A STORMWATER DETENTION ANALYSIS

FOR THE PROPOSED DEVELOPMENT OF THE

CITY OF O'FALLON'S ENVIRONMENTAL SERVICES BUILDING

IN

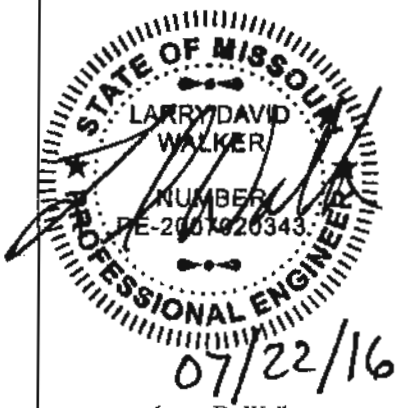
O'FALLON, MISSOURI

FOR

City of O'Fallon
100 N. Main Street
O'Fallon, MO 63366

BAX PROJECT NO. 06-13742A

July 22, 2016



07/22/16

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Civil Engineer
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Engineering Authority No. 000655

INTRODUCTION:

This site currently is developed with an existing building and detention basin which is located at 1550 Progress West Lane in the City of O'Fallon, Missouri. The 4.07-acre (3.4 acres disturbed for this project which includes pavement removal and replacement) tract of land shall be analyzed for the existing and proposed improvements to the site. The existing detention basin will be cleaned out, properly sized, and modified to meet the current City of O'Fallon design standards. The pre-developed conditions that are used in this analysis assumes the site was completely void of any impervious areas. The storage volume and outflow rates shall be proportioned to insure that the peak rate of runoff leaving the tract under post-developed conditions is less than or equal to the peak rate of runoff under pre-developed conditions for the 2, 15, 25 and 100 year 20 minute design storms and also analyzed for the safe passage of the 100 year 20 minute design storm assuming the low flow slot is blocked.

GENERAL SITE DATA AND RUNOFF CALCULATIONS

The pre-developed curve numbers used for the analysis are:

Greenspace				
2 year	0-5%	Impervious	1.15	cfs/ac
15 year	0-5%	Impervious	1.87	cfs/ac
25 year	0-5%	Impervious	2.31	cfs/ac
100 year	0-5%	Impervious	2.95	cfs/ac

The post-developed curve numbers used for the analysis are:

Greenspace				
2 year	0-5%	Impervious	1.15	cfs/ac
15 year	0-5%	Impervious	1.87	cfs/ac
25 year	0-5%	Impervious	2.31	cfs/ac
100 year	0-5%	Impervious	2.95	cfs/ac
Pavement / Building				
2 year	100%	Impervious	2.39	cfs/ac
15 year	100%	Impervious	3.85	cfs/ac
25 year	100%	Impervious	4.75	cfs/ac
100 year	100%	Impervious	6.08	cfs/ac

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PREDEVELOPED CONDITIONS:

The Predeveloped watershed discharges in to a tributary leaving the site in the southwestern area of the tract. The total runoff from the watershed will be calculated using the rational method to determine the Predeveloped Runoff rates leavening the site. For this analysis the Pre-developed runoff for the 2, 15, 25, and 100 year 20 minute design storms will be calculated for comparison to the Post-developed runoff to determine the quantity of detention that will be required.

2 Year

4.07 ac	x	1.15 cfs/ac	=	4.68 cfs
		Total	=	4.68 cfs

15 Year

4.07 ac	x	1.87 cfs/ac	=	7.61 cfs
		Total	=	7.61 cfs

25 Year

4.07 ac	x	2.31 cfs/ac	=	9.40 cfs
		Total	=	9.40 cfs

100 Year

4.07 ac	x	2.95 cfs/ac	=	12.01 cfs
		Total	=	12.01 cfs

2 year-20 minute storm:	4.68 cfs
15 year-20 minute storm:	7.61 cfs
25 year-20 minute storm:	9.40 cfs
100 year-20 minute storm:	12.01 cfs

POSTDEVELOPED CONDITIONS:

The Predeveloped watershed discharges in to a tributary leaving the site in the southwestern area of the tract. The total runoff from the watershed will be calculated using the rational method to determine the Postdeveloped Runoff rates leavening the site. For this analysis the Post-developed runoff for the 2, 15, 25, and 100 year 20 minute design storms will be calculated for comparison to the previously calculated Predeveloped runoff to determine the quantity of detention that will be required.

2 Year					
Green Space	1.60 ac	x	1.15 cfs/ac	=	1.84 cfs
Pavement / Building	2.47 ac	x	2.39 cfs/ac	=	5.90 cfs
			Total	=	7.74 cfs
15 Year					
Green Space	1.60 ac	x	1.87 cfs/ac	=	2.99 cfs
Pavement / Building	2.47 ac	x	3.85 cfs/ac	=	9.51 cfs
			Total	=	12.50 cfs
25 Year					
Green Space	1.60 ac	x	2.31 cfs/ac	=	3.70 cfs
Pavement / Building	2.47 ac	x	4.75 cfs/ac	=	11.73 cfs
			Total	=	15.43 cfs
100 Year					
Green Space	1.60 ac	x	2.95 cfs/ac	=	4.72 cfs
Pavement / Building	2.47 ac	x	6.08 cfs/ac	=	15.02 cfs
			Total	=	19.74 cfs

2 year-20 minute storm:	7.74 cfs
15 year-20 minute storm:	12.50 cfs
25 year-20 minute storm:	15.43 cfs
100 year-20 minute storm:	19.74 cfs

DIFFERENTIAL RUNOFF

The differential runoff is determined by subtracting the predeveloped runoff rate from the postdeveloped runoff rate. Areas that have more than 1 cfs of differential runoff require a detention facility to attenuate the additional runoff.

Design Storm	Postdeveloped Runoff	Predeveloped Runoff	Differential Runoff
2 yr	7.74 cfs	4.68cfs	3.06 cfs
15 yr	12.50 cfs	7.61 cfs	4.89 cfs
25 yr	15.43 cfs	9.40 cfs	6.03 cfs
100 yr	19.74 cfs	12.01 cfs	7.73 cfs

TIME OF CONCENTRATION:

Of the inflows to the basin, the most remote point lies to the northeast of the existing building and flows overland to DCI 103. Flows will travel approximately 317 feet overland to the inlet then 413 feet via storm pipe to the detention basin. Time of concentration is estimated as follows:

T(overland): L = 317 feet
Elevation difference = 4.0 ft.
T(overland) = 1.5 minutes:

T(storm pipe): L = 413 feet
Estimated velocity 5 feet per second
T(storm pipe) = 1.38 minutes

Total time = 1.5 min + 1.38 min = 2.88 min→ use **3 minutes: see chart in Appendix A**

DETENTION BASIN CALCULATIONS:

Basin Peak Inflow

Inflows to the basin have been estimated using the rational method and the drainage area map of the project included in this report.

2 year-20 minute storm:

Green Space	1.37 ac	x	1.15 cfs/ac	= 1.58 cfs
Pavement / Building	2.77 ac	x	2.39 cfs/ac	= 6.62 cfs
			Total	= 8.20 cfs

15 year-20 minute storm:

Green Space	1.37 ac	x	1.87 cfs/ac	= 2.56 cfs
Pavement / Building	2.77 ac	x	3.85 cfs/ac	= 10.66 cfs
			Total	= 13.22 cfs

25 year-20 minute storm:

Green Space	1.37 ac	x	2.31 cfs/ac	= 3.16 cfs
Pavement / Building	2.77 ac	x	4.75 cfs/ac	= 13.16 cfs
			Total	= 16.32 cfs

100 year-20 minute storm:

Green Space	1.37 ac	x	2.95 cfs/ac	= 4.04 cfs
Pavement / Building	2.77 ac	x	6.08 cfs/ac	= 16.84 cfs
			Total	= 20.88 cfs

Allowable Release Rate

STORM	BASIN INFLOW	-	DIFFERENTIAL RUNOFF RATE	=	ALLOWABLE RELEASE RATE
2 yr	8.20 cfs	-	3.06 cfs	=	5.14 cfs
15 yr	13.22 cfs	-	4.73 cfs	=	8.49 cfs
25 yr	16.32 cfs	-	6.03 cfs	=	10.29 cfs
100 yr	20.88 cfs	-	7.73 cfs	=	13.15 cfs

Storm Routing Calculations and Results

A computer program PONDPACK was used in routing the 2, 15, 25 and 100 year storms through the detention basin on the subject property. In addition, the 100 year design storm was also routed with the outflow pipe blocked (Low Flow Blocked) and water ponded to the crest of the spillway. The routing calculations can be found in Appendix B. As found in the routing calculations, the results are as follows:

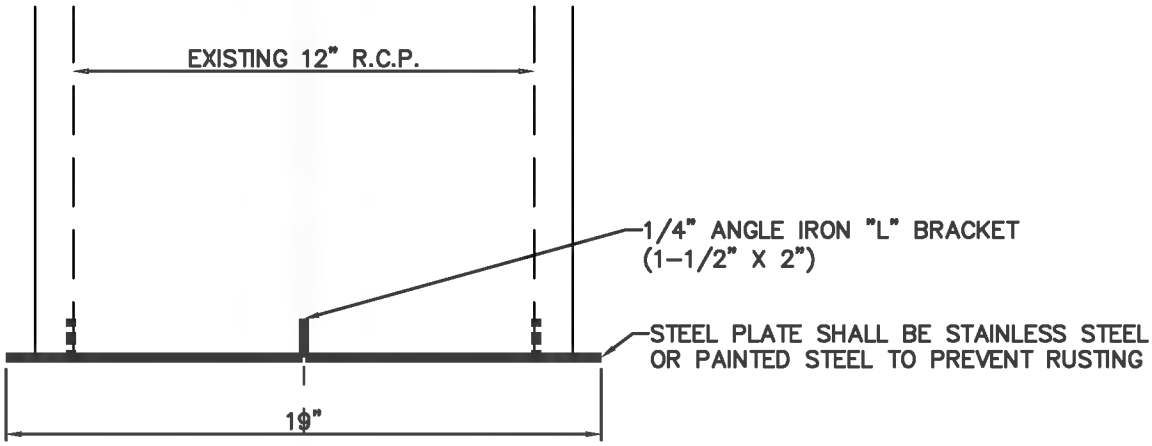
STORM (20 MIN)	PEAK INFLOW	ALLOWABLE RELEASE RATE	CALCULATED RELEASE	PEAK ELEVATION
2 yr	8.20 cfs	5.14 cfs	4.96 cfs	552.02 ft
15 yr	13.22 cfs	8.49 cfs	6.15 cfs	553.26 ft
25 yr	16.32 cfs	10.29 cfs	6.72 cfs	553.95 ft
100 yr	20.88 cfs	13.15 cfs	7.40 cfs	554.87 ft
100 yr (Low Flow Blocked)	20.88 cfs	-------	20.88 cfs	555.68 ft

SUMMARY:

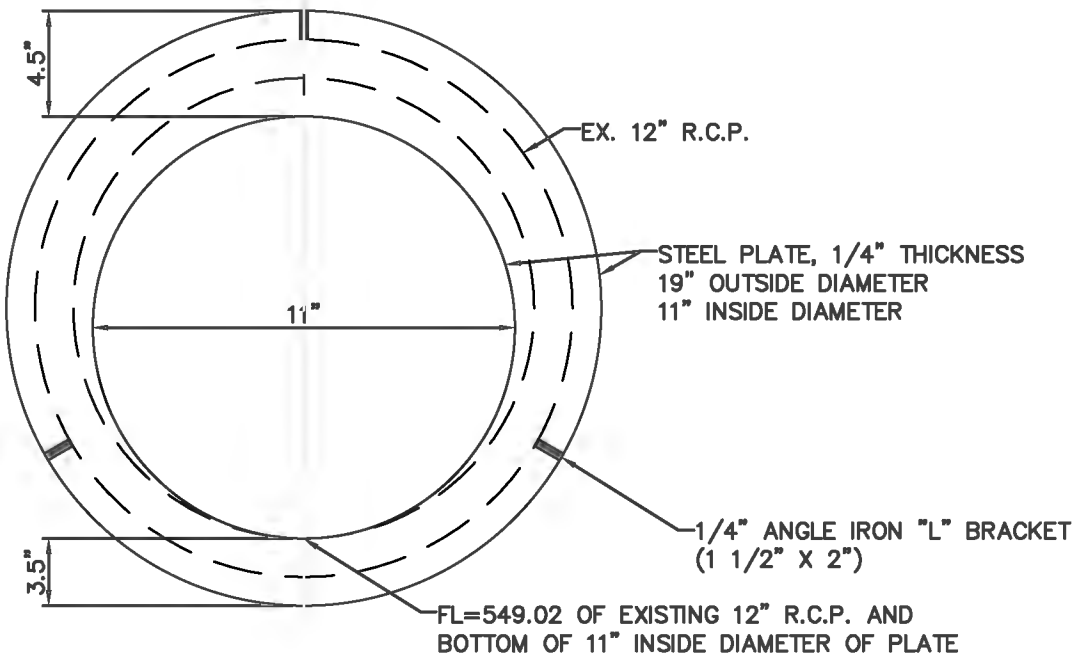
Storm (20 min.)	Basin Release Rate	High Water
2 Year	4.96 cfs	552.02 ft
15 Year	6.15 cfs	553.26 ft
25 Year	6.72 cfs	553.95 ft
100 Year	7.40 cfs	554.87 ft
100 Year –Low Flow Blocked	20.88 cfs	555.68 ft
Existing 12” Outfall Pipe		
Flow Line At Existing Basin		549.02 ft
30 Foot Long Spillway		
Spillway Elevation		555.30 ft
100 Year Water Depth Over Spillway (See Detail Appendix A)		0.38 ft
100 Year-Low Flow Blocked Elevation		555.68 ft
Top of Berm		557.00 ft
Freeboard		1.32 ft

Appendix A

-Structure Detail
-Spillway Calculations
-Time of Concentration Chart



STEEL PLATE SHALL BE INSTALLED BY WELDING "L" BRACKETS (1-1/2" LENGTH) TO PLATE. THE 2" LENGTH OF "L" BRACKET SHALL BE BOLTED INTO EXISTING 12" R.C.P. WITH 3/8" STAINLESS STEEL BOLT.



DETENTION OUTFALL PIPE MODIFICATION DETAIL

NOT TO SCALE

Weir Report

DETENTION BASIN SPILLWAY

Rectangular Weir

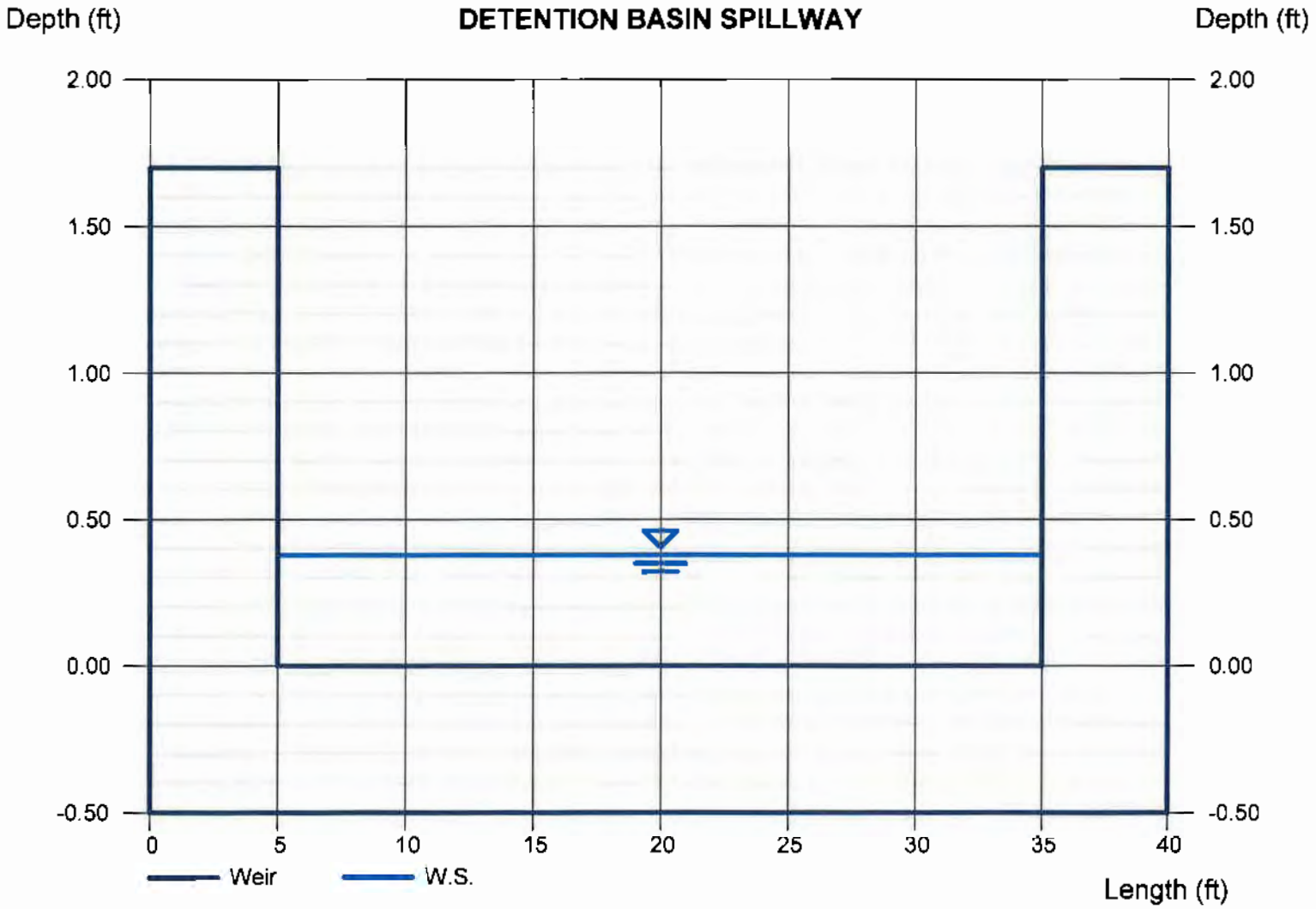
Crest	= Broad
Bottom Length (ft)	= 30.00
Total Depth (ft)	= 1.70

Calculations

Weir Coeff. Cw	= 3.00
Compute by:	Known Q
Known Q (cfs)	= 20.88

Highlighted

Depth (ft)	= 0.38
Q (cfs)	= 20.88
Area (sqft)	= 11.32
Velocity (ft/s)	= 1.84
Top Width (ft)	= 30.00



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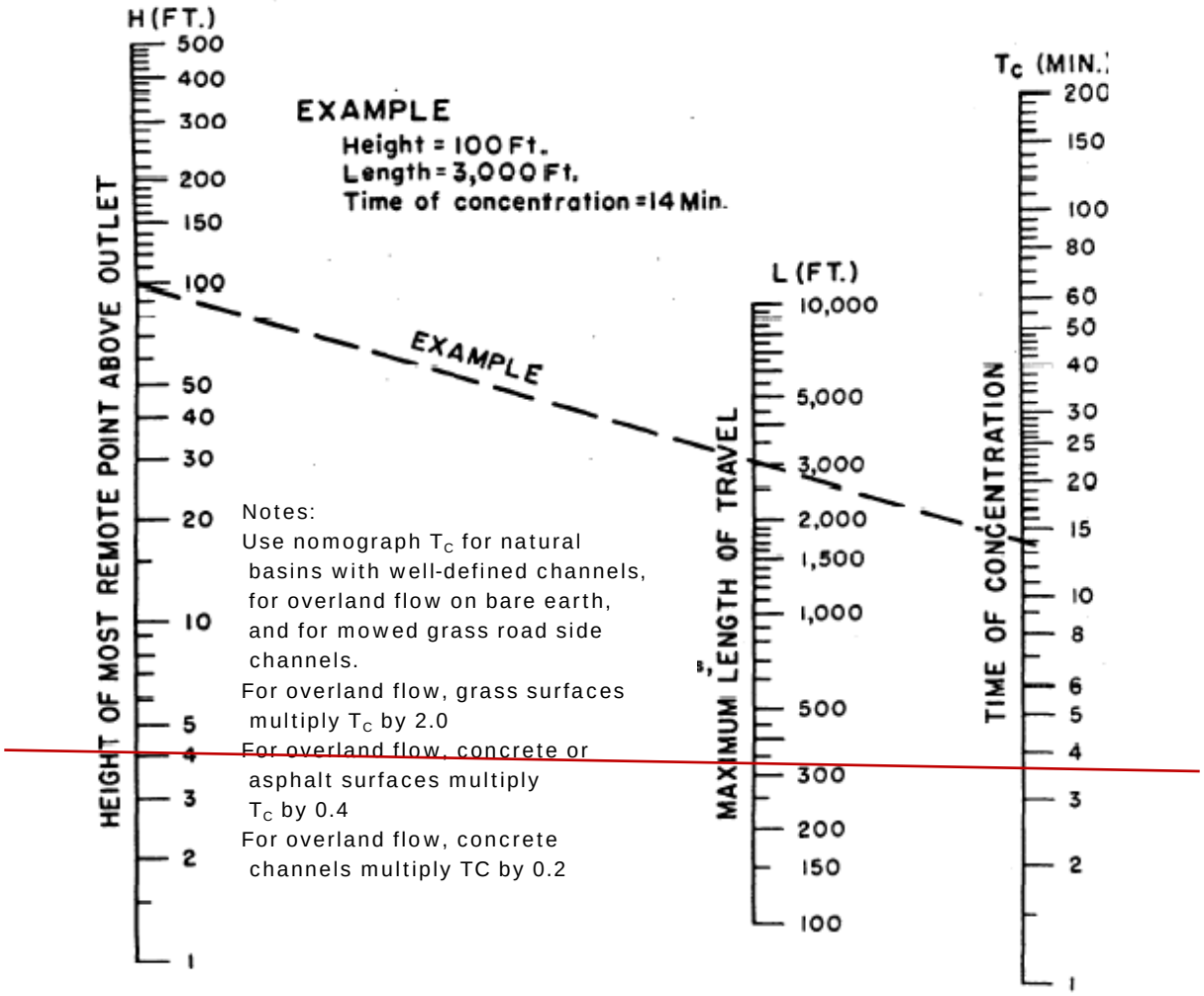
Project: Environmental Services Building
Date: 7-22-2016 Project No: 06-13742A
Designer: LDW Checked: LDW

TIME OF CONCENTRATION FOR SMALL DRAINAGE BASINS



OVERLAND FLOW

Δ Height = 4.0 ft

Length = 317 ft

$T_{Overland}$ = (0.4)(3.8)=1.5 min

STORM SEWER TRAVEL TIME

T_{storm}=Pipe Length (L) * Assumed Velocity (V)

L = 413 ft

V = 5 ft/s

T_{storm} = 413 ft / 5 ft/s / 60 sec/min =1.38 min

Total Time of Concentration = $T_{Overland}$ + T_{storm} = 1.5 + 1.38 = 2.88 → USE 3 min.

Appendix B

Basin Routing Calculations for

-2 year Detention Routing

-15 year Detention Routing

-25 year Detention Routing

-100 year Detention Routing

-100 year Low Flow Blocked Routing

Table of Contents

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Hyd Queue 10	Watershed - 100	0	0.575	3.000	20.88
Hyd Queue 10	Watershed - 025	0	0.450	3.000	16.32
Hyd Queue 10	Watershed - 015	0	0.364	3.000	13.22
Hyd Queue 10	Watershed - 002	0	0.226	3.000	8.20

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Out 10	Watershed - 100	0	0.575	22.000	7.40
Out 10	Watershed - 025	0	0.450	22.000	6.72
Out 10	Watershed - 015	0	0.364	22.000	6.15
Out 10	Watershed - 002	0	0.226	21.000	4.96

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 10 (IN)	Watershed - 100	0	0.575	3.000	20.88	(N/A)	(N/A)
Pond 10 (OUT)	Watershed - 100	0	0.575	22.000	7.40	554.87	0.402
Pond 10 (IN)	Watershed - 025	0	0.450	3.000	16.32	(N/A)	(N/A)
Pond 10 (OUT)	Watershed - 025	0	0.450	22.000	6.72	553.95	0.293
Pond 10 (IN)	Watershed - 015	0	0.364	3.000	13.22	(N/A)	(N/A)
Pond 10 (OUT)	Watershed - 015	0	0.364	22.000	6.15	553.26	0.220
Pond 10 (IN)	Watershed - 002	0	0.226	3.000	8.20	(N/A)	(N/A)
Pond 10 (OUT)	Watershed - 002	0	0.226	21.000	4.96	552.02	0.109

Peak Discharge	8.20 ft³/s
Time to Peak	17.000 min
Hydrograph Volume	0.226 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	2.73	5.47	8.20	8.20
5.000	8.20	8.20	8.20	8.20	8.20
10.000	8.20	8.20	8.20	8.20	8.20
15.000	8.20	8.20	8.20	8.20	8.20
20.000	8.20	5.47	2.73	0.00	0.00
25.000	0.00	0.00	0.00	0.00	0.00
30.000	0.00	0.00	0.00	0.00	0.00
35.000	0.00	0.00	0.00	0.00	0.00
40.000	0.00	0.00	0.00	0.00	0.00
45.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	13.22 ft³/s
Time to Peak	17.000 min
Hydrograph Volume	0.364 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	4.41	8.81	13.22	13.22
5.000	13.22	13.22	13.22	13.22	13.22
10.000	13.22	13.22	13.22	13.22	13.22
15.000	13.22	13.22	13.22	13.22	13.22
20.000	13.22	8.81	4.41	0.00	0.00
25.000	0.00	0.00	0.00	0.00	0.00
30.000	0.00	0.00	0.00	0.00	0.00
35.000	0.00	0.00	0.00	0.00	0.00
40.000	0.00	0.00	0.00	0.00	0.00
45.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	16.32 ft³/s
Time to Peak	17.000 min
Hydrograph Volume	0.450 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	5.44	10.88	16.32	16.32
5.000	16.32	16.32	16.32	16.32	16.32
10.000	16.32	16.32	16.32	16.32	16.32
15.000	16.32	16.32	16.32	16.32	16.32
20.000	16.32	10.88	5.44	0.00	0.00
25.000	0.00	0.00	0.00	0.00	0.00
30.000	0.00	0.00	0.00	0.00	0.00
35.000	0.00	0.00	0.00	0.00	0.00
40.000	0.00	0.00	0.00	0.00	0.00
45.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	20.88 ft³/s
Time to Peak	17.000 min
Hydrograph Volume	0.575 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	6.96	13.92	20.88	20.88
5.000	20.88	20.88	20.88	20.88	20.88
10.000	20.88	20.88	20.88	20.88	20.88
15.000	20.88	20.88	20.88	20.88	20.88
20.000	20.88	13.92	6.96	0.00	0.00
25.000	0.00	0.00	0.00	0.00	0.00
30.000	0.00	0.00	0.00	0.00	0.00
35.000	0.00	0.00	0.00	0.00	0.00
40.000	0.00	0.00	0.00	0.00	0.00
45.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Elevation-Area Volume Curve
Label: Pond 10

Return Event: 2 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ac-ft)	Volume (Total) (ac-ft)
549.02	0.0	0.000	0.000	0.000	0.000
550.00	0.0	631.360	631.360	0.005	0.005
551.00	0.0	2,555.760	4,457.397	0.034	0.039
552.00	0.0	3,448.100	8,972.448	0.069	0.108
553.00	0.0	4,144.890	11,373.466	0.087	0.195
554.00	0.0	4,902.010	13,554.482	0.104	0.298
555.00	0.0	5,713.790	15,908.158	0.122	0.420
556.00	0.0	6,650.580	18,528.785	0.142	0.562
557.00	0.0	7,628.770	21,402.253	0.164	0.726

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Requested Pond Water Surface Elevations	
Minimum (Headwater)	549.02 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	557.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	restrictor plate	Forward	cv	549.02	557.00
Culvert-Circular	cv	Forward	TW	549.02	557.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: Base Outfall

Return Event: 2 years
Storm Event:

Structure ID: cv Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	12.0 in
Length	55.00 ft
Length (Computed Barrel)	55.01 ft
Slope (Computed)	0.023 ft/ft

Outlet Control Data	
Manning's n	0.010
Ke	0.200
Kb	0.019
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.084
T2 ratio (HW/D)	1.186
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	550.10 ft	T1 Flow	2.75 ft³/s
T2 Elevation	550.21 ft	T2 Flow	3.14 ft³/s

Structure ID: restrictor plate Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	11.0 in
Length	0.02 ft
Length (Computed Barrel)	0.02 ft
Slope (Computed)	0.000 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.035
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.095
T2 ratio (HW/D)	1.197
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	550.02 ft	T1 Flow	2.21 ft^3/s
T2 Elevation	550.12 ft	T2 Flow	2.53 ft^3/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	40
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Subsection: Composite Rating Curve
Label: Base Outfall

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
549.02	0.00	(N/A)	0.00
549.12	0.03	(N/A)	0.00
549.22	0.10	(N/A)	0.00
549.32	0.21	(N/A)	0.00
549.42	0.37	(N/A)	0.00
549.52	0.55	(N/A)	0.00
549.62	0.77	(N/A)	0.00
549.72	1.01	(N/A)	0.00
549.82	1.27	(N/A)	0.00
549.92	1.54	(N/A)	0.00
550.02	1.80	(N/A)	0.00
550.12	2.05	(N/A)	0.00
550.22	2.27	(N/A)	0.00
550.32	2.48	(N/A)	0.00
550.42	2.69	(N/A)	0.00
550.52	2.89	(N/A)	0.00
550.62	3.08	(N/A)	0.00
550.72	3.27	(N/A)	0.00
550.82	3.45	(N/A)	0.00
550.92	3.59	(N/A)	0.00
551.02	3.74	(N/A)	0.00
551.12	3.88	(N/A)	0.00
551.22	4.01	(N/A)	0.00
551.32	4.14	(N/A)	0.00
551.42	4.27	(N/A)	0.00
551.52	4.39	(N/A)	0.00
551.62	4.51	(N/A)	0.00
551.72	4.63	(N/A)	0.00
551.82	4.74	(N/A)	0.00
551.92	4.85	(N/A)	0.00
552.02	4.96	(N/A)	0.00
552.12	5.07	(N/A)	0.00
552.22	5.17	(N/A)	0.00
552.32	5.27	(N/A)	0.00
552.42	5.37	(N/A)	0.00
552.52	5.47	(N/A)	0.00
552.62	5.57	(N/A)	0.00
552.72	5.65	(N/A)	0.00
552.82	5.75	(N/A)	0.00
552.92	5.84	(N/A)	0.00
553.02	5.94	(N/A)	0.00
553.12	6.03	(N/A)	0.00
553.22	6.11	(N/A)	0.00
553.32	6.20	(N/A)	0.00

Subsection: Composite Rating Curve
Label: Base Outfall

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
553.42	6.28	(N/A)	0.00
553.52	6.37	(N/A)	0.00
553.62	6.45	(N/A)	0.00
553.72	6.53	(N/A)	0.00
553.82	6.61	(N/A)	0.00
553.92	6.69	(N/A)	0.00
554.02	6.77	(N/A)	0.00
554.12	6.85	(N/A)	0.00
554.22	6.93	(N/A)	0.00
554.32	7.00	(N/A)	0.00
554.42	7.08	(N/A)	0.00
554.52	7.15	(N/A)	0.00
554.62	7.23	(N/A)	0.00
554.72	7.30	(N/A)	0.00
554.82	7.37	(N/A)	0.00
554.92	7.44	(N/A)	0.00
555.02	7.52	(N/A)	0.00
555.12	7.59	(N/A)	0.00
555.22	7.66	(N/A)	0.00
555.32	7.72	(N/A)	0.00
555.42	7.79	(N/A)	0.00
555.52	7.86	(N/A)	0.00
555.62	7.93	(N/A)	0.00
555.72	7.99	(N/A)	0.00
555.82	8.05	(N/A)	0.00
555.92	8.12	(N/A)	0.00
556.02	8.19	(N/A)	0.00
556.12	8.26	(N/A)	0.00
556.22	8.32	(N/A)	0.00
556.32	8.39	(N/A)	0.00
556.42	8.45	(N/A)	0.00
556.52	8.51	(N/A)	0.00
556.62	8.57	(N/A)	0.00
556.72	8.63	(N/A)	0.00
556.82	8.70	(N/A)	0.00
556.92	8.75	(N/A)	0.00
557.00	8.80	(N/A)	0.00

Contributing Structures
(no Q: restrictor plate,cv)
restrictor plate,cv
restrictor plate,cv
restrictor plate,cv
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restrictor plate,cv

Composite Outflow Summary

Contributing Structures
restrictor plate,cv
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Subsection: Composite Rating Curve
Label: Base Outfall

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Contributing Structures
restrictor plate,cv
restrictor plate,cv
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Subsection: Elevation-Volume-Flow Table (Pond)
Label: Pond 10

Return Event: 2 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
549.02	0.00	0.000	0.000	0.00	0.00	0.00
549.12	0.03	0.000	6.574	0.00	0.03	0.03
549.22	0.10	0.000	26.296	0.00	0.10	0.16
549.32	0.21	0.000	59.165	0.00	0.21	0.41
549.42	0.37	0.000	105.183	0.00	0.37	0.83
549.52	0.55	0.001	164.348	0.00	0.55	1.47
549.62	0.77	0.001	236.661	0.00	0.77	2.35
549.72	1.01	0.002	322.122	0.00	1.01	3.52
549.82	1.27	0.003	420.731	0.00	1.27	5.00
549.92	1.54	0.004	532.488	0.00	1.54	6.86
550.02	1.80	0.005	657.175	0.00	1.80	9.11
550.12	2.05	0.007	794.011	0.00	2.05	11.77
550.22	2.27	0.009	943.777	0.00	2.27	14.88
550.32	2.48	0.011	1,106.475	0.00	2.48	18.51
550.42	2.69	0.014	1,282.105	0.00	2.69	22.69
550.52	2.89	0.017	1,470.665	0.00	2.89	27.48
550.62	3.08	0.021	1,672.157	0.00	3.08	32.90
550.72	3.27	0.025	1,886.580	0.00	3.27	39.02
550.82	3.45	0.029	2,113.935	0.00	3.45	45.86
550.92	3.59	0.034	2,354.221	0.00	3.59	53.45
551.02	3.74	0.040	2,572.300	0.00	3.74	61.85
551.12	3.88	0.046	2,655.799	0.00	3.88	70.71
551.22	4.01	0.052	2,740.632	0.00	4.01	79.83
551.32	4.14	0.059	2,826.798	0.00	4.14	89.23
551.42	4.27	0.065	2,914.299	0.00	4.27	98.94
551.52	4.39	0.072	3,003.133	0.00	4.39	108.91
551.62	4.51	0.079	3,093.300	0.00	4.51	119.20
551.72	4.63	0.086	3,184.801	0.00	4.63	129.78
551.82	4.74	0.094	3,277.636	0.00	4.74	140.66
551.92	4.85	0.101	3,371.805	0.00	4.85	151.85
552.02	4.96	0.109	3,461.408	0.00	4.96	163.36

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 2 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
552.12	5.07	0.117	3,528.331	0.00	5.07	175.12
552.22	5.17	0.125	3,595.896	0.00	5.17	187.10
552.32	5.27	0.134	3,664.101	0.00	5.27	199.29
552.42	5.37	0.142	3,732.947	0.00	5.37	211.72
552.52	5.47	0.151	3,802.434	0.00	5.47	224.38
552.62	5.57	0.160	3,872.561	0.00	5.57	237.27
552.72	5.65	0.169	3,943.330	0.00	5.65	250.38
552.82	5.75	0.178	4,014.739	0.00	5.75	263.74
552.92	5.84	0.187	4,086.789	0.00	5.84	277.33
553.02	5.94	0.196	4,159.410	0.00	5.94	291.17
553.12	6.03	0.206	4,232.393	0.00	6.03	305.25
553.22	6.11	0.216	4,306.010	0.00	6.11	319.56
553.32	6.20	0.226	4,380.262	0.00	6.20	334.13
553.42	6.28	0.236	4,455.149	0.00	6.28	348.94
553.52	6.37	0.246	4,530.671	0.00	6.37	364.00
553.62	6.45	0.257	4,606.827	0.00	6.45	379.31
553.72	6.53	0.267	4,683.618	0.00	6.53	394.87
553.82	6.61	0.278	4,761.044	0.00	6.61	410.70
553.92	6.69	0.289	4,839.105	0.00	6.69	426.78
554.02	6.77	0.301	4,917.636	0.00	6.77	443.12
554.12	6.85	0.312	4,996.141	0.00	6.85	459.72
554.22	6.93	0.323	5,075.268	0.00	6.93	476.58
554.32	7.00	0.335	5,155.016	0.00	7.00	493.70
554.42	7.08	0.347	5,235.386	0.00	7.08	511.10
554.52	7.15	0.359	5,316.377	0.00	7.15	528.76
554.62	7.23	0.372	5,397.990	0.00	7.23	546.69
554.72	7.30	0.384	5,480.225	0.00	7.30	564.89
554.82	7.37	0.397	5,563.082	0.00	7.37	583.37
554.92	7.44	0.410	5,646.560	0.00	7.44	602.12
555.02	7.52	0.423	5,731.829	0.00	7.52	621.16
555.12	7.59	0.436	5,822.452	0.00	7.59	640.49
555.22	7.66	0.449	5,913.785	0.00	7.66	660.12
555.32	7.72	0.463	6,005.829	0.00	7.72	680.05
555.42	7.79	0.477	6,098.584	0.00	7.79	700.30
555.52	7.86	0.491	6,192.050	0.00	7.86	720.85
555.62	7.93	0.505	6,286.227	0.00	7.93	741.71
555.72	7.99	0.520	6,381.114	0.00	7.99	762.89
555.82	8.05	0.535	6,476.712	0.00	8.05	784.38
555.92	8.12	0.550	6,573.021	0.00	8.12	806.20
556.02	8.19	0.565	6,669.486	0.00	8.19	828.34
556.12	8.26	0.580	6,764.421	0.00	8.26	850.79
556.22	8.32	0.596	6,860.026	0.00	8.32	873.56
556.32	8.39	0.612	6,956.302	0.00	8.39	896.66
556.42	8.45	0.628	7,053.248	0.00	8.45	920.06
556.52	8.51	0.644	7,150.866	0.00	8.51	943.80

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 2 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
556.62	8.57	0.661	7,249.155	0.00	8.57	967.86
556.72	8.63	0.677	7,348.114	0.00	8.63	992.25
556.82	8.70	0.694	7,447.745	0.00	8.70	1,016.98
556.92	8.75	0.712	7,548.046	0.00	8.75	1,042.03
557.00	8.80	0.726	7,628.770	0.00	8.80	1,062.31

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
549.02	0.00	0.000	0.000	0.00	0.00	0.00
549.12	0.03	0.000	6.574	0.00	0.03	0.03
549.22	0.10	0.000	26.296	0.00	0.10	0.16
549.32	0.21	0.000	59.165	0.00	0.21	0.41
549.42	0.37	0.000	105.183	0.00	0.37	0.83
549.52	0.55	0.001	164.348	0.00	0.55	1.47
549.62	0.77	0.001	236.661	0.00	0.77	2.35
549.72	1.01	0.002	322.122	0.00	1.01	3.52
549.82	1.27	0.003	420.731	0.00	1.27	5.00
549.92	1.54	0.004	532.488	0.00	1.54	6.86
550.02	1.80	0.005	657.175	0.00	1.80	9.11
550.12	2.05	0.007	794.011	0.00	2.05	11.77
550.22	2.27	0.009	943.777	0.00	2.27	14.88
550.32	2.48	0.011	1,106.475	0.00	2.48	18.51
550.42	2.69	0.014	1,282.105	0.00	2.69	22.69
550.52	2.89	0.017	1,470.665	0.00	2.89	27.48
550.62	3.08	0.021	1,672.157	0.00	3.08	32.90
550.72	3.27	0.025	1,886.580	0.00	3.27	39.02
550.82	3.45	0.029	2,113.935	0.00	3.45	45.86
550.92	3.59	0.034	2,354.221	0.00	3.59	53.45
551.02	3.74	0.040	2,572.300	0.00	3.74	61.85
551.12	3.88	0.046	2,655.799	0.00	3.88	70.71
551.22	4.01	0.052	2,740.632	0.00	4.01	79.83
551.32	4.14	0.059	2,826.798	0.00	4.14	89.23
551.42	4.27	0.065	2,914.299	0.00	4.27	98.94
551.52	4.39	0.072	3,003.133	0.00	4.39	108.91
551.62	4.51	0.079	3,093.300	0.00	4.51	119.20
551.72	4.63	0.086	3,184.801	0.00	4.63	129.78
551.82	4.74	0.094	3,277.636	0.00	4.74	140.66
551.92	4.85	0.101	3,371.805	0.00	4.85	151.85
552.02	4.96	0.109	3,461.408	0.00	4.96	163.36

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 15 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
552.12	5.07	0.117	3,528.331	0.00	5.07	175.12
552.22	5.17	0.125	3,595.896	0.00	5.17	187.10
552.32	5.27	0.134	3,664.101	0.00	5.27	199.29
552.42	5.37	0.142	3,732.947	0.00	5.37	211.72
552.52	5.47	0.151	3,802.434	0.00	5.47	224.38
552.62	5.57	0.160	3,872.561	0.00	5.57	237.27
552.72	5.65	0.169	3,943.330	0.00	5.65	250.38
552.82	5.75	0.178	4,014.739	0.00	5.75	263.74
552.92	5.84	0.187	4,086.789	0.00	5.84	277.33
553.02	5.94	0.196	4,159.410	0.00	5.94	291.17
553.12	6.03	0.206	4,232.393	0.00	6.03	305.25
553.22	6.11	0.216	4,306.010	0.00	6.11	319.56
553.32	6.20	0.226	4,380.262	0.00	6.20	334.13
553.42	6.28	0.236	4,455.149	0.00	6.28	348.94
553.52	6.37	0.246	4,530.671	0.00	6.37	364.00
553.62	6.45	0.257	4,606.827	0.00	6.45	379.31
553.72	6.53	0.267	4,683.618	0.00	6.53	394.87
553.82	6.61	0.278	4,761.044	0.00	6.61	410.70
553.92	6.69	0.289	4,839.105	0.00	6.69	426.78
554.02	6.77	0.301	4,917.636	0.00	6.77	443.12
554.12	6.85	0.312	4,996.141	0.00	6.85	459.72
554.22	6.93	0.323	5,075.268	0.00	6.93	476.58
554.32	7.00	0.335	5,155.016	0.00	7.00	493.70
554.42	7.08	0.347	5,235.386	0.00	7.08	511.10
554.52	7.15	0.359	5,316.377	0.00	7.15	528.76
554.62	7.23	0.372	5,397.990	0.00	7.23	546.69
554.72	7.30	0.384	5,480.225	0.00	7.30	564.89
554.82	7.37	0.397	5,563.082	0.00	7.37	583.37
554.92	7.44	0.410	5,646.560	0.00	7.44	602.12
555.02	7.52	0.423	5,731.829	0.00	7.52	621.16
555.12	7.59	0.436	5,822.452	0.00	7.59	640.49
555.22	7.66	0.449	5,913.785	0.00	7.66	660.12
555.32	7.72	0.463	6,005.829	0.00	7.72	680.05
555.42	7.79	0.477	6,098.584	0.00	7.79	700.30
555.52	7.86	0.491	6,192.050	0.00	7.86	720.85
555.62	7.93	0.505	6,286.227	0.00	7.93	741.71
555.72	7.99	0.520	6,381.114	0.00	7.99	762.89
555.82	8.05	0.535	6,476.712	0.00	8.05	784.38
555.92	8.12	0.550	6,573.021	0.00	8.12	806.20
556.02	8.19	0.565	6,669.486	0.00	8.19	828.34
556.12	8.26	0.580	6,764.421	0.00	8.26	850.79
556.22	8.32	0.596	6,860.026	0.00	8.32	873.56
556.32	8.39	0.612	6,956.302	0.00	8.39	896.66
556.42	8.45	0.628	7,053.248	0.00	8.45	920.06
556.52	8.51	0.644	7,150.866	0.00	8.51	943.80

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 15 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
556.62	8.57	0.661	7,249.155	0.00	8.57	967.86
556.72	8.63	0.677	7,348.114	0.00	8.63	992.25
556.82	8.70	0.694	7,447.745	0.00	8.70	1,016.98
556.92	8.75	0.712	7,548.046	0.00	8.75	1,042.03
557.00	8.80	0.726	7,628.770	0.00	8.80	1,062.31

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
549.02	0.00	0.000	0.000	0.00	0.00	0.00
549.12	0.03	0.000	6.574	0.00	0.03	0.03
549.22	0.10	0.000	26.296	0.00	0.10	0.16
549.32	0.21	0.000	59.165	0.00	0.21	0.41
549.42	0.37	0.000	105.183	0.00	0.37	0.83
549.52	0.55	0.001	164.348	0.00	0.55	1.47
549.62	0.77	0.001	236.661	0.00	0.77	2.35
549.72	1.01	0.002	322.122	0.00	1.01	3.52
549.82	1.27	0.003	420.731	0.00	1.27	5.00
549.92	1.54	0.004	532.488	0.00	1.54	6.86
550.02	1.80	0.005	657.175	0.00	1.80	9.11
550.12	2.05	0.007	794.011	0.00	2.05	11.77
550.22	2.27	0.009	943.777	0.00	2.27	14.88
550.32	2.48	0.011	1,106.475	0.00	2.48	18.51
550.42	2.69	0.014	1,282.105	0.00	2.69	22.69
550.52	2.89	0.017	1,470.665	0.00	2.89	27.48
550.62	3.08	0.021	1,672.157	0.00	3.08	32.90
550.72	3.27	0.025	1,886.580	0.00	3.27	39.02
550.82	3.45	0.029	2,113.935	0.00	3.45	45.86
550.92	3.59	0.034	2,354.221	0.00	3.59	53.45
551.02	3.74	0.040	2,572.300	0.00	3.74	61.85
551.12	3.88	0.046	2,655.799	0.00	3.88	70.71
551.22	4.01	0.052	2,740.632	0.00	4.01	79.83
551.32	4.14	0.059	2,826.798	0.00	4.14	89.23
551.42	4.27	0.065	2,914.299	0.00	4.27	98.94
551.52	4.39	0.072	3,003.133	0.00	4.39	108.91
551.62	4.51	0.079	3,093.300	0.00	4.51	119.20
551.72	4.63	0.086	3,184.801	0.00	4.63	129.78
551.82	4.74	0.094	3,277.636	0.00	4.74	140.66
551.92	4.85	0.101	3,371.805	0.00	4.85	151.85
552.02	4.96	0.109	3,461.408	0.00	4.96	163.36

Subsection: Elevation-Volume-Flow Table (Pond) | Return Event: 25 years
Label: Pond 10 | Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
552.12	5.07	0.117	3,528.331	0.00	5.07	175.12
552.22	5.17	0.125	3,595.896	0.00	5.17	187.10
552.32	5.27	0.134	3,664.101	0.00	5.27	199.29
552.42	5.37	0.142	3,732.947	0.00	5.37	211.72
552.52	5.47	0.151	3,802.434	0.00	5.47	224.38
552.62	5.57	0.160	3,872.561	0.00	5.57	237.27
552.72	5.65	0.169	3,943.330	0.00	5.65	250.38
552.82	5.75	0.178	4,014.739	0.00	5.75	263.74
552.92	5.84	0.187	4,086.789	0.00	5.84	277.33
553.02	5.94	0.196	4,159.410	0.00	5.94	291.17
553.12	6.03	0.206	4,232.393	0.00	6.03	305.25
553.22	6.11	0.216	4,306.010	0.00	6.11	319.56
553.32	6.20	0.226	4,380.262	0.00	6.20	334.13
553.42	6.28	0.236	4,455.149	0.00	6.28	348.94
553.52	6.37	0.246	4,530.671	0.00	6.37	364.00
553.62	6.45	0.257	4,606.827	0.00	6.45	379.31
553.72	6.53	0.267	4,683.618	0.00	6.53	394.87
553.82	6.61	0.278	4,761.044	0.00	6.61	410.70
553.92	6.69	0.289	4,839.105	0.00	6.69	426.78
554.02	6.77	0.301	4,917.636	0.00	6.77	443.12
554.12	6.85	0.312	4,996.141	0.00	6.85	459.72
554.22	6.93	0.323	5,075.268	0.00	6.93	476.58
554.32	7.00	0.335	5,155.016	0.00	7.00	493.70
554.42	7.08	0.347	5,235.386	0.00	7.08	511.10
554.52	7.15	0.359	5,316.377	0.00	7.15	528.76
554.62	7.23	0.372	5,397.990	0.00	7.23	546.69
554.72	7.30	0.384	5,480.225	0.00	7.30	564.89
554.82	7.37	0.397	5,563.082	0.00	7.37	583.37
554.92	7.44	0.410	5,646.560	0.00	7.44	602.12
555.02	7.52	0.423	5,731.829	0.00	7.52	621.16
555.12	7.59	0.436	5,822.452	0.00	7.59	640.49
555.22	7.66	0.449	5,913.785	0.00	7.66	660.12
555.32	7.72	0.463	6,005.829	0.00	7.72	680.05
555.42	7.79	0.477	6,098.584	0.00	7.79	700.30
555.52	7.86	0.491	6,192.050	0.00	7.86	720.85
555.62	7.93	0.505	6,286.227	0.00	7.93	741.71
555.72	7.99	0.520	6,381.114	0.00	7.99	762.89
555.82	8.05	0.535	6,476.712	0.00	8.05	784.38
555.92	8.12	0.550	6,573.021	0.00	8.12	806.20
556.02	8.19	0.565	6,669.486	0.00	8.19	828.34
556.12	8.26	0.580	6,764.421	0.00	8.26	850.79
556.22	8.32	0.596	6,860.026	0.00	8.32	873.56
556.32	8.39	0.612	6,956.302	0.00	8.39	896.66
556.42	8.45	0.628	7,053.248	0.00	8.45	920.06
556.52	8.51	0.644	7,150.866	0.00	8.51	943.80

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 25 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
556.62	8.57	0.661	7,249.155	0.00	8.57	967.86
556.72	8.63	0.677	7,348.114	0.00	8.63	992.25
556.82	8.70	0.694	7,447.745	0.00	8.70	1,016.98
556.92	8.75	0.712	7,548.046	0.00	8.75	1,042.03
557.00	8.80	0.726	7,628.770	0.00	8.80	1,062.31

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
549.02	0.00	0.000	0.000	0.00	0.00	0.00
549.12	0.03	0.000	6.574	0.00	0.03	0.03
549.22	0.10	0.000	26.296	0.00	0.10	0.16
549.32	0.21	0.000	59.165	0.00	0.21	0.41
549.42	0.37	0.000	105.183	0.00	0.37	0.83
549.52	0.55	0.001	164.348	0.00	0.55	1.47
549.62	0.77	0.001	236.661	0.00	0.77	2.35
549.72	1.01	0.002	322.122	0.00	1.01	3.52
549.82	1.27	0.003	420.731	0.00	1.27	5.00
549.92	1.54	0.004	532.488	0.00	1.54	6.86
550.02	1.80	0.005	657.175	0.00	1.80	9.11
550.12	2.05	0.007	794.011	0.00	2.05	11.77
550.22	2.27	0.009	943.777	0.00	2.27	14.88
550.32	2.48	0.011	1,106.475	0.00	2.48	18.51
550.42	2.69	0.014	1,282.105	0.00	2.69	22.69
550.52	2.89	0.017	1,470.665	0.00	2.89	27.48
550.62	3.08	0.021	1,672.157	0.00	3.08	32.90
550.72	3.27	0.025	1,886.580	0.00	3.27	39.02
550.82	3.45	0.029	2,113.935	0.00	3.45	45.86
550.92	3.59	0.034	2,354.221	0.00	3.59	53.45
551.02	3.74	0.040	2,572.300	0.00	3.74	61.85
551.12	3.88	0.046	2,655.799	0.00	3.88	70.71
551.22	4.01	0.052	2,740.632	0.00	4.01	79.83
551.32	4.14	0.059	2,826.798	0.00	4.14	89.23
551.42	4.27	0.065	2,914.299	0.00	4.27	98.94
551.52	4.39	0.072	3,003.133	0.00	4.39	108.91
551.62	4.51	0.079	3,093.300	0.00	4.51	119.20
551.72	4.63	0.086	3,184.801	0.00	4.63	129.78
551.82	4.74	0.094	3,277.636	0.00	4.74	140.66
551.92	4.85	0.101	3,371.805	0.00	4.85	151.85
552.02	4.96	0.109	3,461.408	0.00	4.96	163.36

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
552.12	5.07	0.117	3,528.331	0.00	5.07	175.12
552.22	5.17	0.125	3,595.896	0.00	5.17	187.10
552.32	5.27	0.134	3,664.101	0.00	5.27	199.29
552.42	5.37	0.142	3,732.947	0.00	5.37	211.72
552.52	5.47	0.151	3,802.434	0.00	5.47	224.38
552.62	5.57	0.160	3,872.561	0.00	5.57	237.27
552.72	5.65	0.169	3,943.330	0.00	5.65	250.38
552.82	5.75	0.178	4,014.739	0.00	5.75	263.74
552.92	5.84	0.187	4,086.789	0.00	5.84	277.33
553.02	5.94	0.196	4,159.410	0.00	5.94	291.17
553.12	6.03	0.206	4,232.393	0.00	6.03	305.25
553.22	6.11	0.216	4,306.010	0.00	6.11	319.56
553.32	6.20	0.226	4,380.262	0.00	6.20	334.13
553.42	6.28	0.236	4,455.149	0.00	6.28	348.94
553.52	6.37	0.246	4,530.671	0.00	6.37	364.00
553.62	6.45	0.257	4,606.827	0.00	6.45	379.31
553.72	6.53	0.267	4,683.618	0.00	6.53	394.87
553.82	6.61	0.278	4,761.044	0.00	6.61	410.70
553.92	6.69	0.289	4,839.105	0.00	6.69	426.78
554.02	6.77	0.301	4,917.636	0.00	6.77	443.12
554.12	6.85	0.312	4,996.141	0.00	6.85	459.72
554.22	6.93	0.323	5,075.268	0.00	6.93	476.58
554.32	7.00	0.335	5,155.016	0.00	7.00	493.70
554.42	7.08	0.347	5,235.386	0.00	7.08	511.10
554.52	7.15	0.359	5,316.377	0.00	7.15	528.76
554.62	7.23	0.372	5,397.990	0.00	7.23	546.69
554.72	7.30	0.384	5,480.225	0.00	7.30	564.89
554.82	7.37	0.397	5,563.082	0.00	7.37	583.37
554.92	7.44	0.410	5,646.560	0.00	7.44	602.12
555.02	7.52	0.423	5,731.829	0.00	7.52	621.16
555.12	7.59	0.436	5,822.452	0.00	7.59	640.49
555.22	7.66	0.449	5,913.785	0.00	7.66	660.12
555.32	7.72	0.463	6,005.829	0.00	7.72	680.05
555.42	7.79	0.477	6,098.584	0.00	7.79	700.30
555.52	7.86	0.491	6,192.050	0.00	7.86	720.85
555.62	7.93	0.505	6,286.227	0.00	7.93	741.71
555.72	7.99	0.520	6,381.114	0.00	7.99	762.89
555.82	8.05	0.535	6,476.712	0.00	8.05	784.38
555.92	8.12	0.550	6,573.021	0.00	8.12	806.20
556.02	8.19	0.565	6,669.486	0.00	8.19	828.34
556.12	8.26	0.580	6,764.421	0.00	8.26	850.79
556.22	8.32	0.596	6,860.026	0.00	8.32	873.56
556.32	8.39	0.612	6,956.302	0.00	8.39	896.66
556.42	8.45	0.628	7,053.248	0.00	8.45	920.06
556.52	8.51	0.644	7,150.866	0.00	8.51	943.80

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
556.62	8.57	0.661	7,249.155	0.00	8.57	967.86
556.72	8.63	0.677	7,348.114	0.00	8.63	992.25
556.82	8.70	0.694	7,447.745	0.00	8.70	1,016.98
556.92	8.75	0.712	7,548.046	0.00	8.75	1,042.03
557.00	8.80	0.726	7,628.770	0.00	8.80	1,062.31

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	8.20 ft³/s	Time to Peak (Flow, In)	3.000 min
Flow (Peak Outlet)	4.96 ft³/s	Time to Peak (Flow, Outlet)	21.000 min

Elevation (Water Surface, Peak)	552.02 ft
Volume (Peak)	0.109 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.226 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.226 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: Pond 10 (IN)

Return Event: 15 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	13.22 ft³/s	Time to Peak (Flow, In)	3.000 min
Flow (Peak Outlet)	6.15 ft³/s	Time to Peak (Flow, Outlet)	22.000 min

Elevation (Water Surface, Peak)	553.26 ft
Volume (Peak)	0.220 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.364 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.364 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	16.32 ft³/s	Time to Peak (Flow, In)	3.000 min
Flow (Peak Outlet)	6.72 ft³/s	Time to Peak (Flow, Outlet)	22.000 min

Elevation (Water Surface, Peak)	553.95 ft
Volume (Peak)	0.293 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.450 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.450 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: Pond 10 (IN)

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	549.02 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	20.88 ft³/s	Time to Peak (Flow, In)	3.000 min
Flow (Peak Outlet)	7.40 ft³/s	Time to Peak (Flow, Outlet)	22.000 min

Elevation (Water Surface, Peak)	554.87 ft
Volume (Peak)	0.402 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.575 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.575 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Peak Discharge	4.96 ft³/s
Time to Peak	21.000 min
Hydrograph Volume	0.226 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	0.85	1.81	2.52	3.00
5.000	3.32	3.54	3.71	3.86	3.99
10.000	4.10	4.21	4.31	4.40	4.49
15.000	4.58	4.66	4.73	4.80	4.86
20.000	4.93	4.96	4.95	4.88	4.79
25.000	4.69	4.59	4.48	4.38	4.28
30.000	4.16	4.05	3.93	3.81	3.68
35.000	3.56	3.41	3.22	3.02	2.78
40.000	2.53	2.23	1.88	1.43	0.96
45.000	0.52	0.16	0.00	(N/A)	(N/A)

Subsection: Pond Routed Hydrograph (total out) Return Event: 15 years
Label: Pond 10 (OUT) Storm Event:

Peak Discharge	6.15 ft³/s
Time to Peak	22.000 min
Hydrograph Volume	0.364 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	1.16	2.30	3.08	3.59
5.000	3.91	4.16	4.39	4.60	4.78
10.000	4.93	5.09	5.23	5.36	5.48
15.000	5.59	5.70	5.80	5.90	6.00
20.000	6.09	6.14	6.15	6.10	6.03
25.000	5.95	5.87	5.80	5.72	5.63
30.000	5.56	5.47	5.39	5.30	5.22
35.000	5.13	5.04	4.94	4.85	4.76
40.000	4.66	4.56	4.45	4.35	4.24
45.000	4.12	4.01	3.90	3.77	3.64
50.000	3.51	3.35	3.16	2.95	2.71
55.000	2.44	2.13	1.74	1.28	0.82
60.000	0.40	0.07	0.00	(N/A)	(N/A)

Peak Discharge	6.72 ft³/s
Time to Peak	22.000 min
Hydrograph Volume	0.450 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	1.33	2.51	3.33	3.83
5.000	4.18	4.48	4.74	4.96	5.16
10.000	5.35	5.51	5.67	5.82	5.96
15.000	6.08	6.21	6.32	6.43	6.53
20.000	6.63	6.70	6.72	6.68	6.61
25.000	6.54	6.47	6.41	6.34	6.26
30.000	6.19	6.12	6.05	5.97	5.89
35.000	5.81	5.74	5.65	5.57	5.49
40.000	5.41	5.32	5.24	5.15	5.06
45.000	4.96	4.87	4.78	4.68	4.58
50.000	4.47	4.37	4.27	4.15	4.04
55.000	3.93	3.80	3.67	3.54	3.39
60.000	3.21	3.00	2.77	2.51	2.21
65.000	1.85	1.39	0.92	0.49	0.13
70.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	7.40 ft³/s
Time to Peak	22.000 min
Hydrograph Volume	0.575 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	1.55	2.77	3.60	4.13
5.000	4.54	4.88	5.17	5.42	5.65
10.000	5.86	6.05	6.23	6.39	6.54
15.000	6.69	6.82	6.95	7.08	7.19
20.000	7.30	7.38	7.40	7.37	7.32
25.000	7.26	7.20	7.14	7.08	7.02
30.000	6.95	6.89	6.83	6.76	6.70
35.000	6.63	6.56	6.50	6.43	6.36
40.000	6.29	6.22	6.14	6.07	6.00
45.000	5.92	5.84	5.76	5.68	5.60
50.000	5.52	5.43	5.35	5.26	5.18
55.000	5.09	4.99	4.90	4.81	4.72
60.000	4.62	4.51	4.40	4.30	4.19
65.000	4.07	3.96	3.84	3.72	3.59
70.000	3.45	3.27	3.07	2.85	2.59
75.000	2.31	1.97	1.55	1.07	0.62
80.000	0.24	0.00	0.00	(N/A)	(N/A)

Summary for Hydrograph Addition at 'Pond 10'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	0.226	3.000	8.20
Flow (In)	Pond 10	0.226	3.000	8.20

Summary for Hydrograph Addition at 'Pond 10'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	0.364	3.000	13.22
Flow (In)	Pond 10	0.364	3.000	13.22

Summary for Hydrograph Addition at 'Pond 10'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	0.450	3.000	16.32
Flow (In)	Pond 10	0.450	3.000	16.32

Summary for Hydrograph Addition at 'Pond 10'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	0.575	3.000	20.88
Flow (In)	Pond 10	0.575	3.000	20.88

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Hyd Queue 10	Watershed - 100 LFB	0	0.575	3.000	20.88

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Out 10	Watershed - 100 LFB	0	0.575	20.000	20.88

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond 10 (IN)	Watershed - 100 LFB	0	0.575	3.000	20.88	(N/A)	(N/A)
Pond 10 (OUT)	Watershed - 100 LFB	0	0.575	20.000	20.88	555.68	0.513

Peak Discharge	20.88 ft³/s
Time to Peak	17.000 min
Hydrograph Volume	0.575 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	6.96	13.92	20.88	20.88
5.000	20.88	20.88	20.88	20.88	20.88
10.000	20.88	20.88	20.88	20.88	20.88
15.000	20.88	20.88	20.88	20.88	20.88
20.000	20.88	13.92	6.96	0.00	0.00
25.000	0.00	0.00	0.00	0.00	0.00
30.000	0.00	0.00	0.00	0.00	0.00
35.000	0.00	0.00	0.00	0.00	0.00
40.000	0.00	0.00	0.00	0.00	0.00
45.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Individual Outlet Curves
Label: Low Flow Blocked

Return Event: 100 years
Storm Event:

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Rectangular Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
549.02	0.00	(N/A)	0.00
549.12	0.00	(N/A)	0.00
549.22	0.00	(N/A)	0.00
549.32	0.00	(N/A)	0.00
549.42	0.00	(N/A)	0.00
549.52	0.00	(N/A)	0.00
549.62	0.00	(N/A)	0.00
549.72	0.00	(N/A)	0.00
549.82	0.00	(N/A)	0.00
549.92	0.00	(N/A)	0.00
550.02	0.00	(N/A)	0.00
550.12	0.00	(N/A)	0.00
550.22	0.00	(N/A)	0.00
550.32	0.00	(N/A)	0.00
550.42	0.00	(N/A)	0.00
550.52	0.00	(N/A)	0.00
550.62	0.00	(N/A)	0.00
550.72	0.00	(N/A)	0.00
550.82	0.00	(N/A)	0.00
550.92	0.00	(N/A)	0.00
551.02	0.00	(N/A)	0.00
551.12	0.00	(N/A)	0.00
551.22	0.00	(N/A)	0.00
551.32	0.00	(N/A)	0.00
551.42	0.00	(N/A)	0.00
551.52	0.00	(N/A)	0.00
551.62	0.00	(N/A)	0.00
551.72	0.00	(N/A)	0.00
551.82	0.00	(N/A)	0.00
551.92	0.00	(N/A)	0.00
552.02	0.00	(N/A)	0.00
552.12	0.00	(N/A)	0.00
552.22	0.00	(N/A)	0.00
552.32	0.00	(N/A)	0.00
552.42	0.00	(N/A)	0.00
552.52	0.00	(N/A)	0.00
552.62	0.00	(N/A)	0.00
552.72	0.00	(N/A)	0.00
552.82	0.00	(N/A)	0.00

Subsection: Individual Outlet Curves
Label: Low Flow Blocked

Return Event: 100 years
Storm Event:

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Rectangular Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
552.92	0.00	(N/A)	0.00
553.02	0.00	(N/A)	0.00
553.12	0.00	(N/A)	0.00
553.22	0.00	(N/A)	0.00
553.32	0.00	(N/A)	0.00
553.42	0.00	(N/A)	0.00
553.52	0.00	(N/A)	0.00
553.62	0.00	(N/A)	0.00
553.72	0.00	(N/A)	0.00
553.82	0.00	(N/A)	0.00
553.92	0.00	(N/A)	0.00
554.02	0.00	(N/A)	0.00
554.12	0.00	(N/A)	0.00
554.22	0.00	(N/A)	0.00
554.32	0.00	(N/A)	0.00
554.42	0.00	(N/A)	0.00
554.52	0.00	(N/A)	0.00
554.62	0.00	(N/A)	0.00
554.72	0.00	(N/A)	0.00
554.82	0.00	(N/A)	0.00
554.92	0.00	(N/A)	0.00
555.02	0.00	(N/A)	0.00
555.12	0.00	(N/A)	0.00
555.22	0.00	(N/A)	0.00
555.30	0.00	(N/A)	0.00
555.32	0.25	(N/A)	0.00
555.42	3.74	(N/A)	0.00
555.52	9.29	(N/A)	0.00
555.62	16.29	(N/A)	0.00
555.72	24.50	(N/A)	0.00
555.82	33.75	(N/A)	0.00
555.92	43.94	(N/A)	0.00
556.02	54.98	(N/A)	0.00
556.12	66.83	(N/A)	0.00
556.22	79.42	(N/A)	0.00
556.32	92.71	(N/A)	0.00
556.42	106.68	(N/A)	0.00
556.52	121.28	(N/A)	0.00
556.62	136.49	(N/A)	0.00

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RATING TABLE FOR ONE OUTLET TYPE
Structure  ID  = Weir - 1  (Rectangular Weir)
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Upstream   ID  =    (Pond Water Surface)
Downstream ID  = Tailwater (Pond Outfall)
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Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
556.72	152.29	(N/A)	0.00
556.82	168.66	(N/A)	0.00
556.92	185.57	(N/A)	0.00
557.00	199.49	(N/A)	0.00

Computation Messages
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
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HW & TW below Inv.El.=555.300

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Rectangular Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
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HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
HW & TW below Inv.El.=555.300
H=.00; Htw=.00; Qfree=.00;
H=.02; Htw=.00; Qfree=.25;
H=.12; Htw=.00; Qfree=3.74;
H=.22; Htw=.00; Qfree=9.29;
H=.32; Htw=.00; Qfree=16.29;
H=.42; Htw=.00; Qfree=24.50;
H=.52; Htw=.00; Qfree=33.75;
H=.62; Htw=.00; Qfree=43.94;
H=.72; Htw=.00; Qfree=54.98;
H=.82; Htw=.00; Qfree=66.83;
H=.92; Htw=.00; Qfree=79.42;
H=1.02; Htw=.00; Qfree=92.71;

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Rectangular Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
H=1.12; Htw=.00; Qfree=106.68;
H=1.22; Htw=.00; Qfree=121.28;
H=1.32; Htw=.00; Qfree=136.49;
H=1.42; Htw=.00; Qfree=152.29;
H=1.52; Htw=.00; Qfree=168.66;
H=1.62; Htw=.00; Qfree=185.57;
H=1.70; Htw=.00; Qfree=199.49;

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	555.30 ft
Volume (Initial)	0.460 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
549.02	0.00	0.000	0.000	0.00	0.00	0.00
549.12	0.00	0.000	6.574	0.00	0.00	0.01
549.22	0.00	0.000	26.296	0.00	0.00	0.06
549.32	0.00	0.000	59.165	0.00	0.00	0.20
549.42	0.00	0.000	105.183	0.00	0.00	0.47
549.52	0.00	0.001	164.348	0.00	0.00	0.91
549.62	0.00	0.001	236.661	0.00	0.00	1.58
549.72	0.00	0.002	322.122	0.00	0.00	2.51
549.82	0.00	0.003	420.731	0.00	0.00	3.74
549.92	0.00	0.004	532.488	0.00	0.00	5.32
550.02	0.00	0.005	657.175	0.00	0.00	7.30
550.12	0.00	0.007	794.011	0.00	0.00	9.72
550.22	0.00	0.009	943.777	0.00	0.00	12.61
550.32	0.00	0.011	1,106.475	0.00	0.00	16.03
550.42	0.00	0.014	1,282.105	0.00	0.00	20.00
550.52	0.00	0.017	1,470.665	0.00	0.00	24.59
550.62	0.00	0.021	1,672.157	0.00	0.00	29.82
550.72	0.00	0.025	1,886.580	0.00	0.00	35.75
550.82	0.00	0.029	2,113.935	0.00	0.00	42.41
550.92	0.00	0.034	2,354.221	0.00	0.00	49.86
551.02	0.00	0.040	2,572.300	0.00	0.00	58.11
551.12	0.00	0.046	2,655.799	0.00	0.00	66.82
551.22	0.00	0.052	2,740.632	0.00	0.00	75.82
551.32	0.00	0.059	2,826.798	0.00	0.00	85.10
551.42	0.00	0.065	2,914.299	0.00	0.00	94.66
551.52	0.00	0.072	3,003.133	0.00	0.00	104.53
551.62	0.00	0.079	3,093.300	0.00	0.00	114.69
551.72	0.00	0.086	3,184.801	0.00	0.00	125.15
551.82	0.00	0.094	3,277.636	0.00	0.00	135.92
551.92	0.00	0.101	3,371.805	0.00	0.00	147.00
552.02	0.00	0.109	3,461.408	0.00	0.00	158.40

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
552.12	0.00	0.117	3,528.331	0.00	0.00	170.05
552.22	0.00	0.125	3,595.896	0.00	0.00	181.92
552.32	0.00	0.134	3,664.101	0.00	0.00	194.02
552.42	0.00	0.142	3,732.947	0.00	0.00	206.35
552.52	0.00	0.151	3,802.434	0.00	0.00	218.91
552.62	0.00	0.160	3,872.561	0.00	0.00	231.70
552.72	0.00	0.169	3,943.330	0.00	0.00	244.73
552.82	0.00	0.178	4,014.739	0.00	0.00	257.99
552.92	0.00	0.187	4,086.789	0.00	0.00	271.49
553.02	0.00	0.196	4,159.410	0.00	0.00	285.24
553.12	0.00	0.206	4,232.393	0.00	0.00	299.22
553.22	0.00	0.216	4,306.010	0.00	0.00	313.45
553.32	0.00	0.226	4,380.262	0.00	0.00	327.93
553.42	0.00	0.236	4,455.149	0.00	0.00	342.65
553.52	0.00	0.246	4,530.671	0.00	0.00	357.63
553.62	0.00	0.257	4,606.827	0.00	0.00	372.86
553.72	0.00	0.267	4,683.618	0.00	0.00	388.34
553.82	0.00	0.278	4,761.044	0.00	0.00	404.08
553.92	0.00	0.289	4,839.105	0.00	0.00	420.08
554.02	0.00	0.301	4,917.636	0.00	0.00	436.35
554.12	0.00	0.312	4,996.141	0.00	0.00	452.87
554.22	0.00	0.323	5,075.268	0.00	0.00	469.65
554.32	0.00	0.335	5,155.016	0.00	0.00	486.70
554.42	0.00	0.347	5,235.386	0.00	0.00	504.02
554.52	0.00	0.359	5,316.377	0.00	0.00	521.61
554.62	0.00	0.372	5,397.990	0.00	0.00	539.46
554.72	0.00	0.384	5,480.225	0.00	0.00	557.59
554.82	0.00	0.397	5,563.082	0.00	0.00	576.00
554.92	0.00	0.410	5,646.560	0.00	0.00	594.68
555.02	0.00	0.423	5,731.829	0.00	0.00	613.65
555.12	0.00	0.436	5,822.452	0.00	0.00	632.90
555.22	0.00	0.449	5,913.785	0.00	0.00	652.46
555.30	0.00	0.460	5,987.364	0.00	0.00	668.33
555.32	0.25	0.463	6,005.829	0.00	0.25	672.58
555.42	3.74	0.477	6,098.584	0.00	3.74	696.24
555.52	9.29	0.491	6,192.050	0.00	9.29	722.27
555.62	16.29	0.505	6,286.227	0.00	16.29	750.07
555.72	24.50	0.520	6,381.114	0.00	24.50	779.39
555.82	33.75	0.535	6,476.712	0.00	33.75	810.07
555.92	43.94	0.550	6,573.021	0.00	43.94	842.01
556.02	54.98	0.565	6,669.486	0.00	54.98	875.13
556.12	66.83	0.580	6,764.421	0.00	66.83	909.36
556.22	79.42	0.596	6,860.026	0.00	79.42	944.66
556.32	92.71	0.612	6,956.302	0.00	92.71	980.98
556.42	106.68	0.628	7,053.248	0.00	106.68	1,018.29

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: Pond 10 Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
556.52	121.28	0.644	7,150.866	0.00	121.28	1,056.57
556.62	136.49	0.661	7,249.155	0.00	136.49	1,095.78
556.72	152.29	0.677	7,348.114	0.00	152.29	1,135.91
556.82	168.66	0.694	7,447.745	0.00	168.66	1,176.94
556.92	185.57	0.712	7,548.046	0.00	185.57	1,218.85
557.00	199.49	0.726	7,628.770	0.00	199.49	1,253.00

Subsection: Level Pool Pond Routing Summary
Label: Pond 10 (IN)

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	555.30 ft
Volume (Initial)	0.460 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	20.88 ft³/s	Time to Peak (Flow, In)	3.000 min
Flow (Peak Outlet)	20.88 ft³/s	Time to Peak (Flow, Outlet)	20.000 min

Elevation (Water Surface, Peak)	555.68 ft
Volume (Peak)	0.513 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.460 ac-ft
Volume (Total Inflow)	0.575 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.575 ac-ft
Volume (Retained)	0.460 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Peak Discharge	20.88 ft³/s
Time to Peak	20.000 min
Hydrograph Volume	0.575 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	0.65	3.54	9.37	15.17
5.000	18.24	19.72	20.37	20.65	20.78
10.000	20.84	20.86	20.87	20.88	20.88
15.000	20.88	20.88	20.88	20.88	20.88
20.000	20.88	18.93	14.39	8.95	5.14
25.000	3.19	2.25	1.59	1.12	0.79
30.000	0.56	0.39	0.28	0.23	0.20
35.000	0.18	0.16	0.14	0.12	0.11
40.000	0.09	0.08	0.07	0.06	0.06
45.000	0.05	0.04	0.04	0.03	0.03
50.000	0.03	0.02	0.02	0.02	0.02
55.000	0.01	0.01	0.01	0.01	0.01
60.000	0.01	0.01	0.01	0.01	0.00
65.000	0.00	0.00	0.00	0.00	0.00
70.000	0.00	0.00	0.00	0.00	0.00
75.000	0.00	0.00	(N/A)	(N/A)	(N/A)

Summary for Hydrograph Addition at 'Pond 10'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	0.575	3.000	20.88
Flow (In)	Pond 10	0.575	3.000	20.88

Index

Appendix C

-Predeveloped Drainage Area Map
-Postdeveloped Drainage Area Map
-Basin Inflow Drainage Area Map

GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

PROPERTY N/F
H AND K MACHINE SERVICE COMPANY INC.
924/117
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

PROGRESS WEST LANE
(55' WIDE-PUBLIC P.B. 27 G. 35)

SITE BENCHMARK
TOP OF FOUND IRON PIPE
ELEV.=560.79

SITE BENCHMARK
TOP OF FOUND IRON PIPE
ELEV.=563.64

CURB INLET
TOP=562.99
FL=558.45

OFFSITE TO ONSITE
0.32 ac. @3.85
Q = 1.23 c.f.s.

N87°12'58"E 590.28'

0.19 ac. @ 1.87
0.08 ac. @ 3.85
Q = 0.66 c.f.s.

0.37 ac. @3.85
Q = 1.42 c.f.s.

ONSITE TO OFFSITE
0.05 ac. @ 1.87
0.02 ac. @ 3.85
Q = 0.17 c.f.s.

0.02 ac. @3.85
Q = 0.08 c.f.s.

0.18 ac. @ 1.87
0.40 ac. @ 3.85
Q = 1.88 c.f.s.

1.68 ac. @ 1.87
0.36 ac. @ 3.85
Q = 4.53 c.f.s.

0.37 ac. @3.85
Q = 1.42 c.f.s.

0.02 ac. @3.85
Q = 0.08 c.f.s.

0.28 ac. @1.87
Q = 0.52 c.f.s.

OFFSITE TO ONSITE
0.13 ac. @1.87
Q = 0.24 c.f.s.

ONSITE TO OFFSITE
0.05 ac. @1.87
Q = 0.09 c.f.s.

OFFSITE TO ONSITE
0.10 ac. @1.87
Q = 0.19 c.f.s.

LOT 1
PROGRESS WEST
INDUSTRIAL PARK
P.B. 27, PG. 35
AREA=4.07 ACRES

PROPERTY N/F
CITY OF O'FALLON
924/117
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

N52°30'13"E 234.45'

N75°00'35"W 525.64'

S89°09'42"W 35.15'

S87°12'58"W 247.32'

S02°47'02"E 295.16'

LOT 2
PROGRESS WEST
INDUSTRIAL PARK
P.B. 27, PG. 35

PROPERTY N/F
NOAH DANIEL III & TERESA
6294/1286
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

LOT 13
RESUBDIVISION OF CHARLESTOWN
WEST INDUSTRIAL PARK
P.B. 23, PG. 25

PROPERTY N/F
BOGLE, JEROME A & PAMELA
6485/718
CITY OF O'FALLON
ZONED: I-1 LIGHT INDUSTRIAL

NORFOLK AND WESTERN RAILROAD

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PROJECT TITLE:
RENOVATIONS FOR THE CITY OF O'FALLON ENVIRONMENTAL SERVICES BUILDING

Bax Project # 06-157142A Issue Date: 07/22/2016

ENGINEERING
PLANNING
SURVEYING
221 Point West Blvd.
St. Charles, MO 63301
636-928-5552
FAX 928-1718

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Larry D. Walker
Civil Engineer
Engineer License No. 2007020343

REVISIONS

Developer / Owner:
CITY OF O'FALLON
100 N. MAIN STREET
O'FALLON, MO 63366
636-379-5513

EXISTING DRAINAGE AREA MAP

P+Z No.
#05-11.01
Approved 06-02-16

City No.
#

Page No.
7 of 10

GRAPHIC SCALE

30 0 15 30

(IN FEET)
1 inch = 30 ft.

PROPERTY N/F
H AND K MACHINE SERVICE COMPANY INC.
924/117
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

PROGRESS WEST LANE
(55' WIDE-PUBLIC P.B. 27 G. 35)

N87°12'58"E 590.28'

PROPERTY N/F
CITY OF O'FALLON
924/117
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

N52°30'13"E 234.45'

PROGRESS WEST INDUSTRIAL PARK
P.B. 27, PG. 35
AREA=4.07 ACRES

1550 PROGRESS WEST LANE

LOT 2
PROGRESS WEST
INDUSTRIAL PARK
P.B. 27, PG. 35

PROPERTY N/F
NOAH DANIEL III & TERESA
6294/1286
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

S02°47'02"E 295.16'

N75°00'35"W 525.64'

NORFOLK AND WESTERN RAILROAD

S89°09'44"W 35.15'

S87°12'58"W 247.32'

LOT 13
RESUBDIVISION OF CHARLESTOWN
WEST INDUSTRIAL PARK
P.B. 23, PG. 25

PROPERTY N/F
BOGLE, JEROME A & PAMELA
6485/718
CITY OF O'FALLON
ZONED: I-1 LIGHT INDUSTRIAL

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PROJECT TITLE:
RENOVATIONS FOR THE CITY OF O'FALLON ENVIRONMENTAL SERVICES BUILDING

Bax Project # 06-137.42A Issue Date: 07/22/2016

ENGINEERING
PLANNING
SURVEYING
221 Point West Blvd.
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Larry D. Walker
Civil Engineer
Engineer License No. 2007020343

REVISIONS

PROPOSED DRAINAGE AREA MAP

Developer / Owner:
CITY OF O'FALLON
100 N. MAIN STREET
O'FALLON, MO 63366
636-379-5513

P+Z No.
#05-11.01
Approved 06-02-16

City No.
#

EXHIBIT 1
BASIN INFLOW
RENOVATIONS FOR THE CITY OF O'FALLON
ENVIRONMENTAL SERVICES BUILDING
06-13742A

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

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221 Point West Blvd.
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636-928-5552
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PROPERTY N/F
H AND K MACHINE SERVICE COMPANY INC.
924/117
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

PROGRESS WEST LANE
(55' WIDE-PUBLIC P.B. 27 G. 35)

N87°12'58"E 590.28'

SITE BENCHMARK
TOP OF FOUND IRON PIPE
ELEV=560.79

SITE BENCHMARK
TOP OF FOUND IRON PIPE
ELEV=563.64

CURB INLET
TOP=562.99
FL=558.49

SILTATION CONTROL (TYP)

9½' WIDE CONCRETE PAVEMENT W/ ROLLED CONCRETE CURBS

12" NYLOPLAST BASIN W/ 8" DOME GRATE
TOP=563.00
FL=559.40

100'~10" PVC

8" DOME GRATE
TOP=563.00
FL=560.40

80'~10" PVC

8" DOME GRATE
TOP=563.20
FL=561.20

52'~8" PVC
CLEANOUT
TOP=564.15
FL=561.72

GAS LINE AS MARKED
WATER LINE AS MARKED
BURIED TELEPHONE LINE AS MARKED
MAILBOX
WATER METER

PROPERTY N/F
CITY OF O'FALLON
924/117
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

FLARED END
12" CONC
FL=551.63

234.45'

25' WIRE FENCE

NEW TREELINE

30' BUILDING SETBACK (I-2 ZONING)

72" CHAIN LINK FENCE

6" RCP

222.26'~12" PVC DRAIN TO CONNECT DOWNSPOUTS

CONCRETE

RIPRAP

NEW 30' BUILDING SETBACK

BASIN INFLOW
1.37 ac. @ 1.87
2.77 ac. @ 3.85
Q = 13.23c.f.s.

RETAINING WALL W/FENCE

LOT 1
PROGRESS WEST
INDUSTRIAL PARK
P.B. 27, PG. 35
AREA=4.07 ACRES

1 STORY METAL BUILDING
FF=564.9

1550 PROGRESS WEST LANE

NEW OVERHEAD DOOR
NEW OVERHEAD DOOR
NEW MAN DOOR
OVERHEAD DOOR/DOCK
OVERHEAD DOOR/DOCK
OVERHEAD DOOR/DOCK

NEW OVERHEAD DOOR
56.10'~6" PVC
NEW OVERHEAD DOOR
NEW MAN DOOR

4" PIPE BOLLARD (CLEANOUT GUARD)

4.43'~6" PVC
CLEANOUT
TOP=564.65
FL=562.30
NEW MAN DOOR

STEEL PLATE TO BE INSTALLED AT END OF EX. PIPE TO MODIFY OPENING (SEE DETAIL)

FL=551.63

FE TOT

RIPRAP

END OF PIPE
FL=549.02

END OF PIPE
FL=547.71

MISSOURI-EDISON EASEMENT LINE

60' BUILDING SETBACK (I-2 ZONING)

N75°00'35"W

525.64'

OVERHEAD UTILITY LINE

10' PARKING SETBACK

NORFOLK AND WESTERN RAILROAD

GI 102

UTILITY POLE

GUY WIRE

DOOR

NEW OVERHEAD DOOR

DOOR

DOWNSPOUT (TYP)

HVAC UNITS

2' SLOT IN CURB FOR DRAINAGE

S20°47'02"E

295.16'

LOT 2
PROGRESS WEST
INDUSTRIAL PARK
P.B. 27, PG. 35

PROPERTY N/F
NOAH, DANIEL III & TERESA
6294/1286
CITY OF O'FALLON
ZONED: I-2 HEAVY INDUSTRIAL

25' BUILDING SETBACK (I-2 ZONING)

NEW TREELINE

REMAINS OF WIRE FENCE

10' PARKING SETBACK

Ø EASEMENT P.B. 27, PG. 35

S87°12'58"W 247.32'

LOT 13
RESUBDIVISION OF CHARLESTOWN
WEST INDUSTRIAL PARK
P.B. 23, PG. 25

PROPERTY N/F
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SILTATION CONTROL (TYP)

S89°09'44"W
35.15'

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