

CITY OF O'FALLON
COMMUNITY DEVELOPMENT DEPARTMENT
ACCEPTED FOR CONSTRUCTION
BY: [Signature] DATE: 12/14/11
PROFESSIONAL ENGINEER'S SEAL
INDICATES RESPONSIBILITY FOR DESIGN

ASBUILT STORMWATER ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MIDDLE SCHOOL WENTZVILLE SCHOOL DISTRICT
CITY OF O'FALLON
BAX PROJECT NO. 03-12495
May 26, 2009
December 1, 2011 ASBUILT

INTRODUCTION

The existing Middle School is located on a tract of land lies just to the west of the intersection of Sommers Road and State Highway DD. The tract of land contains approximately 25.36 acres. The accompanying plan shows the proposed addition of the track which will cause an increase in the runoff for the northern watershed (watershed A from the original detention report). The Basin in the North of the site shall be modified to attenuate the additional runoff from the proposed additions. This basin will provide detention for the development when considering the increased runoff for the site as required by City of O'Fallon. The storage volume and outflow rates shall be proportioned to insure that the peak rate of runoff leaving the site under post-developed conditions is less than the peak rate of runoff leaving the site under pre-developed conditions for the required design storms. The basin is designed for the 2-year, 15-year, 25-year, and the pass the 100-year 20-minute design storms. **Results that vary from the original basin design are shown in red.**

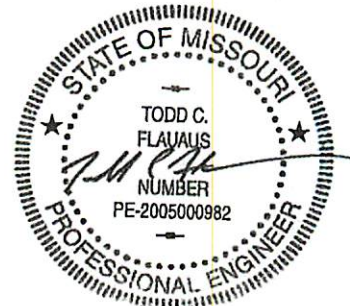
GENERAL SITE DATA AND RUNOFF CALCULATIONS:

The pre-developed P.I. factors to be used for the analysis are:

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 P.I. factors to be used for the analysis are:

2 year	70%	Impervious	2.00 ✓ cfs/ac
15 year	70%	Impervious	3.30 ✓ cfs/ac
25 year	70%	Impervious	4.07 ✓ cfs/ac
100 year	70%	Impervious	5.21 ✓ cfs/ac
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



CITY OF FALLON
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PROJECT NO. 100-1000
 SHEET NO. 100-1000
 DATE: 10/10/2000

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The following table shows the results of the analysis. The table is divided into two columns: "Analysis" and "Results". The "Analysis" column lists the various items that were analyzed, and the "Results" column lists the results of the analysis. The table is as follows:

Analysis	Results
1.0000	1.0000
2.0000	2.0000
3.0000	3.0000
4.0000	4.0000
5.0000	5.0000
6.0000	6.0000
7.0000	7.0000
8.0000	8.0000
9.0000	9.0000
10.0000	10.0000



PREDEVELOPED FLOW RATE:

15 Year 20 Minute

DESIGN STORM	DRAINAGE AREA	PI Factor	PREDEVELOPED RUNOFF
2 year	4.70 ac	1.15 cfs/ac	5.41 cfs ✓
15 year	4.70 ac	1.87 cfs/ac	8.79 cfs ✓
25 year	4.70 ac	2.00 cfs/ac 2.31	10.86 cfs ✓

POSTDEVELOPED FLOW RATE:

15 Year 20 Minute

PER APPROVED DRAINAGE PLAN

DRAINAGE AREA	PI Factor	POSTDEVELOPED RUNOFF
5.58 5.56 ac	1.87 cfs/ac	10.40 cfs 10.43
0.68 0.46 ac	3.30 cfs/ac	1.52 cfs 2.24
		11.92 cfs 12.67

2 Year- ~~7.31~~ cfs 7.78 (6.42+1.36)
 15 Year- ~~11.92~~ cfs 12.67
 25 Year- ~~14.72~~ cfs 15.66 (12.89+2.77)

REQUIRED ATTENUATION:

DESIGN STORM	POSTDEVELOPED RUNOFF	-	PREDEVELOPED RUNOFF	=	REQUIRED ATTENUATION
2 year	7.78 7.31 cfs	-	5.41 cfs	=	1.91 cfs 2.37
15 year	12.67 11.92 cfs	-	8.79 cfs	=	3.13 cfs 3.88
25 year	15.66 14.72 cfs	-	10.86 cfs	=	3.86 cfs 4.80

DETENTION BASIN CALCULATIONS:

BASIN PEAK INFLOW:

Inflows to the basin have been estimated using the drainage area map of the project. (see plans)

STORM	DURATION	RUNOFF
2 YEAR	20 MIN.	6.60 CFS ✓
15 YEAR	20 MIN.	10.76 CFS ✓
25 YEAR	20 MIN.	13.28 CFS ✓
100 YEAR	20 MIN.	16.97 CFS ✓

PERMITTED RELEASE RATE:

The permitted release rate was found by subtracting the required attenuation from the basin inflow for each design storm:

Design Storm	Basin Inflow	-	Required Attenuation	=	Release Rate
2 year	6.60 cfs ✓	-	1.91 cfs 2.37	=	4.69 cfs 4.23
15 year	10.76 cfs ✓	-	3.13 cfs 3.88	=	7.63 cfs 6.88
25 year	13.28 cfs ✓	-	3.86 cfs 4.80	=	9.42 cfs 8.48

STORM ROUTING CALCULATIONS AND RESULTS:

A computer program PONDPACK was used in routing the 2, 15 and 25- year storms through the basin. As found in the routing calculations, the results are as follows:

STORM	PEAK INFLOW	ALLOWABLE RELEASE	CALCULATED RELEASE	PEAK ELEVATION
2 YEAR	6.60 ✓ CFS	4.23 4.69 CFS	3.96 CFS 4.12 CFS ✓	585.33 ft 585.87 ft ✓
15 YEAR	10.76 ✓ CFS	6.88 7.63 CFS	4.81 CFS 5.13 CFS ✓	586.76 ft 587.31 ft ✓
25 YEAR	13.28 ✓ CFS	8.48 9.42 CFS	5.13 CFS 7.27 CFS ✓	587.40 ft 587.98 ft ✓
100 YEAR	16.97 ✓ CFS	---- CFS	10.91 CFS 14.54 CFS ✓	588.13 ft 588.36 ft ✓

²⁵
CHECK 100-YEAR OUTFLOW:(low-flow slots blocked)

WEIR FLOW $Q = C \times L \times H^{3/2}$

Basin A
Where 100-YEAR FLOW $Q = 16.97 \rightarrow 13.27$
C = 3.0 ✓
Spillway width L = 11.00 ✓
H = 0.64 ft ✓
²⁵ Sill = 587.83 ft ✓
₁₀₀yr h/w = 588.47 ft 588.37

$h = \left(\frac{13.27}{33} \right)^{2/3}$

**SEDIMENT VOLUME CALCULATION:
BASIN A**

The basin shall be analyzed to accommodate 2 years of sediment storage.

- The Drainage area to the basin = 6.02 Acres
- Rational Method runoff coefficient 'c' = 0.6
- Annual sediment storage volume (from figure 2) = 150 ft³/Acre
- The sediment volume and storage required =

2 years of sediment storage = 6.02 Acres (150 ft³/Acre/year)(2 years)

2 years of sediment storage = 1,806.0 ft³

To provide for the additional sediment storage the top of the overflow sill will be set at 587.83.

Volume between the 25-year high water of 587.40 and the overflow sill elevation of 587.83 is 1,870 ft³.

1,870 ft³ provided > 1806.0 ft³ required

SUMMARY

BASIN A

2 Year - 20 MINUTE HIGH-WATER

585.33 ft ~~585.97 ft~~ 585.87

15 Year - 20 MINUTE HIGH-WATER

586.76 ft ~~587.37 ft~~ 587.31

25 Year - 20 MINUTE HIGH-WATER

587.40 ft ~~587.98 ft~~ ✓

100 Year - 20 MINUTE HIGH-WATER

588.13 ft ~~588.37 ft~~ 588.36

25 Year - 20 MINUTE HIGH-WATER LFB

~~588.38 ft~~ 588.37

100 Year - 20 MINUTE HIGH-WATER LFB

588.47 ft

LOW-FLOW SLOT

6" W x 12" H ✓

LOW-FLOW ELEVATION

582.13 ft ✓

TOP OF BERM

589.5 ft ~~589.53 ft~~

589.43

BASIN A

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Watershed

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
basin a	Watershed - 100	0	20,364.000	2.000	16.97
basin a	Watershed - 002	0	7,920.000	2.000	6.60
basin a	Watershed - 025	0	15,936.000	2.000	13.28
basin a	Watershed - 015	0	12,912.000	2.000	10.76

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)
basin a	Watershed - 100	0	16,570.000	20.000	14.54
basin a	Watershed - 002	0	7,920.000	18.000	4.12
basin a	Watershed - 025	0	12,689.000	21.000	7.27
basin a	Watershed - 015	0	11,477.000	18.000	5.13

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft ³)	Time to Peak (min)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft ³)
basin a (IN)	Watershed - 100	0	20,364.000	2.000	16.97	(N/A)	(N/A)
basin a (OUT)	Watershed - 100	0	16,570.000	20.000	14.54	588.36	11,680.000
basin a (IN)	Watershed - 002	0	7,920.000	2.000	6.60	(N/A)	(N/A)
basin a (OUT)	Watershed - 002	0	7,920.000	18.000	4.12	585.87	3,363.000
basin a (IN)	Watershed - 025	0	15,936.000	2.000	13.28	(N/A)	(N/A)
basin a (OUT)	Watershed - 025	0	12,689.000	21.000	7.27	587.98	10,107.000
basin a (IN)	Watershed - 015	0	12,912.000	2.000	10.76	(N/A)	(N/A)
basin a (OUT)	Watershed - 015	0	11,477.000	18.000	5.13	587.31	7,587.000

Watershed

Subsection: Read Hydrograph
Label: basin a

Return Event: 2 years
Storm Event:

Peak Discharge	6.60 ft ³ /s
Time to Peak	13.000 min
Hydrograph Volume	7,919.997 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 1.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	3.30	6.60	6.60	6.60
5.000	6.60	6.60	6.60	6.60	6.60
10.000	6.60	6.60	6.60	6.60	6.60
15.000	6.60	6.60	6.60	6.60	6.60
20.000	6.60	3.30	0.00	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	0.00	0.00	0.00	0.00
50.000	0.00	0.00	0.00	0.00	0.00
55.000	0.00	0.00	0.00	0.00	0.00
60.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Read Hydrograph
Label: basin a

Return Event: 15 years
Storm Event:

Peak Discharge	10.76 ft ³ /s
Time to Peak	13.000 min
Hydrograph Volume	12,911.999 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 1.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	5.38	10.76	10.76	10.76
5.000	10.76	10.76	10.76	10.76	10.76
10.000	10.76	10.76	10.76	10.76	10.76
15.000	10.76	10.76	10.76	10.76	10.76
20.000	10.76	5.38	0.00	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	0.00	0.00	0.00	0.00
50.000	0.00	0.00	0.00	0.00	0.00
55.000	0.00	0.00	0.00	0.00	0.00
60.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Read Hydrograph
 Label: basin a

Return Event: 25 years
 Storm Event:

Peak Discharge	13.28 ft ³ /s
Time to Peak	13.000 min
Hydrograph Volume	15,935.999 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 1.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	6.64	13.28	13.28	13.28
5.000	13.28	13.28	13.28	13.28	13.28
10.000	13.28	13.28	13.28	13.28	13.28
15.000	13.28	13.28	13.28	13.28	13.28
20.000	13.28	6.64	0.00	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	0.00	0.00	0.00	0.00
50.000	0.00	0.00	0.00	0.00	0.00
55.000	0.00	0.00	0.00	0.00	0.00
60.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Read Hydrograph
Label: basin a

Return Event: 100 years
Storm Event:

Peak Discharge	16.97 ft ³ /s
Time to Peak	13.000 min
Hydrograph Volume	20,364.000 ft ³

HYDROGRAPH ORDINATES (ft³/s)

Output Time Increment = 1.000 min

Time on left represents time for first value in each row.

Time (min)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)	Flow (ft ³ /s)
0.000	0.00	8.48	16.97	16.97	16.97
5.000	16.97	16.97	16.97	16.97	16.97
10.000	16.97	16.97	16.97	16.97	16.97
15.000	16.97	16.97	16.97	16.97	16.97
20.000	16.97	8.48	0.00	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	0.00	0.00	0.00	0.00
50.000	0.00	0.00	0.00	0.00	0.00
55.000	0.00	0.00	0.00	0.00	0.00
60.000	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Planimeter Volume Curve
Label: basin a

Return Event: 2 years
Storm Event:

Pond Volume Calculations

Scale (Planimeter): 1.000 ft/in

Elevation (ft)	Planimeter (in ²)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ft ³)	Volume (Total) (ft ³)
582.13	0.0	0.000	0.000	0.000	0.000
583.00	35.0	0.001	0.001	10.000	10.000
583.50	230.0	0.005	0.008	59.000	69.000
584.00	699.0	0.016	0.031	222.000	291.000
584.50	1,172.0	0.027	0.064	463.000	754.000
585.00	1,852.0	0.043	0.103	750.000	1,503.000
586.00	2,512.3	0.058	0.150	2,174.000	3,677.000
587.00	3,233.0	0.074	0.197	2,865.000	6,542.000
588.00	4,042.8	0.093	0.250	3,630.000	10,172.000
589.00	5,110.0	0.117	0.314	4,566.000	14,738.000

Watershed

Subsection: Volume Equations
Label: basin a

Return Event: 2 years
Storm Event:

Pond Volume Equations

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

$$\text{Volume} = (1/3) * (\text{EL2} - \text{EL1}) * (\text{Area1} + \text{Area2} + \text{sqr}(\text{Area1} * \text{Area2}))$$

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

Watershed

Subsection: Outlet Input Data
Label: outfall a

Return Event: 2 years
Storm Event:

Requested Pond Water Surface Elevations

Minimum (Headwater)	582.13 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	589.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir	1	Forward	CV	582.13	583.13
Inlet Box	3	Forward	CV	587.83	589.00
Orifice-Area	2	Forward	CV	583.13	589.00
Culvert-Circular	cv	Forward	TW	580.13	589.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Watershed

Subsection: Outlet Input Data
Label: outfall a

Return Event: 2 years
Storm Event:

Structure ID: 1	
Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	582.13 ft
Weir Length	0.50 ft
Weir Coefficient	3.00 (ft ^{0.5})/s

Structure ID: 2	
Structure Type: Orifice-Area	
Number of Openings	1
Elevation	582.13 ft
Orifice Area	72.0 in ²
Top Elevation	583.13 ft
Datum Elevation	582.63 ft
Orifice Coefficient	0.600

Watershed

Subsection: Outlet Input Data
Label: outfall a

Return Event: 2 years
Storm Event:

Structure ID: cv	
Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	15.0 in
Length	66.57 ft
Length (Computed Barrel)	66.58 ft
Slope (Computed)	0.015 ft/ft
Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.023
Kr	0.200
Convergence Tolerance	0.00 ft
Inlet Control Data	
Equation Form	Form 1
K	0.0098
M	2.0000
C	0.0398
Y	0.6700
T1 ratio (HW/D)	1.152
T2 ratio (HW/D)	1.299
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	581.57 ft	T1 Flow	4.80 ft ³ /s
T2 Elevation	581.75 ft	T2 Flow	5.49 ft ³ /s

Watershed

Subsection: Outlet Input Data

Label: outfall a

Return Event: 2 years

Storm Event:

Structure ID: 3	
Structure Type: Inlet Box	
<hr/>	
Number of Openings	1
Elevation	587.83 ft
Orifice Area	1,385.3 in ²
Orifice Coefficient	0.600
Weir Length	11.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False
<hr/>	
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
<hr/>	
Tailwater Type	Free Outfall
<hr/>	
Convergence Tolerances	
<hr/>	
Maximum Iterations	30
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)	0.100 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s
<hr/>	

Watershed

Subsection: Composite Rating Curve
 Label: outfall a

Return Event: 2 years
 Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
582.13	0.00	(N/A)	0.00
582.18	0.02	(N/A)	0.00
582.23	0.05	(N/A)	0.00
582.28	0.09	(N/A)	0.00
582.33	0.13	(N/A)	0.00
582.38	0.26	(N/A)	0.00
582.43	0.26	(N/A)	0.00
582.48	0.31	(N/A)	0.00
582.53	0.46	(N/A)	0.00
582.58	0.46	(N/A)	0.00
582.63	0.50	(N/A)	0.00
582.68	0.67	(N/A)	0.00
582.73	0.67	(N/A)	0.00
582.78	0.82	(N/A)	0.00
582.83	0.82	(N/A)	0.00
582.88	0.97	(N/A)	0.00
582.93	1.03	(N/A)	0.00
582.98	1.13	(N/A)	0.00
583.03	1.36	(N/A)	0.00
583.08	1.41	(N/A)	0.00
583.13	1.61	(N/A)	0.00
583.18	1.76	(N/A)	0.00
583.23	1.97	(N/A)	0.00
583.28	1.97	(N/A)	0.00
583.33	2.04	(N/A)	0.00
583.38	2.22	(N/A)	0.00
583.43	2.22	(N/A)	0.00
583.48	2.22	(N/A)	0.00
583.53	2.31	(N/A)	0.00
583.58	2.48	(N/A)	0.00
583.63	2.48	(N/A)	0.00
583.68	2.48	(N/A)	0.00
583.73	2.48	(N/A)	0.00
583.78	2.58	(N/A)	0.00
583.83	2.76	(N/A)	0.00
583.88	2.76	(N/A)	0.00
583.93	2.76	(N/A)	0.00
583.98	2.76	(N/A)	0.00
584.03	2.87	(N/A)	0.00
584.08	2.87	(N/A)	0.00
584.13	2.87	(N/A)	0.00
584.18	3.05	(N/A)	0.00
584.23	3.05	(N/A)	0.00

Watershed

Subsection: Composite Rating Curve
 Label: outfall a

Return Event: 2 years
 Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
584.28	3.05	(N/A)	0.00
584.33	3.05	(N/A)	0.00
584.38	3.18	(N/A)	0.00
584.43	3.18	(N/A)	0.00
584.48	3.18	(N/A)	0.00
584.53	3.35	(N/A)	0.00
584.58	3.35	(N/A)	0.00
584.63	3.35	(N/A)	0.00
584.68	3.35	(N/A)	0.00
584.73	3.50	(N/A)	0.00
584.78	3.50	(N/A)	0.00
584.83	3.50	(N/A)	0.00
584.88	3.50	(N/A)	0.00
584.93	3.74	(N/A)	0.00
584.98	3.74	(N/A)	0.00
585.03	3.74	(N/A)	0.00
585.08	3.74	(N/A)	0.00
585.13	3.74	(N/A)	0.00
585.18	3.74	(N/A)	0.00
585.23	3.96	(N/A)	0.00
585.28	3.96	(N/A)	0.00
585.33	3.96	(N/A)	0.00
585.38	3.96	(N/A)	0.00
585.43	3.96	(N/A)	0.00
585.48	3.96	(N/A)	0.00
585.53	3.96	(N/A)	0.00
585.58	3.96	(N/A)	0.00
585.63	3.96	(N/A)	0.00
585.68	4.12	(N/A)	0.00
585.73	4.12	(N/A)	0.00
585.78	4.12	(N/A)	0.00
585.83	4.12	(N/A)	0.00
585.88	4.12	(N/A)	0.00
585.93	4.12	(N/A)	0.00
585.98	4.12	(N/A)	0.00
586.03	4.12	(N/A)	0.00
586.08	4.12	(N/A)	0.00
586.13	4.12	(N/A)	0.00
586.18	4.12	(N/A)	0.00
586.23	4.31	(N/A)	0.00
586.28	4.31	(N/A)	0.00
586.33	4.31	(N/A)	0.00
586.38	4.31	(N/A)	0.00

Watershed

Subsection: Composite Rating Curve
 Label: outfall a

Return Event: 2 years
 Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft ³ /s)	Tailwater Elevation (ft)	Convergence Error (ft)
586.43	4.31	(N/A)	0.00
586.48	4.31	(N/A)	0.00
586.53	4.31	(N/A)	0.00
586.58	4.31	(N/A)	0.00
586.63	4.81	(N/A)	0.00
586.68	4.81	(N/A)	0.00
586.73	4.81	(N/A)	0.00
586.78	4.81	(N/A)	0.00
586.83	4.81	(N/A)	0.00
586.88	4.81	(N/A)	0.00
586.93	4.81	(N/A)	0.00
586.98	5.01	(N/A)	0.00
587.03	5.13	(N/A)	0.00
587.08	5.13	(N/A)	0.00
587.13	5.13	(N/A)	0.00
587.18	5.13	(N/A)	0.00
587.23	5.13	(N/A)	0.00
587.28	5.13	(N/A)	0.00
587.33	5.13	(N/A)	0.00
587.38	5.13	(N/A)	0.00
587.43	5.13	(N/A)	0.00
587.48	5.24	(N/A)	0.00
587.53	5.30	(N/A)	0.00
587.58	5.30	(N/A)	0.00
587.63	5.30	(N/A)	0.00
587.68	5.30	(N/A)	0.00
587.73	5.30	(N/A)	0.00
587.78	5.30	(N/A)	0.00
587.83	5.30	(N/A)	0.00
587.88	5.82	(N/A)	0.00
587.93	6.42	(N/A)	0.00
587.98	7.24	(N/A)	0.00
588.03	7.74	(N/A)	0.00
588.08	8.92	(N/A)	0.00
588.13	10.94	(N/A)	0.00
588.18	10.98	(N/A)	0.00
588.23	11.77	(N/A)	0.00
588.28	13.96	(N/A)	0.00
588.33	13.99	(N/A)	0.00
588.38	15.02	(N/A)	0.00
588.43	15.54	(N/A)	0.00
588.48	16.03	(N/A)	0.00
588.53	16.11	(N/A)	0.00

Watershed

Subsection: Composite Rating Curve
Label: outfall a

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Contributing Structures

3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,2,cv (no Q: 1)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)
3,cv (no Q: 1,2)

Watershed

Subsection: Level Pool Pond Routing Summary
 Label: basin a (IN)

Return Event: 2 years
 Storm Event:

Infiltration			
Infiltration Method (Computed)	No Infiltration		
Initial Conditions			
Elevation (Water Surface, Initial)	582.13 ft		
Volume (Initial)	0.000 ft ³		
Flow (Initial Outlet)	0.00 ft ³ /s		
Flow (Initial Infiltration)	0.00 ft ³ /s		
Flow (Initial, Total)	0.00 ft ³ /s		
Time Increment	1.000 min		
Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	6.60 ft ³ /s	Time to Peak (Flow, In)	2.000 min
Flow (Peak Outlet)	4.12 ft ³ /s	Time to Peak (Flow, Outlet)	18.000 min
Peak Conditions			
Elevation (Water Surface, Peak)	585.87 ft		
Volume (Peak)	3,363.223 ft ³		
Mass Balance (ft ³)			
Volume (Initial)	0.000 ft ³		
Volume (Total Inflow)	7,920.000 ft ³		
Volume (Total Infiltration)	0.000 ft ³		
Volume (Total Outlet Outflow)	7,920.000 ft ³		
Volume (Retained)	0.000 ft ³		
Volume (Unrouted)	0.000 ft ³		
Error (Mass Balance)	0.0 %		

Watershed

Subsection: Level Pool Pond Routing Summary
 Label: basin a (IN)

Return Event: 15 years
 Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	582.13 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	10.76 ft ³ /s	Time to Peak (Flow, In)	2.000 min
Flow (Peak Outlet)	5.13 ft ³ /s	Time to Peak (Flow, Outlet)	18.000 min

Elevation (Water Surface, Peak)	587.31 ft
Volume (Peak)	7,587.278 ft ³

Mass Balance (ft ³)	
Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	12,912.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	11,477.000 ft ³
Volume (Retained)	1,218.000 ft ³
Volume (Unrouted)	-217.000 ft ³
Error (Mass Balance)	1.7 %

Watershed

Subsection: Level Pool Pond Routing Summary
 Label: basin a (IN)

Return Event: 25 years
 Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	582.13 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	13.28 ft ³ /s	Time to Peak (Flow, In)	2.000 min
Flow (Peak Outlet)	7.27 ft ³ /s	Time to Peak (Flow, Outlet)	21.000 min

Elevation (Water Surface, Peak)	587.98 ft
Volume (Peak)	10,106.846 ft ³

Mass Balance (ft ³)	
Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	15,936.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	12,689.000 ft ³
Volume (Retained)	3,000.000 ft ³
Volume (Unrouted)	-247.000 ft ³
Error (Mass Balance)	1.6 %

Watershed

Subsection: Level Pool Pond Routing Summary
 Label: basin a (IN)

Return Event: 100 years
 Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	582.13 ft
Volume (Initial)	0.000 ft ³
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	16.97 ft ³ /s	Time to Peak (Flow, In)	2.000 min
Flow (Peak Outlet)	14.54 ft ³ /s	Time to Peak (Flow, Outlet)	20.000 min

Elevation (Water Surface, Peak)	588.36 ft
Volume (Peak)	11,680.119 ft ³

Mass Balance (ft ³)	
Volume (Initial)	0.000 ft ³
Volume (Total Inflow)	20,364.000 ft ³
Volume (Total Infiltration)	0.000 ft ³
Volume (Total Outlet Outflow)	16,570.000 ft ³
Volume (Retained)	3,547.000 ft ³
Volume (Unrouted)	-247.000 ft ³
Error (Mass Balance)	1.2 %

Watershed

Subsection: Pond Inflow Summary
Label: basin a (IN)

Return Event: 15 years
Storm Event:

Summary for Hydrograph Addition at 'basin a'

Upstream Link Upstream Node
<Catchment to Outflow Node> basin a

Node Inflows

Inflow Type	Element	Volume (ft ³)	Time to Peak (min)	Flow (Peak) (ft ³ /s)
Flow (From)	basin a	12,911.999	2.000	10.76
Flow (In)	basin a	12,911.999	2.000	10.76

