0.241	0.128	0.067	0.16
53					3.4	0.362	0.238	0.150	0.124	0.30
54					3.4	0.362	0.234	0.150	0.128	**0.31**
55					2.3	0.245	0.231	0.101	0.014	0.03
56					2.3	0.245	0.227	0.101	0.018	0.04
57					2.7	0.287	0.224	0.119	0.064	0.15
58					2.6	0.277	0.220	0.115	0.056	0.14
59					2.6	0.277	0.217	0.115	0.060	0.14
60					2.5	0.266	0.213	0.110	0.053	0.13
61					2.4	0.255	0.210	0.106	0.045	0.11
62					2.3	0.245	0.207	0.101	0.038	0.09
63					1.9	0.202	0.204	0.084	0.118	0.29
64					1.9	0.202	0.201	0.084	0.001	0.00
65					0.4	0.043	0.198	0.018	0.025	0.06

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.272	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.136
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.195	0.018	0.025	0.06
67					0.3	0.032	0.192	0.013	0.019	0.05
68					0.3	0.032	0.189	0.013	0.019	0.05
69					0.5	0.053	0.186	0.022	0.031	0.08
70					0.5	0.053	0.183	0.022	0.031	0.08
71					0.5	0.053	0.180	0.022	0.031	0.08
72					0.4	0.043	0.178	0.018	0.025	0.06
73					0.4	0.043	0.175	0.018	0.025	0.06
74					0.4	0.043	0.173	0.018	0.025	0.06
75					0.3	0.032	0.170	0.013	0.019	0.05
76					0.2	0.021	0.168	0.009	0.012	0.03
77					0.3	0.032	0.165	0.013	0.019	0.05
78					0.4	0.043	0.163	0.018	0.025	0.06
79					0.3	0.032	0.161	0.013	0.019	0.05
80					0.2	0.021	0.159	0.009	0.012	0.03
81					0.3	0.032	0.157	0.013	0.019	0.05
82					0.3	0.032	0.154	0.013	0.019	0.05
83					0.3	0.032	0.153	0.013	0.019	0.05
84					0.2	0.021	0.151	0.009	0.012	0.03
85					0.3	0.032	0.149	0.013	0.019	0.05
86					0.2	0.021	0.147	0.009	0.012	0.03
87					0.3	0.032	0.146	0.013	0.019	0.05
88					0.2	0.021	0.144	0.009	0.012	0.03
89					0.3	0.032	0.143	0.013	0.019	0.05
90					0.2	0.021	0.141	0.009	0.012	0.03
91					0.2	0.021	0.140	0.009	0.012	0.03
92					0.2	0.021	0.139	0.009	0.012	0.03
93					0.2	0.021	0.138	0.009	0.012	0.03
94					0.2	0.021	0.137	0.009	0.012	0.03
95					0.2	0.021	0.137	0.009	0.012	0.03
96					0.2	0.021	0.136	0.009	0.012	0.03
TOTALS					100.0				4.55	11.02

EFFECTIVE RAIN = 1.14 INCHES
TOTAL RUNOFF VOLUME = 0.23 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.660	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.330
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					0.2	0.021	1.165	0.019	0.002	0.00
2					0.3	0.032	1.152	0.029	0.003	0.00
3					0.3	0.032	1.139	0.029	0.003	0.00
4					0.4	0.043	1.125	0.038	0.004	0.00
5					0.3	0.032	1.112	0.029	0.003	0.00
6					0.3	0.032	1.099	0.029	0.003	0.00
7					0.3	0.032	1.086	0.029	0.003	0.00
8					0.4	0.043	1.072	0.038	0.004	0.00
9					0.4	0.043	1.060	0.038	0.004	0.00
10					0.4	0.043	1.047	0.038	0.004	0.00
11					0.5	0.053	1.034	0.048	0.005	0.00
12					0.5	0.053	1.021	0.048	0.005	0.00
13					0.5	0.053	1.008	0.048	0.005	0.00
14					0.5	0.053	0.996	0.048	0.005	0.00
15					0.5	0.053	0.983	0.048	0.005	0.00
16					0.6	0.064	0.971	0.057	0.006	0.00
17					0.6	0.064	0.959	0.057	0.006	0.00
18					0.7	0.074	0.947	0.067	0.007	0.00
19					0.7	0.074	0.934	0.067	0.007	0.00
20					0.8	0.085	0.922	0.077	0.009	0.00
21					0.6	0.064	0.910	0.057	0.006	0.00
22					0.7	0.074	0.899	0.067	0.007	0.00
23					0.8	0.085	0.887	0.077	0.009	0.00
24					0.8	0.085	0.875	0.077	0.009	0.00
25					0.9	0.096	0.863	0.086	0.010	0.00
26					0.9	0.096	0.852	0.086	0.010	0.00
27					1.0	0.106	0.841	0.096	0.011	0.00
28					1.0	0.106	0.829	0.096	0.011	0.00
29					1.0	0.106	0.818	0.096	0.011	0.00
30					1.1	0.117	0.807	0.105	0.012	0.00
31					1.2	0.128	0.796	0.115	0.013	0.00
32					1.3	0.138	0.785	0.124	0.014	0.00
33					1.5	0.160	0.774	0.144	0.016	0.00
34					1.5	0.160	0.763	0.144	0.016	0.00
35					1.6	0.170	0.752	0.153	0.017	0.00
36					1.7	0.181	0.742	0.163	0.018	0.00
37					1.9	0.202	0.731	0.182	0.020	0.00
38					2.0	0.213	0.721	0.192	0.021	0.00
39					2.1	0.223	0.711	0.201	0.022	0.00
40					2.2	0.234	0.700	0.211	0.023	0.01
41					1.5	0.160	0.690	0.144	0.016	0.00
42					1.5	0.160	0.680	0.144	0.016	0.00
43					2.0	0.213	0.670	0.192	0.021	0.00
44					2.0	0.213	0.661	0.192	0.021	0.00
45					1.9	0.202	0.651	0.182	0.020	0.00
46					1.9	0.202	0.641	0.182	0.020	0.00
47					1.7	0.181	0.632	0.163	0.018	0.00
48					1.8	0.192	0.622	0.172	0.019	0.00
49					2.5	0.266	0.613	0.239	0.027	0.01
50					2.6	0.277	0.604	0.249	0.028	0.01
51					2.8	0.298	0.595	0.268	0.030	0.01
52					2.9	0.309	0.586	0.278	0.031	0.01
53					3.4	0.362	0.577	0.326	0.036	0.01
54					3.4	0.362	0.568	0.326	0.036	**0.01**
55					2.3	0.245	0.560	0.220	0.024	0.01
56					2.3	0.245	0.551	0.220	0.024	0.01
57					2.7	0.287	0.543	0.259	0.029	0.01
58					2.6	0.277	0.534	0.249	0.028	0.01
59					2.6	0.277	0.526	0.249	0.028	0.01
60					2.5	0.266	0.518	0.239	0.027	0.01
61					2.4	0.255	0.510	0.230	0.026	0.01
62					2.3	0.245	0.502	0.220	0.024	0.01
63					1.9	0.202	0.495	0.182	0.020	0.00
64					1.9	0.202	0.487	0.182	0.020	0.00
65					0.4	0.043	0.480	0.038	0.004	0.00

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.660	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.330
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.472	0.038	0.004	0.00
67					0.3	0.032	0.465	0.029	0.003	0.00
68					0.3	0.032	0.458	0.029	0.003	0.00
69					0.5	0.053	0.451	0.048	0.005	0.00
70					0.5	0.053	0.445	0.048	0.005	0.00
71					0.5	0.053	0.438	0.048	0.005	0.00
72					0.4	0.043	0.431	0.038	0.004	0.00
73					0.4	0.043	0.425	0.038	0.004	0.00
74					0.4	0.043	0.419	0.038	0.004	0.00
75					0.3	0.032	0.413	0.029	0.003	0.00
76					0.2	0.021	0.407	0.019	0.002	0.00
77					0.3	0.032	0.401	0.029	0.003	0.00
78					0.4	0.043	0.396	0.038	0.004	0.00
79					0.3	0.032	0.390	0.029	0.003	0.00
80					0.2	0.021	0.385	0.019	0.002	0.00
81					0.3	0.032	0.380	0.029	0.003	0.00
82					0.3	0.032	0.375	0.029	0.003	0.00
83					0.3	0.032	0.370	0.029	0.003	0.00
84					0.2	0.021	0.366	0.019	0.002	0.00
85					0.3	0.032	0.361	0.029	0.003	0.00
86					0.2	0.021	0.357	0.019	0.002	0.00
87					0.3	0.032	0.353	0.029	0.003	0.00
88					0.2	0.021	0.350	0.019	0.002	0.00
89					0.3	0.032	0.346	0.029	0.003	0.00
90					0.2	0.021	0.343	0.019	0.002	0.00
91					0.2	0.021	0.340	0.019	0.002	0.00
92					0.2	0.021	0.337	0.019	0.002	0.00
93					0.2	0.021	0.335	0.019	0.002	0.00
94					0.2	0.021	0.333	0.019	0.002	0.00
95					0.2	0.021	0.331	0.019	0.002	0.00
96					0.2	0.021	0.330	0.019	0.002	0.00
TOTALS					100.0				1.06	0.24

EFFECTIVE RAIN = 0.27 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.600	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.300
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.021	1.060	0.019	0.002	0.00
2					0.3	0.032	1.047	0.029	0.003	0.00
3					0.3	0.032	1.035	0.029	0.003	0.00
4					0.4	0.043	1.023	0.038	0.004	0.00
5					0.3	0.032	1.011	0.029	0.003	0.00
6					0.3	0.032	0.999	0.029	0.003	0.00
7					0.3	0.032	0.987	0.029	0.003	0.00
8					0.4	0.043	0.975	0.038	0.004	0.00
9					0.4	0.043	0.963	0.038	0.004	0.00
10					0.4	0.043	0.951	0.038	0.004	0.00
11					0.5	0.053	0.940	0.048	0.005	0.00
12					0.5	0.053	0.928	0.048	0.005	0.00
13					0.5	0.053	0.917	0.048	0.005	0.00
14					0.5	0.053	0.905	0.048	0.005	0.00
15					0.5	0.053	0.894	0.048	0.005	0.00
16					0.6	0.064	0.883	0.057	0.006	0.00
17					0.6	0.064	0.872	0.057	0.006	0.00
18					0.7	0.074	0.861	0.067	0.007	0.01
19					0.7	0.074	0.849	0.067	0.007	0.01
20					0.8	0.085	0.839	0.077	0.009	0.01
21					0.6	0.064	0.828	0.057	0.006	0.00
22					0.7	0.074	0.817	0.067	0.007	0.01
23					0.8	0.085	0.806	0.077	0.009	0.01
24					0.8	0.085	0.796	0.077	0.009	0.01
25					0.9	0.096	0.785	0.086	0.010	0.01
26					0.9	0.096	0.774	0.086	0.010	0.01
27					1.0	0.106	0.764	0.096	0.011	0.01
28					1.0	0.106	0.754	0.096	0.011	0.01
29					1.0	0.106	0.744	0.096	0.011	0.01
30					1.1	0.117	0.733	0.105	0.012	0.01
31					1.2	0.128	0.723	0.115	0.013	0.01
32					1.3	0.138	0.713	0.124	0.014	0.01
33					1.5	0.160	0.703	0.144	0.016	0.01
34					1.5	0.160	0.694	0.144	0.016	0.01
35					1.6	0.170	0.684	0.153	0.017	0.01
36					1.7	0.181	0.674	0.163	0.018	0.01
37					1.9	0.202	0.665	0.182	0.020	0.01
38					2.0	0.213	0.655	0.192	0.021	0.02
39					2.1	0.223	0.646	0.201	0.022	0.02
40					2.2	0.234	0.637	0.211	0.023	0.02
41					1.5	0.160	0.627	0.144	0.016	0.01
42					1.5	0.160	0.618	0.144	0.016	0.01
43					2.0	0.213	0.609	0.192	0.021	0.02
44					2.0	0.213	0.600	0.192	0.021	0.02
45					1.9	0.202	0.592	0.182	0.020	0.01
46					1.9	0.202	0.583	0.182	0.020	0.01
47					1.7	0.181	0.574	0.163	0.018	0.01
48					1.8	0.192	0.566	0.172	0.019	0.01
49					2.5	0.266	0.557	0.239	0.027	0.02
50					2.6	0.277	0.549	0.249	0.028	0.02
51					2.8	0.298	0.541	0.268	0.030	0.02
52					2.9	0.309	0.533	0.278	0.031	0.02
53					3.4	0.362	0.524	0.326	0.036	0.03
54					3.4	0.362	0.517	0.326	0.036	**0.03**
55					2.3	0.245	0.509	0.220	0.024	0.02
56					2.3	0.245	0.501	0.220	0.024	0.02
57					2.7	0.287	0.493	0.259	0.029	0.02
58					2.6	0.277	0.486	0.249	0.028	0.02
59					2.6	0.277	0.478	0.249	0.028	0.02
60					2.5	0.266	0.471	0.239	0.027	0.02
61					2.4	0.255	0.464	0.230	0.026	0.02
62					2.3	0.245	0.457	0.220	0.024	0.02
63					1.9	0.202	0.450	0.182	0.020	0.01
64					1.9	0.202	0.443	0.182	0.020	0.01
65					0.4	0.043	0.436	0.038	0.004	0.00

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	5-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	2.66
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.600	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.300
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.043	0.429	0.038	0.004	0.00
67					0.3	0.032	0.423	0.029	0.003	0.00
68					0.3	0.032	0.417	0.029	0.003	0.00
69					0.5	0.053	0.410	0.048	0.005	0.00
70					0.5	0.053	0.404	0.048	0.005	0.00
71					0.5	0.053	0.398	0.048	0.005	0.00
72					0.4	0.043	0.392	0.038	0.004	0.00
73					0.4	0.043	0.386	0.038	0.004	0.00
74					0.4	0.043	0.381	0.038	0.004	0.00
75					0.3	0.032	0.375	0.029	0.003	0.00
76					0.2	0.021	0.370	0.019	0.002	0.00
77					0.3	0.032	0.365	0.029	0.003	0.00
78					0.4	0.043	0.360	0.038	0.004	0.00
79					0.3	0.032	0.355	0.029	0.003	0.00
80					0.2	0.021	0.350	0.019	0.002	0.00
81					0.3	0.032	0.345	0.029	0.003	0.00
82					0.3	0.032	0.341	0.029	0.003	0.00
83					0.3	0.032	0.337	0.029	0.003	0.00
84					0.2	0.021	0.332	0.019	0.002	0.00
85					0.3	0.032	0.329	0.029	0.003	0.00
86					0.2	0.021	0.325	0.019	0.002	0.00
87					0.3	0.032	0.321	0.029	0.003	0.00
88					0.2	0.021	0.318	0.019	0.002	0.00
89					0.3	0.032	0.315	0.029	0.003	0.00
90					0.2	0.021	0.312	0.019	0.002	0.00
91					0.2	0.021	0.309	0.019	0.002	0.00
92					0.2	0.021	0.307	0.019	0.002	0.00
93					0.2	0.021	0.305	0.019	0.002	0.00
94					0.2	0.021	0.303	0.019	0.002	0.00
95					0.2	0.021	0.301	0.019	0.002	0.00
96					0.2	0.021	0.300	0.019	0.002	0.00
TOTALS					100.0				1.06	0.78

EFFECTIVE RAIN = 0.27 INCHES
TOTAL RUNOFF VOLUME = 0.02 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.340	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.340	0.077	0.019	0.61
2					1.2	0.105	0.340	0.084	0.021	0.66
3					1.3	0.114	0.340	0.091	0.023	0.72
4					1.4	0.123	0.340	0.098	0.025	0.77
5					1.4	0.123	0.340	0.098	0.025	0.77
6					1.5	0.131	0.340	0.105	0.026	0.83
7					1.6	0.140	0.340	0.112	0.028	0.88
8					1.6	0.140	0.340	0.112	0.028	0.88
9					1.6	0.140	0.340	0.112	0.028	0.88
10					1.6	0.140	0.340	0.112	0.028	0.88
11					1.6	0.140	0.340	0.112	0.028	0.88
12					1.7	0.149	0.340	0.119	0.030	0.94
13					1.7	0.149	0.340	0.119	0.030	0.94
14					1.8	0.158	0.340	0.126	0.032	0.99
15					1.8	0.158	0.340	0.126	0.032	0.99
16					1.8	0.158	0.340	0.126	0.032	0.99
17					2.0	0.175	0.340	0.140	0.035	1.10
18					2.0	0.175	0.340	0.140	0.035	1.10
19					2.1	0.184	0.340	0.147	0.037	1.16
20					2.2	0.193	0.340	0.154	0.039	1.21
21					2.5	0.219	0.340	0.175	0.044	1.38
22					2.8	0.245	0.340	0.196	0.049	1.55
23					3.0	0.263	0.340	0.210	0.053	1.66
24					3.2	0.280	0.340	0.224	0.056	1.77
25					3.5	0.307	0.340	0.245	0.061	1.93
26					3.9	0.342	0.340	0.273	0.068	2.15
27					4.2	0.368	0.340	0.294	0.074	2.32
28					4.5	0.394	0.340	0.315	0.079	2.48
29					4.8	0.420	0.340	0.336	0.084	2.65
30					5.1	0.447	0.340	0.357	0.107	3.36
31					6.7	0.587	0.340	0.470	0.247	7.78
32					8.1	0.710	0.340	0.568	0.370	11.64
33					10.3	0.902	0.340	0.722	0.562	**17.71**
34					2.8	0.245	0.340	0.196	0.049	1.55
35					1.1	0.096	0.340	0.077	0.019	0.61
36					0.5	0.044	0.340	0.035	0.009	0.28
TOTALS					100.0				2.51	79.02

EFFECTIVE RAIN = 0.42 INCHES
TOTAL RUNOFF VOLUME = 1.09 AC-FT

R C F C & W C D HYDROLOGY MANUAL

"SHORTCUT METHOD"
SYNTHETIC UNIT HYDROGRAPH METHOD
Unit Hydrograph and Effective Rain Calculation Form

Project: Barker Industrial: DMA D/1 Proposed Condition

By ____ Date 11/17/16

Checked ____ Date ____

Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.106	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.106	0.015	0.082	1.07
2					1.2	0.105	0.106	0.016	0.089	1.16
3					1.3	0.114	0.106	0.017	0.097	1.26
4					1.4	0.123	0.106	0.019	0.104	1.36
5					1.4	0.123	0.106	0.019	0.104	1.36
6					1.5	0.131	0.106	0.020	0.111	1.45
7					1.6	0.140	0.106	0.021	0.119	1.55
8					1.6	0.140	0.106	0.021	0.119	1.55
9					1.6	0.140	0.106	0.021	0.119	1.55
10					1.6	0.140	0.106	0.021	0.119	1.55
11					1.6	0.140	0.106	0.021	0.119	1.55
12					1.7	0.149	0.106	0.023	0.126	1.65
13					1.7	0.149	0.106	0.023	0.126	1.65
14					1.8	0.158	0.106	0.024	0.134	1.74
15					1.8	0.158	0.106	0.024	0.134	1.74
16					1.8	0.158	0.106	0.024	0.134	1.74
17					2.0	0.175	0.106	0.027	0.149	1.94
18					2.0	0.175	0.106	0.027	0.149	1.94
19					2.1	0.184	0.106	0.028	0.156	2.03
20					2.2	0.193	0.106	0.029	0.164	2.13
21					2.5	0.219	0.106	0.033	0.186	2.42
22					2.8	0.245	0.106	0.037	0.208	2.71
23					3.0	0.263	0.106	0.040	0.223	2.90
24					3.2	0.280	0.106	0.042	0.238	3.10
25					3.5	0.307	0.106	0.046	0.260	3.39
26					3.9	0.342	0.106	0.052	0.290	3.78
27					4.2	0.368	0.106	0.056	0.312	4.07
28					4.5	0.394	0.106	0.060	0.334	4.36
29					4.8	0.420	0.106	0.064	0.357	4.65
30					5.1	0.447	0.106	0.068	0.379	4.94
31					6.7	0.587	0.106	0.089	0.498	6.49
32					8.1	0.710	0.106	0.107	0.604	7.86
33					10.3	0.902	0.106	0.137	0.796	**10.37**
34					2.8	0.245	0.106	0.037	0.208	2.71
35					1.1	0.096	0.106	0.015	0.082	1.07
36					0.5	0.044	0.106	0.007	0.037	0.48
TOTALS					100.0				7.47	97.25

EFFECTIVE RAIN = 1.24 INCHES

TOTAL RUNOFF VOLUME = 1.34 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.057	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.057	0.010	0.086	1.02
2					1.2	0.105	0.057	0.011	0.094	1.11
3					1.3	0.114	0.057	0.012	0.102	1.20
4					1.4	0.123	0.057	0.013	0.110	1.29
5					1.4	0.123	0.057	0.013	0.110	1.29
6					1.5	0.131	0.057	0.014	0.118	1.38
7					1.6	0.140	0.057	0.014	0.126	1.48
8					1.6	0.140	0.057	0.014	0.126	1.48
9					1.6	0.140	0.057	0.014	0.126	1.48
10					1.6	0.140	0.057	0.014	0.126	1.48
11					1.6	0.140	0.057	0.014	0.126	1.48
12					1.7	0.149	0.057	0.015	0.134	1.57
13					1.7	0.149	0.057	0.015	0.134	1.57
14					1.8	0.158	0.057	0.016	0.141	1.66
15					1.8	0.158	0.057	0.016	0.141	1.66
16					1.8	0.158	0.057	0.016	0.141	1.66
17					2.0	0.175	0.057	0.018	0.157	1.85
18					2.0	0.175	0.057	0.018	0.157	1.85
19					2.1	0.184	0.057	0.019	0.165	1.94
20					2.2	0.193	0.057	0.020	0.173	2.03
21					2.5	0.219	0.057	0.023	0.196	2.31
22					2.8	0.245	0.057	0.025	0.220	2.59
23					3.0	0.263	0.057	0.027	0.236	2.77
24					3.2	0.280	0.057	0.029	0.251	2.95
25					3.5	0.307	0.057	0.032	0.275	3.23
26					3.9	0.342	0.057	0.035	0.306	3.60
27					4.2	0.368	0.057	0.038	0.330	3.88
28					4.5	0.394	0.057	0.041	0.354	4.15
29					4.8	0.420	0.057	0.043	0.377	4.43
30					5.1	0.447	0.057	0.046	0.401	4.71
31					6.7	0.587	0.057	0.060	0.530	6.23
32					8.1	0.710	0.057	0.073	0.653	7.67
33					10.3	0.902	0.057	0.093	0.845	**9.93**
34					2.8	0.245	0.057	0.025	0.220	2.59
35					1.1	0.096	0.057	0.010	0.086	1.02
36					0.5	0.044	0.057	0.005	0.039	0.46
TOTALS					100.0				7.91	92.99

EFFECTIVE RAIN = 1.32 INCHES
TOTAL RUNOFF VOLUME = 1.28 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.111	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.111	0.020	0.076	0.14
2					1.2	0.105	0.111	0.022	0.083	0.16
3					1.3	0.114	0.111	0.024	0.090	0.17
4					1.4	0.123	0.111	0.026	0.097	0.18
5					1.4	0.123	0.111	0.026	0.097	0.18
6					1.5	0.131	0.111	0.027	0.104	0.20
7					1.6	0.140	0.111	0.029	0.111	0.21
8					1.6	0.140	0.111	0.029	0.111	0.21
9					1.6	0.140	0.111	0.029	0.111	0.21
10					1.6	0.140	0.111	0.029	0.111	0.21
11					1.6	0.140	0.111	0.029	0.111	0.21
12					1.7	0.149	0.111	0.031	0.118	0.22
13					1.7	0.149	0.111	0.031	0.118	0.22
14					1.8	0.158	0.111	0.033	0.125	0.24
15					1.8	0.158	0.111	0.033	0.125	0.24
16					1.8	0.158	0.111	0.033	0.125	0.24
17					2.0	0.175	0.111	0.036	0.139	0.26
18					2.0	0.175	0.111	0.036	0.139	0.26
19					2.1	0.184	0.111	0.038	0.146	0.27
20					2.2	0.193	0.111	0.040	0.153	0.29
21					2.5	0.219	0.111	0.046	0.173	0.33
22					2.8	0.245	0.111	0.051	0.194	0.37
23					3.0	0.263	0.111	0.055	0.208	0.39
24					3.2	0.280	0.111	0.058	0.222	0.42
25					3.5	0.307	0.111	0.064	0.243	0.46
26					3.9	0.342	0.111	0.071	0.271	0.51
27					4.2	0.368	0.111	0.077	0.291	0.55
28					4.5	0.394	0.111	0.082	0.312	0.59
29					4.8	0.420	0.111	0.087	0.333	0.63
30					5.1	0.447	0.111	0.093	0.354	0.67
31					6.7	0.587	0.111	0.122	0.476	0.90
32					8.1	0.710	0.111	0.148	0.599	1.13
33					10.3	0.902	0.111	0.188	0.792	**1.49**
34					2.8	0.245	0.111	0.051	0.194	0.37
35					1.1	0.096	0.111	0.020	0.076	0.14
36					0.5	0.044	0.111	0.009	0.035	0.07
TOTALS					100.0				7.06	13.30

EFFECTIVE RAIN = 1.18 INCHES
TOTAL RUNOFF VOLUME = 0.18 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.272	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.272	0.040	0.056	0.14
2					1.2	0.105	0.272	0.044	0.062	0.15
3					1.3	0.114	0.272	0.047	0.067	0.16
4					1.4	0.123	0.272	0.051	0.072	0.17
5					1.4	0.123	0.272	0.051	0.072	0.17
6					1.5	0.131	0.272	0.054	0.077	0.19
7					1.6	0.140	0.272	0.058	0.082	0.20
8					1.6	0.140	0.272	0.058	0.082	0.20
9					1.6	0.140	0.272	0.058	0.082	0.20
10					1.6	0.140	0.272	0.058	0.082	0.20
11					1.6	0.140	0.272	0.058	0.082	0.20
12					1.7	0.149	0.272	0.062	0.087	0.21
13					1.7	0.149	0.272	0.062	0.087	0.21
14					1.8	0.158	0.272	0.065	0.092	0.22
15					1.8	0.158	0.272	0.065	0.092	0.22
16					1.8	0.158	0.272	0.065	0.092	0.22
17					2.0	0.175	0.272	0.073	0.103	0.25
18					2.0	0.175	0.272	0.073	0.103	0.25
19					2.1	0.184	0.272	0.076	0.108	0.26
20					2.2	0.193	0.272	0.080	0.113	0.27
21					2.5	0.219	0.272	0.091	0.128	0.31
22					2.8	0.245	0.272	0.102	0.144	0.35
23					3.0	0.263	0.272	0.109	0.154	0.37
24					3.2	0.280	0.272	0.116	0.164	0.40
25					3.5	0.307	0.272	0.127	0.180	0.43
26					3.9	0.342	0.272	0.141	0.200	0.48
27					4.2	0.368	0.272	0.152	0.216	0.52
28					4.5	0.394	0.272	0.163	0.231	0.56
29					4.8	0.420	0.272	0.174	0.246	0.60
30					5.1	0.447	0.272	0.185	0.262	0.63
31					6.7	0.587	0.272	0.243	0.344	0.83
32					8.1	0.710	0.272	0.294	0.438	1.06
33					10.3	0.902	0.272	0.374	0.630	**1.53**
34					2.8	0.245	0.272	0.102	0.144	0.35
35					1.1	0.096	0.272	0.040	0.056	0.14
36					0.5	0.044	0.272	0.018	0.026	0.06
TOTALS					100.0				5.26	12.72

EFFECTIVE RAIN = 0.88 INCHES
TOTAL RUNOFF VOLUME = 0.18 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.660	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.660	0.087	0.010	0.00
2					1.2	0.105	0.660	0.095	0.011	0.00
3					1.3	0.114	0.660	0.102	0.011	0.00
4					1.4	0.123	0.660	0.110	0.012	0.00
5					1.4	0.123	0.660	0.110	0.012	0.00
6					1.5	0.131	0.660	0.118	0.013	0.00
7					1.6	0.140	0.660	0.126	0.014	0.00
8					1.6	0.140	0.660	0.126	0.014	0.00
9					1.6	0.140	0.660	0.126	0.014	0.00
10					1.6	0.140	0.660	0.126	0.014	0.00
11					1.6	0.140	0.660	0.126	0.014	0.00
12					1.7	0.149	0.660	0.134	0.015	0.00
13					1.7	0.149	0.660	0.134	0.015	0.00
14					1.8	0.158	0.660	0.142	0.016	0.00
15					1.8	0.158	0.660	0.142	0.016	0.00
16					1.8	0.158	0.660	0.142	0.016	0.00
17					2.0	0.175	0.660	0.158	0.018	0.00
18					2.0	0.175	0.660	0.158	0.018	0.00
19					2.1	0.184	0.660	0.166	0.018	0.00
20					2.2	0.193	0.660	0.173	0.019	0.00
21					2.5	0.219	0.660	0.197	0.022	0.00
22					2.8	0.245	0.660	0.221	0.025	0.01
23					3.0	0.263	0.660	0.237	0.026	0.01
24					3.2	0.280	0.660	0.252	0.028	0.01
25					3.5	0.307	0.660	0.276	0.031	0.01
26					3.9	0.342	0.660	0.307	0.034	0.01
27					4.2	0.368	0.660	0.331	0.037	0.01
28					4.5	0.394	0.660	0.355	0.039	0.01
29					4.8	0.420	0.660	0.378	0.042	0.01
30					5.1	0.447	0.660	0.402	0.045	0.01
31					6.7	0.587	0.660	0.528	0.059	0.01
32					8.1	0.710	0.660	0.639	0.071	0.02
33					10.3	0.902	0.660	0.812	0.242	**0.05**
34					2.8	0.245	0.660	0.221	0.025	0.01
35					1.1	0.096	0.660	0.087	0.010	0.00
36					0.5	0.044	0.660	0.039	0.004	0.00
TOTALS					100.0				1.03	0.23

EFFECTIVE RAIN = 0.17 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.46
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.600	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.096	0.600	0.087	0.010	0.01
2					1.2	0.105	0.600	0.095	0.011	0.01
3					1.3	0.114	0.600	0.102	0.011	0.01
4					1.4	0.123	0.600	0.110	0.012	0.01
5					1.4	0.123	0.600	0.110	0.012	0.01
6					1.5	0.131	0.600	0.118	0.013	0.01
7					1.6	0.140	0.600	0.126	0.014	0.01
8					1.6	0.140	0.600	0.126	0.014	0.01
9					1.6	0.140	0.600	0.126	0.014	0.01
10					1.6	0.140	0.600	0.126	0.014	0.01
11					1.6	0.140	0.600	0.126	0.014	0.01
12					1.7	0.149	0.600	0.134	0.015	0.01
13					1.7	0.149	0.600	0.134	0.015	0.01
14					1.8	0.158	0.600	0.142	0.016	0.01
15					1.8	0.158	0.600	0.142	0.016	0.01
16					1.8	0.158	0.600	0.142	0.016	0.01
17					2.0	0.175	0.600	0.158	0.018	0.01
18					2.0	0.175	0.600	0.158	0.018	0.01
19					2.1	0.184	0.600	0.166	0.018	0.01
20					2.2	0.193	0.600	0.173	0.019	0.01
21					2.5	0.219	0.600	0.197	0.022	0.02
22					2.8	0.245	0.600	0.221	0.025	0.02
23					3.0	0.263	0.600	0.237	0.026	0.02
24					3.2	0.280	0.600	0.252	0.028	0.02
25					3.5	0.307	0.600	0.276	0.031	0.02
26					3.9	0.342	0.600	0.307	0.034	0.02
27					4.2	0.368	0.600	0.331	0.037	0.03
28					4.5	0.394	0.600	0.355	0.039	0.03
29					4.8	0.420	0.600	0.378	0.042	0.03
30					5.1	0.447	0.600	0.402	0.045	0.03
31					6.7	0.587	0.600	0.528	0.059	0.04
32					8.1	0.710	0.600	0.639	0.110	0.08
33					10.3	0.902	0.600	0.812	0.302	**0.22**
34					2.8	0.245	0.600	0.221	0.025	0.02
35					1.1	0.096	0.600	0.087	0.010	0.01
36					0.5	0.044	0.600	0.039	0.004	0.00
TOTALS					100.0				1.13	0.82

EFFECTIVE RAIN = 0.19 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.340	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.340	0.132	0.033	1.04
2					1.3	0.165	0.340	0.132	0.033	1.04
3					1.1	0.140	0.340	0.112	0.028	0.88
4					1.5	0.191	0.340	0.153	0.038	1.20
5					1.5	0.191	0.340	0.153	0.038	1.20
6					1.8	0.229	0.340	0.183	0.046	1.44
7					1.5	0.191	0.340	0.153	0.038	1.20
8					1.8	0.229	0.340	0.183	0.046	1.44
9					1.8	0.229	0.340	0.183	0.046	1.44
10					1.5	0.191	0.340	0.153	0.038	1.20
11					1.6	0.204	0.340	0.163	0.041	1.28
12					1.8	0.229	0.340	0.183	0.046	1.44
13					2.2	0.280	0.340	0.224	0.056	1.76
14					2.2	0.280	0.340	0.224	0.056	1.76
15					2.2	0.280	0.340	0.224	0.056	1.76
16					2.0	0.254	0.340	0.204	0.051	1.60
17					2.6	0.331	0.340	0.265	0.066	2.08
18					2.7	0.343	0.340	0.275	0.069	2.16
19					2.4	0.305	0.340	0.244	0.061	1.92
20					2.7	0.343	0.340	0.275	0.069	2.16
21					3.3	0.420	0.340	0.336	0.084	2.64
22					3.1	0.394	0.340	0.315	0.079	2.48
23					2.9	0.369	0.340	0.295	0.074	2.32
24					3.0	0.382	0.340	0.305	0.076	2.40
25					3.1	0.394	0.340	0.315	0.079	2.48
26					4.2	0.534	0.340	0.427	0.194	6.12
27					5.0	0.636	0.340	0.509	0.296	9.32
28					3.5	0.445	0.340	0.356	0.105	3.31
29					6.8	0.865	0.340	0.692	0.525	16.54
30					7.3	0.929	0.340	0.743	0.589	18.54
31					8.2	1.043	0.340	0.834	0.703	**22.15**
32					5.9	0.750	0.340	0.600	0.410	12.93
33					2.0	0.254	0.340	0.204	0.051	1.60
34					1.8	0.229	0.340	0.183	0.046	1.44
35					1.8	0.229	0.340	0.183	0.046	1.44
36					0.6	0.076	0.340	0.061	0.015	0.48
TOTALS					100.0				4.33	136.27

EFFECTIVE RAIN = 0.36 INCHES
TOTAL RUNOFF VOLUME = 0.94 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.106	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.106	0.025	0.140	1.83
2					1.3	0.165	0.106	0.025	0.140	1.83
3					1.1	0.140	0.106	0.021	0.119	1.55
4					1.5	0.191	0.106	0.029	0.162	2.11
5					1.5	0.191	0.106	0.029	0.162	2.11
6					1.8	0.229	0.106	0.035	0.194	2.53
7					1.5	0.191	0.106	0.029	0.162	2.11
8					1.8	0.229	0.106	0.035	0.194	2.53
9					1.8	0.229	0.106	0.035	0.194	2.53
10					1.5	0.191	0.106	0.029	0.162	2.11
11					1.6	0.204	0.106	0.031	0.173	2.25
12					1.8	0.229	0.106	0.035	0.194	2.53
13					2.2	0.280	0.106	0.042	0.237	3.09
14					2.2	0.280	0.106	0.042	0.237	3.09
15					2.2	0.280	0.106	0.042	0.237	3.09
16					2.0	0.254	0.106	0.039	0.216	2.81
17					2.6	0.331	0.106	0.050	0.281	3.66
18					2.7	0.343	0.106	0.052	0.291	3.80
19					2.4	0.305	0.106	0.046	0.259	3.37
20					2.7	0.343	0.106	0.052	0.291	3.80
21					3.3	0.420	0.106	0.064	0.356	4.64
22					3.1	0.394	0.106	0.060	0.335	4.36
23					2.9	0.369	0.106	0.056	0.313	4.08
24					3.0	0.382	0.106	0.058	0.324	4.22
25					3.1	0.394	0.106	0.060	0.335	4.36
26					4.2	0.534	0.106	0.081	0.453	5.90
27					5.0	0.636	0.106	0.096	0.540	7.03
28					3.5	0.445	0.106	0.067	0.378	4.92
29					6.8	0.865	0.106	0.131	0.759	9.89
30					7.3	0.929	0.106	0.141	0.823	10.72
31					8.2	1.043	0.106	0.158	0.937	**12.21**
32					5.9	0.750	0.106	0.114	0.645	8.40
33					2.0	0.254	0.106	0.039	0.216	2.81
34					1.8	0.229	0.106	0.035	0.194	2.53
35					1.8	0.229	0.106	0.035	0.194	2.53
36					0.6	0.076	0.106	0.012	0.065	0.84
TOTALS					100.0				10.91	142.16

EFFECTIVE RAIN = 0.91 INCHES
TOTAL RUNOFF VOLUME = 0.98 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.057	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.057	0.017	0.148	1.74
2					1.3	0.165	0.057	0.017	0.148	1.74
3					1.1	0.140	0.057	0.014	0.125	1.47
4					1.5	0.191	0.057	0.020	0.171	2.01
5					1.5	0.191	0.057	0.020	0.171	2.01
6					1.8	0.229	0.057	0.024	0.205	2.41
7					1.5	0.191	0.057	0.020	0.171	2.01
8					1.8	0.229	0.057	0.024	0.205	2.41
9					1.8	0.229	0.057	0.024	0.205	2.41
10					1.5	0.191	0.057	0.020	0.171	2.01
11					1.6	0.204	0.057	0.021	0.183	2.15
12					1.8	0.229	0.057	0.024	0.205	2.41
13					2.2	0.280	0.057	0.029	0.251	2.95
14					2.2	0.280	0.057	0.029	0.251	2.95
15					2.2	0.280	0.057	0.029	0.251	2.95
16					2.0	0.254	0.057	0.026	0.228	2.68
17					2.6	0.331	0.057	0.034	0.297	3.49
18					2.7	0.343	0.057	0.035	0.308	3.62
19					2.4	0.305	0.057	0.031	0.274	3.22
20					2.7	0.343	0.057	0.035	0.308	3.62
21					3.3	0.420	0.057	0.043	0.376	4.42
22					3.1	0.394	0.057	0.041	0.354	4.16
23					2.9	0.369	0.057	0.038	0.331	3.89
24					3.0	0.382	0.057	0.039	0.342	4.02
25					3.1	0.394	0.057	0.041	0.354	4.16
26					4.2	0.534	0.057	0.055	0.479	5.63
27					5.0	0.636	0.057	0.066	0.579	6.80
28					3.5	0.445	0.057	0.046	0.399	4.69
29					6.8	0.865	0.057	0.089	0.808	9.50
30					7.3	0.929	0.057	0.096	0.872	10.24
31					8.2	1.043	0.057	0.107	0.986	**11.59**
32					5.9	0.750	0.057	0.077	0.694	8.15
33					2.0	0.254	0.057	0.026	0.228	2.68
34					1.8	0.229	0.057	0.024	0.205	2.41
35					1.8	0.229	0.057	0.024	0.205	2.41
36					0.6	0.076	0.057	0.008	0.068	0.80
TOTALS					100.0				11.56	135.84

EFFECTIVE RAIN = 0.96 INCHES
TOTAL RUNOFF VOLUME = 0.94 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.111	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.111	0.034	0.131	0.25
2					1.3	0.165	0.111	0.034	0.131	0.25
3					1.1	0.140	0.111	0.029	0.111	0.21
4					1.5	0.191	0.111	0.040	0.151	0.28
5					1.5	0.191	0.111	0.040	0.151	0.28
6					1.8	0.229	0.111	0.048	0.181	0.34
7					1.5	0.191	0.111	0.040	0.151	0.28
8					1.8	0.229	0.111	0.048	0.181	0.34
9					1.8	0.229	0.111	0.048	0.181	0.34
10					1.5	0.191	0.111	0.040	0.151	0.28
11					1.6	0.204	0.111	0.042	0.161	0.30
12					1.8	0.229	0.111	0.048	0.181	0.34
13					2.2	0.280	0.111	0.058	0.222	0.42
14					2.2	0.280	0.111	0.058	0.222	0.42
15					2.2	0.280	0.111	0.058	0.222	0.42
16					2.0	0.254	0.111	0.053	0.202	0.38
17					2.6	0.331	0.111	0.069	0.262	0.49
18					2.7	0.343	0.111	0.071	0.272	0.51
19					2.4	0.305	0.111	0.063	0.242	0.46
20					2.7	0.343	0.111	0.071	0.272	0.51
21					3.3	0.420	0.111	0.087	0.332	0.63
22					3.1	0.394	0.111	0.082	0.312	0.59
23					2.9	0.369	0.111	0.077	0.292	0.55
24					3.0	0.382	0.111	0.079	0.302	0.57
25					3.1	0.394	0.111	0.082	0.312	0.59
26					4.2	0.534	0.111	0.111	0.424	0.80
27					5.0	0.636	0.111	0.132	0.525	0.99
28					3.5	0.445	0.111	0.093	0.353	0.66
29					6.8	0.865	0.111	0.180	0.754	1.42
30					7.3	0.929	0.111	0.193	0.818	1.54
31					8.2	1.043	0.111	0.217	0.932	**1.75**
32					5.9	0.750	0.111	0.156	0.640	1.20
33					2.0	0.254	0.111	0.053	0.202	0.38
34					1.8	0.229	0.111	0.048	0.181	0.34
35					1.8	0.229	0.111	0.048	0.181	0.34
36					0.6	0.076	0.111	0.016	0.060	0.11
TOTALS					100.0				10.40	19.58

EFFECTIVE RAIN = 0.87 INCHES
TOTAL RUNOFF VOLUME = 0.13 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.272	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.272	0.068	0.097	0.23
2					1.3	0.165	0.272	0.068	0.097	0.23
3					1.1	0.140	0.272	0.058	0.082	0.20
4					1.5	0.191	0.272	0.079	0.112	0.27
5					1.5	0.191	0.272	0.079	0.112	0.27
6					1.8	0.229	0.272	0.095	0.134	0.32
7					1.5	0.191	0.272	0.079	0.112	0.27
8					1.8	0.229	0.272	0.095	0.134	0.32
9					1.8	0.229	0.272	0.095	0.134	0.32
10					1.5	0.191	0.272	0.079	0.112	0.27
11					1.6	0.204	0.272	0.084	0.119	0.29
12					1.8	0.229	0.272	0.095	0.134	0.32
13					2.2	0.280	0.272	0.116	0.164	0.40
14					2.2	0.280	0.272	0.116	0.164	0.40
15					2.2	0.280	0.272	0.116	0.164	0.40
16					2.0	0.254	0.272	0.105	0.149	0.36
17					2.6	0.331	0.272	0.137	0.194	0.47
18					2.7	0.343	0.272	0.142	0.201	0.49
19					2.4	0.305	0.272	0.126	0.179	0.43
20					2.7	0.343	0.272	0.142	0.201	0.49
21					3.3	0.420	0.272	0.174	0.246	0.60
22					3.1	0.394	0.272	0.163	0.231	0.56
23					2.9	0.369	0.272	0.153	0.216	0.52
24					3.0	0.382	0.272	0.158	0.224	0.54
25					3.1	0.394	0.272	0.163	0.231	0.56
26					4.2	0.534	0.272	0.221	0.313	0.76
27					5.0	0.636	0.272	0.263	0.373	0.90
28					3.5	0.445	0.272	0.184	0.261	0.63
29					6.8	0.865	0.272	0.358	0.593	1.43
30					7.3	0.929	0.272	0.384	0.657	1.59
31					8.2	1.043	0.272	0.432	0.771	**1.87**
32					5.9	0.750	0.272	0.311	0.479	1.16
33					2.0	0.254	0.272	0.105	0.149	0.36
34					1.8	0.229	0.272	0.095	0.134	0.32
35					1.8	0.229	0.272	0.095	0.134	0.32
36					0.6	0.076	0.272	0.032	0.045	0.11
TOTALS					100.0				7.85	19.00

EFFECTIVE RAIN = 0.65 INCHES
TOTAL RUNOFF VOLUME = 0.13 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By Date: 11/17/16 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.660	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.660	0.149	0.017	0.00
2					1.3	0.165	0.660	0.149	0.017	0.00
3					1.1	0.140	0.660	0.126	0.014	0.00
4					1.5	0.191	0.660	0.172	0.019	0.00
5					1.5	0.191	0.660	0.172	0.019	0.00
6					1.8	0.229	0.660	0.206	0.023	0.01
7					1.5	0.191	0.660	0.172	0.019	0.00
8					1.8	0.229	0.660	0.206	0.023	0.01
9					1.8	0.229	0.660	0.206	0.023	0.01
10					1.5	0.191	0.660	0.172	0.019	0.00
11					1.6	0.204	0.660	0.183	0.020	0.00
12					1.8	0.229	0.660	0.206	0.023	0.01
13					2.2	0.280	0.660	0.252	0.028	0.01
14					2.2	0.280	0.660	0.252	0.028	0.01
15					2.2	0.280	0.660	0.252	0.028	0.01
16					2.0	0.254	0.660	0.229	0.025	0.01
17					2.6	0.331	0.660	0.298	0.033	0.01
18					2.7	0.343	0.660	0.309	0.034	0.01
19					2.4	0.305	0.660	0.275	0.031	0.01
20					2.7	0.343	0.660	0.309	0.034	0.01
21					3.3	0.420	0.660	0.378	0.042	0.01
22					3.1	0.394	0.660	0.355	0.039	0.01
23					2.9	0.369	0.660	0.332	0.037	0.01
24					3.0	0.382	0.660	0.343	0.038	0.01
25					3.1	0.394	0.660	0.355	0.039	0.01
26					4.2	0.534	0.660	0.481	0.053	0.01
27					5.0	0.636	0.660	0.572	0.064	0.01
28					3.5	0.445	0.660	0.401	0.045	0.01
29					6.8	0.865	0.660	0.778	0.205	0.05
30					7.3	0.929	0.660	0.836	0.269	0.06
31					8.2	1.043	0.660	0.939	0.383	**0.09**
32					5.9	0.750	0.660	0.675	0.090	0.02
33					2.0	0.254	0.660	0.229	0.025	0.01
34					1.8	0.229	0.660	0.206	0.023	0.01
35					1.8	0.229	0.660	0.206	0.023	0.01
36					0.6	0.076	0.660	0.069	0.008	0.00
TOTALS					100.0				1.86	0.41

EFFECTIVE RAIN = 0.16 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By: Date: 11/17/16 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.06
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.600	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.165	0.600	0.149	0.017	0.01
2					1.3	0.165	0.600	0.149	0.017	0.01
3					1.1	0.140	0.600	0.126	0.014	0.01
4					1.5	0.191	0.600	0.172	0.019	0.01
5					1.5	0.191	0.600	0.172	0.019	0.01
6					1.8	0.229	0.600	0.206	0.023	0.02
7					1.5	0.191	0.600	0.172	0.019	0.01
8					1.8	0.229	0.600	0.206	0.023	0.02
9					1.8	0.229	0.600	0.206	0.023	0.02
10					1.5	0.191	0.600	0.172	0.019	0.01
11					1.6	0.204	0.600	0.183	0.020	0.01
12					1.8	0.229	0.600	0.206	0.023	0.02
13					2.2	0.280	0.600	0.252	0.028	0.02
14					2.2	0.280	0.600	0.252	0.028	0.02
15					2.2	0.280	0.600	0.252	0.028	0.02
16					2.0	0.254	0.600	0.229	0.025	0.02
17					2.6	0.331	0.600	0.298	0.033	0.02
18					2.7	0.343	0.600	0.309	0.034	0.03
19					2.4	0.305	0.600	0.275	0.031	0.02
20					2.7	0.343	0.600	0.309	0.034	0.03
21					3.3	0.420	0.600	0.378	0.042	0.03
22					3.1	0.394	0.600	0.355	0.039	0.03
23					2.9	0.369	0.600	0.332	0.037	0.03
24					3.0	0.382	0.600	0.343	0.038	0.03
25					3.1	0.394	0.600	0.355	0.039	0.03
26					4.2	0.534	0.600	0.481	0.053	0.04
27					5.0	0.636	0.600	0.572	0.064	0.05
28					3.5	0.445	0.600	0.401	0.045	0.03
29					6.8	0.865	0.600	0.778	0.265	0.19
30					7.3	0.929	0.600	0.836	0.329	0.24
31					8.2	1.043	0.600	0.939	0.443	**0.32**
32					5.9	0.750	0.600	0.675	0.150	0.11
33					2.0	0.254	0.600	0.229	0.025	0.02
34					1.8	0.229	0.600	0.206	0.023	0.02
35					1.8	0.229	0.600	0.206	0.023	0.02
36					0.6	0.076	0.600	0.069	0.008	0.01
TOTALS					100.0				2.10	1.53

EFFECTIVE RAIN = 0.18 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.340	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.340	0.256	0.064	2.02
2					4.3	0.328	0.340	0.262	0.066	2.06
3					5.0	0.381	0.340	0.305	0.076	2.40
4					5.0	0.381	0.340	0.305	0.076	2.40
5					5.8	0.442	0.340	0.354	0.102	3.21
6					6.5	0.495	0.340	0.396	0.155	4.89
7					7.4	0.564	0.340	0.451	0.224	7.05
8					8.6	0.655	0.340	0.524	0.315	9.93
9					12.3	0.937	0.340	0.750	0.597	18.81
10					29.1	2.217	0.340	1.774	1.877	**59.14**
11					6.8	0.518	0.340	0.415	0.178	5.61
12					5.0	0.381	0.340	0.305	0.076	2.40
TOTALS					100.0				3.81	119.94

EFFECTIVE RAIN = 0.32 INCHES
TOTAL RUNOFF VOLUME = 0.83 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.106	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.106	0.048	0.272	3.54
2					4.3	0.328	0.106	0.050	0.278	3.62
3					5.0	0.381	0.106	0.058	0.323	4.21
4					5.0	0.381	0.106	0.058	0.323	4.21
5					5.8	0.442	0.106	0.067	0.375	4.88
6					6.5	0.495	0.106	0.075	0.420	5.47
7					7.4	0.564	0.106	0.085	0.478	6.23
8					8.6	0.655	0.106	0.099	0.556	7.24
9					12.3	0.937	0.106	0.142	0.831	10.83
10					29.1	2.217	0.106	0.336	2.112	**27.51**
11					6.8	0.518	0.106	0.078	0.440	5.73
12					5.0	0.381	0.106	0.058	0.323	4.21
TOTALS					100.0				6.73	87.69

EFFECTIVE RAIN = 0.56 INCHES
TOTAL RUNOFF VOLUME = 0.60 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.057	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.057	0.033	0.287	3.37
2					4.3	0.328	0.057	0.034	0.294	3.45
3					5.0	0.381	0.057	0.039	0.342	4.02
4					5.0	0.381	0.057	0.039	0.342	4.02
5					5.8	0.442	0.057	0.046	0.396	4.66
6					6.5	0.495	0.057	0.051	0.444	5.22
7					7.4	0.564	0.057	0.058	0.507	5.96
8					8.6	0.655	0.057	0.068	0.598	7.03
9					12.3	0.937	0.057	0.097	0.880	10.34
10					29.1	2.217	0.057	0.229	2.161	**25.39**
11					6.8	0.518	0.057	0.053	0.465	5.46
12					5.0	0.381	0.057	0.039	0.342	4.02
TOTALS					100.0				7.06	82.94

EFFECTIVE RAIN = 0.59 INCHES
TOTAL RUNOFF VOLUME = 0.57 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.111	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.111	0.067	0.253	0.48
2					4.3	0.328	0.111	0.068	0.260	0.49
3					5.0	0.381	0.111	0.079	0.302	0.57
4					5.0	0.381	0.111	0.079	0.302	0.57
5					5.8	0.442	0.111	0.092	0.350	0.66
6					6.5	0.495	0.111	0.103	0.392	0.74
7					7.4	0.564	0.111	0.117	0.453	0.85
8					8.6	0.655	0.111	0.136	0.545	1.03
9					12.3	0.937	0.111	0.195	0.827	1.56
10					29.1	2.217	0.111	0.461	2.107	**3.97**
11					6.8	0.518	0.111	0.108	0.410	0.77
12					5.0	0.381	0.111	0.079	0.302	0.57
TOTALS					100.0				6.50	12.24

EFFECTIVE RAIN = 0.54 INCHES
TOTAL RUNOFF VOLUME = 0.08 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By Date: 11/17/16 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.272	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.272	0.132	0.188	0.45
2					4.3	0.328	0.272	0.136	0.192	0.46
3					5.0	0.381	0.272	0.158	0.223	0.54
4					5.0	0.381	0.272	0.158	0.223	0.54
5					5.8	0.442	0.272	0.183	0.259	0.63
6					6.5	0.495	0.272	0.205	0.290	0.70
7					7.4	0.564	0.272	0.233	0.330	0.80
8					8.6	0.655	0.272	0.271	0.384	0.93
9					12.3	0.937	0.272	0.388	0.665	1.61
10					29.1	2.217	0.272	0.918	1.945	**4.71**
11					6.8	0.518	0.272	0.214	0.304	0.73
12					5.0	0.381	0.272	0.158	0.223	0.54
TOTALS					100.0				5.23	12.65

EFFECTIVE RAIN = 0.44 INCHES
TOTAL RUNOFF VOLUME = 0.09 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/17/16 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.660	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.660	0.288	0.032	0.01
2					4.3	0.328	0.660	0.295	0.033	0.01
3					5.0	0.381	0.660	0.343	0.038	0.01
4					5.0	0.381	0.660	0.343	0.038	0.01
5					5.8	0.442	0.660	0.398	0.044	0.01
6					6.5	0.495	0.660	0.446	0.050	0.01
7					7.4	0.564	0.660	0.507	0.056	0.01
8					8.6	0.655	0.660	0.590	0.066	0.01
9					12.3	0.937	0.660	0.844	0.277	0.06
10					29.1	2.217	0.660	1.996	1.557	**0.35**
11					6.8	0.518	0.660	0.466	0.052	0.01
12					5.0	0.381	0.660	0.343	0.038	0.01
TOTALS					100.0				2.28	0.51

EFFECTIVE RAIN = 0.19 INCHES
TOTAL RUNOFF VOLUME = 0.00 AC-FT

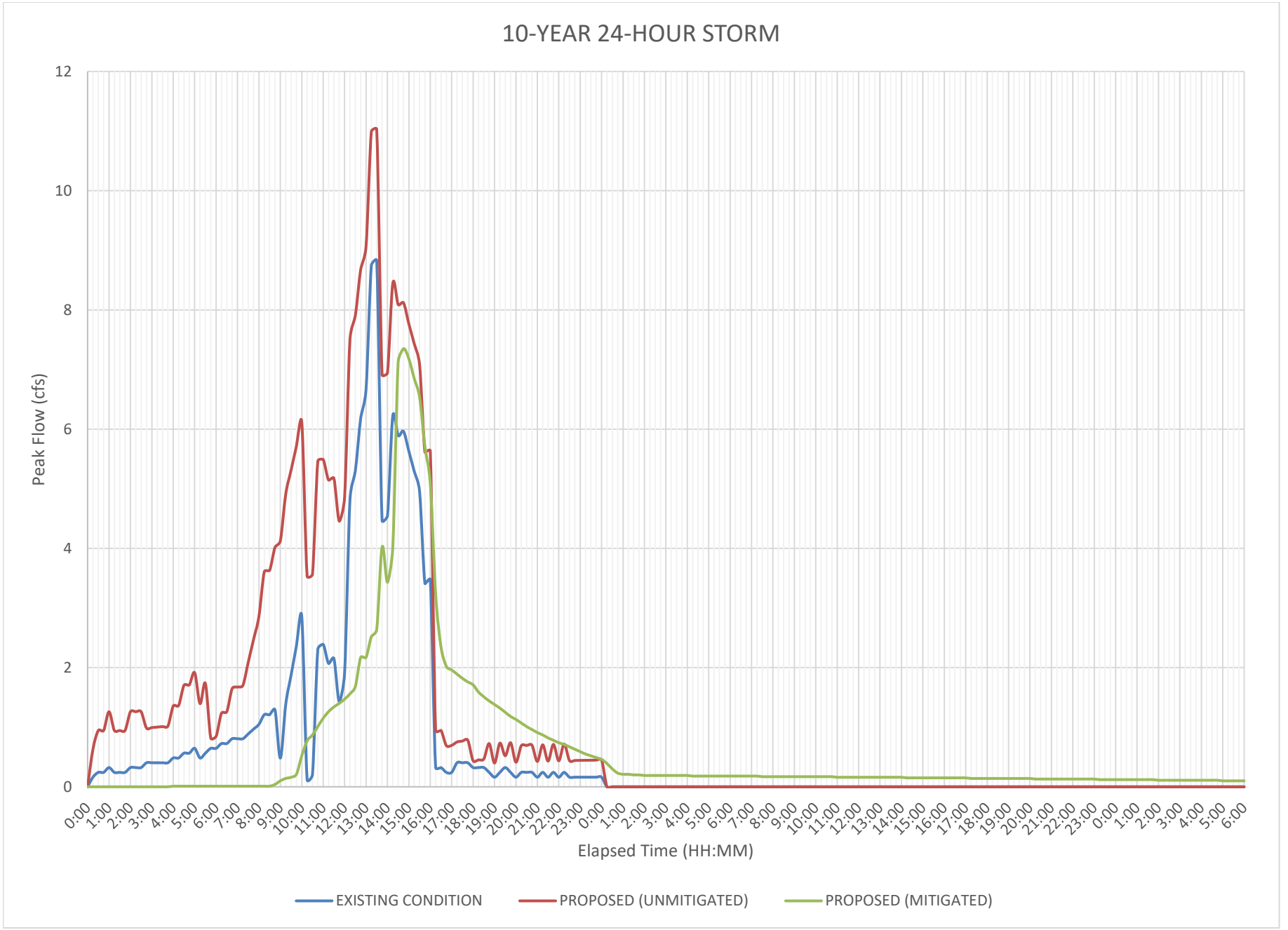
R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By _____ Date 11/17/16 Checked _____ Date _____	Sheet 1 / 1

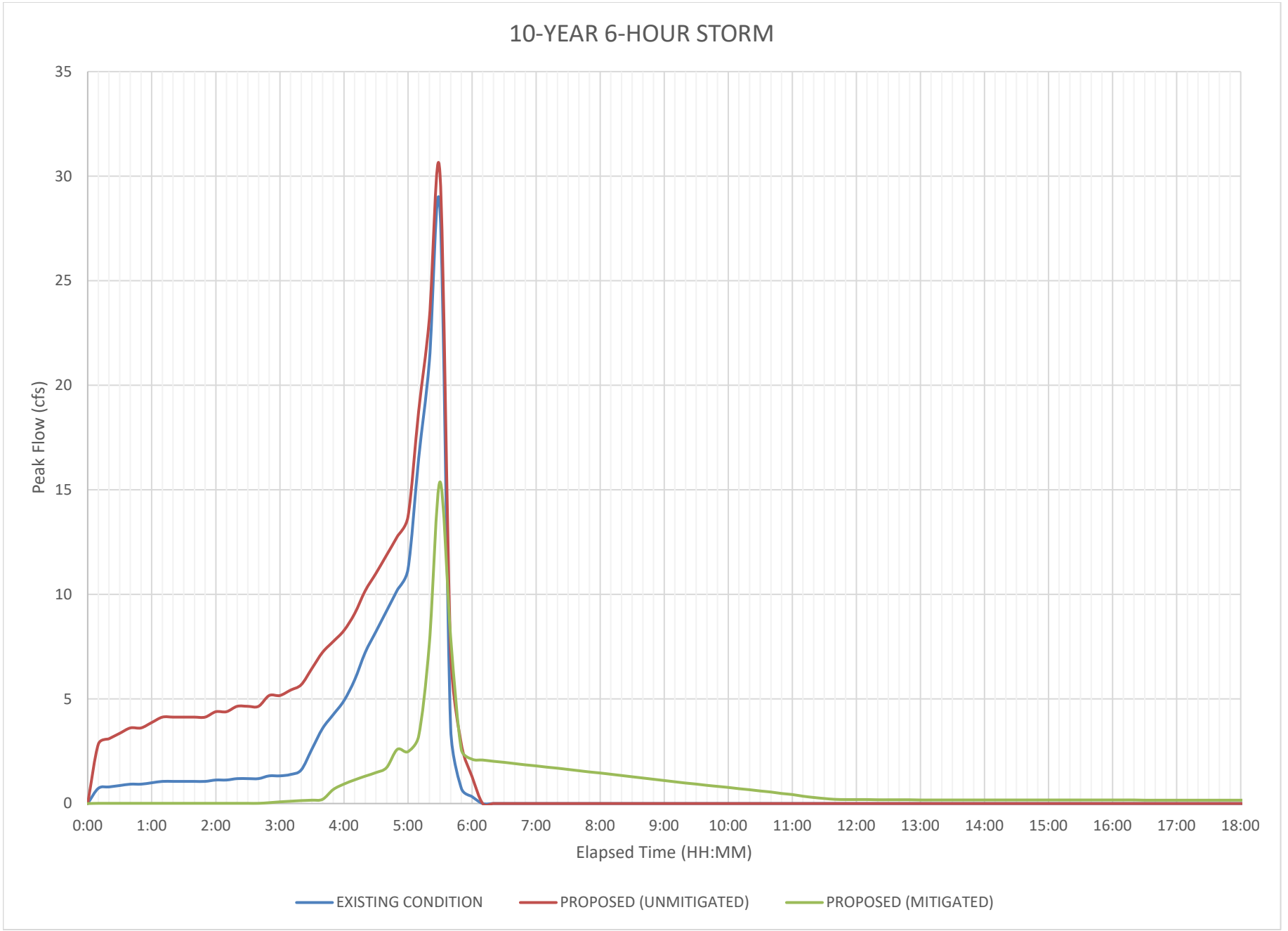
[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	5-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.635
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.600	[14] LOW LOSS RATE-PERCENT	90%

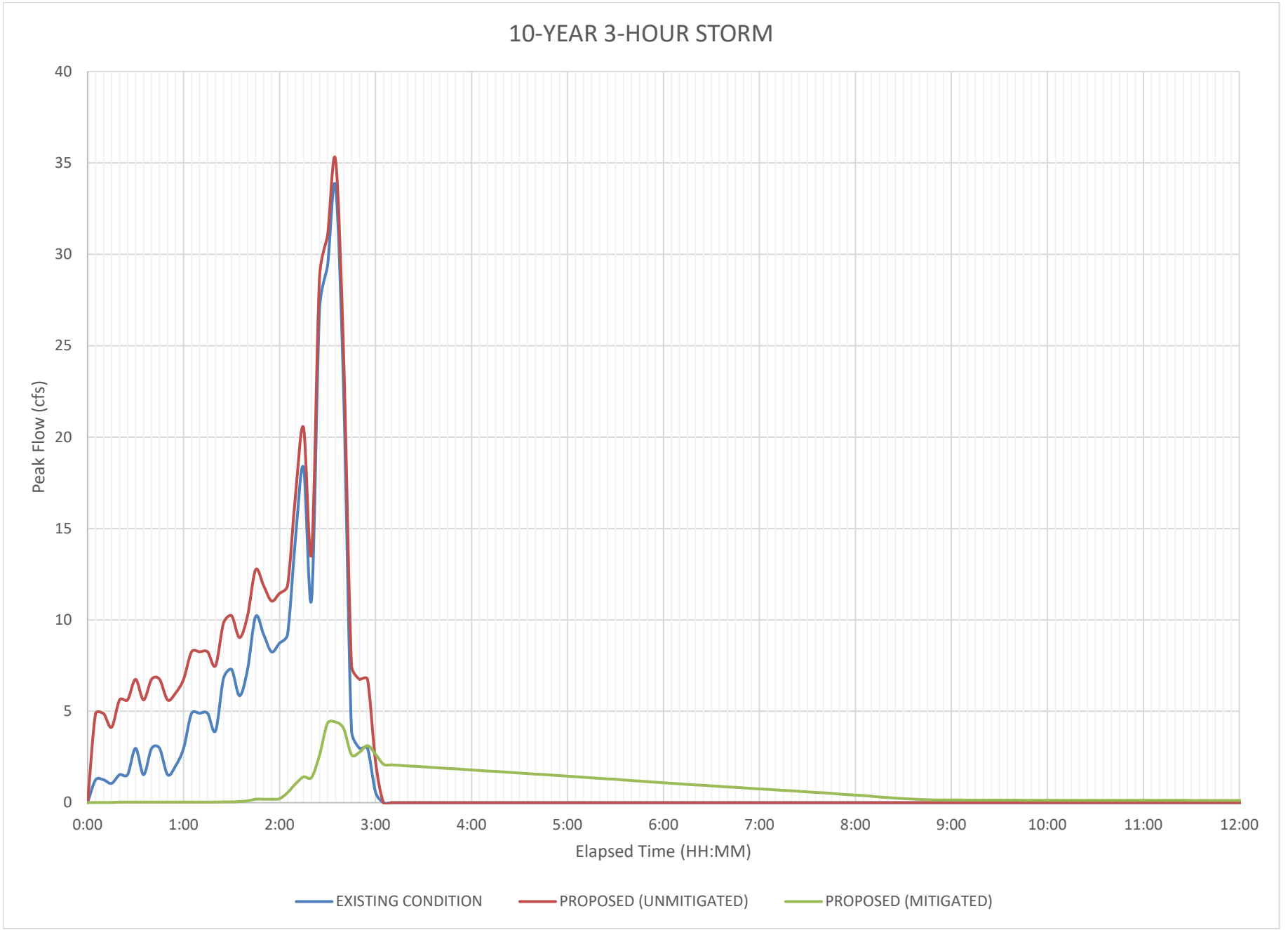
	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.320	0.600	0.288	0.032	0.02
2					4.3	0.328	0.600	0.295	0.033	0.02
3					5.0	0.381	0.600	0.343	0.038	0.03
4					5.0	0.381	0.600	0.343	0.038	0.03
5					5.8	0.442	0.600	0.398	0.044	0.03
6					6.5	0.495	0.600	0.446	0.050	0.04
7					7.4	0.564	0.600	0.507	0.056	0.04
8					8.6	0.655	0.600	0.590	0.066	0.05
9					12.3	0.937	0.600	0.844	0.337	0.25
10					29.1	2.217	0.600	1.996	1.617	**1.18**
11					6.8	0.518	0.600	0.466	0.052	0.04
12					5.0	0.381	0.600	0.343	0.038	0.03
TOTALS					100.0				2.40	1.75

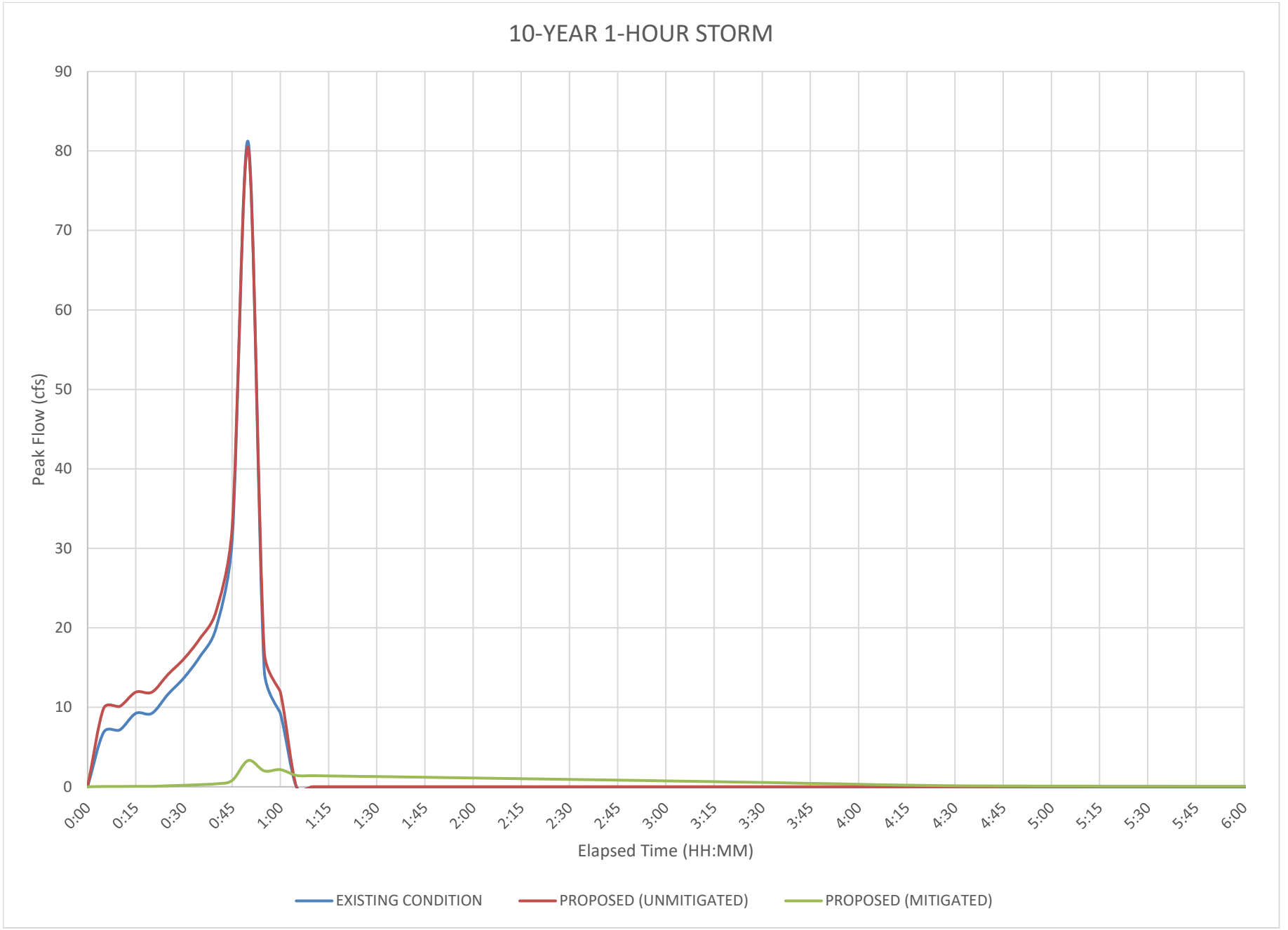
EFFECTIVE RAIN = 0.20 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

Storm Event	Peak Flow Summary (cfs)			
	Existing	Unmitigated	Mitigated	Difference
10-yr, 24-hour	8.83	11.03	7.35	-1.48
10-yr, 6-hour	28.40	30.11	15.38	-13.02
10-yr, 3-hour	33.70	35.16	4.41	-29.29
10-yr, 1-hour	81.12	80.37	3.31	-77.81


10-YEAR 24-HOUR STORM
Peak Flow (cfs)
12
10
8
6
4
2
0
0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00 1:00 2:00 3:00 4:00 5:00 6:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


10-YEAR 6-HOUR STORM
Peak Flow (cfs)
35
30
25
20
15
10
5
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


10-YEAR 3-HOUR STORM
Peak Flow (cfs)
40
35
30
25
20
15
10
5
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)


10-YEAR 1-HOUR STORM
Peak Flow (cfs)
90
80
70
60
50
40
30
20
10
0
0:00
0:15
0:30
0:45
1:00
1:15
1:30
1:45
2:00
2:15
2:30
2:45
3:00
3:15
3:30
3:45
4:00
4:15
4:30
4:45
5:00
5:15
5:30
5:45
6:00
Elapsed Time (HH:MM)
EXISTING CONDITION
PROPOSED (UNMITIGATED)
PROPOSED (MITIGATED)

Storm Event	Precip (inches)	Reference
10-yr, 24-hour	3.20	NOAA Atlas 14
10-yr, 6-hour	1.75	
10-yr, 3-hour	1.27	
10-yr, 1-hour	0.79	

PROJECT SITE EXISTING

Drainage Area	1360848	sf	
	31.24	ac	
A_i	0	sf	
	0%	imp	
Runoff Index	86		Note: Plate E-6.1: Grass (Poor); Soil Types A (10%), C (34%) & D (56%); Area-Weighted
F_p	0.18	in/hr	Note: Plate E-6.2: AMC II

$F = F_p(1 - 0.9A_i)$ **$F_$ = 0.180 in/hr**

For 24-hr storms, F_T is variable loss rate

$F_T = C[24 - (T/60)]^{1.55} + F_M$ **F_T = 0.318**

$C = (F - F_M)/54$ **C = 0.0017**

$T = \text{Unit Time}/2$ **T = 7.5**

$F_M = 0.5F$ **F_M = 0.090**

DMA D/1: PROPOSED

Drainage Area	562726	sf	
	12.92	ac	
A_i	526,512	sf	
	94%	imp	
Runoff Index	59		Note: Plate E-6.1: Residential or Commercial Landscaping (Good); Soil Types A (13%), C (54%) & D (33%); Area-Weighted
F_p	0.48	in/hr	Note: Plate E-6.2: AMC II

$F = F_p(1 - 0.9A_i)$ **$F_$ = 0.076 in/hr**

For 24-hr storms, F_T is variable loss rate

F_T = 0.134

C = 0.0007

T = 7.5

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition; By; Date 11/6/19; Checked; Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.180	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.090
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.318	0.020	0.005	0.16
2					0.3	0.038	0.314	0.031	0.008	0.24
3					0.3	0.038	0.311	0.031	0.008	0.24
4					0.4	0.051	0.307	0.041	0.010	0.32
5					0.3	0.038	0.303	0.031	0.008	0.24
6					0.3	0.038	0.300	0.031	0.008	0.24
7					0.3	0.038	0.296	0.031	0.008	0.24
8					0.4	0.051	0.292	0.041	0.010	0.32
9					0.4	0.051	0.289	0.041	0.010	0.32
10					0.4	0.051	0.285	0.041	0.010	0.32
11					0.5	0.064	0.282	0.051	0.013	0.40
12					0.5	0.064	0.278	0.051	0.013	0.40
13					0.5	0.064	0.275	0.051	0.013	0.40
14					0.5	0.064	0.272	0.051	0.013	0.40
15					0.5	0.064	0.268	0.051	0.013	0.40
16					0.6	0.077	0.265	0.061	0.015	0.48
17					0.6	0.077	0.261	0.061	0.015	0.48
18					0.7	0.090	0.258	0.072	0.018	0.56
19					0.7	0.090	0.255	0.072	0.018	0.56
20					0.8	0.102	0.252	0.082	0.020	0.65
21					0.6	0.077	0.248	0.061	0.015	0.48
22					0.7	0.090	0.245	0.072	0.018	0.56
23					0.8	0.102	0.242	0.082	0.020	0.65
24					0.8	0.102	0.239	0.082	0.020	0.65
25					0.9	0.115	0.235	0.092	0.023	0.73
26					0.9	0.115	0.232	0.092	0.023	0.73
27					1.0	0.128	0.229	0.102	0.026	0.81
28					1.0	0.128	0.226	0.102	0.026	0.81
29					1.0	0.128	0.223	0.102	0.026	0.81
30					1.1	0.141	0.220	0.113	0.028	0.89
31					1.2	0.154	0.217	0.123	0.031	0.97
32					1.3	0.166	0.214	0.133	0.033	1.05
33					1.5	0.192	0.211	0.154	0.038	1.21
34					1.5	0.192	0.208	0.154	0.038	1.21
35					1.6	0.205	0.205	0.164	0.041	1.29
36					1.7	0.218	0.202	0.174	0.015	0.48
37					1.9	0.243	0.199	0.195	0.044	1.38
38					2.0	0.256	0.197	0.205	0.059	1.87
39					2.1	0.269	0.194	0.215	0.075	2.36
40					2.2	0.282	0.191	0.225	0.091	2.85
41					1.5	0.192	0.188	0.154	0.004	0.12
42					1.5	0.192	0.186	0.154	0.006	0.20
43					2.0	0.256	0.183	0.205	0.073	2.31
44					2.0	0.256	0.180	0.205	0.076	2.39
45					1.9	0.243	0.177	0.195	0.066	2.07
46					1.9	0.243	0.175	0.195	0.068	2.15
47					1.7	0.218	0.172	0.174	0.045	1.43
48					1.8	0.230	0.170	0.184	0.061	1.91
49					2.5	0.320	0.167	0.256	0.153	4.81
50					2.6	0.333	0.165	0.266	0.168	5.30
51					2.8	0.358	0.162	0.287	0.196	6.18
52					2.9	0.371	0.160	0.297	0.211	6.66
53					3.4	0.435	0.157	0.348	0.278	8.75
54					3.4	0.435	0.155	0.348	0.280	**8.83**
55					2.3	0.294	0.153	0.236	0.142	4.47
56					2.3	0.294	0.150	0.236	0.144	4.54
57					2.7	0.346	0.148	0.276	0.198	6.22
58					2.6	0.333	0.146	0.266	0.187	5.89
59					2.6	0.333	0.144	0.266	0.189	5.96
60					2.5	0.320	0.141	0.256	0.179	5.63
61					2.4	0.307	0.139	0.246	0.168	5.29
62					2.3	0.294	0.137	0.236	0.157	4.96
63					1.9	0.243	0.135	0.195	0.108	3.41
64					1.9	0.243	0.133	0.195	0.110	3.48
65					0.4	0.051	0.131	0.041	0.010	0.32

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.180	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.090
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.129	0.041	0.010	0.32
67					0.3	0.038	0.127	0.031	0.008	0.24
68					0.3	0.038	0.125	0.031	0.008	0.24
69					0.5	0.064	0.123	0.051	0.013	0.40
70					0.5	0.064	0.121	0.051	0.013	0.40
71					0.5	0.064	0.119	0.051	0.013	0.40
72					0.4	0.051	0.118	0.041	0.010	0.32
73					0.4	0.051	0.116	0.041	0.010	0.32
74					0.4	0.051	0.114	0.041	0.010	0.32
75					0.3	0.038	0.113	0.031	0.008	0.24
76					0.2	0.026	0.111	0.020	0.005	0.16
77					0.3	0.038	0.109	0.031	0.008	0.24
78					0.4	0.051	0.108	0.041	0.010	0.32
79					0.3	0.038	0.106	0.031	0.008	0.24
80					0.2	0.026	0.105	0.020	0.005	0.16
81					0.3	0.038	0.104	0.031	0.008	0.24
82					0.3	0.038	0.102	0.031	0.008	0.24
83					0.3	0.038	0.101	0.031	0.008	0.24
84					0.2	0.026	0.100	0.020	0.005	0.16
85					0.3	0.038	0.099	0.031	0.008	0.24
86					0.2	0.026	0.097	0.020	0.005	0.16
87					0.3	0.038	0.096	0.031	0.008	0.24
88					0.2	0.026	0.095	0.020	0.005	0.16
89					0.3	0.038	0.094	0.031	0.008	0.24
90					0.2	0.026	0.094	0.020	0.005	0.16
91					0.2	0.026	0.093	0.020	0.005	0.16
92					0.2	0.026	0.092	0.020	0.005	0.16
93					0.2	0.026	0.091	0.020	0.005	0.16
94					0.2	0.026	0.091	0.020	0.005	0.16
95					0.2	0.026	0.090	0.020	0.005	0.16
96					0.2	0.026	0.090	0.020	0.005	0.16
TOTALS					100.0				4.44	139.90

EFFECTIVE RAIN = 1.11 INCHES
TOTAL RUNOFF VOLUME = 2.89 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.076	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.038
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.134	0.004	0.022	0.28
2					0.3	0.038	0.132	0.006	0.033	0.42
3					0.3	0.038	0.131	0.006	0.033	0.42
4					0.4	0.051	0.129	0.008	0.043	0.57
5					0.3	0.038	0.128	0.006	0.033	0.42
6					0.3	0.038	0.126	0.006	0.033	0.42
7					0.3	0.038	0.125	0.006	0.033	0.42
8					0.4	0.051	0.123	0.008	0.043	0.57
9					0.4	0.051	0.122	0.008	0.043	0.57
10					0.4	0.051	0.120	0.008	0.043	0.57
11					0.5	0.064	0.119	0.010	0.054	0.71
12					0.5	0.064	0.117	0.010	0.054	0.71
13					0.5	0.064	0.116	0.010	0.054	0.71
14					0.5	0.064	0.114	0.010	0.054	0.71
15					0.5	0.064	0.113	0.010	0.054	0.71
16					0.6	0.077	0.112	0.012	0.065	0.85
17					0.6	0.077	0.110	0.012	0.065	0.85
18					0.7	0.090	0.109	0.014	0.076	0.99
19					0.7	0.090	0.107	0.014	0.076	0.99
20					0.8	0.102	0.106	0.016	0.087	1.13
21					0.6	0.077	0.105	0.012	0.065	0.85
22					0.7	0.090	0.103	0.014	0.076	0.99
23					0.8	0.102	0.102	0.016	0.001	0.01
24					0.8	0.102	0.101	0.016	0.002	0.02
25					0.9	0.115	0.099	0.017	0.016	0.21
26					0.9	0.115	0.098	0.017	0.017	0.23
27					1.0	0.128	0.097	0.019	0.031	0.41
28					1.0	0.128	0.095	0.019	0.033	0.43
29					1.0	0.128	0.094	0.019	0.034	0.44
30					1.1	0.141	0.093	0.021	0.048	0.63
31					1.2	0.154	0.091	0.023	0.062	0.81
32					1.3	0.166	0.090	0.025	0.076	0.99
33					1.5	0.192	0.089	0.029	0.103	1.34
34					1.5	0.192	0.088	0.029	0.104	1.36
35					1.6	0.205	0.086	0.031	0.118	1.54
36					1.7	0.218	0.085	0.033	0.132	1.72
37					1.9	0.243	0.084	0.037	0.159	2.07
38					2.0	0.256	0.083	0.039	0.173	2.26
39					2.1	0.269	0.082	0.041	0.187	2.44
40					2.2	0.282	0.080	0.043	0.201	2.62
41					1.5	0.192	0.079	0.029	0.113	1.47
42					1.5	0.192	0.078	0.029	0.114	1.48
43					2.0	0.256	0.077	0.039	0.179	2.33
44					2.0	0.256	0.076	0.039	0.180	2.35
45					1.9	0.243	0.075	0.037	0.168	2.19
46					1.9	0.243	0.074	0.037	0.170	2.21
47					1.7	0.218	0.073	0.033	0.145	1.89
48					1.8	0.230	0.071	0.035	0.159	2.07
49					2.5	0.320	0.070	0.048	0.250	3.25
50					2.6	0.333	0.069	0.050	0.263	3.43
51					2.8	0.358	0.068	0.054	0.290	3.78
52					2.9	0.371	0.067	0.056	0.304	3.96
53					3.4	0.435	0.066	0.066	0.369	4.81
54					3.4	0.435	0.065	0.066	0.370	**4.82**
55					2.3	0.294	0.064	0.045	0.230	3.00
56					2.3	0.294	0.063	0.045	0.231	3.01
57					2.7	0.346	0.062	0.052	0.283	3.69
58					2.6	0.333	0.061	0.050	0.271	3.54
59					2.6	0.333	0.060	0.050	0.272	3.55
60					2.5	0.320	0.060	0.048	0.260	3.39
61					2.4	0.307	0.059	0.047	0.249	3.24
62					2.3	0.294	0.058	0.045	0.237	3.08
63					1.9	0.243	0.057	0.037	0.186	2.43
64					1.9	0.243	0.056	0.037	0.187	2.44
65					0.4	0.051	0.055	0.008	0.043	0.57

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.076	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.038
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.054	0.008	0.043	0.57
67					0.3	0.038	0.053	0.006	0.033	0.42
68					0.3	0.038	0.053	0.006	0.033	0.42
69					0.5	0.064	0.052	0.010	0.012	0.16
70					0.5	0.064	0.051	0.010	0.013	0.17
71					0.5	0.064	0.050	0.010	0.014	0.18
72					0.4	0.051	0.050	0.008	0.002	0.02
73					0.4	0.051	0.049	0.008	0.002	0.03
74					0.4	0.051	0.048	0.008	0.003	0.04
75					0.3	0.038	0.047	0.006	0.033	0.42
76					0.2	0.026	0.047	0.004	0.022	0.28
77					0.3	0.038	0.046	0.006	0.033	0.42
78					0.4	0.051	0.045	0.008	0.006	0.08
79					0.3	0.038	0.045	0.006	0.033	0.42
80					0.2	0.026	0.044	0.004	0.022	0.28
81					0.3	0.038	0.044	0.006	0.033	0.42
82					0.3	0.038	0.043	0.006	0.033	0.42
83					0.3	0.038	0.043	0.006	0.033	0.42
84					0.2	0.026	0.042	0.004	0.022	0.28
85					0.3	0.038	0.042	0.006	0.033	0.42
86					0.2	0.026	0.041	0.004	0.022	0.28
87					0.3	0.038	0.041	0.006	0.033	0.42
88					0.2	0.026	0.040	0.004	0.022	0.28
89					0.3	0.038	0.040	0.006	0.033	0.42
90					0.2	0.026	0.039	0.004	0.022	0.28
91					0.2	0.026	0.039	0.004	0.022	0.28
92					0.2	0.026	0.039	0.004	0.022	0.28
93					0.2	0.026	0.038	0.004	0.022	0.28
94					0.2	0.026	0.038	0.004	0.022	0.28
95					0.2	0.026	0.038	0.004	0.022	0.28
96					0.2	0.026	0.038	0.004	0.022	0.28
TOTALS					100.0				8.88	115.66

EFFECTIVE RAIN = 2.22 INCHES
TOTAL RUNOFF VOLUME = 2.39 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.036	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.018
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.064	0.003	0.023	0.27
2					0.3	0.038	0.063	0.004	0.034	0.40
3					0.3	0.038	0.062	0.004	0.034	0.40
4					0.4	0.051	0.062	0.005	0.046	0.54
5					0.3	0.038	0.061	0.004	0.034	0.40
6					0.3	0.038	0.060	0.004	0.034	0.40
7					0.3	0.038	0.060	0.004	0.034	0.40
8					0.4	0.051	0.059	0.005	0.046	0.54
9					0.4	0.051	0.058	0.005	0.046	0.54
10					0.4	0.051	0.057	0.005	0.046	0.54
11					0.5	0.064	0.057	0.007	0.007	0.09
12					0.5	0.064	0.056	0.007	0.008	0.09
13					0.5	0.064	0.055	0.007	0.009	0.10
14					0.5	0.064	0.055	0.007	0.009	0.11
15					0.5	0.064	0.054	0.007	0.010	0.12
16					0.6	0.077	0.053	0.008	0.024	0.28
17					0.6	0.077	0.053	0.008	0.024	0.28
18					0.7	0.090	0.052	0.009	0.038	0.44
19					0.7	0.090	0.051	0.009	0.038	0.45
20					0.8	0.102	0.051	0.011	0.052	0.61
21					0.6	0.077	0.050	0.008	0.027	0.32
22					0.7	0.090	0.049	0.009	0.040	0.47
23					0.8	0.102	0.049	0.011	0.054	0.63
24					0.8	0.102	0.048	0.011	0.054	0.64
25					0.9	0.115	0.047	0.012	0.068	0.80
26					0.9	0.115	0.047	0.012	0.068	0.80
27					1.0	0.128	0.046	0.013	0.082	0.96
28					1.0	0.128	0.045	0.013	0.083	0.97
29					1.0	0.128	0.045	0.013	0.083	0.98
30					1.1	0.141	0.044	0.015	0.097	1.13
31					1.2	0.154	0.044	0.016	0.110	1.29
32					1.3	0.166	0.043	0.017	0.123	1.45
33					1.5	0.192	0.042	0.020	0.150	1.76
34					1.5	0.192	0.042	0.020	0.150	1.76
35					1.6	0.205	0.041	0.021	0.164	1.92
36					1.7	0.218	0.041	0.022	0.177	2.08
37					1.9	0.243	0.040	0.025	0.203	2.39
38					2.0	0.256	0.040	0.026	0.216	2.54
39					2.1	0.269	0.039	0.028	0.230	2.70
40					2.2	0.282	0.038	0.029	0.243	2.86
41					1.5	0.192	0.038	0.020	0.154	1.81
42					1.5	0.192	0.037	0.020	0.155	1.82
43					2.0	0.256	0.037	0.026	0.219	2.58
44					2.0	0.256	0.036	0.026	0.220	2.58
45					1.9	0.243	0.036	0.025	0.207	2.44
46					1.9	0.243	0.035	0.025	0.208	2.44
47					1.7	0.218	0.035	0.022	0.183	2.15
48					1.8	0.230	0.034	0.024	0.196	2.31
49					2.5	0.320	0.034	0.033	0.286	3.37
50					2.6	0.333	0.033	0.034	0.300	3.52
51					2.8	0.358	0.033	0.037	0.326	3.83
52					2.9	0.371	0.032	0.038	0.339	3.98
53					3.4	0.435	0.032	0.045	0.404	4.74
54					3.4	0.435	0.031	0.045	0.404	**4.75**
55					2.3	0.294	0.031	0.030	0.264	3.10
56					2.3	0.294	0.030	0.030	0.264	3.10
57					2.7	0.346	0.030	0.036	0.316	3.71
58					2.6	0.333	0.029	0.034	0.303	3.57
59					2.6	0.333	0.029	0.034	0.304	3.57
60					2.5	0.320	0.028	0.033	0.292	3.43
61					2.4	0.307	0.028	0.032	0.279	3.28
62					2.3	0.294	0.028	0.030	0.267	3.14
63					1.9	0.243	0.027	0.025	0.216	2.54
64					1.9	0.243	0.027	0.025	0.216	2.54
65					0.4	0.051	0.026	0.005	0.025	0.29

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.036	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.018
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.026	0.005	0.025	0.30
67					0.3	0.038	0.026	0.004	0.013	0.15
68					0.3	0.038	0.025	0.004	0.013	0.16
69					0.5	0.064	0.025	0.007	0.039	0.46
70					0.5	0.064	0.024	0.007	0.040	0.47
71					0.5	0.064	0.024	0.007	0.040	0.47
72					0.4	0.051	0.024	0.005	0.028	0.32
73					0.4	0.051	0.023	0.005	0.028	0.33
74					0.4	0.051	0.023	0.005	0.028	0.33
75					0.3	0.038	0.023	0.004	0.016	0.19
76					0.2	0.026	0.022	0.003	0.003	0.04
77					0.3	0.038	0.022	0.004	0.016	0.19
78					0.4	0.051	0.022	0.005	0.029	0.35
79					0.3	0.038	0.021	0.004	0.017	0.20
80					0.2	0.026	0.021	0.003	0.004	0.05
81					0.3	0.038	0.021	0.004	0.018	0.21
82					0.3	0.038	0.021	0.004	0.018	0.21
83					0.3	0.038	0.020	0.004	0.018	0.21
84					0.2	0.026	0.020	0.003	0.006	0.07
85					0.3	0.038	0.020	0.004	0.019	0.22
86					0.2	0.026	0.020	0.003	0.006	0.07
87					0.3	0.038	0.019	0.004	0.019	0.22
88					0.2	0.026	0.019	0.003	0.006	0.08
89					0.3	0.038	0.019	0.004	0.019	0.23
90					0.2	0.026	0.019	0.003	0.007	0.08
91					0.2	0.026	0.019	0.003	0.007	0.08
92					0.2	0.026	0.019	0.003	0.007	0.08
93					0.2	0.026	0.018	0.003	0.007	0.08
94					0.2	0.026	0.018	0.003	0.007	0.09
95					0.2	0.026	0.018	0.003	0.007	0.09
96					0.2	0.026	0.018	0.003	0.007	0.09
TOTALS					100.0				9.89	116.16

EFFECTIVE RAIN = 2.47 INCHES
TOTAL RUNOFF VOLUME = 2.40 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.066	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.033
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.117	0.005	0.020	0.04
2					0.3	0.038	0.116	0.008	0.030	0.06
3					0.3	0.038	0.115	0.008	0.030	0.06
4					0.4	0.051	0.113	0.011	0.041	0.08
5					0.3	0.038	0.112	0.008	0.030	0.06
6					0.3	0.038	0.111	0.008	0.030	0.06
7					0.3	0.038	0.109	0.008	0.030	0.06
8					0.4	0.051	0.108	0.011	0.041	0.08
9					0.4	0.051	0.107	0.011	0.041	0.08
10					0.4	0.051	0.105	0.011	0.041	0.08
11					0.5	0.064	0.104	0.013	0.051	0.10
12					0.5	0.064	0.103	0.013	0.051	0.10
13					0.5	0.064	0.102	0.013	0.051	0.10
14					0.5	0.064	0.100	0.013	0.051	0.10
15					0.5	0.064	0.099	0.013	0.051	0.10
16					0.6	0.077	0.098	0.016	0.061	0.11
17					0.6	0.077	0.097	0.016	0.061	0.11
18					0.7	0.090	0.095	0.019	0.071	0.13
19					0.7	0.090	0.094	0.019	0.071	0.13
20					0.8	0.102	0.093	0.021	0.010	0.02
21					0.6	0.077	0.092	0.016	0.061	0.11
22					0.7	0.090	0.090	0.019	0.071	0.13
23					0.8	0.102	0.089	0.021	0.013	0.02
24					0.8	0.102	0.088	0.021	0.014	0.03
25					0.9	0.115	0.087	0.024	0.028	0.05
26					0.9	0.115	0.086	0.024	0.029	0.06
27					1.0	0.128	0.085	0.027	0.043	0.08
28					1.0	0.128	0.083	0.027	0.045	0.08
29					1.0	0.128	0.082	0.027	0.046	0.09
30					1.1	0.141	0.081	0.029	0.060	0.11
31					1.2	0.154	0.080	0.032	0.074	0.14
32					1.3	0.166	0.079	0.035	0.087	0.16
33					1.5	0.192	0.078	0.040	0.114	0.21
34					1.5	0.192	0.077	0.040	0.115	0.22
35					1.6	0.205	0.076	0.043	0.129	0.24
36					1.7	0.218	0.075	0.045	0.143	0.27
37					1.9	0.243	0.074	0.051	0.170	0.32
38					2.0	0.256	0.073	0.053	0.183	0.35
39					2.1	0.269	0.072	0.056	0.197	0.37
40					2.2	0.282	0.070	0.059	0.211	0.40
41					1.5	0.192	0.069	0.040	0.123	0.23
42					1.5	0.192	0.068	0.040	0.124	0.23
43					2.0	0.256	0.067	0.053	0.189	0.35
44					2.0	0.256	0.066	0.053	0.190	0.36
45					1.9	0.243	0.066	0.051	0.178	0.33
46					1.9	0.243	0.065	0.051	0.179	0.34
47					1.7	0.218	0.064	0.045	0.154	0.29
48					1.8	0.230	0.063	0.048	0.168	0.32
49					2.5	0.320	0.062	0.067	0.258	0.49
50					2.6	0.333	0.061	0.069	0.272	0.51
51					2.8	0.358	0.060	0.075	0.299	0.56
52					2.9	0.371	0.059	0.077	0.312	0.59
53					3.4	0.435	0.058	0.090	0.377	0.71
54					3.4	0.435	0.057	0.090	0.378	**0.71**
55					2.3	0.294	0.056	0.061	0.238	0.45
56					2.3	0.294	0.055	0.061	0.239	0.45
57					2.7	0.346	0.055	0.072	0.291	0.55
58					2.6	0.333	0.054	0.069	0.279	0.53
59					2.6	0.333	0.053	0.069	0.280	0.53
60					2.5	0.320	0.052	0.067	0.268	0.50
61					2.4	0.307	0.051	0.064	0.256	0.48
62					2.3	0.294	0.051	0.061	0.244	0.46
63					1.9	0.243	0.050	0.051	0.193	0.36
64					1.9	0.243	0.049	0.051	0.194	0.37
65					0.4	0.051	0.048	0.011	0.003	0.01

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.066	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.033
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.048	0.011	0.004	0.01
67					0.3	0.038	0.047	0.008	0.030	0.06
68					0.3	0.038	0.046	0.008	0.030	0.06
69					0.5	0.064	0.045	0.013	0.019	0.03
70					0.5	0.064	0.045	0.013	0.019	0.04
71					0.5	0.064	0.044	0.013	0.020	0.04
72					0.4	0.051	0.043	0.011	0.008	0.01
73					0.4	0.051	0.043	0.011	0.008	0.02
74					0.4	0.051	0.042	0.011	0.009	0.02
75					0.3	0.038	0.042	0.008	0.030	0.06
76					0.2	0.026	0.041	0.005	0.020	0.04
77					0.3	0.038	0.040	0.008	0.030	0.06
78					0.4	0.051	0.040	0.011	0.011	0.02
79					0.3	0.038	0.039	0.008	0.030	0.06
80					0.2	0.026	0.039	0.005	0.020	0.04
81					0.3	0.038	0.038	0.008	0.000	0.00
82					0.3	0.038	0.038	0.008	0.001	0.00
83					0.3	0.038	0.037	0.008	0.001	0.00
84					0.2	0.026	0.037	0.005	0.020	0.04
85					0.3	0.038	0.036	0.008	0.002	0.00
86					0.2	0.026	0.036	0.005	0.020	0.04
87					0.3	0.038	0.036	0.008	0.003	0.01
88					0.2	0.026	0.035	0.005	0.020	0.04
89					0.3	0.038	0.035	0.008	0.004	0.01
90					0.2	0.026	0.035	0.005	0.020	0.04
91					0.2	0.026	0.034	0.005	0.020	0.04
92					0.2	0.026	0.034	0.005	0.020	0.04
93					0.2	0.026	0.034	0.005	0.020	0.04
94					0.2	0.026	0.034	0.005	0.020	0.04
95					0.2	0.026	0.033	0.005	0.020	0.04
96					0.2	0.026	0.033	0.005	0.020	0.04
TOTALS					100.0				8.88	16.72

EFFECTIVE RAIN = 2.22 INCHES
TOTAL RUNOFF VOLUME = 0.35 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.181	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.091
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.320	0.011	0.015	0.04
2					0.3	0.038	0.316	0.016	0.023	0.05
3					0.3	0.038	0.313	0.016	0.023	0.05
4					0.4	0.051	0.309	0.021	0.030	0.07
5					0.3	0.038	0.305	0.016	0.023	0.05
6					0.3	0.038	0.302	0.016	0.023	0.05
7					0.3	0.038	0.298	0.016	0.023	0.05
8					0.4	0.051	0.295	0.021	0.030	0.07
9					0.4	0.051	0.291	0.021	0.030	0.07
10					0.4	0.051	0.287	0.021	0.030	0.07
11					0.5	0.064	0.284	0.026	0.038	0.09
12					0.5	0.064	0.280	0.026	0.038	0.09
13					0.5	0.064	0.277	0.026	0.038	0.09
14					0.5	0.064	0.274	0.026	0.038	0.09
15					0.5	0.064	0.270	0.026	0.038	0.09
16					0.6	0.077	0.267	0.032	0.045	0.11
17					0.6	0.077	0.263	0.032	0.045	0.11
18					0.7	0.090	0.260	0.037	0.053	0.13
19					0.7	0.090	0.257	0.037	0.053	0.13
20					0.8	0.102	0.253	0.042	0.060	0.15
21					0.6	0.077	0.250	0.032	0.045	0.11
22					0.7	0.090	0.247	0.037	0.053	0.13
23					0.8	0.102	0.244	0.042	0.060	0.15
24					0.8	0.102	0.240	0.042	0.060	0.15
25					0.9	0.115	0.237	0.048	0.068	0.16
26					0.9	0.115	0.234	0.048	0.068	0.16
27					1.0	0.128	0.231	0.053	0.075	0.18
28					1.0	0.128	0.228	0.053	0.075	0.18
29					1.0	0.128	0.225	0.053	0.075	0.18
30					1.1	0.141	0.222	0.058	0.083	0.20
31					1.2	0.154	0.219	0.064	0.090	0.22
32					1.3	0.166	0.216	0.069	0.098	0.24
33					1.5	0.192	0.213	0.079	0.113	0.27
34					1.5	0.192	0.210	0.079	0.113	0.27
35					1.6	0.205	0.207	0.085	0.120	0.29
36					1.7	0.218	0.204	0.090	0.014	0.03
37					1.9	0.243	0.201	0.101	0.042	0.10
38					2.0	0.256	0.198	0.106	0.058	0.14
39					2.1	0.269	0.195	0.111	0.074	0.18
40					2.2	0.282	0.192	0.117	0.089	0.22
41					1.5	0.192	0.190	0.079	0.002	0.01
42					1.5	0.192	0.187	0.079	0.005	0.01
43					2.0	0.256	0.184	0.106	0.072	0.17
44					2.0	0.256	0.181	0.106	0.075	0.18
45					1.9	0.243	0.179	0.101	0.064	0.16
46					1.9	0.243	0.176	0.101	0.067	0.16
47					1.7	0.218	0.174	0.090	0.044	0.11
48					1.8	0.230	0.171	0.095	0.059	0.14
49					2.5	0.320	0.168	0.132	0.152	0.37
50					2.6	0.333	0.166	0.138	0.167	0.40
51					2.8	0.358	0.163	0.148	0.195	0.47
52					2.9	0.371	0.161	0.154	0.210	0.51
53					3.4	0.435	0.158	0.180	0.277	0.67
54					3.4	0.435	0.156	0.180	0.279	**0.68**
55					2.3	0.294	0.154	0.122	0.141	0.34
56					2.3	0.294	0.151	0.122	0.143	0.35
57					2.7	0.346	0.149	0.143	0.197	0.48
58					2.6	0.333	0.147	0.138	0.186	0.45
59					2.6	0.333	0.145	0.138	0.188	0.46
60					2.5	0.320	0.142	0.132	0.178	0.43
61					2.4	0.307	0.140	0.127	0.167	0.40
62					2.3	0.294	0.138	0.122	0.156	0.38
63					1.9	0.243	0.136	0.101	0.107	0.26
64					1.9	0.243	0.134	0.101	0.109	0.26
65					0.4	0.051	0.132	0.021	0.030	0.07

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.181	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.091
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.130	0.021	0.030	0.07
67					0.3	0.038	0.128	0.016	0.023	0.05
68					0.3	0.038	0.126	0.016	0.023	0.05
69					0.5	0.064	0.124	0.026	0.038	0.09
70					0.5	0.064	0.122	0.026	0.038	0.09
71					0.5	0.064	0.120	0.026	0.038	0.09
72					0.4	0.051	0.119	0.021	0.030	0.07
73					0.4	0.051	0.117	0.021	0.030	0.07
74					0.4	0.051	0.115	0.021	0.030	0.07
75					0.3	0.038	0.113	0.016	0.023	0.05
76					0.2	0.026	0.112	0.011	0.015	0.04
77					0.3	0.038	0.110	0.016	0.023	0.05
78					0.4	0.051	0.109	0.021	0.030	0.07
79					0.3	0.038	0.107	0.016	0.023	0.05
80					0.2	0.026	0.106	0.011	0.015	0.04
81					0.3	0.038	0.104	0.016	0.023	0.05
82					0.3	0.038	0.103	0.016	0.023	0.05
83					0.3	0.038	0.102	0.016	0.023	0.05
84					0.2	0.026	0.100	0.011	0.015	0.04
85					0.3	0.038	0.099	0.016	0.023	0.05
86					0.2	0.026	0.098	0.011	0.015	0.04
87					0.3	0.038	0.097	0.016	0.023	0.05
88					0.2	0.026	0.096	0.011	0.015	0.04
89					0.3	0.038	0.095	0.016	0.023	0.05
90					0.2	0.026	0.094	0.011	0.015	0.04
91					0.2	0.026	0.093	0.011	0.015	0.04
92					0.2	0.026	0.093	0.011	0.015	0.04
93					0.2	0.026	0.092	0.011	0.015	0.04
94					0.2	0.026	0.091	0.011	0.015	0.04
95					0.2	0.026	0.091	0.011	0.015	0.04
96					0.2	0.026	0.091	0.011	0.015	0.04
TOTALS					100.0				6.12	14.81

EFFECTIVE RAIN = 1.53 INCHES
TOTAL RUNOFF VOLUME = 0.31 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.460	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.230
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.812	0.023	0.003	0.00
2					0.3	0.038	0.803	0.035	0.004	0.00
3					0.3	0.038	0.794	0.035	0.004	0.00
4					0.4	0.051	0.784	0.046	0.005	0.00
5					0.3	0.038	0.775	0.035	0.004	0.00
6					0.3	0.038	0.766	0.035	0.004	0.00
7					0.3	0.038	0.757	0.035	0.004	0.00
8					0.4	0.051	0.747	0.046	0.005	0.00
9					0.4	0.051	0.738	0.046	0.005	0.00
10					0.4	0.051	0.729	0.046	0.005	0.00
11					0.5	0.064	0.721	0.058	0.006	0.00
12					0.5	0.064	0.712	0.058	0.006	0.00
13					0.5	0.064	0.703	0.058	0.006	0.00
14					0.5	0.064	0.694	0.058	0.006	0.00
15					0.5	0.064	0.685	0.058	0.006	0.00
16					0.6	0.077	0.677	0.069	0.008	0.00
17					0.6	0.077	0.668	0.069	0.008	0.00
18					0.7	0.090	0.660	0.081	0.009	0.00
19					0.7	0.090	0.651	0.081	0.009	0.00
20					0.8	0.102	0.643	0.092	0.010	0.00
21					0.6	0.077	0.635	0.069	0.008	0.00
22					0.7	0.090	0.626	0.081	0.009	0.00
23					0.8	0.102	0.618	0.092	0.010	0.00
24					0.8	0.102	0.610	0.092	0.010	0.00
25					0.9	0.115	0.602	0.104	0.012	0.00
26					0.9	0.115	0.594	0.104	0.012	0.00
27					1.0	0.128	0.586	0.115	0.013	0.00
28					1.0	0.128	0.578	0.115	0.013	0.00
29					1.0	0.128	0.570	0.115	0.013	0.00
30					1.1	0.141	0.562	0.127	0.014	0.00
31					1.2	0.154	0.555	0.138	0.015	0.00
32					1.3	0.166	0.547	0.150	0.017	0.00
33					1.5	0.192	0.539	0.173	0.019	0.00
34					1.5	0.192	0.532	0.173	0.019	0.00
35					1.6	0.205	0.524	0.184	0.020	0.00
36					1.7	0.218	0.517	0.196	0.022	0.00
37					1.9	0.243	0.510	0.219	0.024	0.01
38					2.0	0.256	0.502	0.230	0.026	0.01
39					2.1	0.269	0.495	0.242	0.027	0.01
40					2.2	0.282	0.488	0.253	0.028	0.01
41					1.5	0.192	0.481	0.173	0.019	0.00
42					1.5	0.192	0.474	0.173	0.019	0.00
43					2.0	0.256	0.467	0.230	0.026	0.01
44					2.0	0.256	0.460	0.230	0.026	0.01
45					1.9	0.243	0.454	0.219	0.024	0.01
46					1.9	0.243	0.447	0.219	0.024	0.01
47					1.7	0.218	0.440	0.196	0.022	0.00
48					1.8	0.230	0.434	0.207	0.023	0.01
49					2.5	0.320	0.427	0.288	0.032	0.01
50					2.6	0.333	0.421	0.300	0.033	0.01
51					2.8	0.358	0.415	0.323	0.036	0.01
52					2.9	0.371	0.408	0.334	0.037	0.01
53					3.4	0.435	0.402	0.392	0.033	0.01
54					3.4	0.435	0.396	0.392	0.039	**0.01**
55					2.3	0.294	0.390	0.265	0.029	0.01
56					2.3	0.294	0.384	0.265	0.029	0.01
57					2.7	0.346	0.378	0.311	0.035	0.01
58					2.6	0.333	0.372	0.300	0.033	0.01
59					2.6	0.333	0.367	0.300	0.033	0.01
60					2.5	0.320	0.361	0.288	0.032	0.01
61					2.4	0.307	0.356	0.276	0.031	0.01
62					2.3	0.294	0.350	0.265	0.029	0.01
63					1.9	0.243	0.345	0.219	0.024	0.01
64					1.9	0.243	0.340	0.219	0.024	0.01
65					0.4	0.051	0.334	0.046	0.005	0.00

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.460	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.230
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.329	0.046	0.005	0.00
67					0.3	0.038	0.324	0.035	0.004	0.00
68					0.3	0.038	0.319	0.035	0.004	0.00
69					0.5	0.064	0.315	0.058	0.006	0.00
70					0.5	0.064	0.310	0.058	0.006	0.00
71					0.5	0.064	0.305	0.058	0.006	0.00
72					0.4	0.051	0.301	0.046	0.005	0.00
73					0.4	0.051	0.296	0.046	0.005	0.00
74					0.4	0.051	0.292	0.046	0.005	0.00
75					0.3	0.038	0.288	0.035	0.004	0.00
76					0.2	0.026	0.284	0.023	0.003	0.00
77					0.3	0.038	0.280	0.035	0.004	0.00
78					0.4	0.051	0.276	0.046	0.005	0.00
79					0.3	0.038	0.272	0.035	0.004	0.00
80					0.2	0.026	0.268	0.023	0.003	0.00
81					0.3	0.038	0.265	0.035	0.004	0.00
82					0.3	0.038	0.261	0.035	0.004	0.00
83					0.3	0.038	0.258	0.035	0.004	0.00
84					0.2	0.026	0.255	0.023	0.003	0.00
85					0.3	0.038	0.252	0.035	0.004	0.00
86					0.2	0.026	0.249	0.023	0.003	0.00
87					0.3	0.038	0.246	0.035	0.004	0.00
88					0.2	0.026	0.244	0.023	0.003	0.00
89					0.3	0.038	0.241	0.035	0.004	0.00
90					0.2	0.026	0.239	0.023	0.003	0.00
91					0.2	0.026	0.237	0.023	0.003	0.00
92					0.2	0.026	0.235	0.023	0.003	0.00
93					0.2	0.026	0.233	0.023	0.003	0.00
94					0.2	0.026	0.232	0.023	0.003	0.00
95					0.2	0.026	0.231	0.023	0.003	0.00
96					0.2	0.026	0.230	0.023	0.003	0.00
TOTALS					100.0				1.27	0.28

EFFECTIVE RAIN = 0.32 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.400	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.200
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR		[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
							MAX	LOW		
1					0.2	0.026	0.706	0.023	0.003	0.00
2					0.3	0.038	0.698	0.035	0.004	0.00
3					0.3	0.038	0.690	0.035	0.004	0.00
4					0.4	0.051	0.682	0.046	0.005	0.00
5					0.3	0.038	0.674	0.035	0.004	0.00
6					0.3	0.038	0.666	0.035	0.004	0.00
7					0.3	0.038	0.658	0.035	0.004	0.00
8					0.4	0.051	0.650	0.046	0.005	0.00
9					0.4	0.051	0.642	0.046	0.005	0.00
10					0.4	0.051	0.634	0.046	0.005	0.00
11					0.5	0.064	0.627	0.058	0.006	0.00
12					0.5	0.064	0.619	0.058	0.006	0.00
13					0.5	0.064	0.611	0.058	0.006	0.00
14					0.5	0.064	0.604	0.058	0.006	0.00
15					0.5	0.064	0.596	0.058	0.006	0.00
16					0.6	0.077	0.589	0.069	0.008	0.01
17					0.6	0.077	0.581	0.069	0.008	0.01
18					0.7	0.090	0.574	0.081	0.009	0.01
19					0.7	0.090	0.566	0.081	0.009	0.01
20					0.8	0.102	0.559	0.092	0.010	0.01
21					0.6	0.077	0.552	0.069	0.008	0.01
22					0.7	0.090	0.545	0.081	0.009	0.01
23					0.8	0.102	0.537	0.092	0.010	0.01
24					0.8	0.102	0.530	0.092	0.010	0.01
25					0.9	0.115	0.523	0.104	0.012	0.01
26					0.9	0.115	0.516	0.104	0.012	0.01
27					1.0	0.128	0.509	0.115	0.013	0.01
28					1.0	0.128	0.503	0.115	0.013	0.01
29					1.0	0.128	0.496	0.115	0.013	0.01
30					1.1	0.141	0.489	0.127	0.014	0.01
31					1.2	0.154	0.482	0.138	0.015	0.01
32					1.3	0.166	0.476	0.150	0.017	0.01
33					1.5	0.192	0.469	0.173	0.019	0.01
34					1.5	0.192	0.462	0.173	0.019	0.01
35					1.6	0.205	0.456	0.184	0.020	0.01
36					1.7	0.218	0.450	0.196	0.022	0.02
37					1.9	0.243	0.443	0.219	0.024	0.02
38					2.0	0.256	0.437	0.230	0.026	0.02
39					2.1	0.269	0.431	0.242	0.027	0.02
40					2.2	0.282	0.424	0.253	0.028	0.02
41					1.5	0.192	0.418	0.173	0.019	0.01
42					1.5	0.192	0.412	0.173	0.019	0.01
43					2.0	0.256	0.406	0.230	0.026	0.02
44					2.0	0.256	0.400	0.230	0.026	0.02
45					1.9	0.243	0.394	0.219	0.024	0.02
46					1.9	0.243	0.389	0.219	0.024	0.02
47					1.7	0.218	0.383	0.196	0.022	0.02
48					1.8	0.230	0.377	0.207	0.023	0.02
49					2.5	0.320	0.372	0.288	0.032	0.02
50					2.6	0.333	0.366	0.300	0.033	0.02
51					2.8	0.358	0.360	0.323	0.036	0.03
52					2.9	0.371	0.355	0.334	0.016	0.01
53					3.4	0.435	0.350	0.392	0.086	0.06
54					3.4	0.435	0.344	0.392	0.091	**0.07**
55					2.3	0.294	0.339	0.265	0.029	0.02
56					2.3	0.294	0.334	0.265	0.029	0.02
57					2.7	0.346	0.329	0.311	0.017	0.01
58					2.6	0.333	0.324	0.300	0.009	0.01
59					2.6	0.333	0.319	0.300	0.014	0.01
60					2.5	0.320	0.314	0.288	0.006	0.00
61					2.4	0.307	0.309	0.276	0.031	0.02
62					2.3	0.294	0.304	0.265	0.029	0.02
63					1.9	0.243	0.300	0.219	0.024	0.02
64					1.9	0.243	0.295	0.219	0.024	0.02
65					0.4	0.051	0.291	0.046	0.005	0.00

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By ____ Date 11/6/19 Checked ____ Date ____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	N/A
[5] UNIT TIME-MINUTES	15	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	N/A
[9] STORM FREQUENCY & DURATION	10-YR, 24-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	3.2
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	0.400	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	0.200
[13] CONSTANT LOSS RATE-INCHES/HOUR	---	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
66					0.4	0.051	0.286	0.046	0.005	0.00
67					0.3	0.038	0.282	0.035	0.004	0.00
68					0.3	0.038	0.278	0.035	0.004	0.00
69					0.5	0.064	0.274	0.058	0.006	0.00
70					0.5	0.064	0.269	0.058	0.006	0.00
71					0.5	0.064	0.265	0.058	0.006	0.00
72					0.4	0.051	0.261	0.046	0.005	0.00
73					0.4	0.051	0.258	0.046	0.005	0.00
74					0.4	0.051	0.254	0.046	0.005	0.00
75					0.3	0.038	0.250	0.035	0.004	0.00
76					0.2	0.026	0.247	0.023	0.003	0.00
77					0.3	0.038	0.243	0.035	0.004	0.00
78					0.4	0.051	0.240	0.046	0.005	0.00
79					0.3	0.038	0.236	0.035	0.004	0.00
80					0.2	0.026	0.233	0.023	0.003	0.00
81					0.3	0.038	0.230	0.035	0.004	0.00
82					0.3	0.038	0.227	0.035	0.004	0.00
83					0.3	0.038	0.224	0.035	0.004	0.00
84					0.2	0.026	0.222	0.023	0.003	0.00
85					0.3	0.038	0.219	0.035	0.004	0.00
86					0.2	0.026	0.217	0.023	0.003	0.00
87					0.3	0.038	0.214	0.035	0.004	0.00
88					0.2	0.026	0.212	0.023	0.003	0.00
89					0.3	0.038	0.210	0.035	0.004	0.00
90					0.2	0.026	0.208	0.023	0.003	0.00
91					0.2	0.026	0.206	0.023	0.003	0.00
92					0.2	0.026	0.204	0.023	0.003	0.00
93					0.2	0.026	0.203	0.023	0.003	0.00
94					0.2	0.026	0.202	0.023	0.003	0.00
95					0.2	0.026	0.201	0.023	0.003	0.00
96					0.2	0.026	0.200	0.023	0.003	0.00
TOTALS					100.0				1.26	0.92

EFFECTIVE RAIN = 0.32 INCHES
TOTAL RUNOFF VOLUME = 0.02 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.180	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.180	0.092	0.023	0.73
2					1.2	0.126	0.180	0.101	0.025	0.79
3					1.3	0.137	0.180	0.109	0.027	0.86
4					1.4	0.147	0.180	0.118	0.029	0.93
5					1.4	0.147	0.180	0.118	0.029	0.93
6					1.5	0.158	0.180	0.126	0.032	0.99
7					1.6	0.168	0.180	0.134	0.034	1.06
8					1.6	0.168	0.180	0.134	0.034	1.06
9					1.6	0.168	0.180	0.134	0.034	1.06
10					1.6	0.168	0.180	0.134	0.034	1.06
11					1.6	0.168	0.180	0.134	0.034	1.06
12					1.7	0.179	0.180	0.143	0.036	1.12
13					1.7	0.179	0.180	0.143	0.036	1.12
14					1.8	0.189	0.180	0.151	0.038	1.19
15					1.8	0.189	0.180	0.151	0.038	1.19
16					1.8	0.189	0.180	0.151	0.038	1.19
17					2.0	0.210	0.180	0.168	0.042	1.32
18					2.0	0.210	0.180	0.168	0.042	1.32
19					2.1	0.221	0.180	0.176	0.044	1.39
20					2.2	0.231	0.180	0.185	0.051	1.61
21					2.5	0.263	0.180	0.210	0.083	2.60
22					2.8	0.294	0.180	0.235	0.114	3.59
23					3.0	0.315	0.180	0.252	0.135	4.25
24					3.2	0.336	0.180	0.269	0.156	4.91
25					3.5	0.368	0.180	0.294	0.188	5.91
26					3.9	0.410	0.180	0.328	0.230	7.23
27					4.2	0.441	0.180	0.353	0.261	8.22
28					4.5	0.473	0.180	0.378	0.293	9.21
29					4.8	0.504	0.180	0.403	0.324	10.21
30					5.1	0.536	0.180	0.428	0.356	11.20
31					6.7	0.704	0.180	0.563	0.524	16.49
32					8.1	0.851	0.180	0.680	0.671	21.12
33					10.3	1.082	0.180	0.865	0.902	**28.40**
34					2.8	0.294	0.180	0.235	0.114	3.59
35					1.1	0.116	0.180	0.092	0.023	0.73
36					0.5	0.053	0.180	0.042	0.011	0.33
TOTALS					100.0				5.08	159.98

EFFECTIVE RAIN = 0.85 INCHES
TOTAL RUNOFF VOLUME = 2.20 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By: Date: 11/6/19 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.076	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.076	0.017	0.098	1.28
2					1.2	0.126	0.076	0.019	0.107	1.39
3					1.3	0.137	0.076	0.021	0.116	1.51
4					1.4	0.147	0.076	0.022	0.125	1.62
5					1.4	0.147	0.076	0.022	0.125	1.62
6					1.5	0.158	0.076	0.024	0.134	1.74
7					1.6	0.168	0.076	0.025	0.143	1.86
8					1.6	0.168	0.076	0.025	0.143	1.86
9					1.6	0.168	0.076	0.025	0.143	1.86
10					1.6	0.168	0.076	0.025	0.143	1.86
11					1.6	0.168	0.076	0.025	0.143	1.86
12					1.7	0.179	0.076	0.027	0.151	1.97
13					1.7	0.179	0.076	0.027	0.151	1.97
14					1.8	0.189	0.076	0.029	0.160	2.09
15					1.8	0.189	0.076	0.029	0.160	2.09
16					1.8	0.189	0.076	0.029	0.160	2.09
17					2.0	0.210	0.076	0.032	0.178	2.32
18					2.0	0.210	0.076	0.032	0.178	2.32
19					2.1	0.221	0.076	0.033	0.187	2.44
20					2.2	0.231	0.076	0.035	0.196	2.55
21					2.5	0.263	0.076	0.040	0.223	2.90
22					2.8	0.294	0.076	0.045	0.249	3.25
23					3.0	0.315	0.076	0.048	0.267	3.48
24					3.2	0.336	0.076	0.051	0.285	3.71
25					3.5	0.368	0.076	0.056	0.312	4.06
26					3.9	0.410	0.076	0.062	0.347	4.53
27					4.2	0.441	0.076	0.067	0.374	4.87
28					4.5	0.473	0.076	0.072	0.401	5.22
29					4.8	0.504	0.076	0.076	0.428	5.58
30					5.1	0.536	0.076	0.081	0.460	5.99
31					6.7	0.704	0.076	0.107	0.628	8.18
32					8.1	0.851	0.076	0.129	0.775	10.09
33					10.3	1.082	0.076	0.164	1.006	**13.10**
34					2.8	0.294	0.076	0.045	0.249	3.25
35					1.1	0.116	0.076	0.017	0.098	1.28
36					0.5	0.053	0.076	0.008	0.045	0.58
TOTALS					100.0				9.09	118.37

EFFECTIVE RAIN = 1.51 INCHES
TOTAL RUNOFF VOLUME = 1.63 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By Date: 11/6/19 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.036	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.036	0.012	0.104	1.22
2					1.2	0.126	0.036	0.013	0.113	1.33
3					1.3	0.137	0.036	0.014	0.122	1.44
4					1.4	0.147	0.036	0.015	0.132	1.55
5					1.4	0.147	0.036	0.015	0.132	1.55
6					1.5	0.158	0.036	0.016	0.141	1.66
7					1.6	0.168	0.036	0.017	0.151	1.77
8					1.6	0.168	0.036	0.017	0.151	1.77
9					1.6	0.168	0.036	0.017	0.151	1.77
10					1.6	0.168	0.036	0.017	0.151	1.77
11					1.6	0.168	0.036	0.017	0.151	1.77
12					1.7	0.179	0.036	0.018	0.160	1.88
13					1.7	0.179	0.036	0.018	0.160	1.88
14					1.8	0.189	0.036	0.019	0.170	1.99
15					1.8	0.189	0.036	0.019	0.170	1.99
16					1.8	0.189	0.036	0.019	0.170	1.99
17					2.0	0.210	0.036	0.022	0.188	2.21
18					2.0	0.210	0.036	0.022	0.188	2.21
19					2.1	0.221	0.036	0.023	0.198	2.32
20					2.2	0.231	0.036	0.024	0.207	2.43
21					2.5	0.263	0.036	0.027	0.235	2.77
22					2.8	0.294	0.036	0.030	0.264	3.10
23					3.0	0.315	0.036	0.032	0.283	3.32
24					3.2	0.336	0.036	0.035	0.301	3.54
25					3.5	0.368	0.036	0.038	0.331	3.89
26					3.9	0.410	0.036	0.042	0.373	4.39
27					4.2	0.441	0.036	0.045	0.405	4.76
28					4.5	0.473	0.036	0.049	0.436	5.13
29					4.8	0.504	0.036	0.052	0.468	5.50
30					5.1	0.536	0.036	0.055	0.499	5.87
31					6.7	0.704	0.036	0.073	0.667	7.84
32					8.1	0.851	0.036	0.088	0.814	9.57
33					10.3	1.082	0.036	0.111	1.045	**12.28**
34					2.8	0.294	0.036	0.030	0.264	3.10
35					1.1	0.116	0.036	0.012	0.104	1.22
36					0.5	0.053	0.036	0.005	0.047	0.55
TOTALS					100.0				9.64	113.34

EFFECTIVE RAIN = 1.61 INCHES
TOTAL RUNOFF VOLUME = 1.56 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.066	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.066	0.024	0.091	0.17
2					1.2	0.126	0.066	0.026	0.100	0.19
3					1.3	0.137	0.066	0.028	0.108	0.20
4					1.4	0.147	0.066	0.031	0.116	0.22
5					1.4	0.147	0.066	0.031	0.116	0.22
6					1.5	0.158	0.066	0.033	0.125	0.23
7					1.6	0.168	0.066	0.035	0.133	0.25
8					1.6	0.168	0.066	0.035	0.133	0.25
9					1.6	0.168	0.066	0.035	0.133	0.25
10					1.6	0.168	0.066	0.035	0.133	0.25
11					1.6	0.168	0.066	0.035	0.133	0.25
12					1.7	0.179	0.066	0.037	0.141	0.27
13					1.7	0.179	0.066	0.037	0.141	0.27
14					1.8	0.189	0.066	0.039	0.150	0.28
15					1.8	0.189	0.066	0.039	0.150	0.28
16					1.8	0.189	0.066	0.039	0.150	0.28
17					2.0	0.210	0.066	0.044	0.166	0.31
18					2.0	0.210	0.066	0.044	0.166	0.31
19					2.1	0.221	0.066	0.046	0.175	0.33
20					2.2	0.231	0.066	0.048	0.183	0.34
21					2.5	0.263	0.066	0.055	0.208	0.39
22					2.8	0.294	0.066	0.061	0.233	0.44
23					3.0	0.315	0.066	0.066	0.249	0.47
24					3.2	0.336	0.066	0.070	0.270	0.51
25					3.5	0.368	0.066	0.076	0.301	0.57
26					3.9	0.410	0.066	0.085	0.343	0.65
27					4.2	0.441	0.066	0.092	0.375	0.71
28					4.5	0.473	0.066	0.098	0.406	0.76
29					4.8	0.504	0.066	0.105	0.438	0.82
30					5.1	0.536	0.066	0.111	0.469	0.88
31					6.7	0.704	0.066	0.146	0.637	1.20
32					8.1	0.851	0.066	0.177	0.784	1.48
33					10.3	1.082	0.066	0.225	1.015	**1.91**
34					2.8	0.294	0.066	0.061	0.233	0.44
35					1.1	0.116	0.066	0.024	0.091	0.17
36					0.5	0.053	0.066	0.011	0.042	0.08
TOTALS					100.0				8.84	16.64

EFFECTIVE RAIN = 1.47 INCHES
TOTAL RUNOFF VOLUME = 0.23 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.181	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.181	0.048	0.068	0.16
2					1.2	0.126	0.181	0.052	0.074	0.18
3					1.3	0.137	0.181	0.057	0.080	0.19
4					1.4	0.147	0.181	0.061	0.086	0.21
5					1.4	0.147	0.181	0.061	0.086	0.21
6					1.5	0.158	0.181	0.065	0.092	0.22
7					1.6	0.168	0.181	0.070	0.098	0.24
8					1.6	0.168	0.181	0.070	0.098	0.24
9					1.6	0.168	0.181	0.070	0.098	0.24
10					1.6	0.168	0.181	0.070	0.098	0.24
11					1.6	0.168	0.181	0.070	0.098	0.24
12					1.7	0.179	0.181	0.074	0.105	0.25
13					1.7	0.179	0.181	0.074	0.105	0.25
14					1.8	0.189	0.181	0.078	0.111	0.27
15					1.8	0.189	0.181	0.078	0.111	0.27
16					1.8	0.189	0.181	0.078	0.111	0.27
17					2.0	0.210	0.181	0.087	0.123	0.30
18					2.0	0.210	0.181	0.087	0.123	0.30
19					2.1	0.221	0.181	0.091	0.129	0.31
20					2.2	0.231	0.181	0.096	0.135	0.33
21					2.5	0.263	0.181	0.109	0.154	0.37
22					2.8	0.294	0.181	0.122	0.172	0.42
23					3.0	0.315	0.181	0.130	0.185	0.45
24					3.2	0.336	0.181	0.139	0.197	0.48
25					3.5	0.368	0.181	0.152	0.215	0.52
26					3.9	0.410	0.181	0.170	0.240	0.58
27					4.2	0.441	0.181	0.183	0.260	0.63
28					4.5	0.473	0.181	0.196	0.291	0.70
29					4.8	0.504	0.181	0.209	0.323	0.78
30					5.1	0.536	0.181	0.222	0.354	0.86
31					6.7	0.704	0.181	0.291	0.522	1.26
32					8.1	0.851	0.181	0.352	0.669	1.62
33					10.3	1.082	0.181	0.448	0.900	**2.18**
34					2.8	0.294	0.181	0.122	0.172	0.42
35					1.1	0.116	0.181	0.048	0.068	0.16
36					0.5	0.053	0.181	0.022	0.031	0.07
TOTALS					100.0				6.78	16.41

EFFECTIVE RAIN = 1.13 INCHES
TOTAL RUNOFF VOLUME = 0.23 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By _____ Date 11/6/19 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.460	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.460	0.104	0.012	0.00
2					1.2	0.126	0.460	0.113	0.013	0.00
3					1.3	0.137	0.460	0.123	0.014	0.00
4					1.4	0.147	0.460	0.132	0.015	0.00
5					1.4	0.147	0.460	0.132	0.015	0.00
6					1.5	0.158	0.460	0.142	0.016	0.00
7					1.6	0.168	0.460	0.151	0.017	0.00
8					1.6	0.168	0.460	0.151	0.017	0.00
9					1.6	0.168	0.460	0.151	0.017	0.00
10					1.6	0.168	0.460	0.151	0.017	0.00
11					1.6	0.168	0.460	0.151	0.017	0.00
12					1.7	0.179	0.460	0.161	0.018	0.00
13					1.7	0.179	0.460	0.161	0.018	0.00
14					1.8	0.189	0.460	0.170	0.019	0.00
15					1.8	0.189	0.460	0.170	0.019	0.00
16					1.8	0.189	0.460	0.170	0.019	0.00
17					2.0	0.210	0.460	0.189	0.021	0.00
18					2.0	0.210	0.460	0.189	0.021	0.00
19					2.1	0.221	0.460	0.198	0.022	0.00
20					2.2	0.231	0.460	0.208	0.023	0.01
21					2.5	0.263	0.460	0.236	0.026	0.01
22					2.8	0.294	0.460	0.265	0.029	0.01
23					3.0	0.315	0.460	0.284	0.032	0.01
24					3.2	0.336	0.460	0.302	0.034	0.01
25					3.5	0.368	0.460	0.331	0.037	0.01
26					3.9	0.410	0.460	0.369	0.041	0.01
27					4.2	0.441	0.460	0.397	0.044	0.01
28					4.5	0.473	0.460	0.425	0.047	0.01
29					4.8	0.504	0.460	0.454	0.050	0.01
30					5.1	0.536	0.460	0.482	0.076	0.02
31					6.7	0.704	0.460	0.633	0.244	0.05
32					8.1	0.851	0.460	0.765	0.391	0.09
33					10.3	1.082	0.460	0.973	0.622	**0.14**
34					2.8	0.294	0.460	0.265	0.029	0.01
35					1.1	0.116	0.460	0.104	0.012	0.00
36					0.5	0.053	0.460	0.047	0.005	0.00
TOTALS					100.0				2.06	0.46

EFFECTIVE RAIN = 0.34 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By _____ Date 11/6/19 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	10	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 6-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.75
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.400	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.1	0.116	0.400	0.104	0.012	0.01
2					1.2	0.126	0.400	0.113	0.013	0.01
3					1.3	0.137	0.400	0.123	0.014	0.01
4					1.4	0.147	0.400	0.132	0.015	0.01
5					1.4	0.147	0.400	0.132	0.015	0.01
6					1.5	0.158	0.400	0.142	0.016	0.01
7					1.6	0.168	0.400	0.151	0.017	0.01
8					1.6	0.168	0.400	0.151	0.017	0.01
9					1.6	0.168	0.400	0.151	0.017	0.01
10					1.6	0.168	0.400	0.151	0.017	0.01
11					1.6	0.168	0.400	0.151	0.017	0.01
12					1.7	0.179	0.400	0.161	0.018	0.01
13					1.7	0.179	0.400	0.161	0.018	0.01
14					1.8	0.189	0.400	0.170	0.019	0.01
15					1.8	0.189	0.400	0.170	0.019	0.01
16					1.8	0.189	0.400	0.170	0.019	0.01
17					2.0	0.210	0.400	0.189	0.021	0.02
18					2.0	0.210	0.400	0.189	0.021	0.02
19					2.1	0.221	0.400	0.198	0.022	0.02
20					2.2	0.231	0.400	0.208	0.023	0.02
21					2.5	0.263	0.400	0.236	0.026	0.02
22					2.8	0.294	0.400	0.265	0.029	0.02
23					3.0	0.315	0.400	0.284	0.032	0.02
24					3.2	0.336	0.400	0.302	0.034	0.02
25					3.5	0.368	0.400	0.331	0.037	0.03
26					3.9	0.410	0.400	0.369	0.041	0.03
27					4.2	0.441	0.400	0.397	0.044	0.03
28					4.5	0.473	0.400	0.425	0.073	0.05
29					4.8	0.504	0.400	0.454	0.104	0.08
30					5.1	0.536	0.400	0.482	0.136	0.10
31					6.7	0.704	0.400	0.633	0.304	0.22
32					8.1	0.851	0.400	0.765	0.451	0.33
33					10.3	1.082	0.400	0.973	0.682	**0.50**
34					2.8	0.294	0.400	0.265	0.029	0.02
35					1.1	0.116	0.400	0.104	0.012	0.01
36					0.5	0.053	0.400	0.047	0.005	0.00
TOTALS					100.0				2.38	1.74

EFFECTIVE RAIN = 0.40 INCHES
TOTAL RUNOFF VOLUME = 0.02 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition; By; Date 11/6/19; Checked; Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.180	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.180	0.158	0.040	1.25
2					1.3	0.198	0.180	0.158	0.040	1.25
3					1.1	0.168	0.180	0.134	0.034	1.06
4					1.5	0.229	0.180	0.183	0.049	1.53
5					1.5	0.229	0.180	0.183	0.049	1.53
6					1.8	0.274	0.180	0.219	0.094	2.97
7					1.5	0.229	0.180	0.183	0.049	1.53
8					1.8	0.274	0.180	0.219	0.094	2.97
9					1.8	0.274	0.180	0.219	0.094	2.97
10					1.5	0.229	0.180	0.183	0.049	1.53
11					1.6	0.244	0.180	0.195	0.064	2.01
12					1.8	0.274	0.180	0.219	0.094	2.97
13					2.2	0.335	0.180	0.268	0.155	4.89
14					2.2	0.335	0.180	0.268	0.155	4.89
15					2.2	0.335	0.180	0.268	0.155	4.89
16					2.0	0.305	0.180	0.244	0.125	3.93
17					2.6	0.396	0.180	0.317	0.216	6.81
18					2.7	0.411	0.180	0.329	0.231	7.29
19					2.4	0.366	0.180	0.293	0.186	5.85
20					2.7	0.411	0.180	0.329	0.231	7.29
21					3.3	0.503	0.180	0.402	0.323	10.17
22					3.1	0.472	0.180	0.378	0.292	9.21
23					2.9	0.442	0.180	0.354	0.262	8.25
24					3.0	0.457	0.180	0.366	0.277	8.73
25					3.1	0.472	0.180	0.378	0.292	9.21
26					4.2	0.640	0.180	0.512	0.460	14.49
27					5.0	0.762	0.180	0.610	0.582	18.33
28					3.5	0.533	0.180	0.427	0.353	11.13
29					6.8	1.036	0.180	0.829	0.856	26.98
30					7.3	1.113	0.180	0.890	0.933	29.38
31					8.2	1.250	0.180	1.000	1.070	**33.70**
32					5.9	0.899	0.180	0.719	0.719	22.65
33					2.0	0.305	0.180	0.244	0.125	3.93
34					1.8	0.274	0.180	0.219	0.094	2.97
35					1.8	0.274	0.180	0.219	0.094	2.97
36					0.6	0.091	0.180	0.073	0.018	0.58
TOTALS					100.0				8.96	282.12

EFFECTIVE RAIN = 0.75 INCHES
TOTAL RUNOFF VOLUME = 1.94 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By: Date: 11/6/19 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.076	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.076	0.030	0.168	2.19
2					1.3	0.198	0.076	0.030	0.168	2.19
3					1.1	0.168	0.076	0.025	0.142	1.85
4					1.5	0.229	0.076	0.035	0.194	2.53
5					1.5	0.229	0.076	0.035	0.194	2.53
6					1.8	0.274	0.076	0.042	0.233	3.03
7					1.5	0.229	0.076	0.035	0.194	2.53
8					1.8	0.274	0.076	0.042	0.233	3.03
9					1.8	0.274	0.076	0.042	0.233	3.03
10					1.5	0.229	0.076	0.035	0.194	2.53
11					1.6	0.244	0.076	0.037	0.207	2.70
12					1.8	0.274	0.076	0.042	0.233	3.03
13					2.2	0.335	0.076	0.051	0.284	3.71
14					2.2	0.335	0.076	0.051	0.284	3.71
15					2.2	0.335	0.076	0.051	0.284	3.71
16					2.0	0.305	0.076	0.046	0.259	3.37
17					2.6	0.396	0.076	0.060	0.336	4.38
18					2.7	0.411	0.076	0.062	0.349	4.55
19					2.4	0.366	0.076	0.055	0.310	4.04
20					2.7	0.411	0.076	0.062	0.349	4.55
21					3.3	0.503	0.076	0.076	0.427	5.56
22					3.1	0.472	0.076	0.072	0.401	5.22
23					2.9	0.442	0.076	0.067	0.375	4.88
24					3.0	0.457	0.076	0.069	0.388	5.05
25					3.1	0.472	0.076	0.072	0.401	5.22
26					4.2	0.640	0.076	0.097	0.564	7.35
27					5.0	0.762	0.076	0.115	0.686	8.94
28					3.5	0.533	0.076	0.081	0.458	5.96
29					6.8	1.036	0.076	0.157	0.961	12.51
30					7.3	1.113	0.076	0.169	1.037	13.50
31					8.2	1.250	0.076	0.189	1.174	**15.29**
32					5.9	0.899	0.076	0.136	0.823	10.73
33					2.0	0.305	0.076	0.046	0.259	3.37
34					1.8	0.274	0.076	0.042	0.233	3.03
35					1.8	0.274	0.076	0.042	0.233	3.03
36					0.6	0.091	0.076	0.014	0.078	1.01
TOTALS					100.0				13.35	173.84

EFFECTIVE RAIN = 1.11 INCHES
TOTAL RUNOFF VOLUME = 1.20 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By: Date: 11/6/19 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.036	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.036	0.020	0.178	2.09
2					1.3	0.198	0.036	0.020	0.178	2.09
3					1.1	0.168	0.036	0.017	0.150	1.77
4					1.5	0.229	0.036	0.024	0.205	2.41
5					1.5	0.229	0.036	0.024	0.205	2.41
6					1.8	0.274	0.036	0.028	0.246	2.89
7					1.5	0.229	0.036	0.024	0.205	2.41
8					1.8	0.274	0.036	0.028	0.246	2.89
9					1.8	0.274	0.036	0.028	0.246	2.89
10					1.5	0.229	0.036	0.024	0.205	2.41
11					1.6	0.244	0.036	0.025	0.219	2.57
12					1.8	0.274	0.036	0.028	0.246	2.89
13					2.2	0.335	0.036	0.035	0.301	3.53
14					2.2	0.335	0.036	0.035	0.301	3.53
15					2.2	0.335	0.036	0.035	0.301	3.53
16					2.0	0.305	0.036	0.031	0.273	3.21
17					2.6	0.396	0.036	0.041	0.360	4.23
18					2.7	0.411	0.036	0.042	0.375	4.41
19					2.4	0.366	0.036	0.038	0.330	3.87
20					2.7	0.411	0.036	0.042	0.375	4.41
21					3.3	0.503	0.036	0.052	0.467	5.48
22					3.1	0.472	0.036	0.049	0.436	5.13
23					2.9	0.442	0.036	0.046	0.406	4.77
24					3.0	0.457	0.036	0.047	0.421	4.95
25					3.1	0.472	0.036	0.049	0.436	5.13
26					4.2	0.640	0.036	0.066	0.604	7.10
27					5.0	0.762	0.036	0.079	0.726	8.53
28					3.5	0.533	0.036	0.055	0.497	5.84
29					6.8	1.036	0.036	0.107	1.000	11.75
30					7.3	1.113	0.036	0.115	1.076	12.65
31					8.2	1.250	0.036	0.129	1.213	**14.26**
32					5.9	0.899	0.036	0.093	0.863	10.14
33					2.0	0.305	0.036	0.031	0.273	3.21
34					1.8	0.274	0.036	0.028	0.246	2.89
35					1.8	0.274	0.036	0.028	0.246	2.89
36					0.6	0.091	0.036	0.009	0.082	0.96
TOTALS					100.0				14.14	166.13

EFFECTIVE RAIN = 1.18 INCHES
TOTAL RUNOFF VOLUME = 1.14 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By _____ Date 11/6/19 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.066	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.066	0.041	0.157	0.30
2					1.3	0.198	0.066	0.041	0.157	0.30
3					1.1	0.168	0.066	0.035	0.133	0.25
4					1.5	0.229	0.066	0.048	0.181	0.34
5					1.5	0.229	0.066	0.048	0.181	0.34
6					1.8	0.274	0.066	0.057	0.217	0.41
7					1.5	0.229	0.066	0.048	0.181	0.34
8					1.8	0.274	0.066	0.057	0.217	0.41
9					1.8	0.274	0.066	0.057	0.217	0.41
10					1.5	0.229	0.066	0.048	0.181	0.34
11					1.6	0.244	0.066	0.051	0.193	0.36
12					1.8	0.274	0.066	0.057	0.217	0.41
13					2.2	0.335	0.066	0.070	0.269	0.51
14					2.2	0.335	0.066	0.070	0.269	0.51
15					2.2	0.335	0.066	0.070	0.269	0.51
16					2.0	0.305	0.066	0.063	0.241	0.45
17					2.6	0.396	0.066	0.082	0.330	0.62
18					2.7	0.411	0.066	0.086	0.345	0.65
19					2.4	0.366	0.066	0.076	0.299	0.56
20					2.7	0.411	0.066	0.086	0.345	0.65
21					3.3	0.503	0.066	0.105	0.436	0.82
22					3.1	0.472	0.066	0.098	0.406	0.76
23					2.9	0.442	0.066	0.092	0.376	0.71
24					3.0	0.457	0.066	0.095	0.391	0.74
25					3.1	0.472	0.066	0.098	0.406	0.76
26					4.2	0.640	0.066	0.133	0.574	1.08
27					5.0	0.762	0.066	0.158	0.696	1.31
28					3.5	0.533	0.066	0.111	0.467	0.88
29					6.8	1.036	0.066	0.215	0.970	1.83
30					7.3	1.113	0.066	0.231	1.046	1.97
31					8.2	1.250	0.066	0.260	1.183	**2.23**
32					5.9	0.899	0.066	0.187	0.833	1.57
33					2.0	0.305	0.066	0.063	0.241	0.45
34					1.8	0.274	0.066	0.057	0.217	0.41
35					1.8	0.274	0.066	0.057	0.217	0.41
36					0.6	0.091	0.066	0.019	0.072	0.14
TOTALS					100.0				13.13	24.72

EFFECTIVE RAIN = 1.09 INCHES
TOTAL RUNOFF VOLUME = 0.17 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.181	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.181	0.082	0.116	0.28
2					1.3	0.198	0.181	0.082	0.116	0.28
3					1.1	0.168	0.181	0.069	0.098	0.24
4					1.5	0.229	0.181	0.095	0.134	0.32
5					1.5	0.229	0.181	0.095	0.134	0.32
6					1.8	0.274	0.181	0.114	0.161	0.39
7					1.5	0.229	0.181	0.095	0.134	0.32
8					1.8	0.274	0.181	0.114	0.161	0.39
9					1.8	0.274	0.181	0.114	0.161	0.39
10					1.5	0.229	0.181	0.095	0.134	0.32
11					1.6	0.244	0.181	0.101	0.143	0.35
12					1.8	0.274	0.181	0.114	0.161	0.39
13					2.2	0.335	0.181	0.139	0.196	0.48
14					2.2	0.335	0.181	0.139	0.196	0.48
15					2.2	0.335	0.181	0.139	0.196	0.48
16					2.0	0.305	0.181	0.126	0.179	0.43
17					2.6	0.396	0.181	0.164	0.232	0.56
18					2.7	0.411	0.181	0.170	0.241	0.58
19					2.4	0.366	0.181	0.151	0.214	0.52
20					2.7	0.411	0.181	0.170	0.241	0.58
21					3.3	0.503	0.181	0.208	0.322	0.78
22					3.1	0.472	0.181	0.196	0.291	0.70
23					2.9	0.442	0.181	0.183	0.261	0.63
24					3.0	0.457	0.181	0.189	0.276	0.67
25					3.1	0.472	0.181	0.196	0.291	0.70
26					4.2	0.640	0.181	0.265	0.459	1.11
27					5.0	0.762	0.181	0.315	0.581	1.41
28					3.5	0.533	0.181	0.221	0.352	0.85
29					6.8	1.036	0.181	0.429	0.855	2.07
30					7.3	1.113	0.181	0.461	0.931	2.25
31					8.2	1.250	0.181	0.517	1.068	**2.59**
32					5.9	0.899	0.181	0.372	0.718	1.74
33					2.0	0.305	0.181	0.126	0.179	0.43
34					1.8	0.274	0.181	0.114	0.161	0.39
35					1.8	0.274	0.181	0.114	0.161	0.39
36					0.6	0.091	0.181	0.038	0.054	0.13
TOTALS					100.0				10.31	24.94

EFFECTIVE RAIN = 0.86 INCHES
TOTAL RUNOFF VOLUME = 0.17 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.460	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.460	0.178	0.020	0.00
2					1.3	0.198	0.460	0.178	0.020	0.00
3					1.1	0.168	0.460	0.151	0.017	0.00
4					1.5	0.229	0.460	0.206	0.023	0.01
5					1.5	0.229	0.460	0.206	0.023	0.01
6					1.8	0.274	0.460	0.247	0.027	0.01
7					1.5	0.229	0.460	0.206	0.023	0.01
8					1.8	0.274	0.460	0.247	0.027	0.01
9					1.8	0.274	0.460	0.247	0.027	0.01
10					1.5	0.229	0.460	0.206	0.023	0.01
11					1.6	0.244	0.460	0.219	0.024	0.01
12					1.8	0.274	0.460	0.247	0.027	0.01
13					2.2	0.335	0.460	0.302	0.034	0.01
14					2.2	0.335	0.460	0.302	0.034	0.01
15					2.2	0.335	0.460	0.302	0.034	0.01
16					2.0	0.305	0.460	0.274	0.030	0.01
17					2.6	0.396	0.460	0.357	0.040	0.01
18					2.7	0.411	0.460	0.370	0.041	0.01
19					2.4	0.366	0.460	0.329	0.037	0.01
20					2.7	0.411	0.460	0.370	0.041	0.01
21					3.3	0.503	0.460	0.453	0.050	0.01
22					3.1	0.472	0.460	0.425	0.047	0.01
23					2.9	0.442	0.460	0.398	0.044	0.01
24					3.0	0.457	0.460	0.411	0.046	0.01
25					3.1	0.472	0.460	0.425	0.047	0.01
26					4.2	0.640	0.460	0.576	0.180	0.04
27					5.0	0.762	0.460	0.686	0.302	0.07
28					3.5	0.533	0.460	0.480	0.073	0.02
29					6.8	1.036	0.460	0.933	0.576	0.13
30					7.3	1.113	0.460	1.001	0.653	0.15
31					8.2	1.250	0.460	1.125	0.790	**0.18**
32					5.9	0.899	0.460	0.809	0.439	0.10
33					2.0	0.305	0.460	0.274	0.030	0.01
34					1.8	0.274	0.460	0.247	0.027	0.01
35					1.8	0.274	0.460	0.247	0.027	0.01
36					0.6	0.091	0.460	0.082	0.009	0.00
TOTALS					100.0				3.91	0.87

EFFECTIVE RAIN = 0.33 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By _____ Date 11/6/19 Checked _____ Date _____	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 3-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	1.27
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.400	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] / 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] / 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					1.3	0.198	0.400	0.178	0.020	0.01
2					1.3	0.198	0.400	0.178	0.020	0.01
3					1.1	0.168	0.400	0.151	0.017	0.01
4					1.5	0.229	0.400	0.206	0.023	0.02
5					1.5	0.229	0.400	0.206	0.023	0.02
6					1.8	0.274	0.400	0.247	0.027	0.02
7					1.5	0.229	0.400	0.206	0.023	0.02
8					1.8	0.274	0.400	0.247	0.027	0.02
9					1.8	0.274	0.400	0.247	0.027	0.02
10					1.5	0.229	0.400	0.206	0.023	0.02
11					1.6	0.244	0.400	0.219	0.024	0.02
12					1.8	0.274	0.400	0.247	0.027	0.02
13					2.2	0.335	0.400	0.302	0.034	0.02
14					2.2	0.335	0.400	0.302	0.034	0.02
15					2.2	0.335	0.400	0.302	0.034	0.02
16					2.0	0.305	0.400	0.274	0.030	0.02
17					2.6	0.396	0.400	0.357	0.040	0.03
18					2.7	0.411	0.400	0.370	0.041	0.03
19					2.4	0.366	0.400	0.329	0.037	0.03
20					2.7	0.411	0.400	0.370	0.041	0.03
21					3.3	0.503	0.400	0.453	0.103	0.08
22					3.1	0.472	0.400	0.425	0.072	0.05
23					2.9	0.442	0.400	0.398	0.044	0.03
24					3.0	0.457	0.400	0.411	0.057	0.04
25					3.1	0.472	0.400	0.425	0.072	0.05
26					4.2	0.640	0.400	0.576	0.240	0.18
27					5.0	0.762	0.400	0.686	0.362	0.26
28					3.5	0.533	0.400	0.480	0.133	0.10
29					6.8	1.036	0.400	0.933	0.636	0.46
30					7.3	1.113	0.400	1.001	0.713	0.52
31					8.2	1.250	0.400	1.125	0.850	**0.62**
32					5.9	0.899	0.400	0.809	0.499	0.36
33					2.0	0.305	0.400	0.274	0.030	0.02
34					1.8	0.274	0.400	0.247	0.027	0.02
35					1.8	0.274	0.400	0.247	0.027	0.02
36					0.6	0.091	0.400	0.082	0.009	0.01
TOTALS					100.0				4.45	3.25

EFFECTIVE RAIN = 0.37 INCHES
TOTAL RUNOFF VOLUME = 0.02 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: Existing Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	31.24	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.180	[14] LOW LOSS RATE-PERCENT	80%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.180	0.318	0.218	6.86
2					4.3	0.407	0.180	0.326	0.227	7.15
3					5.0	0.473	0.180	0.379	0.293	9.24
4					5.0	0.473	0.180	0.379	0.293	9.24
5					5.8	0.549	0.180	0.439	0.369	11.63
6					6.5	0.615	0.180	0.492	0.435	13.72
7					7.4	0.701	0.180	0.561	0.521	16.40
8					8.6	0.814	0.180	0.651	0.634	19.98
9					12.3	1.165	0.180	0.932	0.985	31.01
10					29.1	2.755	0.180	2.204	2.575	**81.12**
11					6.8	0.644	0.180	0.515	0.464	14.61
12					5.0	0.473	0.180	0.379	0.293	9.24
TOTALS					100.0				7.31	230.21

EFFECTIVE RAIN = 0.61 INCHES
TOTAL RUNOFF VOLUME = 1.59 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/1 Proposed Condition By Date: 11/6/19 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	12.92	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.076	[14] LOW LOSS RATE-PERCENT	15%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.076	0.060	0.337	4.40
2					4.3	0.407	0.076	0.062	0.345	4.50
3					5.0	0.473	0.076	0.072	0.402	5.23
4					5.0	0.473	0.076	0.072	0.402	5.23
5					5.8	0.549	0.076	0.083	0.473	6.17
6					6.5	0.615	0.076	0.093	0.540	7.03
7					7.4	0.701	0.076	0.106	0.625	8.14
8					8.6	0.814	0.076	0.123	0.738	9.62
9					12.3	1.165	0.076	0.176	1.089	14.18
10					29.1	2.755	0.076	0.417	2.679	**34.90**
11					6.8	0.644	0.076	0.098	0.568	7.40
12					5.0	0.473	0.076	0.072	0.402	5.23
TOTALS					100.0				8.60	112.03

EFFECTIVE RAIN = 0.72 INCHES
TOTAL RUNOFF VOLUME = 0.77 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/2 Proposed Condition By Date: 11/6/19 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	11.65	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.036	[14] LOW LOSS RATE-PERCENT	10%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.036	0.041	0.361	4.25
2					4.3	0.407	0.036	0.042	0.371	4.36
3					5.0	0.473	0.036	0.049	0.437	5.14
4					5.0	0.473	0.036	0.049	0.437	5.14
5					5.8	0.549	0.036	0.057	0.513	6.03
6					6.5	0.615	0.036	0.063	0.579	6.81
7					7.4	0.701	0.036	0.072	0.664	7.81
8					8.6	0.814	0.036	0.084	0.778	9.14
9					12.3	1.165	0.036	0.120	1.128	13.26
10					29.1	2.755	0.036	0.284	2.719	**31.95**
11					6.8	0.644	0.036	0.066	0.608	7.14
12					5.0	0.473	0.036	0.049	0.437	5.14
TOTALS					100.0				9.03	106.15

EFFECTIVE RAIN = 0.75 INCHES
TOTAL RUNOFF VOLUME = 0.73 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/3 Proposed Condition By Date: 11/6/19 Checked Date	Sheet: 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	1.87	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.066	[14] LOW LOSS RATE-PERCENT	21%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.066	0.083	0.331	0.62
2					4.3	0.407	0.066	0.085	0.341	0.64
3					5.0	0.473	0.066	0.098	0.407	0.77
4					5.0	0.473	0.066	0.098	0.407	0.77
5					5.8	0.549	0.066	0.114	0.483	0.91
6					6.5	0.615	0.066	0.128	0.549	1.03
7					7.4	0.701	0.066	0.146	0.634	1.19
8					8.6	0.814	0.066	0.169	0.748	1.41
9					12.3	1.165	0.066	0.242	1.098	2.07
10					29.1	2.755	0.066	0.573	2.689	**5.06**
11					6.8	0.644	0.066	0.134	0.577	1.09
12					5.0	0.473	0.066	0.098	0.407	0.77
TOTALS					100.0				8.67	16.32

EFFECTIVE RAIN = 0.72 INCHES
TOTAL RUNOFF VOLUME = 0.11 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA D/4 Proposed Condition By Date: 11/6/19 Checked Date	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	2.40	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.181	[14] LOW LOSS RATE-PERCENT	41%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.181	0.165	0.233	0.56
2					4.3	0.407	0.181	0.169	0.239	0.58
3					5.0	0.473	0.181	0.196	0.292	0.71
4					5.0	0.473	0.181	0.196	0.292	0.71
5					5.8	0.549	0.181	0.227	0.368	0.89
6					6.5	0.615	0.181	0.255	0.434	1.05
7					7.4	0.701	0.181	0.290	0.519	1.26
8					8.6	0.814	0.181	0.337	0.633	1.53
9					12.3	1.165	0.181	0.482	0.983	2.38
10					29.1	2.755	0.181	1.141	2.574	**6.23**
11					6.8	0.644	0.181	0.267	0.463	1.12
12					5.0	0.473	0.181	0.196	0.292	0.71
TOTALS					100.0				7.32	17.72

EFFECTIVE RAIN = 0.61 INCHES
TOTAL RUNOFF VOLUME = 0.12 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/1 Proposed Condition By: Date: 11/6/19 Checked: Date:	Sheet 1 / 1

[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.22	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.460	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.460	0.358	0.040	0.01
2					4.3	0.407	0.460	0.366	0.041	0.01
3					5.0	0.473	0.460	0.426	0.047	0.01
4					5.0	0.473	0.460	0.426	0.047	0.01
5					5.8	0.549	0.460	0.494	0.089	0.02
6					6.5	0.615	0.460	0.554	0.155	0.03
7					7.4	0.701	0.460	0.631	0.241	0.05
8					8.6	0.814	0.460	0.733	0.354	0.08
9					12.3	1.165	0.460	1.048	0.705	0.16
10					29.1	2.755	0.460	2.480	2.295	**0.51**
11					6.8	0.644	0.460	0.579	0.184	0.04
12					5.0	0.473	0.460	0.426	0.047	0.01
TOTALS					100.0				4.25	0.94

EFFECTIVE RAIN = 0.35 INCHES
TOTAL RUNOFF VOLUME = 0.01 AC-FT

R C F C & W C D HYDROLOGY MANUAL	"SHORTCUT METHOD" SYNTHETIC UNIT HYDROGRAPH METHOD Unit Hydrograph and Effective Rain Calculation Form	Project: Barker Industrial: DMA A/2 Proposed Condition By Date: 11/6/19 Checked Date	Sheet: 1 / 1

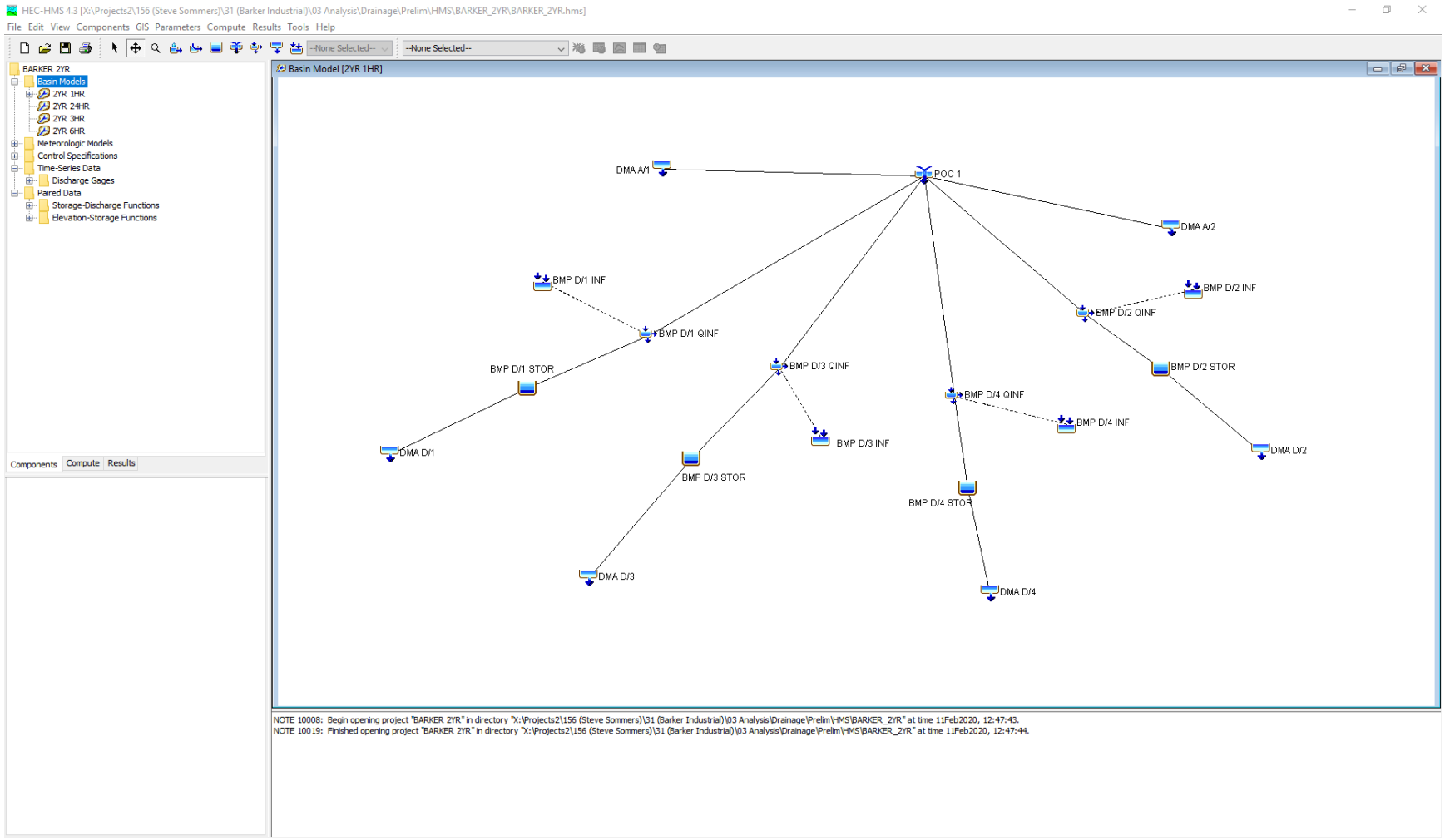
[1] CONCENTRATION POINT	---	[2] AREA DESIGNATION	---
[3] DRAINAGE AREA-ACRES	0.72	[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])	---
[5] UNIT TIME-MINUTES	5	[6] LAG TIME-MINUTES	---
[7] UNIT TIME-PERCENT OF LAG (100*[5]/[6])	---	[8] S-CURVE	---
[9] STORM FREQUENCY & DURATION	10-YR, 1-HR	[10] TOTAL ADJUSTED STORM RAIN-INCHES	0.789
[11] VARIABLE LOSS RATE (AVG)-INCHES/HOUR	---	[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR	---
[13] CONSTANT LOSS RATE-INCHES/HOUR	0.400	[14] LOW LOSS RATE-PERCENT	90%

	UNIT HYDROGRAPH				EFFECTIVE RAIN					FLOOD HYDROGRAPH
[15] UNIT TIME PERIOD m	[16] TIME PERCENT OF LAG [7]*[15]	[17] CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	[16] DISTRIB GRAPH PERCENT [17]m-[17]m-1	[17] UNIT HYDROGRAPH CFS-HRS/IN [4]*[18] 100.000	[20] PATTERN PERCENT (PL E-5.9)	[21] STORM RAIN IN/HR 60[10][20] 100[5]	[22] LOSS RATE IN/HR MAX	[22] LOSS RATE IN/HR LOW	[23] EFFECTIVE RAIN IN/HR [21]-[22]	[24] FLOW CFS
1					4.2	0.398	0.400	0.358	0.040	0.03
2					4.3	0.407	0.400	0.366	0.041	0.03
3					5.0	0.473	0.400	0.426	0.073	0.05
4					5.0	0.473	0.400	0.426	0.073	0.05
5					5.8	0.549	0.400	0.494	0.149	0.11
6					6.5	0.615	0.400	0.554	0.215	0.16
7					7.4	0.701	0.400	0.631	0.301	0.22
8					8.6	0.814	0.400	0.733	0.414	0.30
9					12.3	1.165	0.400	1.048	0.765	0.56
10					29.1	2.755	0.400	2.480	2.355	**1.72**
11					6.8	0.644	0.400	0.579	0.244	0.18
12					5.0	0.473	0.400	0.426	0.073	0.05
TOTALS					100.0				4.74	3.46

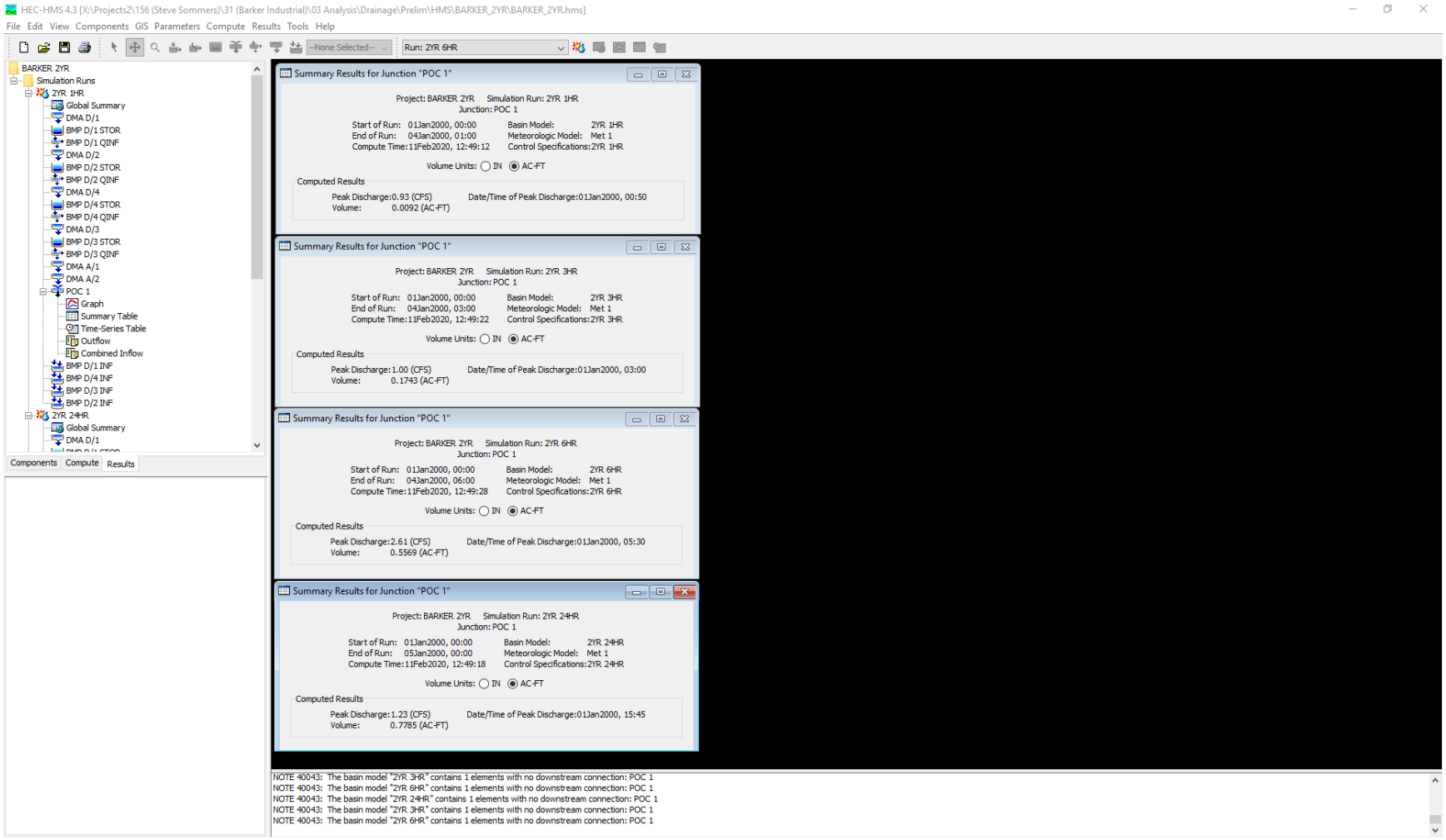
EFFECTIVE RAIN = 0.40 INCHES
TOTAL RUNOFF VOLUME = 0.02 AC-FT

Appendix 6

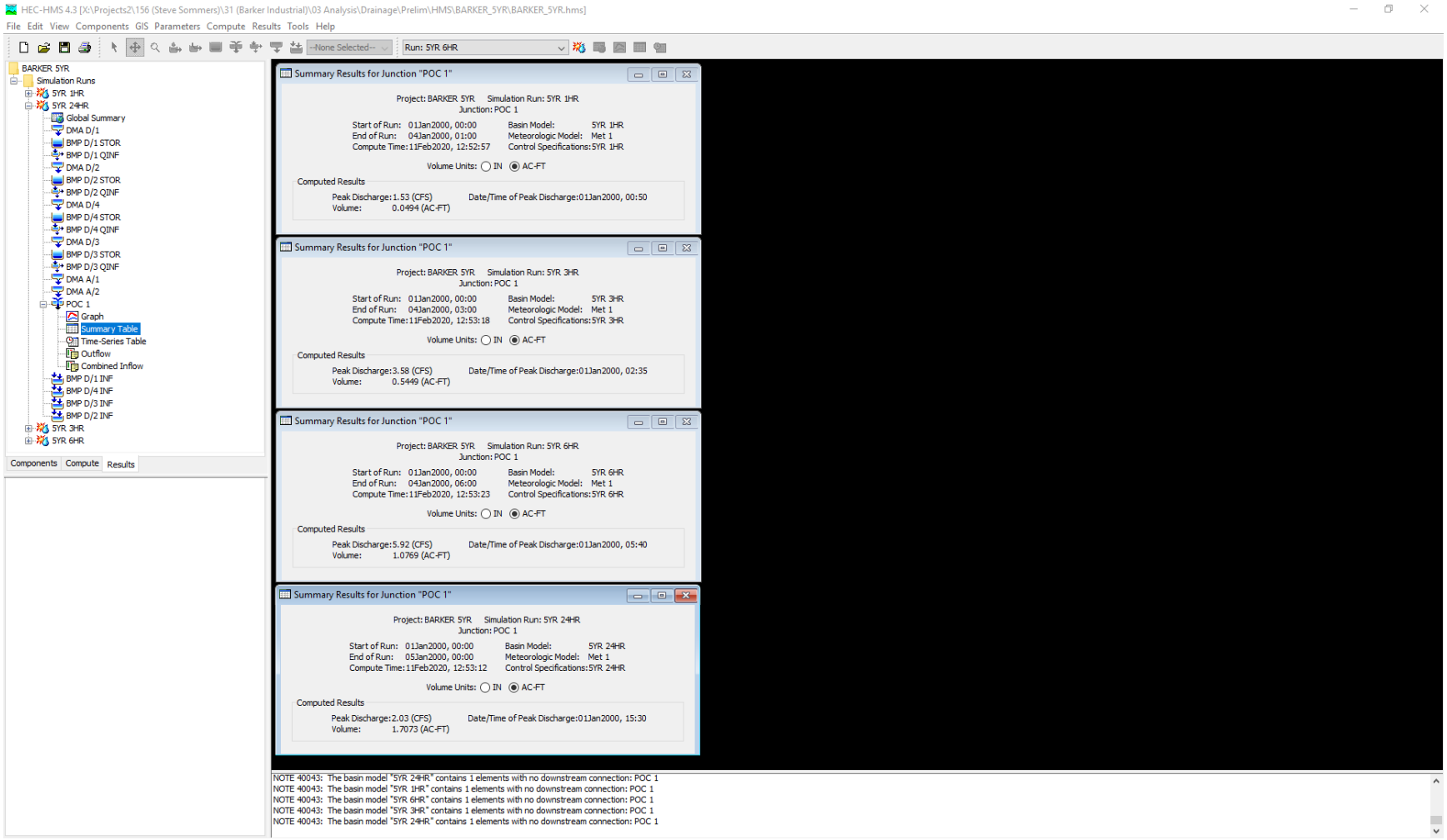
HEC-HMS Results


HEC-HMS 4.3 [X:\Projects2\156 (Steve Sommers)\31 (Barker Industrial)\03 Analysis\Drainage\Prelim\HMS\BARKER_2YR\BARKER_2YR.hms]
File Edit View Components GIS Parameters Compute Results Tools Help
--None Selected--
--None Selected--
BARKER 2YR
Basin Models
2YR 1HR
2YR 24HR
2YR 3HR
2YR 6HR
Meteorologic Models
Control Specifications
Time-Series Data
Discharge Gages
Paired Data
Storage-Discharge Functions
Elevation-Storage Functions
Components
Compute
Results
Basin Model [2YR 1HR]
DMA A/1
POC 1
DMA A/2
BMP D/1 INF
BMP D/2 INF
BMP D/2 QINF
BMP D/1 QINF
BMP D/1 STOR
BMP D/3 QINF
BMP D/2 STOR
BMP D/4 QINF
BMP D/4 INF
BMP D/3 INF
DMA D/1
DMA D/2
BMP D/3 STOR
BMP D/4 STOR
DMA D/3
DMA D/4
NOTE 10008: Begin opening project "BARKER 2YR" in directory "X:\Projects2\156 (Steve Sommers)\31 (Barker Industrial)\03 Analysis\Drainage\Prelim\HMS\BARKER_2YR" at time 11Feb2020, 12:47:43.
NOTE 10019: Finished opening project "BARKER 2YR" in directory "X:\Projects2\156 (Steve Sommers)\31 (Barker Industrial)\03 Analysis\Drainage\Prelim\HMS\BARKER_2YR" at time 11Feb2020, 12:47:44.

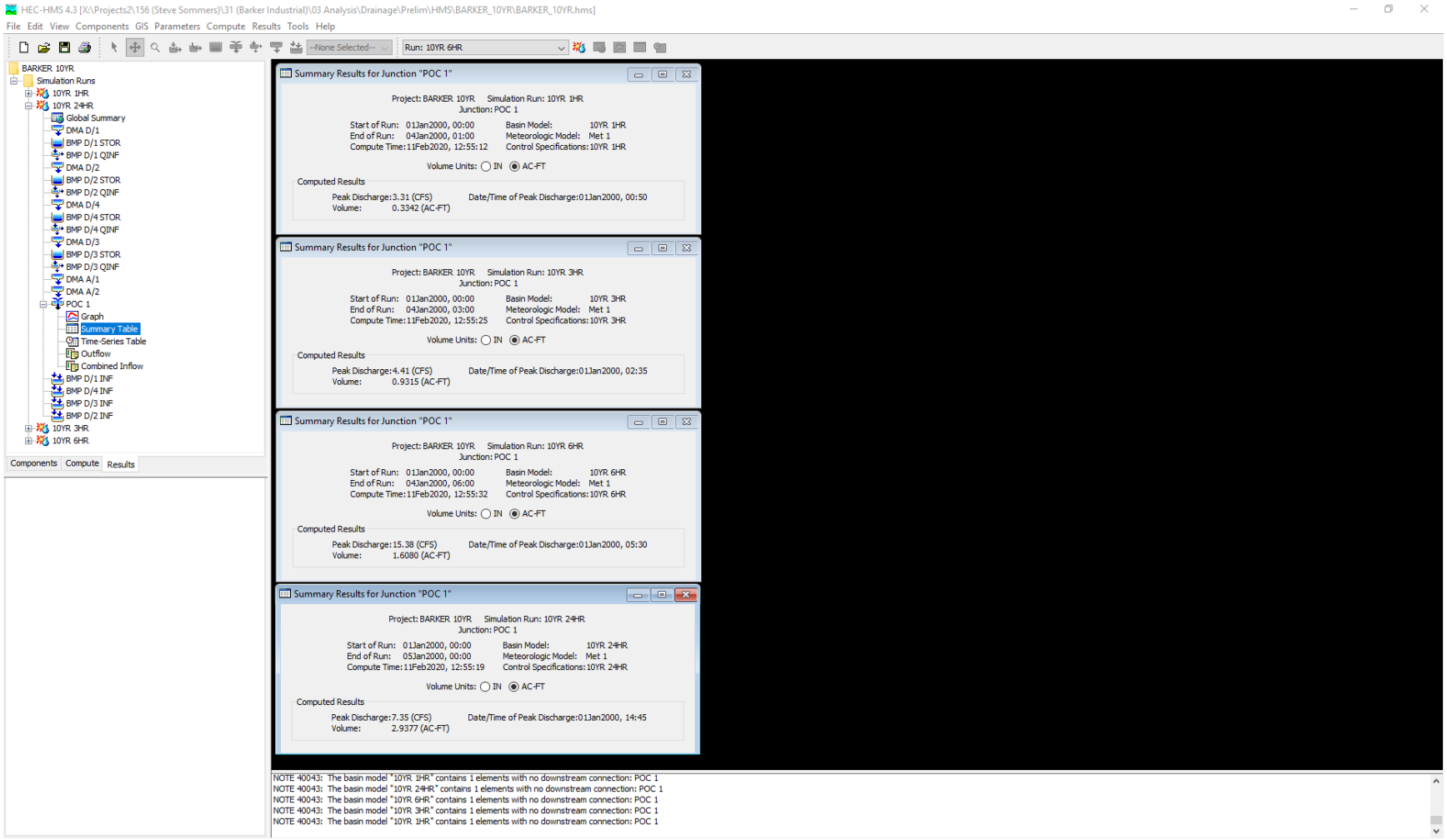
2-Year Storm Peak Flows (Detained)



5-Year Storm Peak Flows (Detained)



10-Year Storm Peak Flows (Detained)



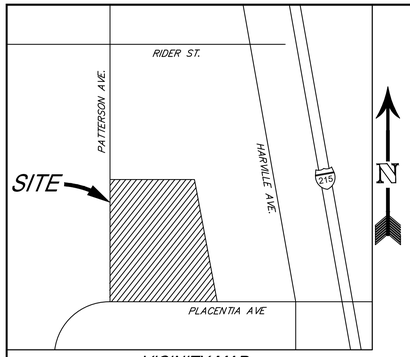
Appendix 7

Line H-10.1 & H-11 Plan View

BARKER INDUSTRIAL

PRELIMINARY GRADING PLAN - PPT190008

COUNTY OF RIVERSIDE, CA.
FEBRUARY 2020



VICINITY MAP
NOT TO SCALE

OWNER/APPLICANT

ORBIS REAL ESTATE PARTNERS
280 NEWPORT DRIVE STE 240
NEWPORT BEACH, CA 92660
VOICE: (949) 330-7564
EMAIL: RPOLVERINI@ORBISREP.COM

ENGINEER

SDH & ASSOCIATES, INC
5225 CANYON CREST DRIVE 71439
RIVERSIDE, CA. 92507
VOICE: (951) 683-3691
FAX: (951) 788-2314
EMAIL: STEFFEN@SDHINC.NET

ARCHITECT

HPA ARCHITECTS
18831 BARDEEN AVE, STE. 100
IRVINE, CA 92612
VOICE: (949) 863-1770

ASSESSOR'S PARCEL NO.

317-240-001

SITE AREA

30.19 AC.

ZONING & LAND USE

EXISTING ZONING: I-P, M-SC
EXISTING LAND USE: VACANT
PROPOSED ZONING: I-P, M-SC
PROPOSED LAND USE: INDUSTRIAL

SURROUNDING ZONING & LAND USE

NORTH: I-P, M-SC, VACANT/ RESIDENTIAL
EAST: I-P, M-SC, INDUSTRIAL/ RESIDENTIAL
SOUTH: I-P, M-SC, VACANT/ RESIDENTIAL
WEST: I-P, M-SC, RESIDENTIAL

WASTE AND DISPOSAL

E.M.W.D.

WATER QUALITY NOTE

WATER QUALITY DESIGN STORM TO BE TREATED BY INFILTRATION BASIN LOCATED AT NORTH END OF SITE (SHOWN HEREON), AND 100 YEAR STORM FLOW TO BE MITIGATED OR CONVEYED TO MASTER PLAN STORM DRAIN

PROJECT DATA

SITE AREA:	1,315,102 S.F. (30.19 AC.)
NET AREA:	1,294,065 S.F. (29.71 AC.)
BUILDING AREA:	
OFFICE:	10,000 S.F.
WAREHOUSE:	684,640 S.F.
TOTAL:	694,640 S.F.

PARKING INFO

REQUIRED PARKING	
OFFICE AREA:	40 STALLS
WAREHOUSE AREA:	343 STALLS
TOTAL STALLS:	383 STALLS
PROVIDED PARKING:	468 STALLS

LEGAL DESCRIPTION

(PER NORTH AMERICAN TITLE COMPANY TITLE REPORT NO. 91402-1541640-17 DATED NOVEMBER 28, 2017.)

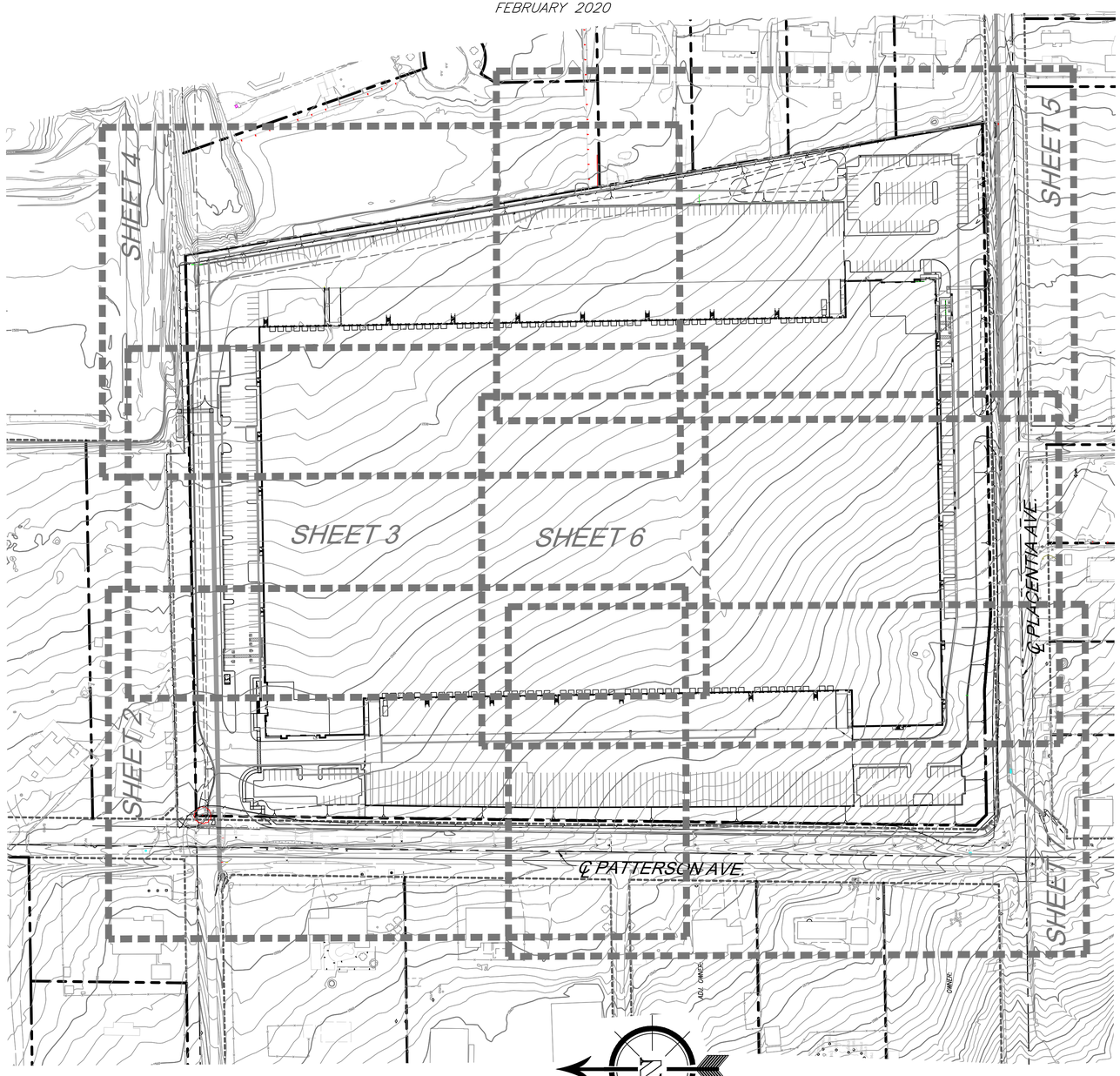
THE REAL PROPERTY IN THE UNINCORPORATED AREA OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

LOTS 11 AND 14 OF CHANDLER'S SUBDIVISION, AS SHOWN BY MAP ENTITLED "REVISED MAP OF CHANDLER'S SUBDIVISION OF THE NORTHEAST 1/4 OF SECTION 13, IN TOWNSHIP 4 SOUTH, RANGE 4 WEST, SAN BERNARDINO BASE AND MERIDIAN", ON FILE IN BOOK 1 PAGE 33 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

THE LAND SHOWN IN THIS SURVEY IS THE SAME AS THAT DESCRIBED PER NORTH AMERICAN TITLE COMPANY TITLE REPORT NO. 91402-1541640-17 DATED NOVEMBER 28, 2017.

FEMA NOTE

ZONE "X" DENOTES AREAS OUTSIDE THE 1-PERCENT ANNUAL CHANCE FLOOD PLAIN, AREAS OF 1% ANNUAL CHANCE SHEET FLOW FLOODING WHERE AVERAGE DEPTHS ARE LESS THAN 1 FOOT, AREAS OF 1% ANNUAL CHANCE STREAM FLOODING WHERE THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 1 SQUARE MILE, OR AREAS PROTECTED FROM THE 1% ANNUAL CHANCE FLOOD BY LEVEES.



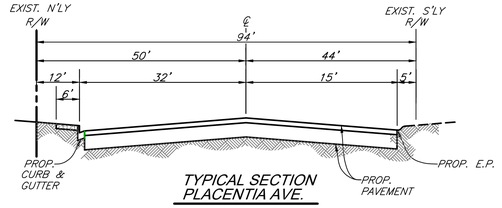
INDEX MAP
SCALE 1"=100'

CONSTRUCTION NOTES

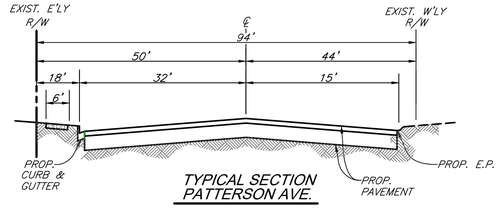
1. CONSTRUCT P.C.C./A.C. DRIVE ISLE, PARKING AREAS, AND TRUCK COURT
2. CONSTRUCT 6" CURB ONLY (ONSITE)
3. CONSTRUCT 6" CURB AND GUTTER (ONSITE)
4. CONSTRUCT P.C.C. SIDEWALK (FINISHED SURFACE MATERIALS PER ARCH. PLANS)
5. CONSTRUCT A.D.A. COMPLIANT HANDICAP RAMP
6. CONSTRUCT 3' WIDE CONC. RIBBON GUTTER
7. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH
8. CONSTRUCT TOW DITCH
9. CONSTRUCT 8" CURB & GUTTER PER COUNTY STANDARDS
10. CONSTRUCT XX" A.C. OVER XX A.B. STREET SECTION PER COUNTY STANDARDS
11. RELOCATE/ REMOVE EX. POLE
12. CONSTRUCT SIDE INLET CATCH BASIN PER COUNTY STANDARDS
13. CONSTRUCT CURB OPENING FOR DRAINAGE CONVEYANCE
14. CONSTRUCT 48" RCP MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
15. CONSTRUCT 36" RCP MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
16. CONSTRUCT 30" RCP MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
17. CONSTRUCT 6" PVC DRAIN PIPE (ONSITE)
18. CONSTRUCT 12" PVC DRAIN PIPE (ONSITE)
19. CONSTRUCT 18" RCP DRAIN PIPE (ONSITE)
20. CONSTRUCT 24" RCP DRAIN PIPE (ONSITE)
21. CONSTRUCT 20" RCP DRAIN PIPE (ONSITE)
22. JOIN EX. PIPE
23. CONSTRUCT BULK HEAD
24. CONSTRUCT 24" CATCH BASIN (BROOKS 2424CB OR APPROVED EQUAL)
25. CONSTRUCT RETAINING WALL
26. CONSTRUCT 2' WIDE X 12" DEEP "V" DITCH
27. CONSTRUCT 66" MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
28. CONSTRUCT SIDE INLET CATCH BASIN PER COONTY OF RIVERSIDE STANDARDS

EXISTING EASEMENT INFORMATION

1. WALNUT STREET VACATION PER RESOLUTION NO. 2005 198, INST.# 2005-0457957
2. RIGHTS OF THE PUBLIC IN AND TO THAT PORTION OF THE LAND LYING WITHIN THE NORTHERN 20' OF SAID LAND



TYPICAL SECTION
PLACENTIA AVE.



TYPICAL SECTION
PATTERSON AVE.

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD | PLAN CHECK OVERSIGHT ENGINEER | REGISTRATION NUMBER | DATE SIGNED

DIGALERT
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

The private engineer signing these plans is responsible for assuring the accuracy and acceptability of the design hereon. In the event of discrepancies arising after county approval or during construction, the private engineer shall be responsible for determining an acceptable solution and revising the plans for approval by the county.

MARK	BY	DATE
ENGINEER		

REVISIONS	APPR.	DATE
	COUNTY	

SEAL-ENGINEER

REGISTERED PROFESSIONAL ENGINEER
ROBERT C. VAN ZANTEN
No. 62325
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

ENGINEERING COMPANY

SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
14060 Meridian Parkway 102
Riverside, California 92518
TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN
R.C.E. NO. 62325
DATE 9-30-19

BENCHMARK:

ELEVATIONS SHOWN HEREON ARE BASED UPON THE N.G.S. BENCHMARK DX5442, DESIGNATION "435". THE BENCHMARK IS LOCATED 1300' WEST OF THE ATSF RAILROAD ALONG RIDER STREET, ON TOP OF THE NORTH CURB FACE OF RIDER STREET, 28' NORTH OF RIDER STREET, 6' SOUTH OF GTE TELEPHONE BOX (DAMAGED). A STANDARD 3 1/4" ALUMINUM DISK SET FLUSH IN TOP OF CURB. ELEVATION 1515.12 FEET (NAVD 88).

SCALE: H: 1"=100' V:

FOR:

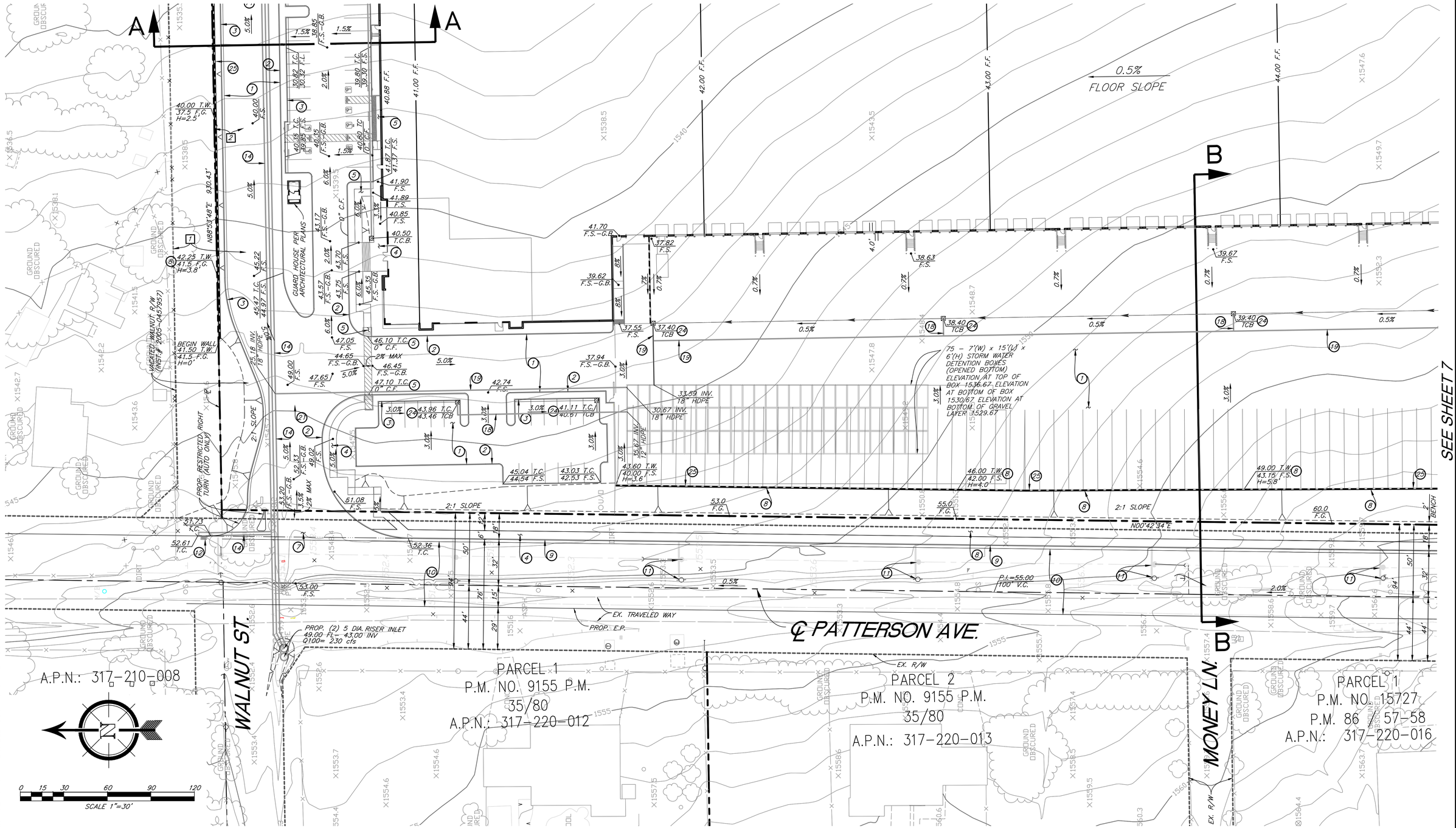
W.O.

COUNTY FILE NO.

BARKER INDUSTRIAL
PRELIMINARY GRADING PLAN
TITLE SHEET

SHEET NO. 1
1 OF 8 SHTS

SEE SHEET 3



SEE SHEET 7

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

DIGALERT
DIAL BEFORE YOU DIG
TOLL FREE 1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

The private engineer signing these plans is responsible for assuring the accuracy and acceptability of the design hereon. In the event of discrepancies arising after county approval or during construction, the private engineer shall be responsible for determining an acceptable solution and revising the plans for approval by the county.

MARK	BY	DATE
ENGINEER		

REVISIONS

APPR.	DATE
COUNTY	

SEAL – ENGINEER
REGISTERED PROFESSIONAL ENGINEER
ROBERT C. VAN ZANTEN
No. 62325
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

ENGINEERING COMPANY
SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
14060 Meridian Parkway
Riverside, California 92518
TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN
R.C.E. NO. 62325
DATE 9-30-19

BENCHMARK:
ELEVATIONS SHOWN HEREON ARE BASED UPON THE N.G.S. BENCHMARK DJ5442, DESIGNATION "435". THE BENCHMARK IS LOCATED 1300' WEST OF THE ATSF RAILROAD ALONG RIDER STREET, ON TOP OF THE NORTH CURB FACE OF RIDER STREET, 28' NORTH OF RIDER STREET, 6' SOUTH OF GTE TELEPHONE BOX (DAMAGED), A STANDARD 3 1/4" ALUMINUM DISK SET FLUSH IN TOP OF CURB. ELEVATION 1515.12 FEET (NAVD 88).

SCALE: H: 1"=30' V:

BARKER INDUSTRIAL
PRELIMINARY GRADING PLAN

SHEET NO. 2
2 OF 9 SHTS

FOR:
W.O.
COUNTY FILE NO.

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

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MARK	BY	DATE	REVISIONS	APPR.	DATE
ENGINEER				COUNTY	

SEAL-ENGINEER
REGISTERED PROFESSIONAL ENGINEER ROBERT C VAN ZANTEN No. 62325 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

ENGINEERING COMPANY
SDH AND ASSOCIATES INC.
14060 Meridian Parkway 102
Riverside, California 92518
TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN
R.C.E. NO. 62325
DATE 9-30-19

BENCHMARK:
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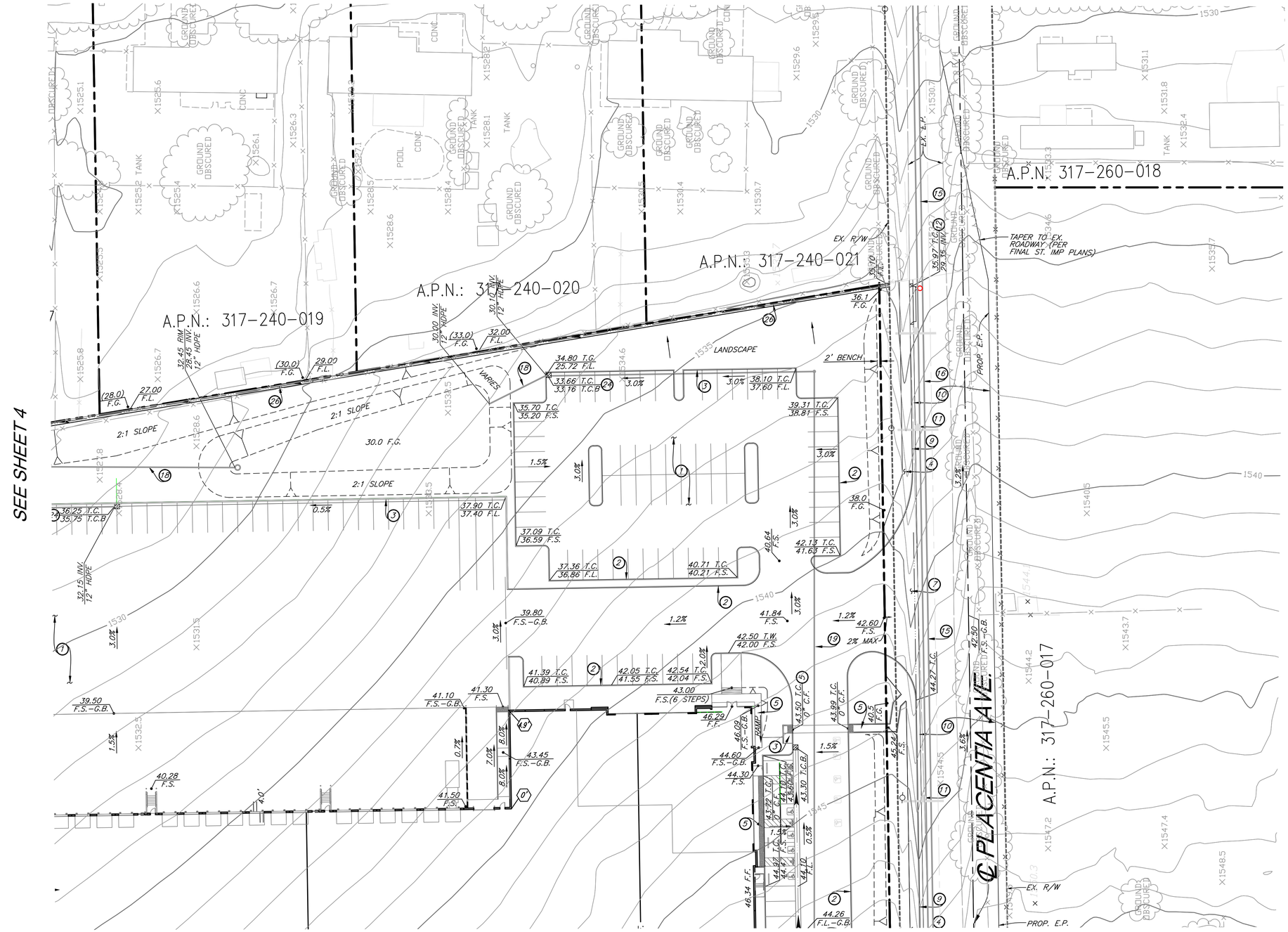
SCALE: H: 1"=30' V:

BARKER INDUSTRIAL
PRELIMINARY GRADING PLAN

FOR: | W.O. | COUNTY FILE NO.

SHEET NO. 3
3 OF 9 SHTS



SEE SHEET 4

SEE SHEET 6

0 15 30 60 90 120

SCALE 1"=30'

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

DIGALERT

DIAL BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — TWO WORKING DAYS BEFORE YOU DIG

A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

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MARK	BY	DATE

ENGINEER

REVISIONS

APPR.	DATE

COUNTY

SEAL—ENGINEER

REGISTERED PROFESSIONAL ENGINEER — ROBERT C. VAN ZANTEN — No. 62325 Exp. 9-30-19 — CIVIL — STATE OF CALIFORNIA

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TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN

R.C.E. NO. 62325

DATE 9-30-19

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SCALE: H: 1"=30' V:

BARKER INDUSTRIAL
PRELIMINARY GRADING PLAN

SHEET NO. 5

5 OF 9 SHTS

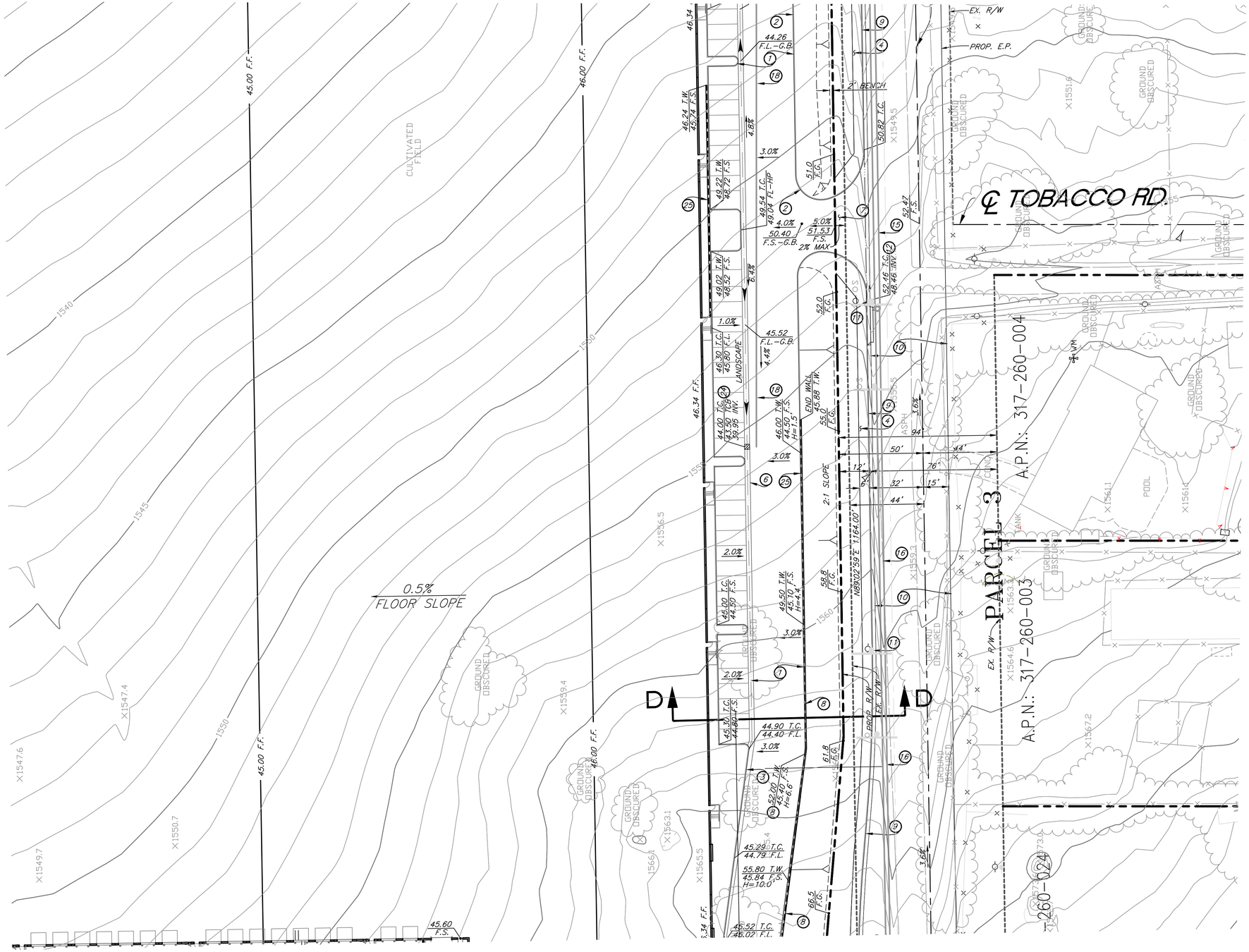
FOR:

W.O.

COUNTY FILE NO.

SEE SHEET 5

SEE SHEET 3



0 15 30 60 90 120

SCALE 1"=30'

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

DIGALERT

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MARK	BY	DATE
	ENGINEER	

REVISIONS

APPR.	DATE
	COUNTY

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ROBERT C. VAN ZANTEN
No. 62325
Exp. 9-30-19
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TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN
R.C.E. NO. 62325
DATE 9-30-19

BENCHMARK:

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THE BENCHMARK IS LOCATED 1300' WEST OF THE ATSF RAILROAD ALONG RIDER STREET, ON TOP OF THE NORTH CURB FACE OF RIDER STREET, 28' NORTH OF RIDER STREET, 6' SOUTH OF GTE TELEPHONE BOX (DAMAGED), A STANDARD 3 1/4" ALUMINUM DISK SET FLUSH IN TOP OF CURB. ELEVATION 1515.12 FEET (NAVD 88).

SCALE: H: 1"=30' V:

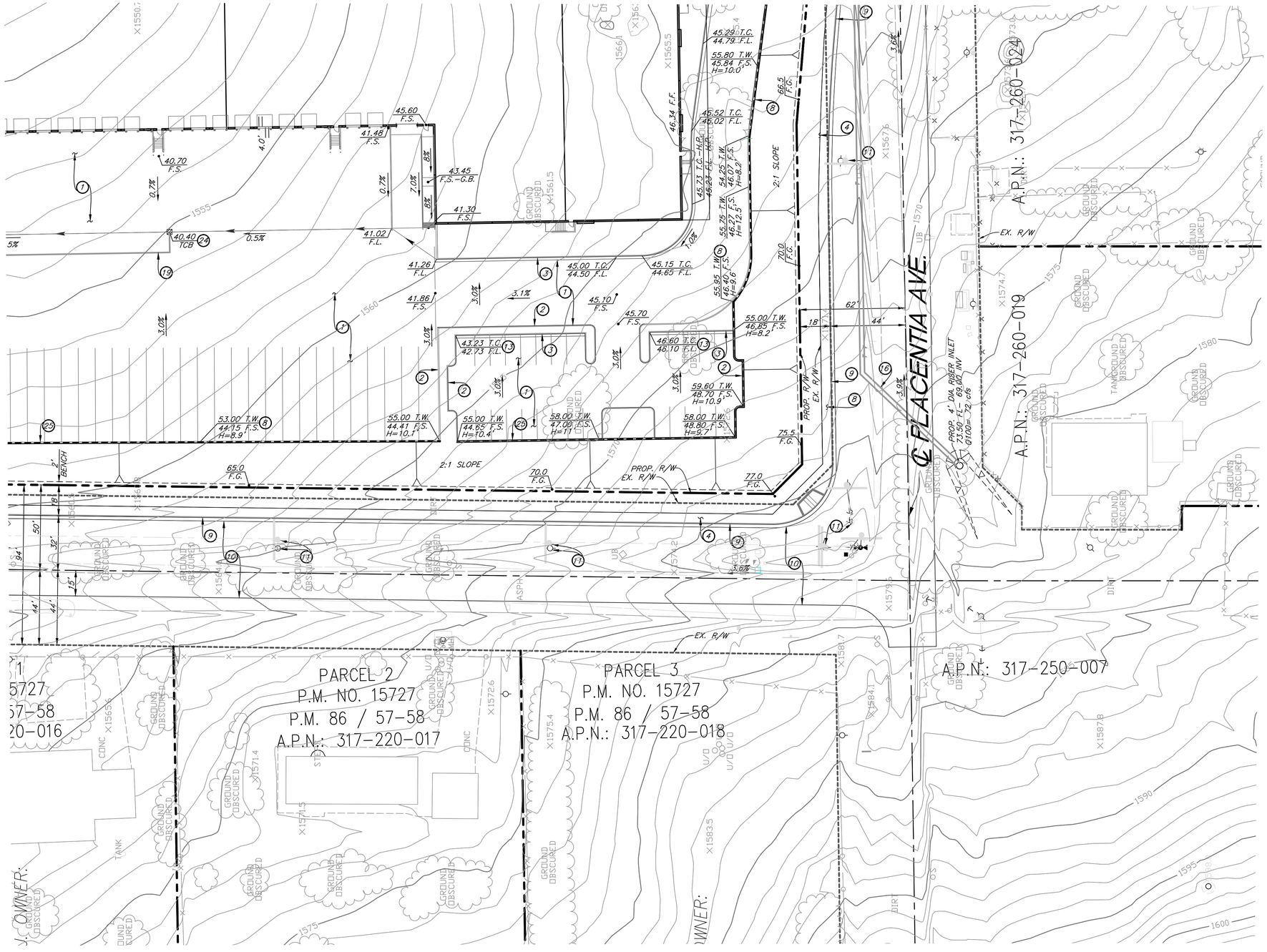
BARKER INDUSTRIAL
PRELIMINARY GRADING PLAN

SHEET NO. 6 — 6 OF 9 SHTS

FOR: | W.O. | COUNTY FILE NO.

SEE SHEET 6

SEE SHEET 2



0 15 30 60 90 120

SCALE 1"=30'

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

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	ENGINEER	

REVISIONS

APPR.	DATE
	COUNTY

SEAL–ENGINEER

REGISTERED PROFESSIONAL ENGINEER — ROBERT C. VAN ZANTEN — No. 62325 Exp. 9-30-19 — CIVIL — STATE OF CALIFORNIA

ENGINEERING COMPANY

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Riverside, California 92518
TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN — R.C.E. NO. 62325 — DATE 9-30-19

BENCHMARK:

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SCALE: H: 1"=30' V:

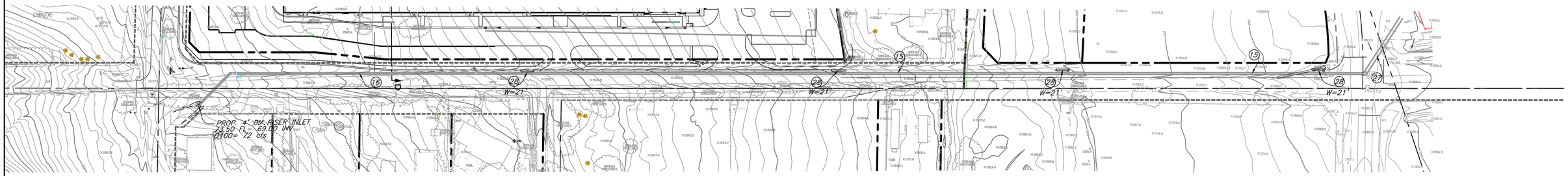
BARKER INDUSTRIAL
PRELIMINARY GRADING PLAN

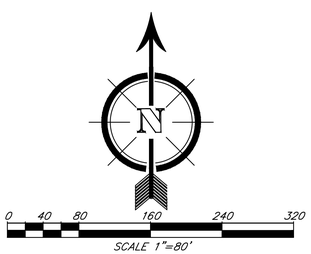
SHEET NO. 7 — 7 OF 9 SHTS

FOR: | W.O. | COUNTY FILE NO.

CONSTRUCTION NOTES

(1) CONSTRUCT P.C.C./A.C. DRIVE ISLE, PARKING AREAS, AND TRUCK COURT
(2) CONSTRUCT 6" CURB ONLY (ONSITE)
(3) CONSTRUCT 6" CURB AND GUTTER (ONSITE)
(4) CONSTRUCT P.C.C. SIDEWALK (FINISHED SURFACE MATERIALS PER ARCH. PLANS)
(5) CONSTRUCT A.D.A. COMPLIANT HANDICAP RAMP
(6) CONSTRUCT 3' WIDE CONC. RIBBON GUTTER
(7) CONSTRUCT COMMERCIAL DRIVEWAY APPROACH
(8) CONSTRUCT TOW DITCH
(9) CONSTRUCT 8" CURB & GUTTER PER COUNTY STANDARDS
(10) CONSTRUCT XX" A.C. OVER XX A.B. STREET SECTION PER COUNTY STANDARDS
(11) RELOCATE/ REMOVE EX. POLE
(12) CONSTRUCT SIDE INLET CATCH BASIN PER COUNTY STANDARDS
(13) CONSTRUCT CURB OPENING FOR DRAINAGE CONVEYANCE
(14) CONSTRUCT 48" RCP MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
(15) CONSTRUCT 36" RCP MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
(16) CONSTRUCT 30" RCP MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
(17) CONSTRUCT 6" PVC DRAIN PIPE (ONSITE)
(18) CONSTRUCT 12" PVC DRAIN PIPE (ONSITE)
(19) CONSTRUCT 18" RCP DRAIN PIPE (ONSITE)
(20) CONSTRUCT 24" RCP DRAIN PIPE (ONSITE)
(21) CONSTRUCT 20" RCP DRAIN PIPE (ONSITE)
(22) JOIN EX. PIPE
(23) CONSTRUCT BULK HEAD
(24) CONSTRUCT 24" CATCH BASIN (BROOKS 2424CB OR APPROVED EQUAL)
(25) CONSTRUCT RETAINING WALL
(26) CONSTRUCT 2' WIDE X 12" DEEP "V" DITCH
(27) CONSTRUCT 66" MASTER PLANNED STORM DRAIN PER RCFC STANDARDS
(28) CONSTRUCT SIDE INLET CATCH BASIN PER COONTY OF RIVERSIDE STANDARDS





APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES:

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED

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MARK	BY	DATE
ENGINEER		

REVISIONS	APPR.	DATE
	COUNTY	

SEAL–ENGINEER

REGISTERED PROFESSIONAL ENGINEER
ROBERT C. VAN ZANTEN
No. 62325
Exp. 9-30-19
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TEL: (951) 683-3691 FAX (951) 788-2314

PREPARED BY: ROBERT VAN ZANTEN
R.C.E. NO. 62325
DATE 9-30-21

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SCALE: H: 1"=80' V:

BARKER INDUSTRIAL
PLACENTIA AVENUE STORM DRAIN

SHEET NO. 9
9 OF 9 SHTS

FOR:
W.O.
COUNTY FILE NO.

Appendix 8

Line H-10.1 & H-11 Inlet Calculations

Line H-10.1 Inlet - Weir Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	0.000	"	Lower slot			Lower Weir	
Number of orif:	0		Number of slots:	0		Number of weirs:	1
Cg-low:	0.62		Invert:	0.00	ft	Invert:	0.00
			B	0.00	ft	B:	12.57
			h_{slot}	0.0	in		
Middle orifice	0	"		0.000	ft		
Number of orif:	0						
Cg-middle:	0.62		Upper slot			Emergency weir	
invert elev:	0.00	ft	Number of slots:	0		Invert:	0.00 ft
			Invert:	0.00	ft	B:	0.00 ft
			B:	0.00	ft		
*Note: h = head above the invert of the lowest surface discharge opening.			h_{slot}	0.0	in		
				0.000	ft		

Elevation (ft)	h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qtot (cfs)
1573.50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
1573.58	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.907	0.000	0.91
1573.67	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.565	0.000	2.57
1573.75	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.712	0.000	4.71
1573.83	0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.255	0.000	7.26
1573.92	0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.139	0.000	10.14
1574.00	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.329	0.000	13.33
1574.08	0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.796	0.000	16.80
1574.17	0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.521	0.000	20.52
1574.25	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.486	0.000	24.49
1574.33	0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.679	0.000	28.68
1574.42	0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.086	0.000	33.09
1574.50	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.699	0.000	37.70
1574.58	1.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42.508	0.000	42.51
1574.67	1.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	47.506	0.000	47.51
1574.75	1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	52.686	0.000	52.69
1574.83	1.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	58.042	0.000	58.04
1574.92	1.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	63.567	0.000	63.57
1575.00	1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	69.258	0.000	69.26
1575.08	1.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	75.109	0.000	75.11
1575.17	1.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81.116	0.000	81.12
1575.25	1.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	87.275	0.000	87.27
1575.33	1.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	93.582	0.000	93.58
1575.42	1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.035	0.000	100.03
1575.50	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	106.629	0.000	106.63

Line H-10.1 Inlet - Orifice Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	48.000 "	Lower slot		Lower Weir	
Number of orif:	1	Number of slots:	0	Number of weirs:	0
Cg-low:	0.62	Invert:	0.00 ft	Invert:	0.00
		B	0.00 ft	B:	0.00
		h_{slot}	0.0 in		
Middle orifice	0 "		0.000 ft		
Number of orif:	0				
Cg-middle:	0.62	Upper slot		Emergency weir	
invert elev:	0.00 ft	Number of slots:	0	Invert:	0.00 ft
		Invert:	0.00 ft	B:	0.00 ft
		B:	0.00 ft		
*Note: h = head above the invert of the lowest surface discharge opening.		h_{slot}	0.0 in		
			0.000 ft		

Elevation (ft)	h* (ft)	H/D-low -	H/D-mid -	QHORIZ-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qtot (cfs)
1573.50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
1573.58	0.083	0.021	0.000	18.049	0.000	18.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.05
1573.67	0.167	0.042	0.000	25.525	0.000	25.525	0.000	0.000	0.000	0.000	0.000	0.000	0.000	25.53
1573.75	0.250	0.063	0.000	31.262	0.000	31.262	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.26
1573.83	0.333	0.083	0.000	36.098	0.000	36.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.10
1573.92	0.417	0.104	0.000	40.359	0.000	40.359	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.36
1574.00	0.500	0.125	0.000	44.211	0.000	44.211	0.000	0.000	0.000	0.000	0.000	0.000	0.000	44.21
1574.08	0.583	0.146	0.000	47.753	0.000	47.753	0.000	0.000	0.000	0.000	0.000	0.000	0.000	47.75
1574.17	0.667	0.167	0.000	51.050	0.000	51.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	51.05
1574.25	0.750	0.188	0.000	54.147	0.000	54.147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	54.15
1574.33	0.833	0.208	0.000	57.076	0.000	57.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000	57.08
1574.42	0.917	0.229	0.000	59.862	0.000	59.862	0.000	0.000	0.000	0.000	0.000	0.000	0.000	59.86
1574.50	1.000	0.250	0.000	62.524	0.000	62.524	0.000	0.000	0.000	0.000	0.000	0.000	0.000	62.52
1574.58	1.083	0.271	0.000	65.077	0.000	65.077	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.08
1574.67	1.167	0.292	0.000	67.533	0.000	67.533	0.000	0.000	0.000	0.000	0.000	0.000	0.000	67.53
1574.75	1.250	0.313	0.000	69.904	0.000	69.904	0.000	0.000	0.000	0.000	0.000	0.000	0.000	69.90
1574.83	1.333	0.333	0.000	72.196	0.000	72.196	0.000	0.000	0.000	0.000	0.000	0.000	0.000	72.20
1574.92	1.417	0.354	0.000	74.418	0.000	74.418	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74.42
1575.00	1.500	0.375	0.000	76.576	0.000	76.576	0.000	0.000	0.000	0.000	0.000	0.000	0.000	76.58
1575.08	1.583	0.396	0.000	78.674	0.000	78.674	0.000	0.000	0.000	0.000	0.000	0.000	0.000	78.67
1575.17	1.667	0.417	0.000	80.718	0.000	80.718	0.000	0.000	0.000	0.000	0.000	0.000	0.000	80.72
1575.25	1.750	0.438	0.000	82.711	0.000	82.711	0.000	0.000	0.000	0.000	0.000	0.000	0.000	82.71
1575.33	1.833	0.458	0.000	84.657	0.000	84.657	0.000	0.000	0.000	0.000	0.000	0.000	0.000	84.66
1575.42	1.917	0.479	0.000	86.560	0.000	86.560	0.000	0.000	0.000	0.000	0.000	0.000	0.000	86.56
1575.50	2.000	0.500	0.000	88.422	0.000	88.422	0.000	0.000	0.000	0.000	0.000	0.000	0.000	88.42

Line H-11 Inlet - Weir Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	0.000	"	Lower slot			Lower Weir	
Number of orif:	0		Number of slots:	0		Number of weirs:	2
Cg-low:	0.62		Invert:	0.00	ft	Invert:	0.00
			B	0.00	ft	B:	15.71
			h_{slot}	0.0	in		
Middle orifice	0	"		0.000	ft		
Number of orif:	0						
Cg-middle:	0.62		Upper slot			Emergency weir	
invert elev:	0.00	ft	Number of slots:	0		Invert:	0.00 ft
			Invert:	0.00	ft	B:	0.00 ft
			B:	0.00	ft		
*Note: h = head above the invert of the lowest surface discharge opening.			h_{slot}	0.0	in		
				0.000	ft		

Elevation (ft)	h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qtot (cfs)
1549.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
1549.08	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.267	0.000	2.27
1549.17	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.413	0.000	6.41
1549.25	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.781	0.000	11.78
1549.33	0.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.138	0.000	18.14
1549.42	0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	25.349	0.000	25.35
1549.50	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.322	0.000	33.32
1549.58	0.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	41.990	0.000	41.99
1549.67	0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	51.302	0.000	51.30
1549.75	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	61.216	0.000	61.22
1549.83	0.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.697	0.000	71.70
1549.92	0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	82.716	0.000	82.72
1550.00	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	94.248	0.000	94.25
1550.08	1.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	106.271	0.000	106.27
1550.17	1.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	118.766	0.000	118.77
1550.25	1.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	131.715	0.000	131.72
1550.33	1.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	145.104	0.000	145.10
1550.42	1.417	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	158.918	0.000	158.92
1550.50	1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	173.144	0.000	173.14
1550.58	1.583	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	187.771	0.000	187.77
1550.67	1.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	202.789	0.000	202.79
1550.75	1.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	218.187	0.000	218.19
1550.83	1.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	233.956	0.000	233.96
1550.92	1.917	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	250.087	0.000	250.09
1551.00	2.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	266.573	0.000	266.57

Line H-11 Inlet - Orifice Flow Control Rating Curve

Discharge vs Elevation Table

Low orifice	60.000 "	Lower slot			Lower Weir		
Number of orif:	2	Number of slots:	0		Number of weirs:	0	
Cg-low:	0.62	Invert:	0.00	ft	Invert:	0.00	
		B	0.00	ft	B:	0.00	
		h_{slot}	0.0	in			
Middle orifice	0 "		0.000	ft			
Number of orif:	0						
Cg-middle:	0.62	Upper slot			Emergency weir		
invert elev:	0.00 ft	Number of slots:	0		Invert:	0.00	ft
		Invert:	0.00	ft	B:	0.00	ft
		B:	0.00	ft			
*Note: h = head above the invert of the lowest surface discharge opening.		h_{slot}	0.0	in			
			0.000	ft			

Elevation (ft)	h* (ft)	H/D-low -	H/D-mid -	QHORIZ-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qtot (cfs)
1549.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
1549.08	0.083	0.017	0.000	56.403	0.000	56.403	0.000	0.000	0.000	0.000	0.000	0.000	0.000	56.40
1549.17	0.167	0.033	0.000	79.766	0.000	79.766	0.000	0.000	0.000	0.000	0.000	0.000	0.000	79.77
1549.25	0.250	0.050	0.000	97.693	0.000	97.693	0.000	0.000	0.000	0.000	0.000	0.000	0.000	97.69
1549.33	0.333	0.067	0.000	112.806	0.000	112.806	0.000	0.000	0.000	0.000	0.000	0.000	0.000	112.81
1549.42	0.417	0.083	0.000	126.121	0.000	126.121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	126.12
1549.50	0.500	0.100	0.000	138.159	0.000	138.159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	138.16
1549.58	0.583	0.117	0.000	149.229	0.000	149.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	149.23
1549.67	0.667	0.133	0.000	159.532	0.000	159.532	0.000	0.000	0.000	0.000	0.000	0.000	0.000	159.53
1549.75	0.750	0.150	0.000	169.210	0.000	169.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	169.21
1549.83	0.833	0.167	0.000	178.363	0.000	178.363	0.000	0.000	0.000	0.000	0.000	0.000	0.000	178.36
1549.92	0.917	0.183	0.000	187.068	0.000	187.068	0.000	0.000	0.000	0.000	0.000	0.000	0.000	187.07
1550.00	1.000	0.200	0.000	195.386	0.000	195.386	0.000	0.000	0.000	0.000	0.000	0.000	0.000	195.39
1550.08	1.083	0.217	0.000	203.365	0.000	203.365	0.000	0.000	0.000	0.000	0.000	0.000	0.000	203.36
1550.17	1.167	0.233	0.000	211.042	0.000	211.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	211.04
1550.25	1.250	0.250	0.000	218.449	0.000	218.449	0.000	0.000	0.000	0.000	0.000	0.000	0.000	218.45
1550.33	1.333	0.267	0.000	225.613	0.000	225.613	0.000	0.000	0.000	0.000	0.000	0.000	0.000	225.61
1550.42	1.417	0.283	0.000	232.556	0.000	232.556	0.000	0.000	0.000	0.000	0.000	0.000	0.000	232.56
1550.50	1.500	0.300	0.000	239.299	0.000	239.299	0.000	0.000	0.000	0.000	0.000	0.000	0.000	239.30
1550.58	1.583	0.317	0.000	245.856	0.000	245.856	0.000	0.000	0.000	0.000	0.000	0.000	0.000	245.86
1550.67	1.667	0.333	0.000	252.243	0.000	252.243	0.000	0.000	0.000	0.000	0.000	0.000	0.000	252.24
1550.75	1.750	0.350	0.000	258.472	0.000	258.472	0.000	0.000	0.000	0.000	0.000	0.000	0.000	258.47
1550.83	1.833	0.367	0.000	264.555	0.000	264.555	0.000	0.000	0.000	0.000	0.000	0.000	0.000	264.55
1550.92	1.917	0.383	0.000	270.500	0.000	270.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	270.50
1551.00	2.000	0.400	0.000	276.318	0.000	276.318	0.000	0.000	0.000	0.000	0.000	0.000	0.000	276.32

Appendix 9

Line H-10.1 & H-11 HGL Calculations

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************************************
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 3.1         19/04/2012
Innovyze              www.innovyze.com
************************************

INPUT FILE
************************************
X:\Projects2\156 (Steve Sommers)\31 (Barker Industrial)\03 Analysis\Drainage\Prelim\XP\Barker_100_LatH-101.wsx
Computed  02/11/20  15:38:21

TITLE INFORMATION
************************************
PERRIS MDP LINE H-10.1
RESULTS SUMMARY

WARNING SUMMARY
************************************
 WARNING 47: Junction Node3 has a different channel than its direct downstream element.
 WARNING 47: Junction Node6 has a different channel than its direct downstream element.
 WARNING 61: Angle point for closed channel Link1 outside proposed range of between 0 and 15 degrees.
 WARNING 61: Angle point for closed channel Link6 outside proposed range of between 0 and 15 degrees.
 WARNING 36: D/S processing stopped in junction Node6 because critical momentum is greater than maximum momentum.

RESULTS
************************************

================================================================
   Main Line
================================================================

 Composite Profile:

ELEMENT    TYPE       STATION    INVERT   GROUND   W.S.      DEPTH    Q   BARREL VELOC.  VELOC. ENERGY     SUPER   CRITICAL FROUDE  SLOPE    NORMAL   CROSS
NAME                             ELEV     ELEV     ELEV                              HEAD   GRADE LN   ELEV    DEPTH    NUMBER           DEPTH    SECTION
---------- ---------- ---------- -------- -------- --------  -------- ---------- ------- ------ ---------- ------  -------- ------  -------  ------   ---------
###
"Node7"    Outlet     0.00       1490.16  1506.00  1498.500   8.340    132.00  1   5.56    0.48   1498.98    0.000   3.196    0.000   0.00000  0.000    Circular Pipe
"Link6"    Reach      114.22     1491.64  1507.51  1498.767   7.127    132.00  1   5.56    0.48   1499.25    0.000   3.196    0.000   0.01296  2.230    Circular Pipe
"Node6"    Junction   118.22     1491.64  1507.51  1499.238   7.598    132.00  1   0.84    0.01   1499.25    0.000   1.897    0.000   0.00000  0.000    Circular Pipe
           "i.p."     137.31     1491.89  1507.14  1499.237   7.349    132.00  1   0.88    0.01   1499.25    0.000   1.897    0.069   0.01301  1.276    Circular Pipe
           "i.p."     155.73     1492.13  1506.79  1499.236   7.108    132.00  1   0.93    0.01   1499.25    0.000   1.897    0.073   0.01301  1.276    Circular Pipe
           "i.p."     173.51     1492.36  1506.44  1499.235   6.875    132.00  1   0.97    0.01   1499.25    0.000   1.897    0.078   0.01301  1.276    Circular Pipe
"Link5"    Reach      189.68     1492.57  1506.13  1499.234   6.664    132.00  1   1.02    0.02   1499.25    0.000   1.897    0.083   0.01301  1.276    Circular Pipe
"Node5"    Junction   193.68     1492.57  1506.13  1499.234   6.664    132.00  1   1.02    0.02   1499.25    0.000   1.897    0.000   0.00000  0.000    Circular Pipe
 HYDRAULIC JUMP  at  277.96  of length  0.12
           "i.p."     199.21     1492.79  1506.30  1499.232   6.446    132.00  1   1.07    0.02   1499.25    0.000   1.897    0.089   0.03901  0.988    Circular Pipe
           "i.p."     204.55     1492.99  1506.47  1499.230   6.237    132.00  1   1.12    0.02   1499.25    0.000   1.897    0.095   0.03901  0.988    Circular Pipe
           "i.p."     209.69     1493.19  1506.63  1499.229   6.034    132.00  1   1.17    0.02   1499.25    0.000   1.897    0.101   0.03901  0.988    Circular Pipe
           "i.p."     214.66     1493.39  1506.78  1499.227   5.838    132.00  1   1.23    0.02   1499.25    0.000   1.897    0.108   0.03901  0.988    Circular Pipe
           "i.p."     219.45     1493.58  1506.93  1499.224   5.649    132.00  1   1.29    0.03   1499.25    0.000   1.897    0.115   0.03901  0.988    Circular Pipe
```

	"i.p."	224.08	1493.76	1507.08	1499.222	5.466	132.00	1	1.35	0.03	1499.25	0.000	1.897	0.123	0.03901	0.988	Circular Pipe
	"i.p."	228.54	1493.93	1507.21	1499.219	5.289	132.00	1	1.42	0.03	1499.25	0.000	1.897	0.131	0.03901	0.988	Circular Pipe
	"i.p."	232.84	1494.10	1507.35	1499.216	5.119	132.00	1	1.49	0.03	1499.25	0.000	1.897	0.140	0.03901	0.988	Circular Pipe
	"i.p."	236.99	1494.26	1507.48	1499.213	4.954	132.00	1	1.56	0.04	1499.25	0.000	1.897	0.149	0.03901	0.988	Circular Pipe
	"i.p."	240.99	1494.42	1507.60	1499.209	4.794	132.00	1	1.64	0.04	1499.25	0.000	1.897	0.159	0.03901	0.988	Circular Pipe
	"i.p."	244.84	1494.57	1507.72	1499.205	4.640	132.00	1	1.72	0.05	1499.25	0.000	1.897	0.170	0.03901	0.988	Circular Pipe
	"i.p."	248.55	1494.71	1507.84	1499.201	4.491	132.00	1	1.80	0.05	1499.25	0.000	1.897	0.181	0.03901	0.988	Circular Pipe
	"i.p."	252.12	1494.85	1507.95	1499.196	4.346	132.00	1	1.89	0.06	1499.25	0.000	1.897	0.193	0.03901	0.988	Circular Pipe
	"i.p."	255.56	1494.98	1508.06	1499.191	4.207	132.00	1	1.98	0.06	1499.25	0.000	1.897	0.206	0.03901	0.988	Circular Pipe
	"i.p."	258.87	1495.11	1508.16	1499.185	4.072	132.00	1	2.08	0.07	1499.25	0.000	1.897	0.220	0.03901	0.988	Circular Pipe
	"i.p."	262.05	1495.24	1508.26	1499.179	3.942	132.00	1	2.18	0.07	1499.25	0.000	1.897	0.234	0.03901	0.988	Circular Pipe
	"i.p."	265.10	1495.36	1508.35	1499.172	3.815	132.00	1	2.29	0.08	1499.25	0.000	1.897	0.250	0.03901	0.988	Circular Pipe
	"i.p."	268.03	1495.47	1508.44	1499.164	3.693	132.00	1	2.40	0.09	1499.25	0.000	1.897	0.267	0.03901	0.988	Circular Pipe
	"i.p."	270.84	1495.58	1508.53	1499.155	3.575	132.00	1	2.52	0.10	1499.25	0.000	1.897	0.284	0.03901	0.988	Circular Pipe
	"i.p."	273.53	1495.68	1508.61	1499.146	3.461	132.00	1	2.64	0.11	1499.25	0.000	1.897	0.303	0.03901	0.988	Circular Pipe
	"i.p."	276.09	1495.78	1508.69	1499.136	3.351	132.00	1	2.77	0.12	1499.25	0.000	1.897	0.323	0.03901	0.988	Circular Pipe
	"i.p."	277.96	1495.86	1508.75	1499.128	3.270	132.00	1	2.87	0.13	1499.26	0.000	1.897	0.339	0.03901	0.988	Circular Pipe
	"i.p."	277.96	1495.86	1508.75	1496.845	0.988	132.00	1	16.94	4.46	1501.30	0.000	1.897	3.669	0.03901	0.988	Circular Pipe
	"i.p."	426.15	1501.64	1513.36	1502.631	0.993	132.00	1	16.81	4.39	1507.02	0.000	1.897	3.631	0.03901	0.988	Circular Pipe
	"i.p."	536.56	1505.95	1516.80	1506.970	1.025	132.00	1	16.03	3.99	1510.96	0.000	1.897	3.406	0.03901	0.988	Circular Pipe
	"i.p."	578.25	1507.57	1518.09	1508.630	1.059	132.00	1	15.28	3.63	1512.26	0.000	1.897	3.196	0.03901	0.988	Circular Pipe
	"i.p."	603.08	1508.54	1518.87	1509.633	1.093	132.00	1	14.57	3.30	1512.93	0.000	1.897	2.999	0.03901	0.988	Circular Pipe
	"i.p."	620.27	1509.21	1519.40	1510.339	1.129	132.00	1	13.89	3.00	1513.34	0.000	1.897	2.814	0.03901	0.988	Circular Pipe
"Link4"	Reach	633.08	1509.71	1519.80	1510.875	1.165	132.00	1	13.25	2.72	1513.60	0.000	1.897	2.640	0.03901	0.988	Circular Pipe
"Node4"	Junction	637.08	1509.71	1519.80	1510.633	0.923	114.00	1	16.20	4.07	1514.71	0.000	1.762	0.000	0.00000	0.000	Circular Pipe
	"i.p."	1310.57	1535.97	1543.33	1536.895	0.923	114.00	1	16.20	4.07	1540.97	0.000	1.762	3.630	0.03899	0.923	Circular Pipe
	"i.p."	1446.13	1541.26	1548.06	1542.203	0.945	114.00	1	15.64	3.80	1546.00	0.000	1.762	3.465	0.03899	0.923	Circular Pipe
	"i.p."	1498.74	1543.31	1549.90	1544.285	0.975	114.00	1	14.92	3.45	1547.74	0.000	1.762	3.251	0.03899	0.923	Circular Pipe
	"i.p."	1526.38	1544.39	1550.86	1545.394	1.007	114.00	1	14.22	3.14	1548.54	0.000	1.762	3.050	0.03899	0.923	Circular Pipe
	"i.p."	1544.55	1545.10	1551.50	1546.136	1.040	114.00	1	13.56	2.86	1548.99	0.000	1.762	2.862	0.03899	0.923	Circular Pipe
"Link3"	Reach	1557.73	1545.61	1551.96	1546.683	1.073	114.00	1	12.93	2.60	1549.28	0.000	1.762	2.685	0.03899	0.923	Circular Pipe
"Node3"	Junction	1561.73	1545.61	1551.96	1547.445	1.835	72.00	1	18.64	5.40	1552.84	0.000	2.446	0.000	0.00000	0.000	Circular Pipe
	"i.p."	1879.27	1557.99	1563.86	1559.829	1.835	72.00	1	18.64	5.40	1565.23	0.000	2.446	2.485	0.03900	1.835	Circular Pipe
"Link2"	Reach	2082.24	1565.91	1571.47	1567.831	1.921	72.00	1	17.79	4.92	1572.75	0.000	2.446	2.264	0.03900	1.835	Circular Pipe
"Node2"	Junction	2086.24	1565.91	1571.47	1567.798	1.888	72.00	1	18.11	5.09	1572.89	0.000	2.446	0.000	0.00000	0.000	Circular Pipe
	"i.p."	2105.34	1566.68	1571.35	1568.583	1.905	72.00	1	17.94	5.00	1573.58	0.000	2.446	2.302	0.04021	1.812	Circular Pipe
"Link1"	Reach	2163.08	1569.00	1571.00	1571.000	2.000	72.00	1	17.10	4.54	1575.54	0.000	2.446	2.077	0.04021	1.812	Circular Pipe
"Node1"	Headwrk	2163.08	1569.00	1571.00	1571.000	2.000	72.00	1	17.10	4.54	1575.54	0.000	2.446	0.000	0.00000	0.000	Circular Pipe

*) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
i.p. = intermediate point processing results for reaches

```
[TITLE]
PERRIS MDP LINE H-10.1
INPUT SUMMARY


[REPORT]
COMPOSITE_ONLY

[NETWORK]
**TYPE           NAME
**-----          -------
Outlet           "Node7"
Reach            "Link6"
Junction         "Node6"
Reach            "Link5"
Junction         "Node5"
Reach            "Link4"
Junction         "Node4"
Reach            "Link3"
Junction         "Node3"
Reach            "Link2"
Junction         "Node2"
Reach            "Link1"
Headwork         "Node1"

**BRANCH DEFINITIONS

[OUTLET]
**NAME             STATION    INVERT     GROUND     CHANNEL     WATER SURFACE
**                            ELEV       ELEV       ID          ELEV (opt.)
**-------------    ---------  ---------- ---------- ----------  ----------
"Node7"            0          1490.16    1506       "66"        1498.5

[HEADWORK]
**NAME             INVERT     GROUND     CHANNEL     FLOW       WATER SURFACE
**                 ELEV       ELEV       ID                     ELEV (opt.)
**-------------    ---------  ---------- ----------  ---------- ----------
"Node1"            1569       1571       "30"        72         1571

[WALLENTRANCE]
**NAME             INVERT     GROUND     CHANNEL     LOSS
**                 ELEV       ELEV       ID          COEFFICIENT(opt.)
**-------------    ---------  ---------- ----------  --------------

[WALLEXIT]
**NAME             INVERT     GROUND     CHANNEL     LOSS
**                 ELEV       ELEV       ID          COEFFICIENT(opt.)
**-------------    ---------  ---------- ----------  --------------

[BRIDGEENTRANCE]
**NAME             INVERT     GROUND     CHANNEL     REDUCTION
**                 ELEV       ELEV       ID          FACTOR(opt.)
**-------------    ---------  ---------- ----------  --------------
```

```
[BRIDGEEXIT]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------

[JOIN]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE
**                  ELEV       ELEV       ID                               BRANCHES   ANGLE
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ----------

[JUNCTION]
**Name              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE FLOW
**                  ELEV       ELEV       ID                               LATERALS   ANGLE
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ---------- ----------
"Node2"             1565.91    1571.47    "30"        4          0.013      1
"Node2_Lateral1"    1565.91               "18"                                       0          0

"Node3"             1545.61    1551.96    "30"        4          0.013      1
"Node3_Lateral1"    1545.61               "18"                                       90         42

"Node4"             1509.71    1519.8     "36"        4          0.013      1
"Node4_Lateral1"    1509.71               "18"                                       90         18

"Node5"             1492.57    1506.13    "36"        4          0.013      1
"Node5_Lateral1"    1492.57               "18"                                       90         0
"Node6"             1491.64    1507.51    "36"        4          0.013      1
"Node6_Lateral1"    1491.64               "18"                                       0          0


[TRANSITION]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n
**                  ELEV       ELEV       ID
**------------      ---------  ---------- ----------  ---------- ----------

[REACH]
**NAME              INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n CURVE      ANGLE      NUMBER
**                  ELEV       ELEV       ID                               (opt)      POINT(opt) MANHOLES(opt)
**------------      ---------  ---------- ----------  ---------- ---------- ---------- ---------- ----------
"Link1"             1569       1571       "30"        76.84      0.013      0          46         0
"Link2"             1565.91    1571.47    "30"        520.51     0.013      0          0          0
"Link3"             1545.61    1551.96    "36"        920.65     0.013      0          0          0
"Link4"             1509.71    1519.8     "36"        439.4      0.013      0          0          0
"Link5"             1492.57    1506.13    "36"        71.46      0.013      0          0          0
"Link6"             1491.64    1507.51    "66"        114.22     0.013      0          57         0

[DROP]
**Name              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT
**------------      ---------  ---------- ----------  ----------

[CHANNEL]
```

```
**REGULAR TYPES 1-4 7-8
**ID          TYPE HEIGHT     WIDTH      LEFT       RIGHT      NUMBER     AVG PIER   INVERT     NUM OF
**                                        SLOPE      SLOPE      PIERS      WIDTH      CROSS FALL BARRELS
**----------  ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
"66"          4    5.5                                                                          1
"30"          4    2.5                                                                          1
"18"          4    1.5                                                                          1
"36"          4    36                                                                           1

**IRREGULAR TYPES 5-6
**ID       TYPE NUMBER     AVG PIER   PIER1      PIER2      PIER3      PIER4      PIER5      PIER6      PIER7      PIER8      PIER9      PIER10
**              PIERS      WIDTH      ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------



[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
```

```
************************************
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 3.1         19/04/2012
Innovyze              www.innovyze.com
************************************

INPUT FILE
************************************
X:\Projects2\156 (Steve Sommers)\31 (Barker Industrial)\03 Analysis\Drainage\Prelim\XP\Barker_100_LatH-11.wsx
Computed  02/11/20  14:36:57

TITLE INFORMATION
************************************
PERRIS MDP LINE H-11
RESULTS SUMMARY

WARNING SUMMARY
************************************
 WARNING 61: Angle point for closed channel Link2 outside proposed range of between 0 and 15 degrees.

RESULTS
************************************

================================================================
   Main Line
================================================================

 Composite Profile:

ELEMENT    TYPE       STATION    INVERT   GROUND   W.S.      DEPTH    Q   BARREL VELOC.  VELOC.  ENERGY     SUPER   CRITICAL FROUDE  SLOPE    NORMAL   CROSS
NAME                             ELEV     ELEV     ELEV                             HEAD    GRADE LN   ELEV    DEPTH    NUMBER           DEPTH    SECTION
---------- ---------- ---------- -------- -------- --------  -------- ---------- ------- ------ ---------- ------  -------- ------  -------  ------   ---------
###
"Node3"    Outlet     0.00       1515.00  1527.09  1517.980   2.980    230.00  1   22.91   8.15   1526.13    0.000   3.910    0.000   0.00000  0.000    Circular Pipe
           "i.p."     14.68      1515.20  1529.17  1518.123   2.924    230.00  1   23.37   8.48   1526.60    0.000   3.910    2.472   0.01355  4.000    Circular Pipe
"Link2"    Reach      48.72      1515.66  1534.00  1518.457   2.797    230.00  1   24.51   9.33   1527.78    0.000   3.910    2.700   0.01355  4.000    Circular Pipe
           "i.p."     170.59     1520.13  1536.78  1522.930   2.797    230.00  1   24.50   9.32   1532.25    0.000   3.910    2.699   0.03670  2.796    Circular Pipe
           "i.p."     533.87     1533.46  1545.07  1536.388   2.924    230.00  1   23.36   8.48   1544.86    0.000   3.910    2.471   0.03670  2.796    Circular Pipe
           "i.p."     646.57     1537.60  1547.64  1540.663   3.063    230.00  1   22.28   7.71   1548.37    0.000   3.910    2.249   0.03670  2.796    Circular Pipe
           "i.p."     709.41     1539.91  1549.08  1543.122   3.216    230.00  1   21.24   7.00   1550.13    0.000   3.910    2.027   0.03670  2.796    Circular Pipe
           "i.p."     750.37     1541.41  1550.01  1544.800   3.391    230.00  1   20.25   6.37   1551.17    0.000   3.910    1.795   0.03670  2.796    Circular Pipe
           "i.p."     778.19     1542.43  1550.65  1546.030   3.600    230.00  1   19.31   5.79   1551.82    0.000   3.910    1.528   0.03670  2.796    Circular Pipe
"Link1"    Reach      793.72     1543.00  1551.00  1546.909   3.909    230.00  1   18.41   5.26   1552.17    0.000   3.910    1.003   0.03670  2.796    Circular Pipe
"Node1"    Headwrk    793.72     1543.00  1551.00  1546.910   3.910    230.00  1   18.41   5.26   1552.17    0.000   3.910    0.000   0.00000  0.000    Circular Pipe

 *) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
    i.p. = intermediate point processing results for reaches
```

```
[TITLE]
PERRIS MDP LINE H-11
INPUT SUMMARY


[REPORT]
COMPOSITE_ONLY

[NETWORK]
**TYPE           NAME
**-----          -------
Outlet           "Node3"
Reach            "Link2"
Reach            "Link1"
Headwork         "Node1"

**BRANCH DEFINITIONS

[OUTLET]
**NAME              STATION    INVERT     GROUND     CHANNEL     WATER SURFACE
**                             ELEV       ELEV       ID          ELEV (opt.)
**------------      ---------  ---------- ---------- ----------  ----------
"Node3"             0          1515       1527.09    "48"        1520

[HEADWORK]
**NAME              INVERT     GROUND     CHANNEL     FLOW       WATER SURFACE
**                  ELEV       ELEV       ID                     ELEV (opt.)
**------------      ---------  ---------- ----------  ---------- ----------
"Node1"             1543       1551       "48"        230        0

[WALLENTRANCE]
**NAME              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT(opt.)
**------------      ---------  ---------- ----------  --------------

[WALLEXIT]
**NAME              INVERT     GROUND     CHANNEL     LOSS
**                  ELEV       ELEV       ID          COEFFICIENT(opt.)
**------------      ---------  ---------- ----------  --------------

[BRIDGEENTRANCE]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------

[BRIDGEEXIT]
**NAME              INVERT     GROUND     CHANNEL     REDUCTION
**                  ELEV       ELEV       ID          FACTOR(opt.)
**------------      ---------  ---------- ----------  --------------
```

```
[JOIN]
**NAME             INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE
**                 ELEV       ELEV       ID                                BRANCHES   ANGLE
**-------------    ---------  ---------- ----------  ---------- ---------- ---------- ----------

[JUNCTION]
**Name             INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n NUMBER OF  CONFLUENCE FLOW
**                 ELEV       ELEV       ID                                LATERALS   ANGLE
**-------------    ---------  ---------- ----------  ---------- ---------- ---------- ---------- ----------

[TRANSITION]
**NAME             INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n
**                 ELEV       ELEV       ID
**-------------    ---------  ---------- ----------  ---------- ----------

[REACH]
**NAME             INVERT     GROUND     CHANNEL     LENGTH     MANNINGS n CURVE      ANGLE      NUMBER
**                 ELEV       ELEV       ID                                (opt)      POINT(opt) MANHOLES(opt)
**-------------    ---------  ---------- ----------  ---------- ---------- ---------- ---------- ----------
"Link1"            1543       1551       "48"        745        0.013      0          0          0
"Link2"            1515.66    1534       "48"        48.72      0.013      0          90         0

[DROP]
**Name             INVERT     GROUND     CHANNEL     LOSS
**                 ELEV       ELEV       ID          COEFFICIENT
**-------------    ---------  ---------- ----------  ----------

[CHANNEL]
**REGULAR TYPES 1-4 7-8
**ID          TYPE HEIGHT     WIDTH      LEFT       RIGHT      NUMBER     AVG PIER   INVERT     NUM OF
**                                       SLOPE      SLOPE      PIERS      WIDTH      CROSS FALL BARRELS
**----------  ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
"48"          4    4                                                                             1

**IRREGULAR TYPES 5-6
**ID       TYPE NUMBER     AVG PIER   PIER1      PIER2      PIER3      PIER4      PIER5      PIER6      PIER7      PIER8      PIER9      PIER10
**             PIERS      WIDTH      ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV       ELEV
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------



[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
```

Appendix 10

Placentia Avenue Street Flow

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Feb 11 2020

Placentia Ave - XS 1 (NLY)

User-defined

Invert Elev (ft)	= 73.54
Slope (%)	= 3.90
N-Value	= 0.015

Calculations

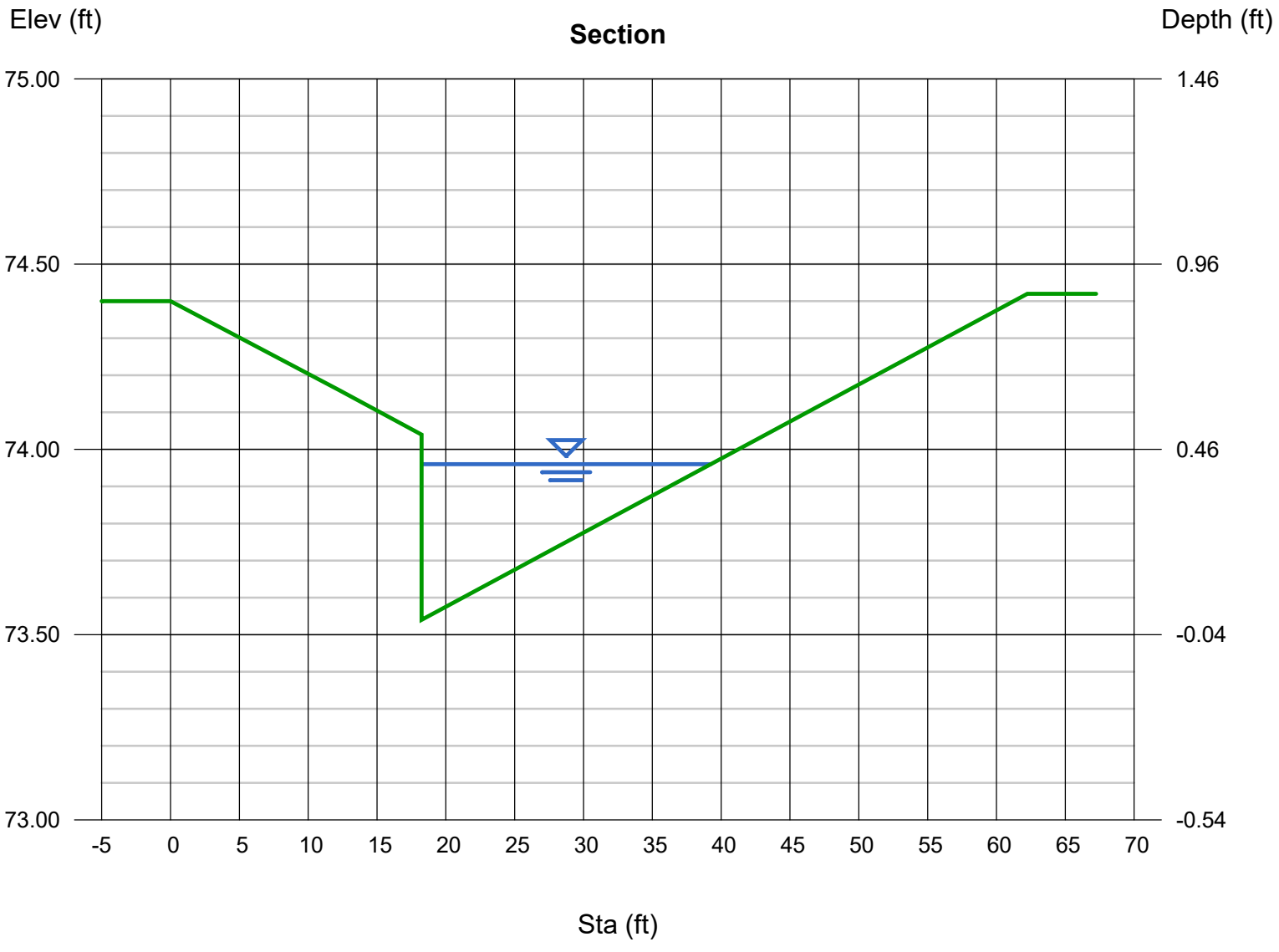
Compute by:	Known Q
Known Q (cfs)	= 30.00

Highlighted

Depth (ft)	= 0.42
Q (cfs)	= 30.00
Area (sqft)	= 4.41
Velocity (ft/s)	= 6.80
Wetted Perim (ft)	= 21.42
Crit Depth, Yc (ft)	= 0.63
Top Width (ft)	= 21.00
EGL (ft)	= 1.14

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

(0.00, 74.40)-(12.24, 74.16, 0.030)-(18.24, 74.04, 0.015)-(18.24, 73.54, 0.015)-(62.24, 74.42, 0.015)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Feb 11 2020

Placentia Ave - Southern Half-Street Capacity

User-defined

Invert Elev (ft)	= 68.53
Slope (%)	= 3.80
N-Value	= 0.016

Calculations

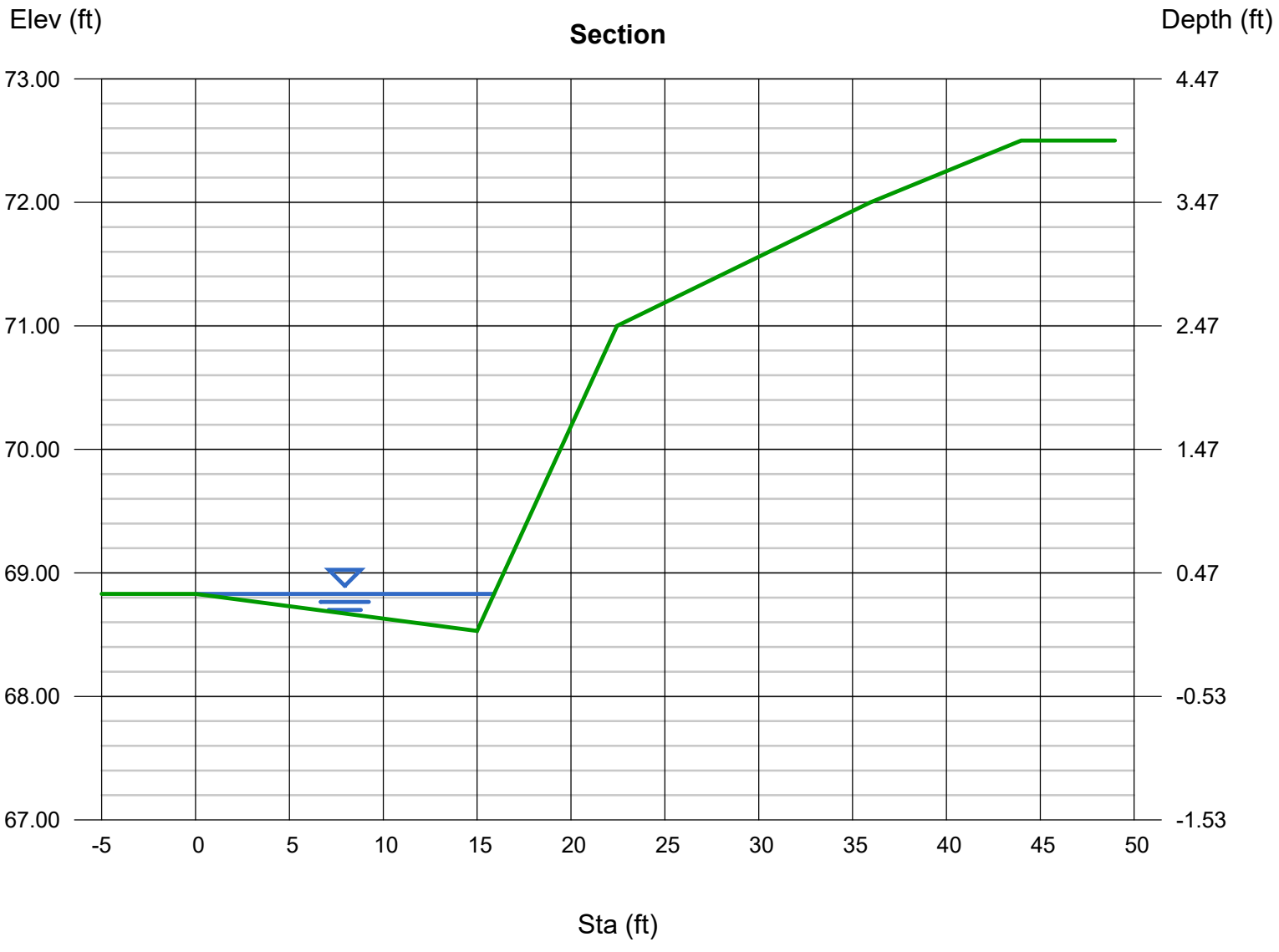
Compute by:	Known Depth
Known Depth (ft)	= 0.30

Highlighted

Depth (ft)	= 0.30
Q (cfs)	= 12.13
Area (sqft)	= 2.39
Velocity (ft/s)	= 5.08
Wetted Perim (ft)	= 15.96
Crit Depth, Yc (ft)	= 0.42
Top Width (ft)	= 15.90
EGL (ft)	= 0.70

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

(0.00, 68.83)-(15.00, 68.53, 0.015)-(22.45, 71.00, 0.030)-(35.95, 72.00, 0.030)-(43.98, 72.50, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Feb 11 2020

Placentia Ave - Driveway 1 (WESTERLY)

User-defined

Invert Elev (ft)	= 51.21
Slope (%)	= 3.90
N-Value	= 0.015

Calculations

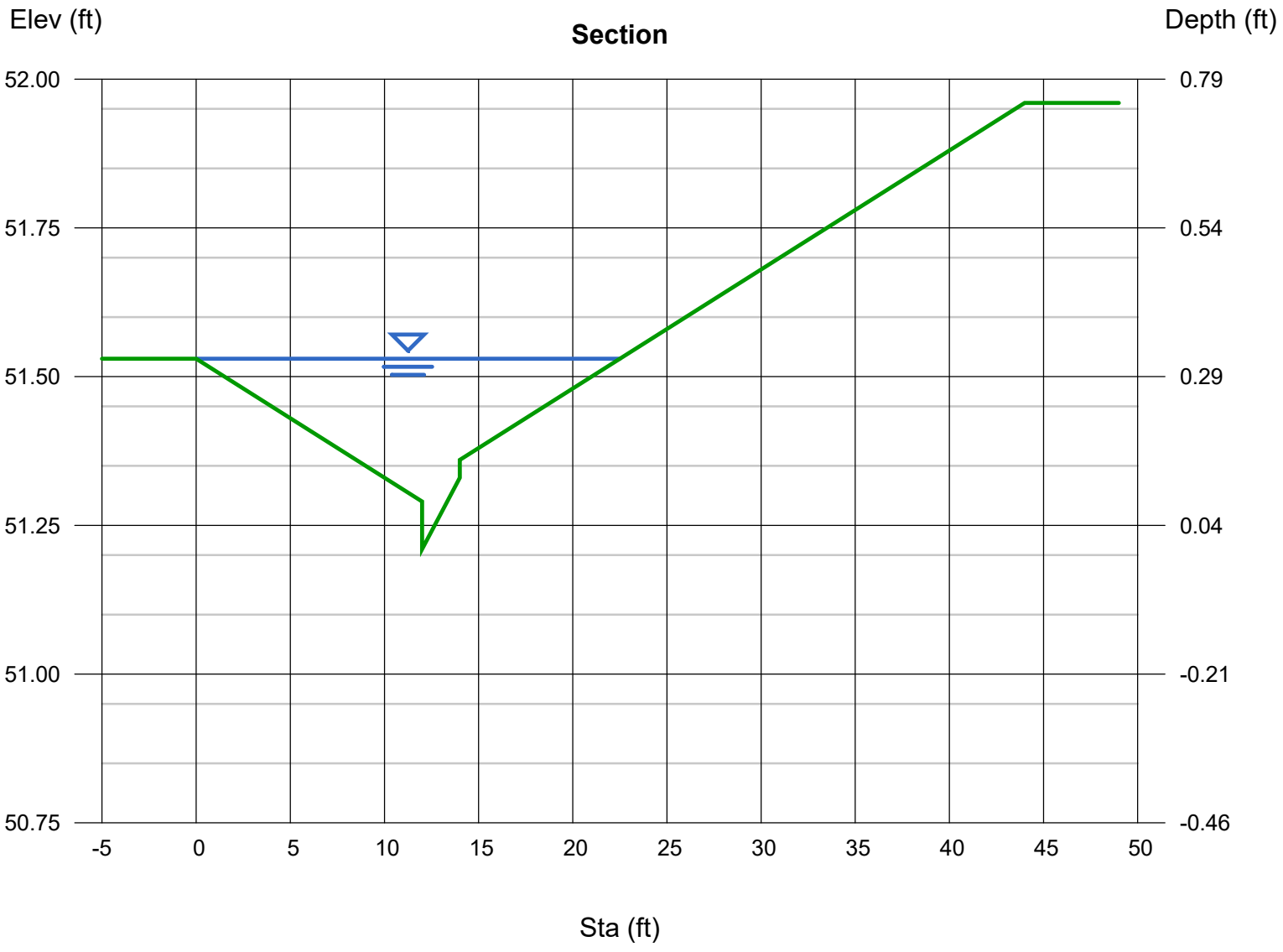
Compute by:	Known Depth
Known Depth (ft)	= 0.32

Highlighted

Depth (ft)	= 0.32
Q (cfs)	= 12.69
Area (sqft)	= 2.68
Velocity (ft/s)	= 4.73
Wetted Perim (ft)	= 22.62
Crit Depth, Yc (ft)	= 0.42
Top Width (ft)	= 22.50
EGL (ft)	= 0.67

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

(0.00, 51.53)-(6.00, 51.41, 0.015)-(12.00, 51.29, 0.015)-(12.00, 51.21, 0.015)-(14.00, 51.33, 0.015)-(14.00, 51.36, 0.015)-(44.00, 51.96, 0.015)



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Feb 11 2020

Placentia Ave - Inlet 1

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	21.00
Throat Height (in)	=	6.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

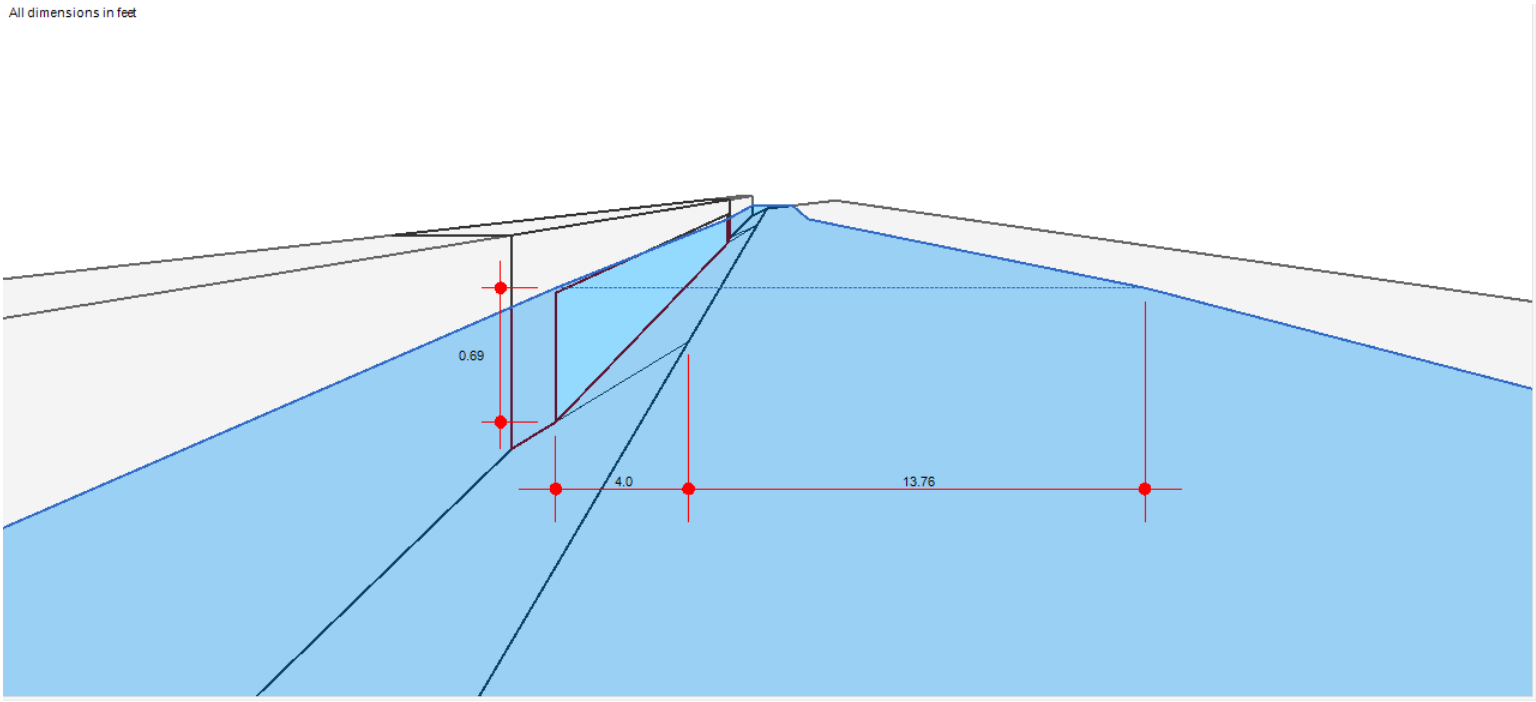
Slope, Sw (ft/ft)	=	0.083
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	0.98
Gutter Width (ft)	=	4.00
Gutter Slope (%)	=	3.80
Gutter n-value	=	0.016

Calculations

Compute by:		Known Q
Q (cfs)	=	30.00

Highlighted

Q Total (cfs)	=	30.00
Q Capt (cfs)	=	17.66
Q Bypass (cfs)	=	12.34
Depth at Inlet (in)	=	8.27
Efficiency (%)	=	59
Gutter Spread (ft)	=	17.76
Gutter Vel (ft/s)	=	8.20
Bypass Spread (ft)	=	10.93
Bypass Depth (in)	=	5.65



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Feb 11 2020

Placentia Ave - Inlet 2

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	21.00
Throat Height (in)	=	6.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

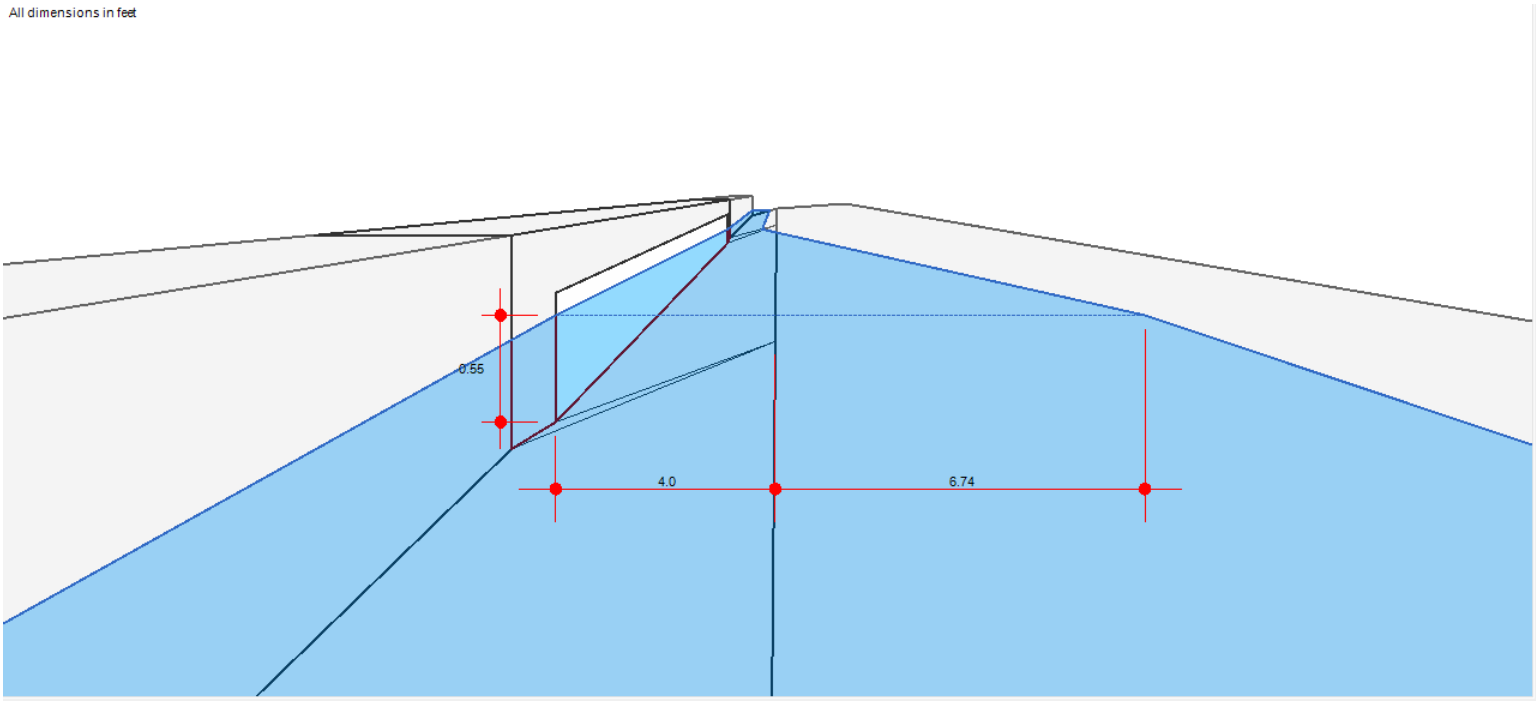
Slope, Sw (ft/ft)	=	0.083
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	0.98
Gutter Width (ft)	=	4.00
Gutter Slope (%)	=	3.80
Gutter n-value	=	0.016

Calculations

Compute by:		Known Q
Q (cfs)	=	12.00

Highlighted

Q Total (cfs)	=	12.00
Q Capt (cfs)	=	10.26
Q Bypass (cfs)	=	1.74
Depth at Inlet (in)	=	6.58
Efficiency (%)	=	85
Gutter Spread (ft)	=	10.74
Gutter Vel (ft/s)	=	7.24
Bypass Spread (ft)	=	2.84
Bypass Depth (in)	=	2.83



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Feb 12 2020

Placentia Ave - Inlet 3

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	21.00
Throat Height (in)	=	6.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

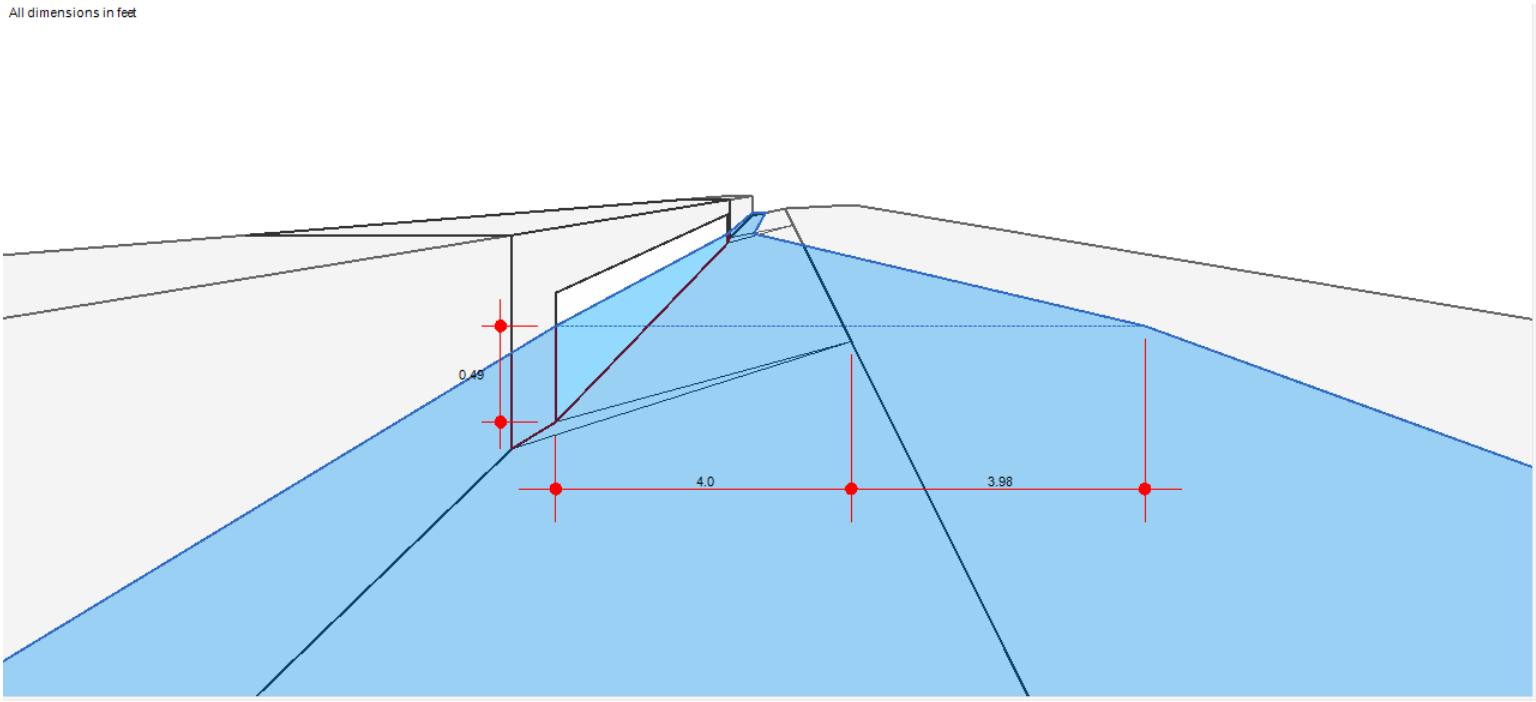
Slope, Sw (ft/ft)	=	0.083
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	0.98
Gutter Width (ft)	=	4.00
Gutter Slope (%)	=	3.80
Gutter n-value	=	0.016

Calculations

Compute by:		Known Q
Q (cfs)	=	8.00

Highlighted

Q Total (cfs)	=	8.00
Q Capt (cfs)	=	7.62
Q Bypass (cfs)	=	0.38
Depth at Inlet (in)	=	5.92
Efficiency (%)	=	95
Gutter Spread (ft)	=	7.98
Gutter Vel (ft/s)	=	7.02
Bypass Spread (ft)	=	1.61
Bypass Depth (in)	=	1.60



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Feb 12 2020

Placentia Ave - Inlet 4

Curb Inlet

Location	= Sag
Curb Length (ft)	= 21.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

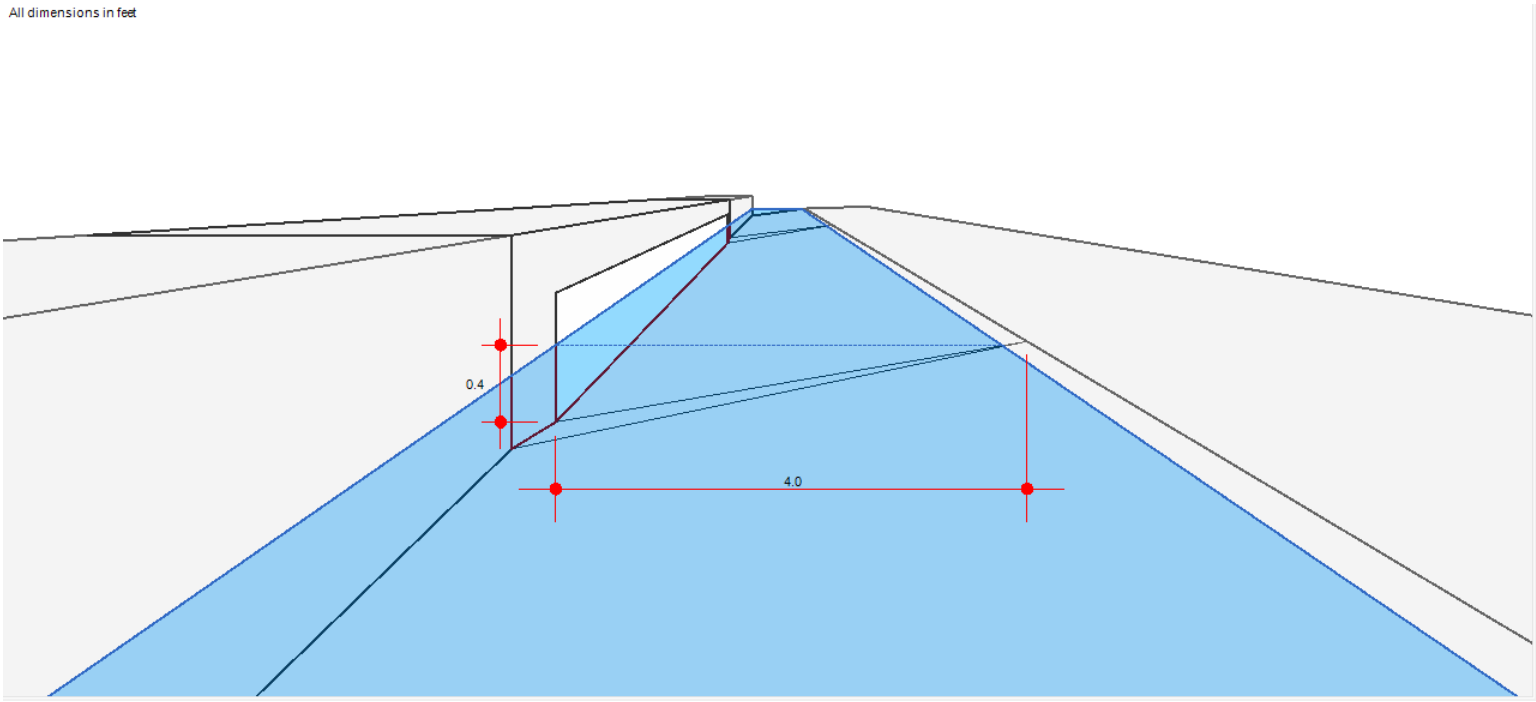
Slope, Sw (ft/ft)	= 0.083
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 0.98
Gutter Width (ft)	= 4.00
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 1.00

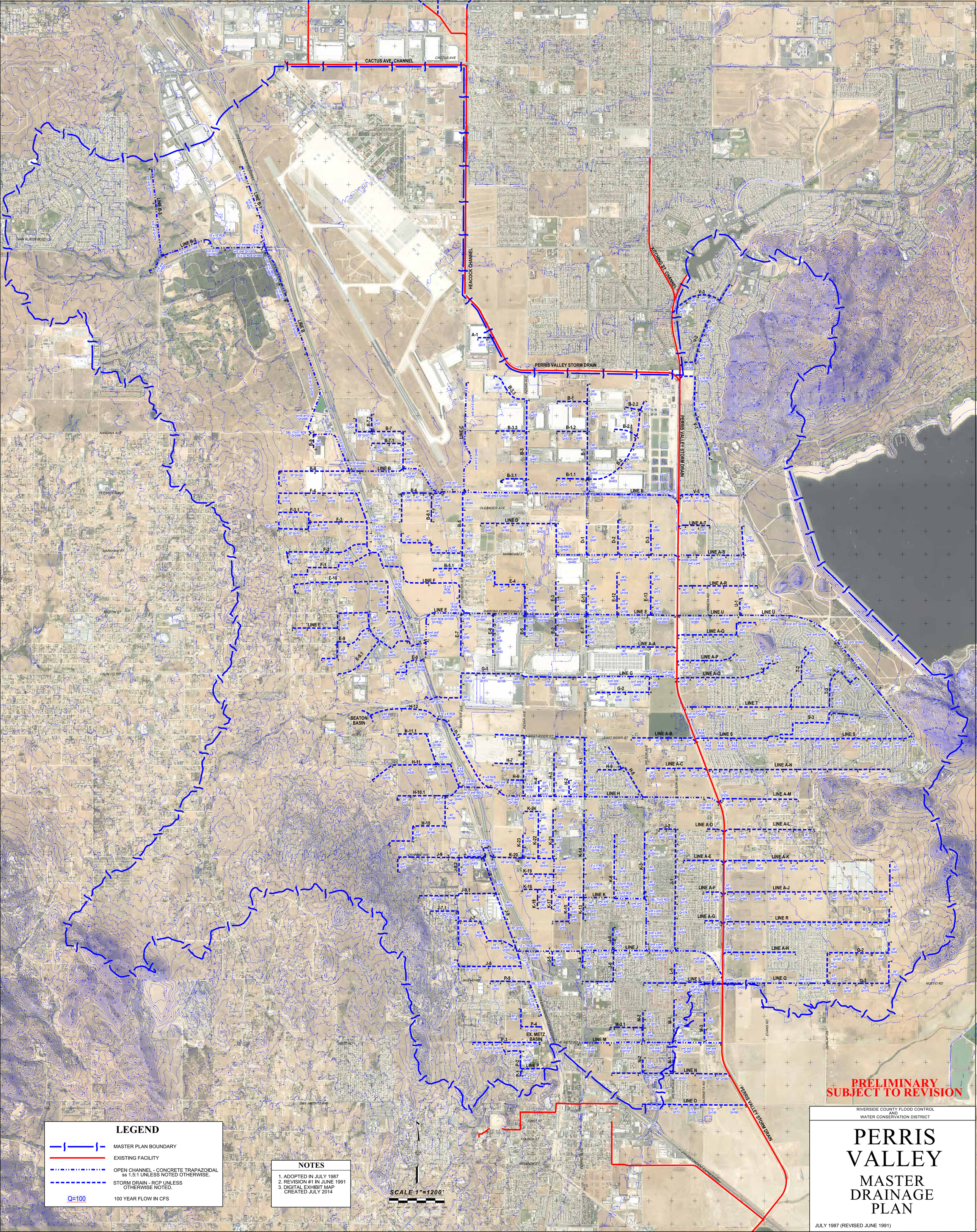
Highlighted

Q Total (cfs)	= 1.00
Q Capt (cfs)	= 1.00
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 4.75
Efficiency (%)	= 100
Gutter Spread (ft)	= 3.78
Gutter Vel (ft/s)	= 7.02
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Appendix 11

Referenced Drawings



PRELIMINARY
SUBJECT TO REVISION

LEGEND

━╿━━╿━ MASTER PLAN BOUNDARY

━━━━ EXISTING FACILITY

━ · · ━ · · ━ OPEN CHANNEL - CONCRETE TRAPAZOIDAL ss 1.5:1 UNLESS NOTED OTHERWISE.

━ ━ ━ ━ STORM DRAIN - RCP UNLESS OTHERWISE NOTED.

Q=100 100 YEAR FLOW IN CFS

NOTES

1. ADOPTED IN JULY 1987
2. REVISION #1 IN JUNE 1991
3. DIGITAL EXHIBIT MAP CREATED JULY 2014

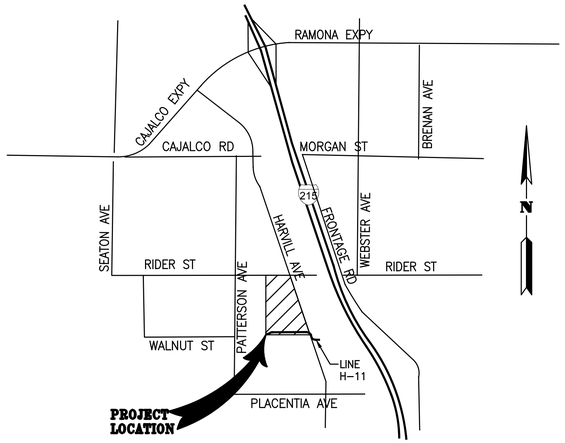
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

PERRIS VALLEY

MASTER DRAINAGE PLAN

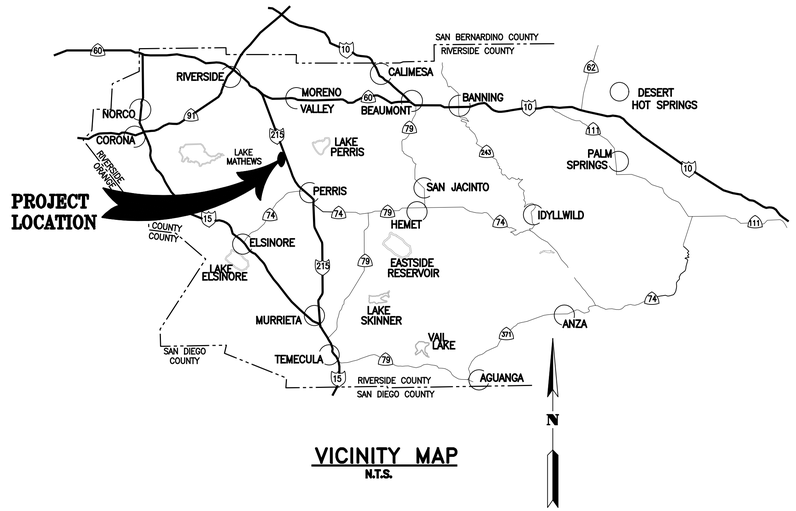
JULY 1987 (REVISED JUNE 1991)

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



VICINITY MAP

T4S R4W SEC 13
N.T.S.



VICINITY MAP

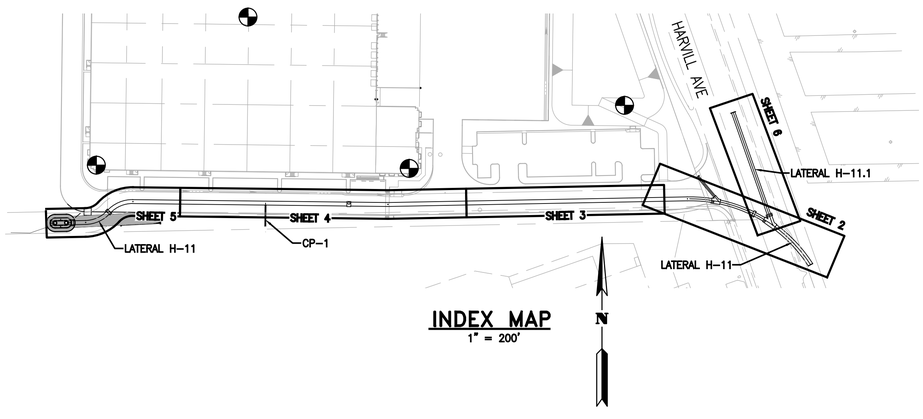
N.T.S.

GENERAL NOTES

1. THE CONTRACTOR SHALL CONSTRUCT THE FLOOD CONTROL IMPROVEMENTS SHOWN ON THE DRAWINGS IN CONFORMANCE WITH THE REQUIREMENTS OF THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S M.O.U. STANDARD SPECIFICATIONS DATED JUNE 24, 2008, AND RCFC & WCD STANDARD MANUAL. FOR THE LATEST DRAWINGS OF THE STANDARD MANUAL, PLEASE REFER TO THE "PUBLICATIONS AND RECORDS" PAGE FOUND ON THE DISTRICT'S WEBSITE.
2. (IF) AN ENCROACHMENT PERMIT IS REQUIRED FROM RIVERSIDE COUNTY FLOOD CONTROL. CONTACT ENCROACHMENT PERMITS AT 951/955-1266. AFTER THE PERMIT IS ISSUED THE DISTRICT MUST BE NOTIFIED ONE WEEK PRIOR TO CONSTRUCTION.
3. CONSTRUCTION INSPECTION WILL BE PERFORMED BY RIVERSIDE COUNTY FLOOD CONTROL. CONTACT CONSTRUCTION ADMINISTRATION AT 951/955-1288. THE DISTRICT MUST BE NOTIFIED TWENTY DAYS (20) PRIOR TO CONSTRUCTION.
4. ALL STATIONING REFERS TO CENTERLINE OF CONSTRUCTION UNLESS OTHERWISE NOTED.
5. STATIONING FOR LATERALS AND CONNECTOR PIPE REFER TO THE CENTERLINE INTERSECTION STATIONS.
6. FORTY-EIGHT HOURS BEFORE EXCAVATION, CALL UNDERGROUND SERVICE ALERT 1-800-227-2600.
7. ALL ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD 88).
8. ALL COORDINATES ARE SHOWN IN FEET AND DECIMALS THEREOF BASED ON THE NORTH AMERICAN DATUM (NAD 83), CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 6 AND EPOCH 2010.00.
9. ALL CROSS SECTIONS ARE TAKEN LOOKING DOWNSTREAM.
10. ELEVATIONS OF UTILITIES ARE APPROXIMATE UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE SPECIFIED, MINIMUM STREET RECONSTRUCTION SHALL BE 4" TYPE "B" HOT MIX ASPHALT OVER 6" CLASS 2 AGGREGATE BASE OR AS SPECIFIED BY THE ENGINEER.
12. OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES TO BE ABANDONED SHALL BE SEALED WITH 6" OF CLASS "B" CONCRETE.
13. PIPE CONNECTED TO THE MAINLINE PIPE SHALL CONFORM TO JUNCTION STRUCTURE NO. 4 (JS 229) UNLESS OTHERWISE NOTED.
14. PIPE BEDDING SHALL CONFORM TO RCFC & WCD STD. DWG. NO. M815 EXCEPT FOR COVER <2 FEET. FOR COVER <2 FEET, CONCRETE SLURRY (2000 PSI) SHALL BE USED. THE ENTIRE TRENCH SHALL BE SLURRY EXTENDING 4 INCHES MINIMUM AND 12 INCHES MAXIMUM ABOVE THE TOP OF THE PIPE.
15. T-1 INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT DATED NOVEMBER 3, 2015. LOCATIONS SHOWN ARE APPROXIMATE.
16. "V" IS THE DEPTH OF CATCH BASINS MEASURED FROM THE TOP OF CURB TO INVERT OF CONNECTOR PIPE.
17. CATCH BASINS SHALL BE LOCATED SO THAT LOCAL DEPRESSION SHALL BEGIN AT EXISTING CURB RETURN JOINT, UNLESS OTHERWISE SPECIFIED.
18. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
19. STANDARD DRAWINGS CALLED FOR ON THE PLAN AND PROFILE SHALL CONFORM TO DISTRICT STANDARD DRAWINGS UNLESS NOTED OTHERWISE.
20. THE CONTRACTOR IS REQUIRED TO CALL ALL UTILITY AGENCIES REGARDING TEMPORARY SHORING AND SUPPORT REQUIREMENTS FOR THE VARIOUS UTILITY LINES SHOWN ON THESE PLANS.
21. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHOULD BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
22. APPROVAL OF THESE PLANS BY THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT DOES NOT RELIEVE THE DEVELOPER'S ENGINEER OF RESPONSIBILITY FOR THE ENGINEERING DESIGN. IF FIELD CHANGES ARE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER TO MAKE THE NECESSARY CORRECTIONS.
23. THE CONTRACTOR OR DEVELOPER SHALL SECURE ALL REQUIRED ENCROACHMENT AND/OR STATE AND FEDERAL REGULATORY PERMITS PRIOR TO THE COMMENCEMENT OF ANY WORK.
24. THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING AND INCREASED TO A MINIMUM OF 3-1/2 INCHES OVER REINFORCING FOR BOX CULVERT, WHEN DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'C=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'C=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.
25. CONSTRUCTION JOINT FOR CALTRANS STANDARD REINFORCED CONCRETE BOX SHALL BE PLACED ACCORDING TO RCFC & WCD STANDARD DRAWING NO. BX 401.

R.C.F.C. & W.C.D. STANDARD DRAWINGS

CB	110	CONCRETE DROP INLET
JS	229	JUNCTION STRUCTURE NO.4
MH	254	MANHOLE NO. 4
M	803	CONCRETE COLLAR
M	816	CONCRETE BULKHEAD



INDEX MAP

1" = 200'

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM,
CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATIONS "MLFP", AND "PPBF" NAD 83(NSRS2011) AS SHOWN HEREON. ALL BEARINGS SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AND DISTANCES FROM REFERENCE MAPS OR DEEDS ARE AS SHOWN PER THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCES, MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF 0.999921668. CALCULATIONS ARE MADE AT POINT WITH COORDINATES OF:
N: 2242591.767, E: 6259065.349,
USING AN ELEVATION OF 1532.127 FEET (NAVD88).

NOTICE TO CONTRACTOR

IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION AND ELEVATION OF THE EXISTING FACILITIES PRIOR TO THE START OF ANY CONSTRUCTION

SHEET INDEX

	SHEET NO.
TITLE SHEET	1
PLAN & PROFILE	2-5
ACCESS ROAD & DETAILS	6
CONNECTOR PIPE PROFILE	7

RECMD	COUNTY OVERSIGHT ENGINEER	REGISTRATION #	DATE SIGNED
	APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.		

Don't Dig...Until You Call:
U.S.A. Toll Free:
1-800-422-4133
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

SCALE: 1" = 200'
DATE: 06/29/2018
DESIGNED BY: CC
DRAWN BY: JJO
CHECKED BY: JCC
F.B.

APPROVED BY:
ALBERT A. WEBB ASSOCIATES

ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

ENGINEER, RCE C627239 DATE:

REGISTERED PROFESSIONAL ENGINEER JOSEPH C. CALDWELL NO. C67239 CIVIL STATE OF CALIFORNIA

PERMANENT BENCH MARK
NGS DESIGNATION #435 (PID DX5442)
ELEV. = 1515.12' (NAVD88)
DESCRIBED BY METRO WATER DISTRICT OF SO. CALIFORNIA 1992 PERRIS, 1300 FEET (396.2 M) WEST OF ATSF RAILROAD ALONG RIDER ST, ON TOP OF NORTH CURB FACE OF RIDER ST. 28 FEET (8.5 M) NORTH OF RIDER ST, 6 FEET (1.8 M) SOUTH OF A GTE TELEPHONE BOX (DAMAGED). A STANDARD 3-1/4 INCH ALUMINUM DISK SET FLUSH IN TOP OF CURB.

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY:
PLANNING ENGINEER R.E. NO.
DATE:

APPROVED BY:
CHIEF ENGINEER R.E. NO.
DATE:

PERRIS VALLEY MDP
LATERAL H-11
STAGE NO. 2
TITLE SHEET

PROJECT NO. 4-0-00502
DRAWING NO. 4-1128
SHEET NO. 1 7

PP 26173

SUBMITTAL 2 - FOR REVIEW ONLY
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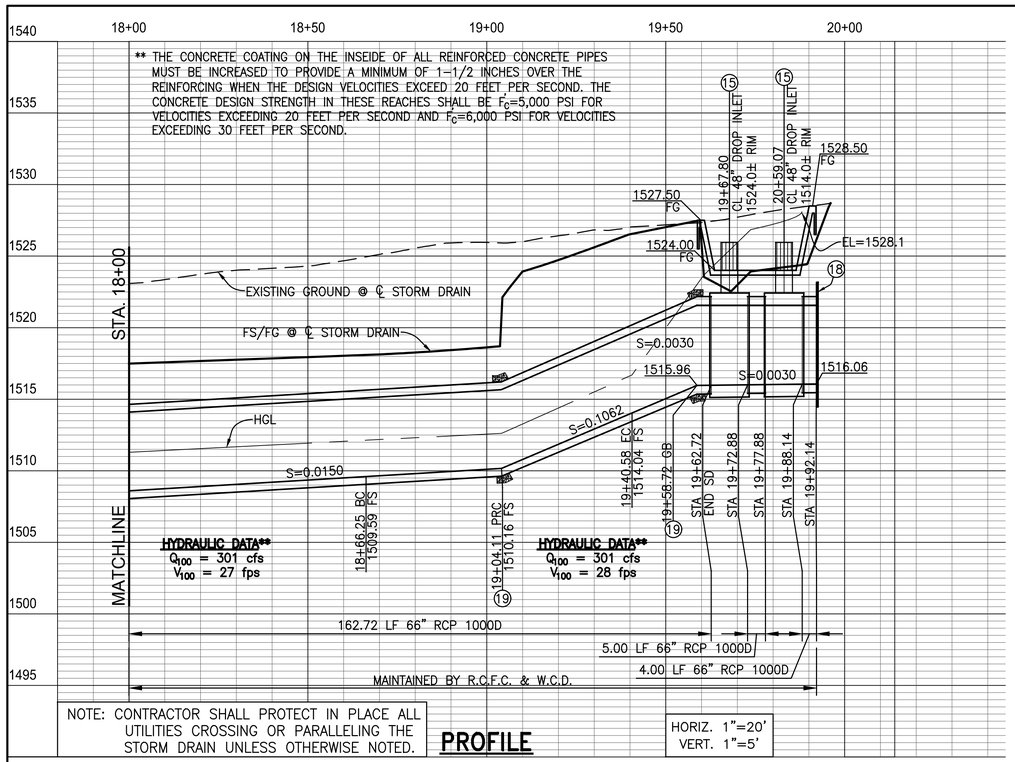
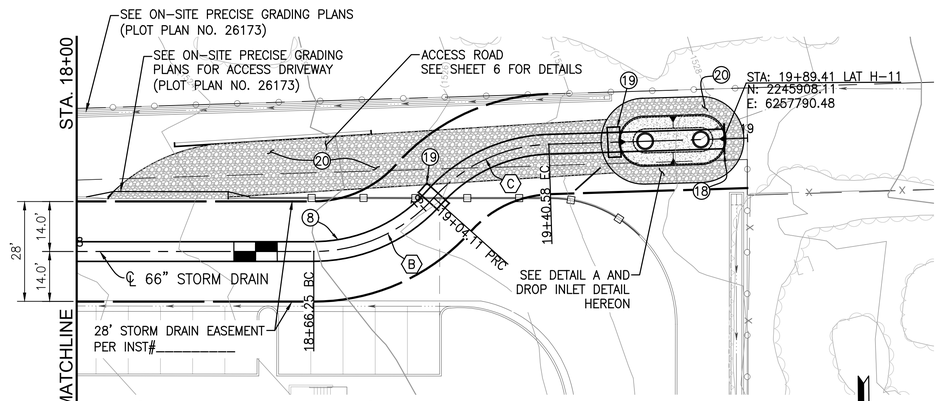


NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED.

PROFILE

HORIZ. 1"=20'
VERT. 1"=5'



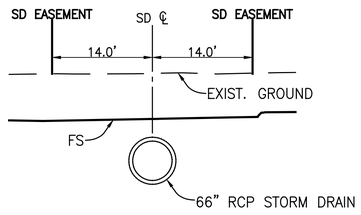
B ℄ CURVE DATA
Δ = 48°13'32"
R = 45.00'
T = 20.13'
L = 37.88'
BC= 18+66.25
EC= 19+04.11
PI = N 2245938.51
E 6257885.23

C ℄ CURVE DATA
Δ = 46°28'03"
R = 45.00'
T = 19.30'
L = 36.50'
BC= 19+04.11
EC= 19+40.58
PI = N 2245909.42
E 6257858.61

PLAN

20' 0 20'

N



SECTION AT STA. 16+00

TYPICAL FROM STA 18+00 TO STA 18+66.25

10' 0 10'

NOTES:

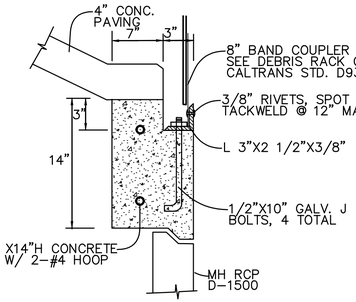
(8) INSTALL 66" RCP STORM DRAIN (D-LOAD PER PLAN).

(15) CONSTRUCT DROP INLET PER DETAILS BELOW.

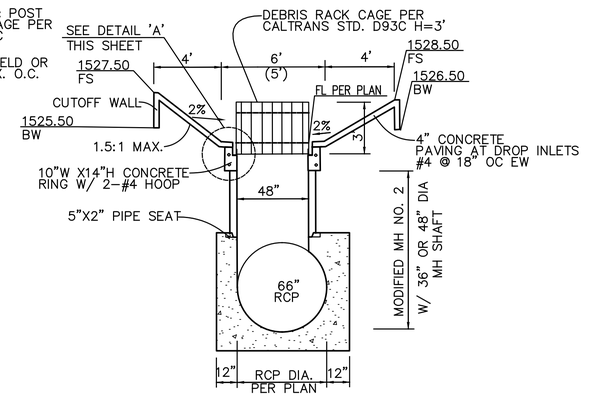
(18) CONSTRUCT CONCRETE BULKHEAD PER RCFC&WCD STD. DWG. M816.

(19) CONSTRUCT CONCRETE COLLAR PER RCFC&WCD STD. DWG. M803.

(20) INSTALL 3" THICK CLASS 2 AGGREGATE BASE MAINTENACE ROAD.



DETAIL A
NOT TO SCALE



(15) DROP INLET DETAIL
MODIFIED MH NO. 2 PER RCFC STD. MH 252
NOT TO SCALE

RECMD | COUNTY OVERSIGHT ENGINEER | REGISTRATION # | DATE SIGNED

APPROVED AS TO COMPLIANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

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PH. (951) 686-1070
FAX (951) 788-1256

ENGINEER, RCE C67239 DATE:

REGISTERED PROFESSIONAL ENGINEER JOSEPH C. CALDWELL NO. C67239 CIVIL STATE OF CALIFORNIA

PERMANENT BENCH MARK
SEE COVER SHEET

REVISIONS			
REF.	DESCRIPTION	APPR.	DATE

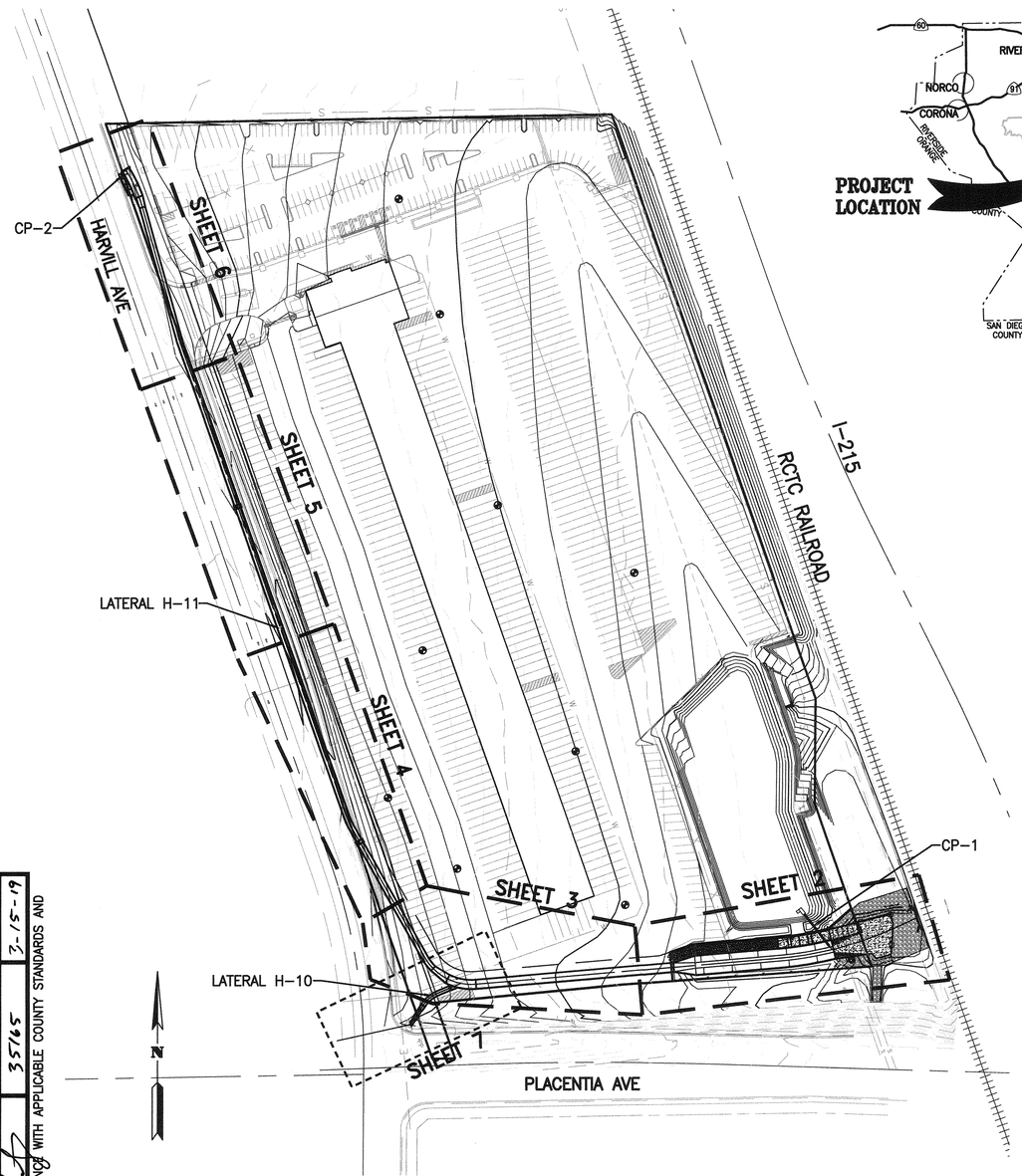
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
RECOMMENDED FOR APPROVAL: DATE:
APPROVED BY: DATE:

PERRIS VALLEY MDP
LATERAL H-11
STAGE NO. 2
STORM DRAIN
STA. 18+00 TO END OF PROJECT

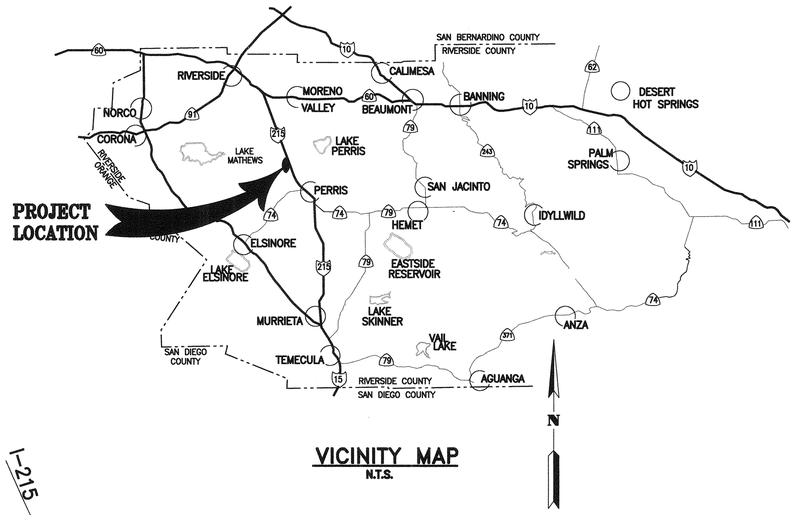
PROJECT NO. 4-0-00502
DRAWING NO. 4-1128
SHEET NO. 4 7

SUBMITTAL 2 - FOR REVIEW ONLY
G:\2016\16-0235\DRAWINGS\PLAN SHEETS\16-0235 SD SHEETS_RCFC_2018.DWG 10/10/2018 4:40:48 PM

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT



INDEX MAP
1" = 100'



VICINITY MAP
N.T.S.

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15. ⊕ INDICATES SOIL BORING LOCATIONS BASED ON THE SOILS REPORT BY TERRACON DATED 4/19/2017. LOCATIONS SHOWN ARE APPROXIMATE.
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18. ALL CURBS, GUTTERS, SIDEWALKS, DRIVEWAYS AND OTHER EXISTING IMPROVEMENTS TO BE RECONSTRUCTED IN KIND AND AT THE SAME ELEVATION AND LOCATION AS THE EXISTING IMPROVEMENTS UNLESS OTHERWISE NOTED.
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SHEET INDEX

	SHEET NO.
TITLE SHEET	1
PLAN & PROFILE	2–7
DETAILS	8–10

R.C.F.C. & W.C.D. STANDARD DRAWINGS

JS	226	JUNCTION STRUCTURE NO. 1
JS	228	JUNCTION STRUCTURE NO. 3
JS	231	JUNCTION STRUCTURE NO. 6
MH	252	MANHOLE NO. 2
MH	253	MANHOLE NO. 3
TS	301	TRANSITION STRUCTURE NO. 1
TS	303	TRANSITION STRUCTURE NO. 3
CH	326	TRAPEZOIDAL CHANNEL STRUCTURAL DETAILS
CH	329	TRANSITION STRUCTURAL DETAILS
CH	332	SUBDRAINS LAYOUT, SECTIONS & DETAILS
CH	333	DRAINAGE APRON FOR ACCESS ROAD
M	801	CHAIN LINK FENCE DETAILS
M	816	CONCRETE BULKHEAD
M	818	WIRE FENCE
M	827	VEHICULAR TURN AROUND AREA

CALTRANS STANDARD PLANS

D80	CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT
D81	CAST-IN-PLACE REINFORCED CONCRETE DOUBLE BOX CULVERT
D82	CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT MISC. DETAILS
D89	PIPE CULVERT HEADWALLS STRAIGHT AND "L"

RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT

300	CURB INLET CATCH BASIN
311	GUTTER DEPRESSION FOR CURB OPENING CATCH BASIN

	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
RECMD		35765	3-15-19

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE, CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

REGISTERED PROFESSIONAL ENGINEER — JOSEPH C. CALDWELL — NO. C67239 — CIVIL — STATE OF CALIFORNIA

ENGINEER, RCE C67239 — DATE: 13 MAR 2019

DESIGNED BY:	JCC
DRAWN BY:	CS
DATE DRAWN:	JAN 2019
CHECKED BY:	JCC

Don't Dig...Until You Call:
U.S.A. Toll Free: 1-800-422-4133
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
NATIONAL GEODETIC SURVEY, 435 PID: DX5442
NAVD 88, ELEV =(1515.12) FT DESCRIBED BY METRO WATER DISTR. SO. CALIFONIA 1992
PERRIS, 1.300' WEST OF AT&SF RAILROAD RIDER ST., ON TOP OF NORTH CURB FACE OF RIDER ST., 28' NORTH OF RIDER ST., 6' SOUTH OF A GTE TELEPHONE BOX. A STANDARD 3-1/4" ALUMINUM DISK SET FLUSH IN THE TOP OF CURB. MWDSC B.M. 435 REFERENCE MWD FB 4205-06-001

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: Edwin Quinonez, PLANNING ENGINEER — DATE: 3/20/19
APPROVED BY: CHIEF ENGINEER — DATE: 3/20/19

PERRIS VALLEY MDP
LATERAL H-11 & LATERAL H-10

TITLE SHEET

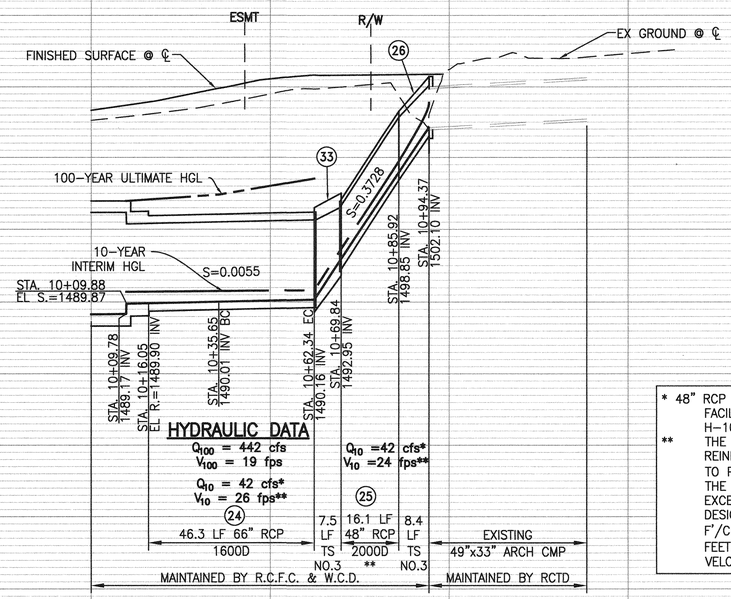
PROJECT NO. 4-0-00499 and 4-0-00502
DRAWING NO. 4-1124
SHEET NO. 1 OF 10

1P180002 PP 26220

966-0

G:\2018\18-0169\DRAWINGS\PLAN SHEETS\18-0169 SD SHEETS.DWG 3/13/2019 1:37:51 PM

NOTE: CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN UNLESS OTHERWISE NOTED.

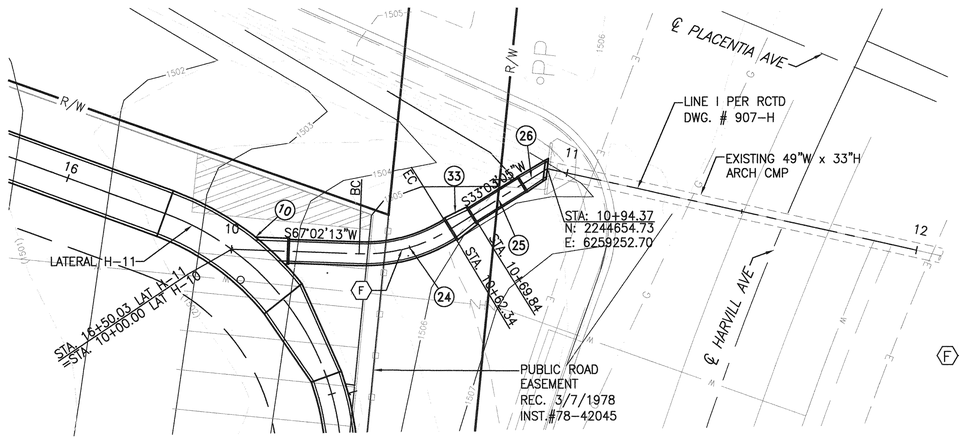


PROFILE

HORIZ. 1"=20'
VERT. 1"=5'

* 48" RCP AND TRANSITION STRUCTURE ARE TEMPORARY FACILITIES THAT WILL BE REMOVED WHEN LATERAL H-10 IS EXTENDED UPSTREAM

** THE CONCRETE COATING ON THE INSIDE OF ALL REINFORCED CONCRETE PIPES MUST BE INCREASED TO PROVIDE A MINIMUM OF 1-1/2 INCHES OVER THE REINFORCING WHEN THE DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'/C=5,000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'/C=6,000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.



Ⓕ ℄ CURVE DATA
Δ = 33°59'08"
R = 45.00'
T = 13.75'
L = 26.69'
BC= 10+35.65
EC= 10+62.34
PI = N 2244693.094
E 6259277.663

CONSTRUCTION NOTES

⑩ CONSTRUCT JUNCTION STRUCTURE NO. 1 PER RCFCWCD STD DWG. NO. JS226

㉔ INSTALL 66" RCP D-LOAD PER PLAN

㉕ INSTALL 48" RCP D-LOAD PER PLAN

㉖ DEMOLISH EXISTING HEADWALL. CONSTRUCT TRANSITION STRUCTURE NO. 3 PER RCFCWCD STD DWG. NO. TS303 48" RCP TO 49" ARCH CMP.

㉝ CONSTRUCT TRANSITION STRUCTURE NO.3 PER RCFCWCD STD DWG. NO. TS303

20' 0 20'

PLAN

RECMD	PLAN CHECK OVERSIGHT ENGINEER	REGISTRATION NUMBER	DATE SIGNED
		35765	3-15-19

APPROVED AS TO CONFORMANCE WITH APPLICABLE COUNTY STANDARDS AND PRACTICES.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256
ENGINEER, RCE C67239 DATE: 13 MAR 2019
REGISTERED PROFESSIONAL ENGINEER JOSEPH C. CALDWELL NO. C67239 CIVIL STATE OF CALIFORNIA

DESIGNED BY:	JCC
DRAWN BY:	CS
DATE DRAWN:	JAN 2019
CHECKED BY:	JCC

Don't Dig...Until You Call:
U.S.A. Toll Free:
1-800-422-4133
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
SEE SHEET 1

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECOMMENDED FOR APPROVAL BY: DATE: 03/19/19

APPROVED BY: Edwin Quinonez DATE: 3/20/19

IP180002 PP 26220

PERRIS VALLEY MDP LATERAL H-10 CONNECTION

PLAN & PROFILE

STA. 10+00 TO STA. 10+94.37

PROJECT NO.	4-0-00499
DRAWING NO.	4-1124
SHEET NO.	7 OF 10

966-0

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COUNTY OF RIVERSIDE, CALIFORNIA

CONSTRUCTION PLANS FOR

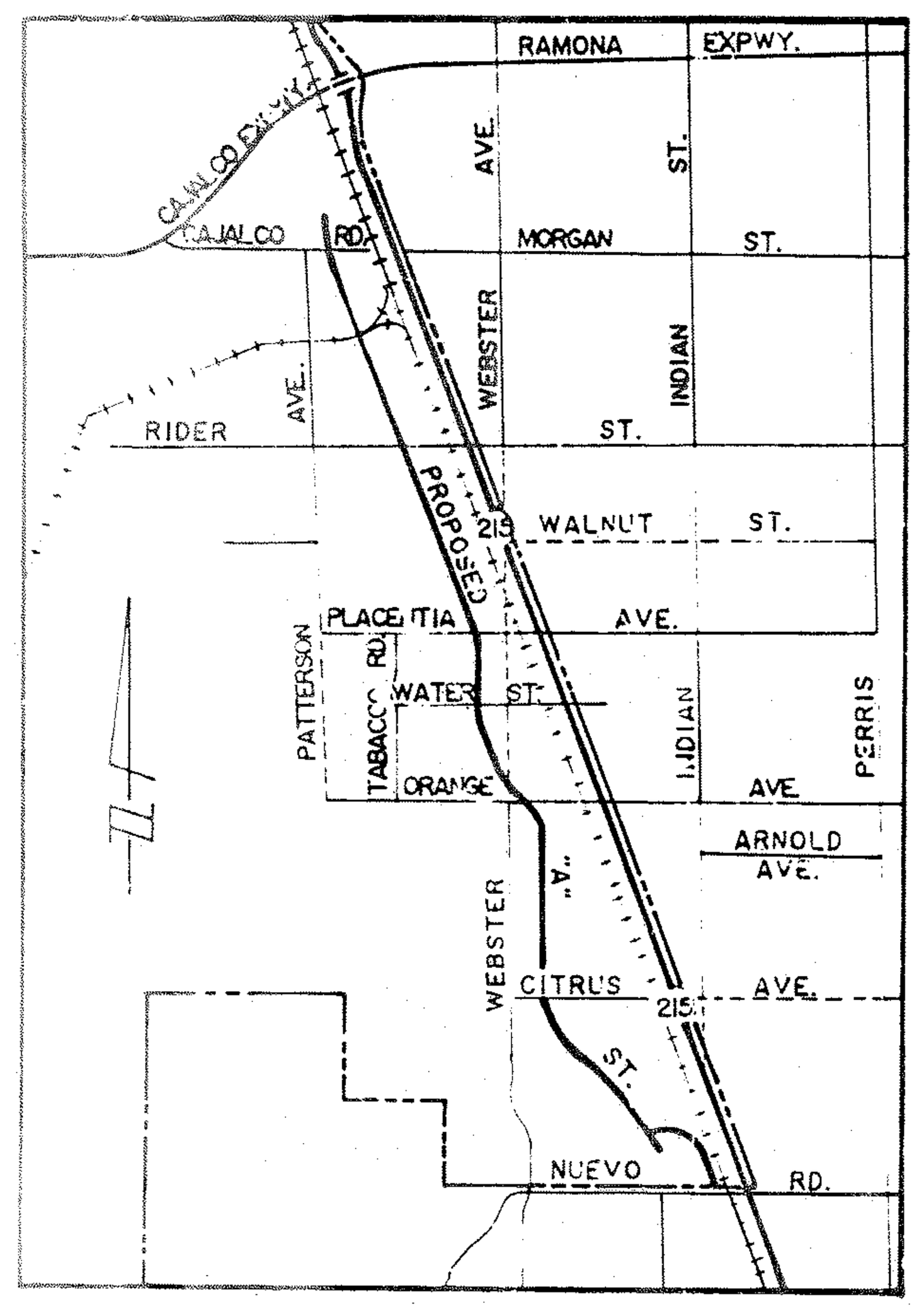
CFD 87-1

"A" STREET SOUTH

NUEVO ROAD TO CAJALCO ROAD

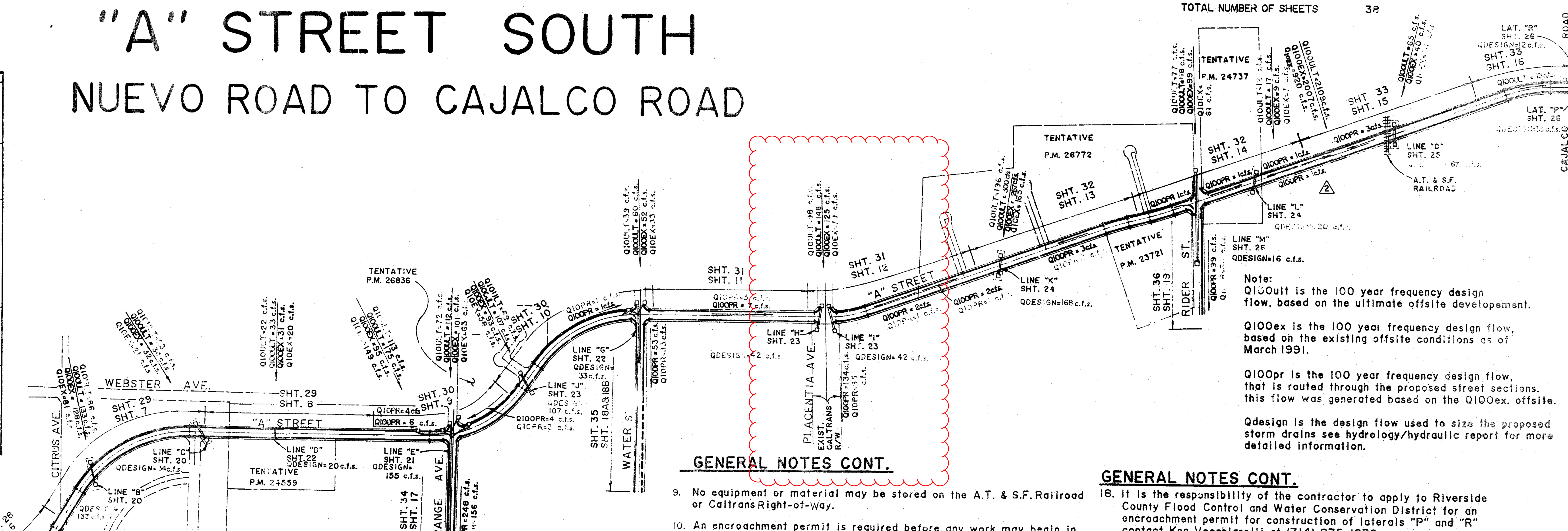
SHEET INDEX

TITLE	SHEET NO.
TITLE SHEET	1
QUANTITIES & MISC. DETAILS	2
TYPICAL SECTIONS	2A
STREET PLANS	3-19 - INCLUDES SHEETS 18A & 18B.
STORM DRAIN PLANS	20-26
SIGNING AND STRIPING PLANS	27-36
TOTAL NUMBER OF SHEETS	38



LOCATION MAP

SCALE 1" = ½ mile
SECTIONS 12&13 T4S R4W
SECTIONS 18&19 T4S R3W



Note:
Q100ult is the 100 year frequency design flow, based on the ultimate offsite developement.

Q100ex is the 100 year frequency design flow, based on the existing offsite conditions as of March 1991.

Q100pr is the 100 year frequency design flow, that is routed through the proposed street sections. this flow was generated based on the Q100ex. offsite.

Qdesign is the design flow used to size the proposed storm drains see hydrology/hydraulic report for more detailed information.

GENERAL NOTES

1. The contractor shall be responsible for the clearing of the proposed work area, and relocation costs for all existing utilities. Permittee must inform county of construction schedule at least 48 hours prior to begining of construction. Phone No. 275-6883.
2. All work shall conform to the requirements of the Riverside County Transportation Department. Improvement Standards and Specifications, dated 1990 County Ordinance No. 461 & subsequent amendments.
3. It shall be the responsibility of the contractor to notify the engineer, to install street centerline monuments as required by Riverside County Ordinance No. 461.
4. All underground facilities, including laterals, shall be in place prior to paving the street including, but not limited to, the following: ~~SEWER~~, WATER, ~~ELECTRIC, GAS~~, and DRAINAGE.
5. Curb depressions and driveway approaches will be installed and constructed according to County Standard No. 206 and/or No. 207 as directed in the field.
6. All street sections are tentative. Additional soil tests shall be taken after rough grading to determine the exact street section requirements. Use std. 401 if expansive material are encountered.
7. "Asphaltic Emulsion" (Fog Seal) shall be applied not less than fourteen days following placement of the asphalt surfacing and shall be applied at a rate of 0.10 gallon per square yard. Asphaltic Emulsion shall conform to sections 37, 39 and 94 of the State Standard Specifications.
8. Prime coat is required prior to paving all grades in excess of ten percent.

GENERAL NOTES CONT.

9. No equipment or material may be stored on the A.T. & S.F. Railroad or Caltrans Right-of-Way.
10. An encroachment permit is required before any work may begin in or near the State Right-of-Way. (From Caltrans).
11. All work within the State Right-of-Way shall conform to the latest State Standard Plans & Specifications or as directed by the State's Representative (standards other than State must be pre-approved and justified).
12. All disturbed areas in the State Right-of-Way must be treated for erosion control (Hydroseeding or equivalent), or as directed by the State's Representative). The responsibility for maintaining erosion control will not be released until the seeding is well established. The contractor will be responsible for the cost of Caltrans cleaning any drainage structures/channels which have become cluttered with debris and/or silt as a result of, or caused by, the construction project.
13. Access control on the freeway will be maintained at all times. I.E., the work inside the State Right-of-Way must be fenced off with no access to the work area from the freeway.
14. No freeway ramps or freeway lanes may be closed or obstructed at anytime unless specifically allowed per the encroachment permit and/or as directed by the State's Representative.
15. Where survey monuments exist, such monuments shall be protected or shall be referenced and reset pursuant to business and professions code, sections 8700 to 8805 (Land surveyor's act).
16. All signs, roadside markers, electroliers, etc., shall be protected and/or replaced in-kind according to the current State Standard Plans and the current Traffic Manual, at no cost to the State.
17. It shall be the responsibility of the contractor to install and maintain all construction, regulatory, guide and warning signs within the project limits and its surroundings and to provide safe passage for the travelling public and workers until the final completion and acceptance of the project by the county.

GENERAL NOTES CONT.

18. It is the responsibility of the contractor to apply to Riverside County Flood Control and Water Conservation District for an encroachment permit for construction of laterals "P" and "R" contact Ken Vecchiarelli at (714) 275-1279.
19. All "Grade to drain" daylight ditches shall be constructed as trapezoidal earth channels having a minimum basewidth of 5 feet and 4:1 sideslope.
20. The contractor shall be responsible for ensuring that any State drainage facility which is connected to or directly affected by the contractors operation shall be clean and operational prior to final acceptance of the permit work by the State. Adequate clean-outs and access opening shall be provided in any construction within the State's right of way for future maintenance and repair work as needed. This work shall be furnished at no cost to the State.

BENCH MARK

Riverside County Bench Mark #600-37-68 found brass disk stamped "600-37-68" in the top of a concrete post 2:1 miles N.W. of Perris Railroad sta. 0.2 miles S.E. of Orange Ave. 28' N.W. of Southbound Hwy. 395, 53' N.E. of A.T. & S.F. railroad tracks South end of a 16' concrete headwall established by Riverside County, 1970 elev. 1475.686'

PP25870 — IP 160002 FOR ⚠ ONLY — PROPOSED CALTRANS EXTENSION OF "A" STREET (BY OTHERS)

ALBERT A. WEBB ASSOCIATES
3788 Mc CRAY STREET
RIVERSIDE, CALIFORNIA 92506
(951) 686-1070

MS4287, IP 140052
FOR ⚠ ONLY
ENCOMPASS ASSOCIATES, INC.
5699 COUSINS PLACE
RANCHO CUCAMONGA, CA 91737
(909) 684-0093

W.O. #68-8128

RECOMMENDED FOR APPROVAL
DATE
CHECKED BY
DATE 6-15-92

Underground Service Alert
Call: TOLL FREE 1-800 422-4133

PRIVATE ENGINEERING NOTE

MARK	REVISIONS	APPR	DATE
⚠	MODIFIED ⚠ ADDED DWY. TO SHEET 17		6/16
⚠	REPLACE SHEET 3B WITH 3C		
⚠	REFER TO ... FOR CURB RETURN & 2 DWYS ON SHT. 3A&3B		
⚠	DEL LINE "U"		
⚠	ADDED GENERAL NOTE No. 20		

DESIGNED BY / DRAWN BY / CHECKED BY

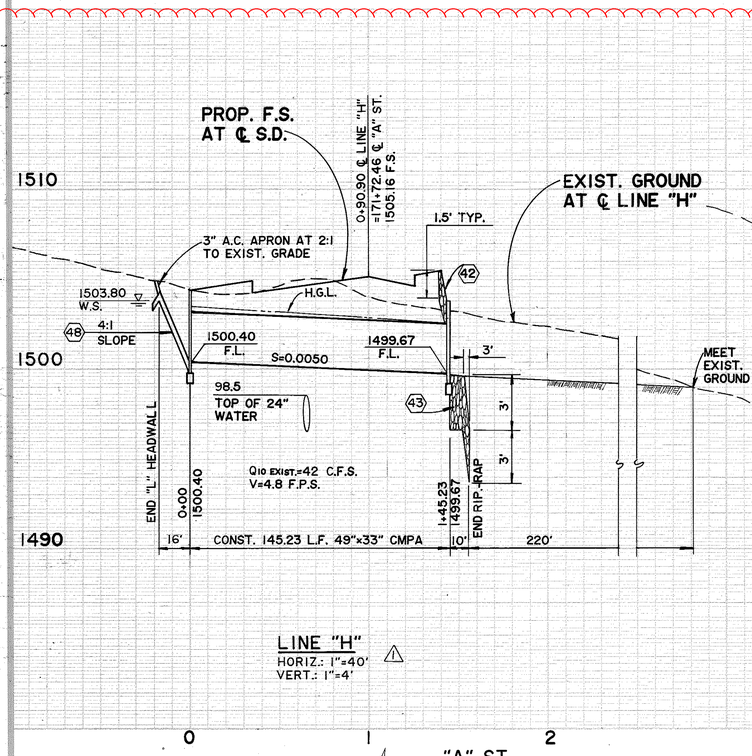
PREPARED UNDER THE DIRECTION OF: DATE 4-5-91
REGISTERED CIVIL ENGINEER No. 35458 EXP. DATE 9/30/95
APPROVED BY: DATE
FOR TRANSPORTATION DEPT. RIVERSIDE CO.

SCALE N/A
DATE MARCH 1991
BENCH MARK: SEE ABOVE

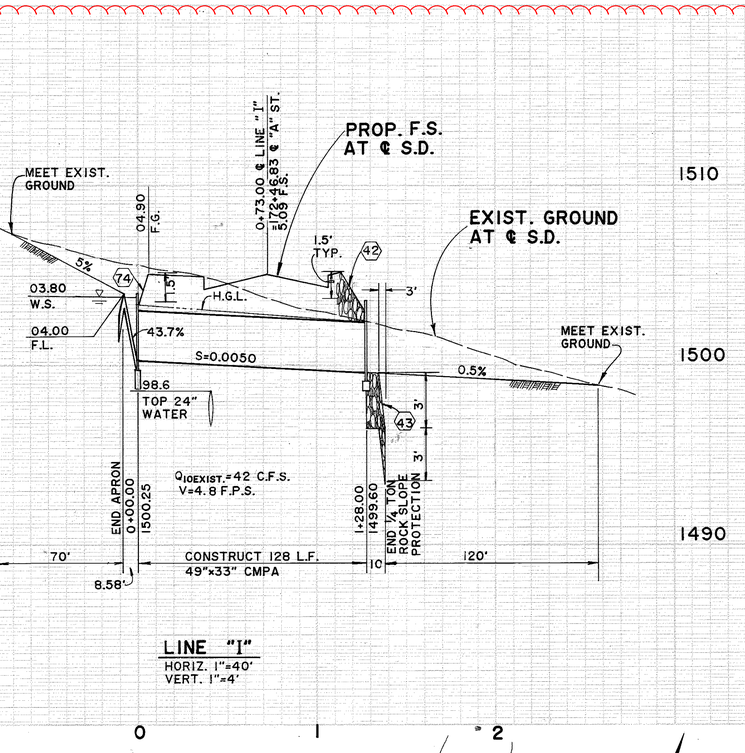
JFD J.F. Davidson Associates, Inc.

STREET IMPROVEMENT PLANS
TITLE SHEET
SHEET 1 of 38 SHEETS
FOR COUNTY OF RIVERSIDE

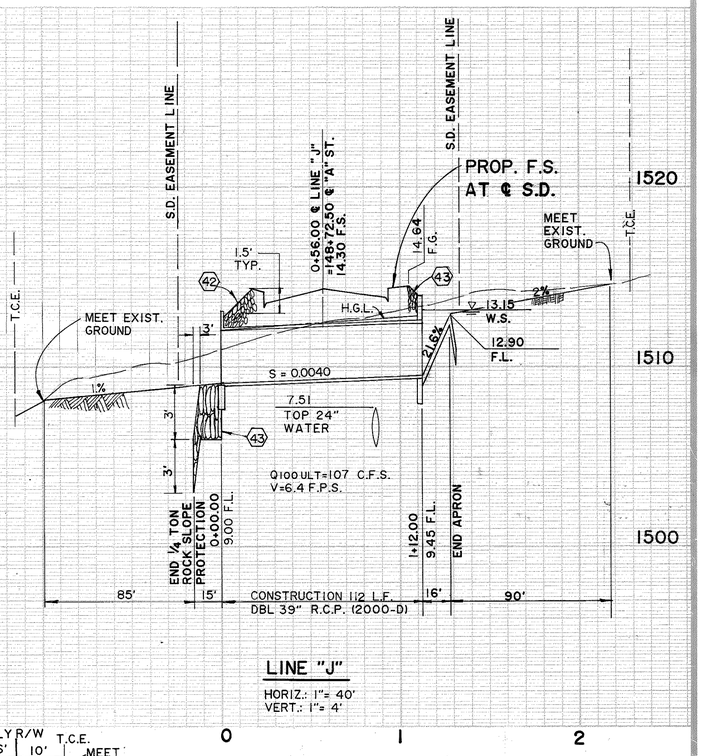
907-H



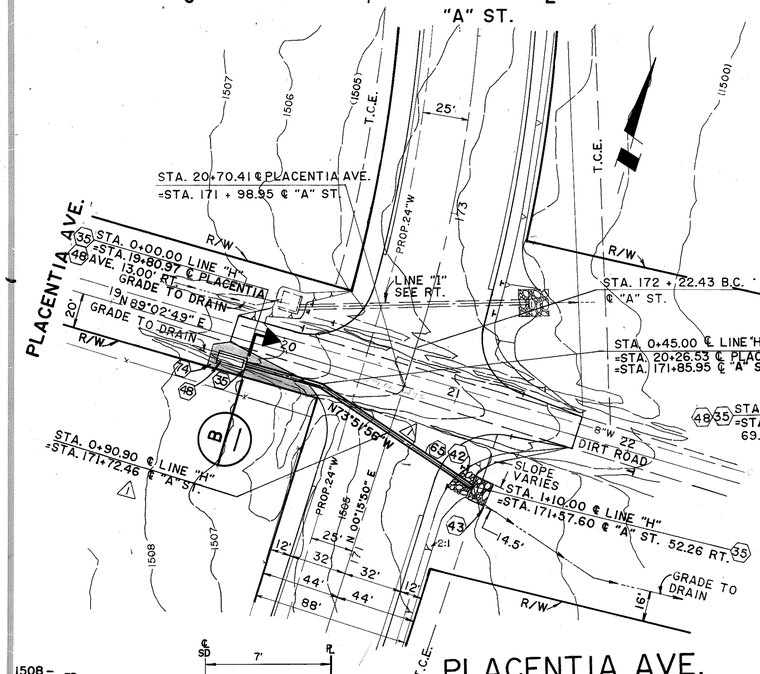
LINE "H"
HORIZ.: 1"=40'
VERT.: 1"=4'



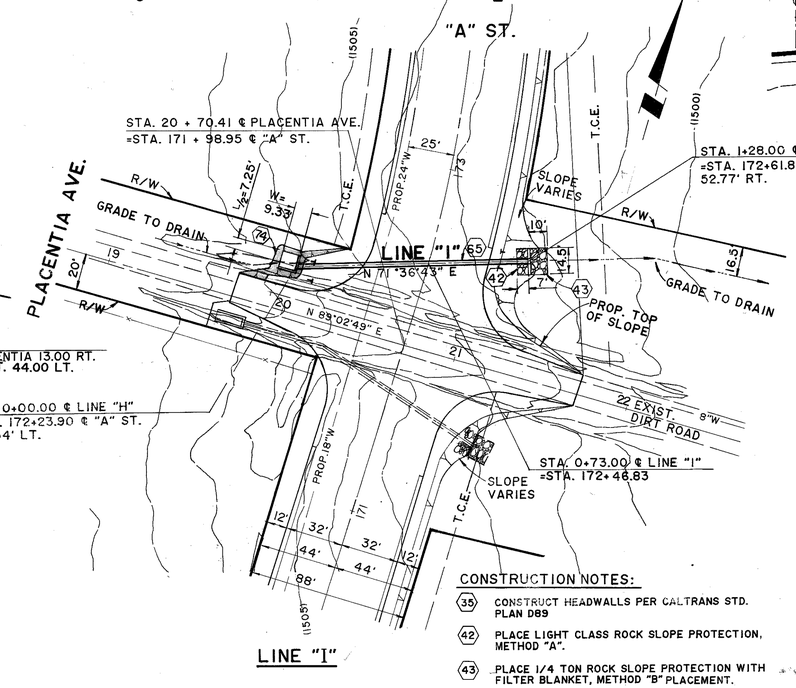
LINE "I"
HORIZ. 1"=40'
VERT. 1"=4'



LINE "J"
HORIZ.: 1"= 40'
VERT.: 1"= 4'



PLACENTIA AVE.



LINE "I"

PLACENTIA AVE

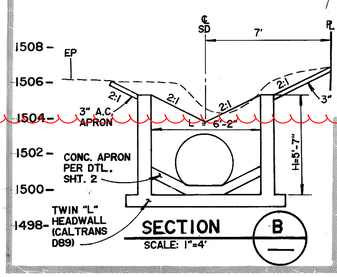
CONSTRUCTION NOTES:

35 CONSTRUCT HEADWALLS PER CALTRANS STD. PLAN D89

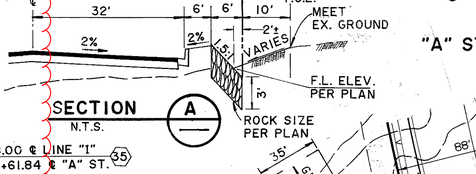
42 PLACE LIGHT CLASS ROCK SLOPE PROTECTION, METHOD "A".

43 PLACE 1/4 TON ROCK SLOPE PROTECTION WITH FILTER BLANKET, METHOD "B" PLACEMENT.

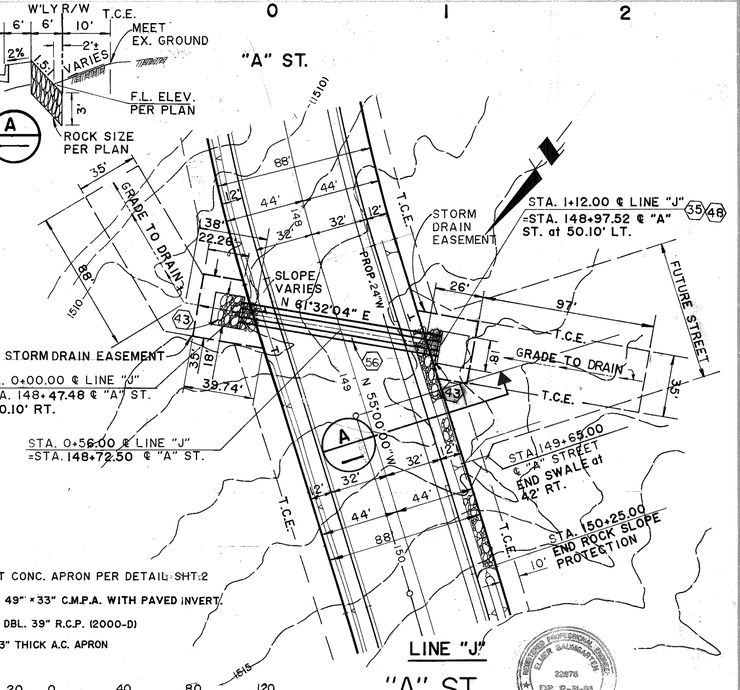
AS-BUILT PLAN
CORRECTIONS NOTED



SECTION B
SCALE: 1"=4'



SECTION A
N.T.S.



LINE "J"

"A" ST.

48 CONSTRUCT CONC. APRON PER DETAIL SHT. 2

65 CONSTRUCT 49" x 33" C.M.P.A. WITH PAVED INVERT

56 CONSTRUCT DBL. 39" R.C.P. (2000-D)

74 CONSTRUCT 3" THICK A.C. APRON

SCALE IN FEET 40 20 0 40 80 120

W.O. #68-8128 74-1010

IMPROVEMENT DISTRICT 14

D

SD-

Underground Service Alert
Call TOLL FREE
1-800 422-4133
TWO WORKING DAYS BEFORE YOU DIG

PRIVATE ENGINEERING NOTE

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

⚠ REVISED STORM DRAIN LINE "H" — 2/2/93

DESIGNED BY M.M. · DRAWN BY L.T. · CHECKED BY

REGISTERED PROFESSIONAL ENGINEER JIMMY W. SIMS No. 35458 Exp. 9/30/95 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF: DATE 4-5-91

REGISTERED CIVIL ENGINEER No. 35458 EXP. DATE 9/30/95

APPROVED BY: FOR TRANSPORTATION DEPT. RIVERSIDE CO. DATE 6/25/92

DATE MARCH 1991

SCALE HORIZ. 1"=40' VERT. 1"= 4'

BENCH MARK: SEE SHEET No. 1

J.F. Davidson Associates, Inc.
ENGINEERING PLANNING SURVEYING ARCHITECTURE LANDSCAPE ARCHITECTURE
3560 Lemon Street, P.O. Box 493, Riverside, CA 92502, (714) 686-5944, FAX 714-686-5954
11700 S. Mt. Vernon Ave., Suite "D", Colton, CA 92324, (714) 825-1082
72-080 El Paseo, Suite 108, Palm Desert, CA 92260, (619) 346-9691, FAX 619-340-0529

IN THE COUNTY OF RIVERSIDE
STORM DRAIN IMPROVEMENT PLANS
LINE "H", "I", & "J"
SCHEDULE I IMPROVEMENTS
FOR COUNTY OF RIVERSIDE

SHEET 23 OF 38 SHEETS

W.O. F.B. FILE NO. 8710383

907-H