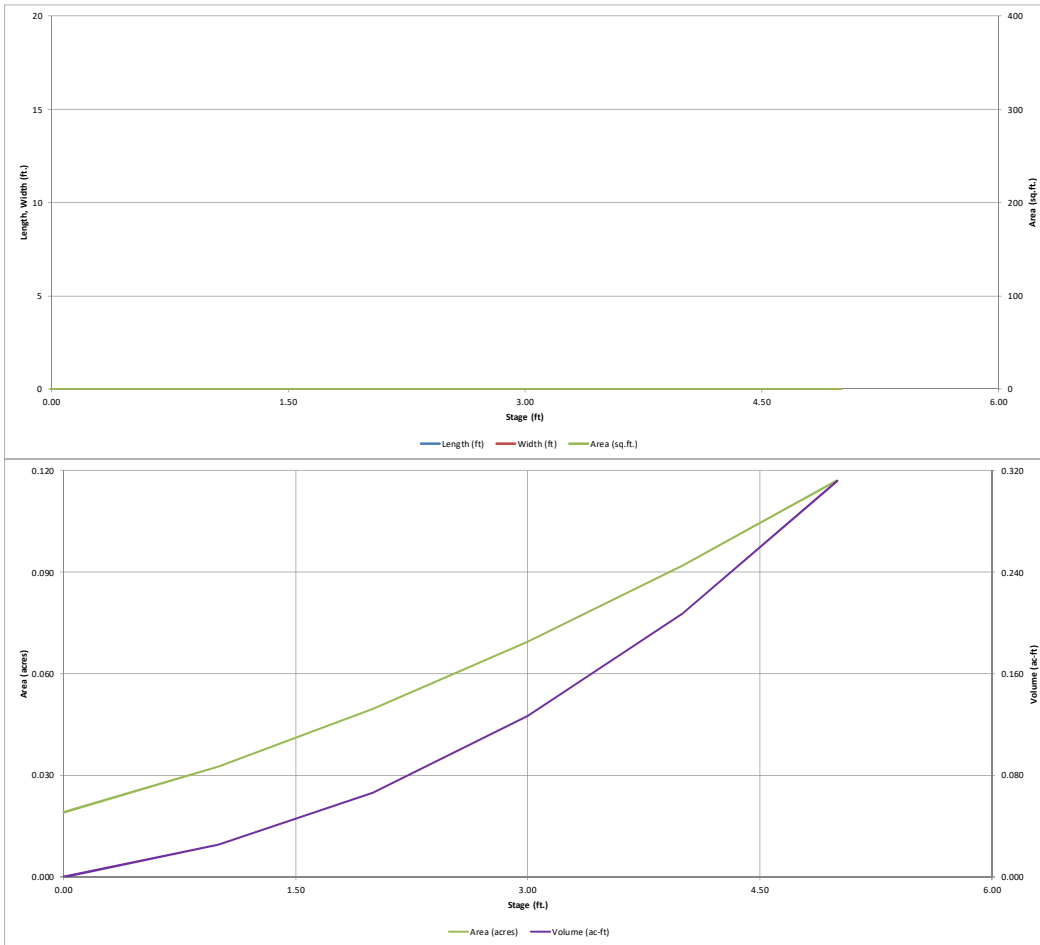


DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

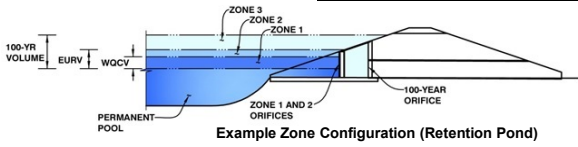


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Legacy Church - Green Mountain Falls - West Pond

Basin ID: _____



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.22	0.033	Orifice Plate
Zone 2 (EURV)	2.56	0.064	Orifice Plate
Zone 3 (100-year)	3.49	0.065	Weir & Pipe (Rect.)
		0.163	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
 Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
 Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
 Orifice Plate: Orifice Vertical Spacing = inches
 Orifice Plate: Orifice Area per Row = sq. inches (diameter = 11/16 inch)

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
 Elliptical Half-Width = feet
 Elliptical Slot Centroid = feet
 Elliptical Slot Area = ft²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.61	1.22					
Orifice Area (sq. inches)	0.39	0.39	0.39					

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

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft ²
Vertical Orifice Centroid =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	<input type="text" value="3.04"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	<input type="text" value="4.00"/>	<input type="text" value="N/A"/>	feet
Overflow Weir Slope =	<input type="text" value="0.00"/>	<input type="text" value="N/A"/>	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	<input type="text" value="4.00"/>	<input type="text" value="N/A"/>	feet
Overflow Grate Open Area % =	<input type="text" value="70%"/>	<input type="text" value="N/A"/>	% grate open area/total area
Debris Clogging % =	<input type="text" value="50%"/>	<input type="text" value="N/A"/>	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H ₁ =	<input type="text" value="3.04"/>	<input type="text" value="N/A"/>	feet
Over Flow Weir Slope Length =	<input type="text" value="4.00"/>	<input type="text" value="N/A"/>	feet
Grate Open Area / 100-yr Orifice Area =		<input type="text" value="N/A"/>	should be ≥ 4
Overflow Grate Open Area w/o Debris =	<input type="text" value="11.20"/>	<input type="text" value="N/A"/>	ft ²
Overflow Grate Open Area w/ Debris =	<input type="text" value="5.60"/>	<input type="text" value="N/A"/>	ft ²

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

	Zone 3 Rectangular	Not Selected	
Depth to Invert of Outlet Pipe =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (distance below basin bottom at Stage = 0 ft)
Rectangular Orifice Width =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	inches
Rectangular Orifice Height =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Rectangular	Not Selected	
Outlet Orifice Area =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft ²
Outlet Orifice Centroid =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	feet
Half-Central Angle of Restrictor Plate on Pipe =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

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

Calculated Parameters for Spillway

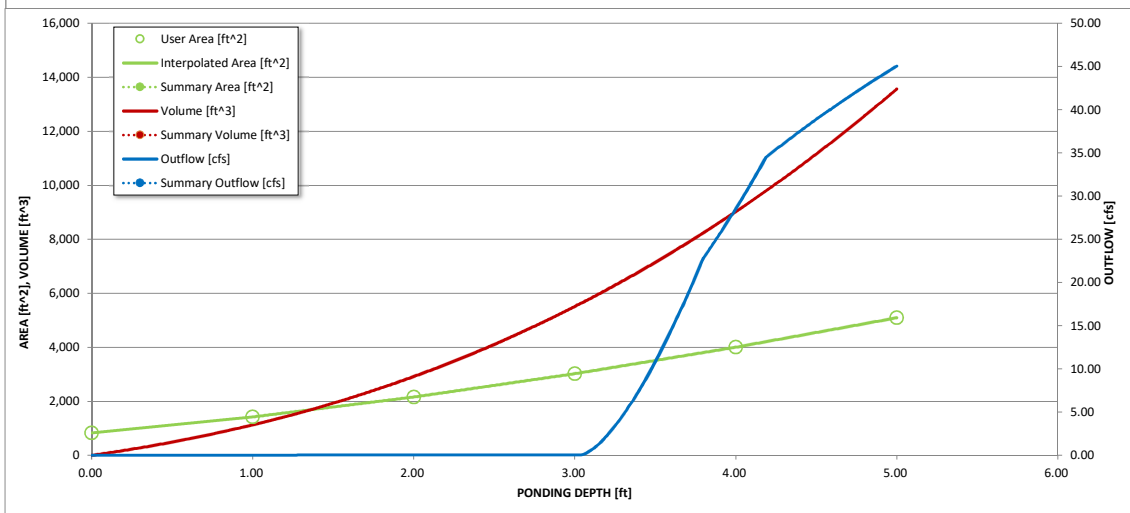
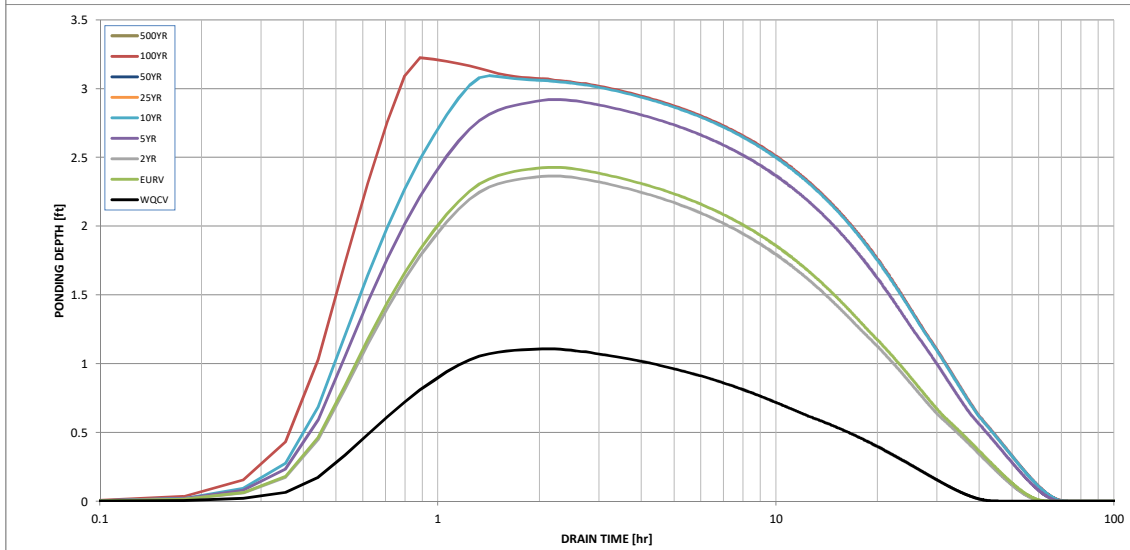
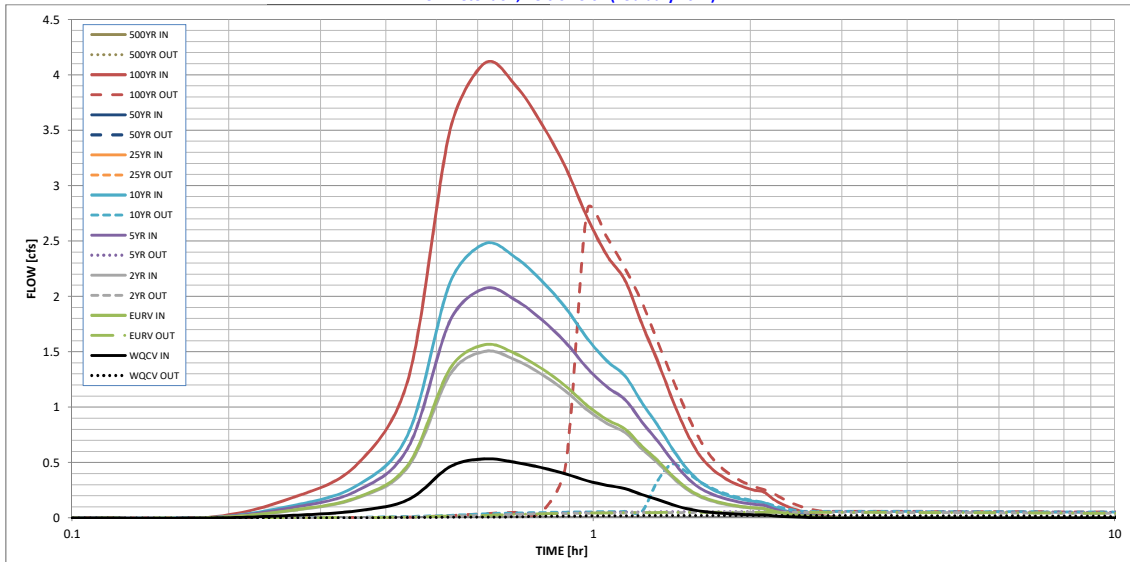
Spillway Design Flow Depth = feet
 Stage at Top of Freeboard = feet
 Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.51	1.75	0.00	0.00	2.52	0.00
Calculated Runoff Volume (acre-ft) =	0.033	0.098	0.094	0.130	0.156	0.000	0.000	0.261	0.000
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.033	0.098	0.094	0.130	0.156	#N/A	#N/A	0.260	#N/A
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.11	0.31	0.00	0.00	1.27	0.00
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.2	0.4	0.0	0.0	1.7	0.0
Peak Inflow Q (cfs) =	0.5	1.6	1.5	2.1	2.5	#N/A	#N/A	4.1	#N/A
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.1	0.5	#N/A	#N/A	2.8	#N/A
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	1.2	#N/A	#N/A	1.6	#N/A
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	#N/A	#N/A	Overflow Grate 1	#N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	#N/A	#N/A	0.0	#N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	#N/A	#N/A	N/A	#N/A
Time to Drain 97% of Inflow Volume (hours) =	37	49	49	54	54	#N/A	#N/A	49	#N/A
Time to Drain 99% of Inflow Volume (hours) =	40	55	55	61	62	#N/A	#N/A	59	#N/A
Maximum Ponding Depth (ft) =	1.11	2.43	2.36	2.92	3.09	#N/A	#N/A	3.22	#N/A
Area at Maximum Ponding Depth (acres) =	0.03	0.06	0.06	0.07	0.07	#N/A	#N/A	0.07	#N/A
Maximum Volume Stored (acre-ft) =	0.029	0.090	0.086	0.121	0.133	#N/A	#N/A	0.142	#N/A

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



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

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename: _____

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

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

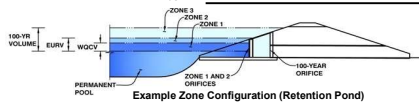
Time Interval	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	#N/A	#N/A	WORKBOOK	#N/A
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.31 min	0:00:00	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	0:05:19	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
Hydrograph Constant	0:10:37	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	0:15:56	0.02	0.07	0.07	0.10	0.11	#N/A	#N/A	0.19	#N/A
0.941	0:21:14	0.07	0.19	0.18	0.25	0.30	#N/A	#N/A	0.50	#N/A
	0:26:33	0.17	0.49	0.47	0.65	0.77	#N/A	#N/A	1.27	#N/A
	0:31:52	0.46	1.35	1.30	1.78	2.12	#N/A	#N/A	3.50	#N/A
	0:37:10	0.53	1.56	1.50	2.07	2.48	#N/A	#N/A	4.11	#N/A
	0:42:29	0.50	1.48	1.43	1.97	2.35	#N/A	#N/A	3.91	#N/A
	0:47:47	0.45	1.35	1.30	1.79	2.14	#N/A	#N/A	3.56	#N/A
	0:53:06	0.40	1.19	1.15	1.58	1.90	#N/A	#N/A	3.16	#N/A
	0:58:25	0.34	1.01	0.98	1.35	1.62	#N/A	#N/A	2.71	#N/A
	1:03:43	0.30	0.89	0.85	1.18	1.42	#N/A	#N/A	2.37	#N/A
	1:09:02	0.27	0.80	0.77	1.07	1.28	#N/A	#N/A	2.14	#N/A
	1:14:20	0.21	0.65	0.62	0.87	1.04	#N/A	#N/A	1.75	#N/A
	1:19:39	0.17	0.52	0.50	0.70	0.84	#N/A	#N/A	1.42	#N/A
	1:24:58	0.12	0.39	0.37	0.52	0.63	#N/A	#N/A	1.08	#N/A
	1:30:16	0.09	0.28	0.27	0.38	0.46	#N/A	#N/A	0.79	#N/A
	1:35:35	0.07	0.21	0.20	0.28	0.34	#N/A	#N/A	0.58	#N/A
	1:40:53	0.05	0.16	0.16	0.22	0.26	#N/A	#N/A	0.45	#N/A
	1:46:12	0.04	0.13	0.13	0.18	0.22	#N/A	#N/A	0.37	#N/A
	1:51:31	0.04	0.12	0.11	0.15	0.19	#N/A	#N/A	0.32	#N/A
	1:56:49	0.03	0.10	0.10	0.14	0.16	#N/A	#N/A	0.28	#N/A
	2:02:08	0.03	0.09	0.09	0.12	0.15	#N/A	#N/A	0.25	#N/A
	2:07:26	0.03	0.09	0.08	0.12	0.14	#N/A	#N/A	0.23	#N/A
	2:12:45	0.02	0.06	0.06	0.08	0.10	#N/A	#N/A	0.17	#N/A
	2:18:04	0.02	0.05	0.04	0.06	0.07	#N/A	#N/A	0.13	#N/A
	2:23:22	0.01	0.03	0.03	0.05	0.05	#N/A	#N/A	0.09	#N/A
	2:28:41	0.01	0.02	0.02	0.03	0.04	#N/A	#N/A	0.07	#N/A
	2:33:59	0.01	0.02	0.02	0.02	0.03	#N/A	#N/A	0.05	#N/A
	2:39:18	0.00	0.01	0.01	0.02	0.02	#N/A	#N/A	0.03	#N/A
	2:44:37	0.00	0.01	0.01	0.01	0.01	#N/A	#N/A	0.02	#N/A
	2:49:55	0.00	0.00	0.00	0.01	0.01	#N/A	#N/A	0.01	#N/A
	2:55:14	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.01	#N/A
	3:00:32	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:05:51	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:11:10	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:16:28	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:21:47	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:27:05	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:32:24	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:37:43	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:43:01	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:48:20	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:53:38	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:58:57	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:04:16	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:09:34	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:14:53	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:20:11	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:25:30	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:30:49	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:36:07	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:41:26	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:46:44	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:52:03	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:57:22	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:02:40	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:07:59	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:13:17	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:18:36	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:23:55	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:29:13	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:34:32	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:39:50	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:45:09	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:50:28	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:55:46	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	6:01:05	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	6:06:23	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	6:11:42	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	6:17:01	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	6:22:19	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Legacy Church - Green Mountain Falls - East Pond

Basin ID: _____



Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	1.71	acres
Watershed Length =	454	ft
Watershed Slope =	0.060	ft/ft
Watershed Imperviousness =	77.70%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.045	acre-feet
Excess Urban Runoff Volume (EURV) =	0.130	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.125	acre-feet
5-yr Runoff Volume (P1 = 1.51 in.) =	0.172	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	0.206	acre-feet
25-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
50-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	0.336	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.118	acre-feet
Approximate 5-yr Detention Volume =	0.162	acre-feet
Approximate 10-yr Detention Volume =	0.185	acre-feet
Approximate 25-yr Detention Volume =	0.000	acre-feet
Approximate 50-yr Detention Volume =	0.000	acre-feet
Approximate 100-yr Detention Volume =	0.214	acre-feet

Optional User Override	
1-hr Precipitation	
1.19	inches
1.51	inches
1.75	inches
	inches
	inches
2.52	inches

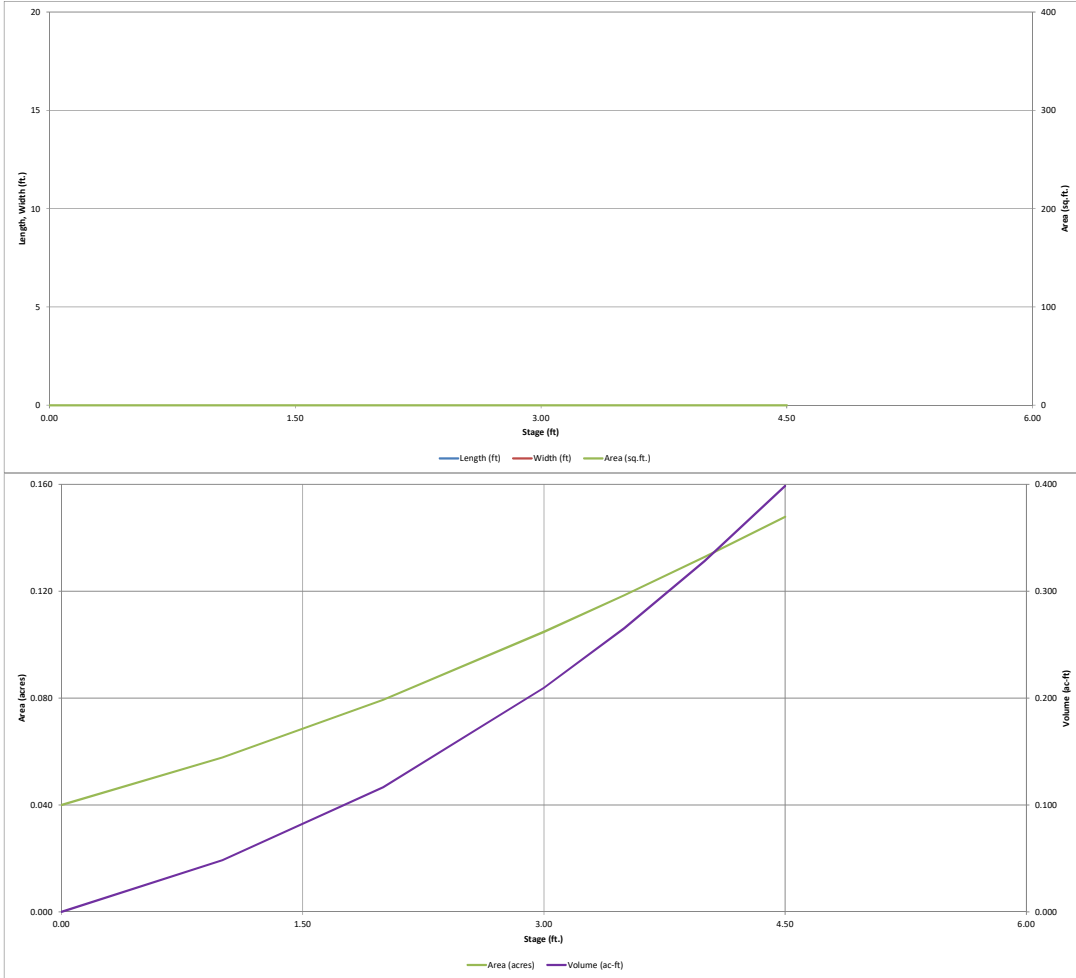
Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.045	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.085	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.084	acre-feet
Total Detention Basin Volume =	0.214	acre-feet
Initial Surcharge Volume (ISV) =	user	ft ³
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H _{total}) =	user	ft
Depth of Trickle Channel (H _{TC}) =	user	ft
Slope of Trickle Channel (S _{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S _{MB}) =	user	H:V
Basin Length-to-Width Ratio (R _{L/W}) =	user	
Initial Surcharge Area (A _{IS}) =	user	ft ²
Surcharge Volume Length (L _{SV}) =	user	ft
Surcharge Volume Width (W _{SV}) =	user	ft
Depth of Basin Floor (H _{B,100yr}) =	user	ft
Length of Basin Floor (L _{B,100yr}) =	user	ft
Width of Basin Floor (W _{B,100yr}) =	user	ft
Area of Basin Floor (A _{B,100yr}) =	user	ft ²
Volume of Basin Floor (V _{B,100yr}) =	user	ft ³
Depth of Main Basin (H _{MB,100yr}) =	user	ft
Length of Main Basin (L _{MB,100yr}) =	user	ft
Width of Main Basin (W _{MB,100yr}) =	user	ft
Area of Main Basin (A _{MB,100yr}) =	user	ft ²
Volume of Main Basin (V _{MB,100yr}) =	user	ft ³
Calculated Total Basin Volume (V _{total}) =	user	acre-feet

Depth Increment = 1 ft									
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft ²)	Optional Override Area (ft ²)	Area (acre)	Volume (ft ³)	Volume (ac-ft)
Top of Micropool	0.00					1,743	0.040		
	1.00					2,517	0.058	2,105	0.048
	2.00					3,457	0.079	5,082	0.117
	3.00					4,565	0.105	9,128	0.210
	3.50					5,164	0.119	11,560	0.265
	4.00					5,789	0.133	14,298	0.328
	4.50					6,438	0.148	17,355	0.398

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

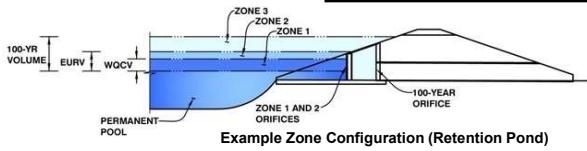


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **Legacy Church - Green Mountain Falls - East Pond**

Basin ID: _____



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.93	0.045	Orifice Plate
Zone 2 (EURV)	2.16	0.085	Orifice Plate
Zone 3 (100-year)	3.05	0.084	Weir&Pipe (Rect.)
		0.214	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

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

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	2.64	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	0.60	sq. inches (diameter = 7/8 inch)

Calculated Parameters for Plate

WQ Orifice Area per Row =	4.167E-03	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

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

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.46	0.47					
Orifice Area (sq. inches)	0.60	0.60	0.60					
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

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

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	2.64	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	% grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _g =	2.64	N/A	feet
Over Flow Weir Slope Length =	4.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =		N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	11.20	N/A	ft ²
Overflow Grate Open Area w/ Debris =	5.60	N/A	ft ²

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

	Zone 3 Rectangular	Not Selected	
Depth to Invert of Outlet Pipe =		N/A	ft (distance below basin bottom at Stage = 0 ft)
Rectangular Orifice Width =		N/A	inches
Rectangular Orifice Height =			inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

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

User Input: Emergency Spillway (Rectangular or Trapezoidal)

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

Calculated Parameters for Spillway

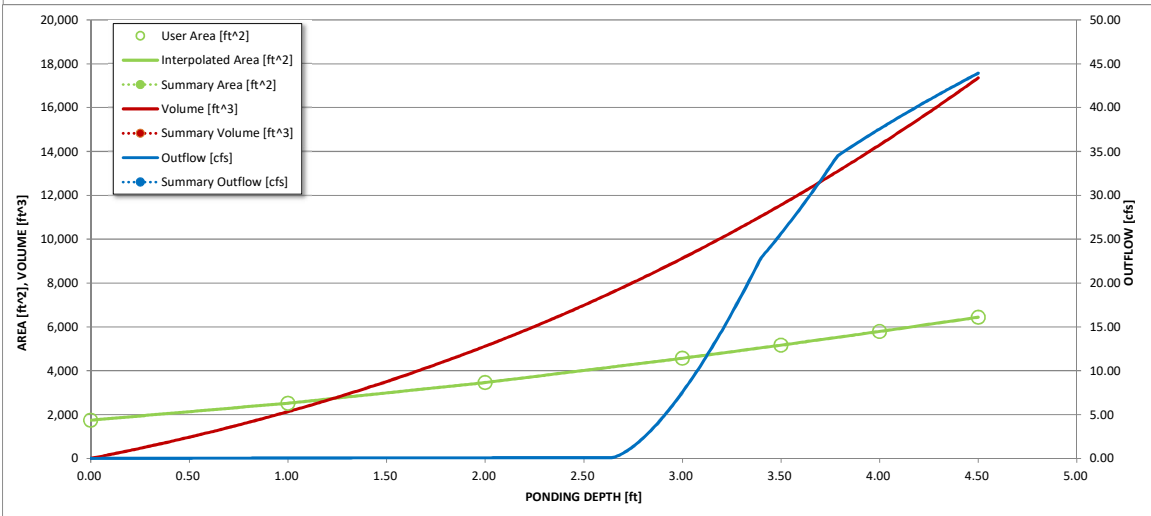
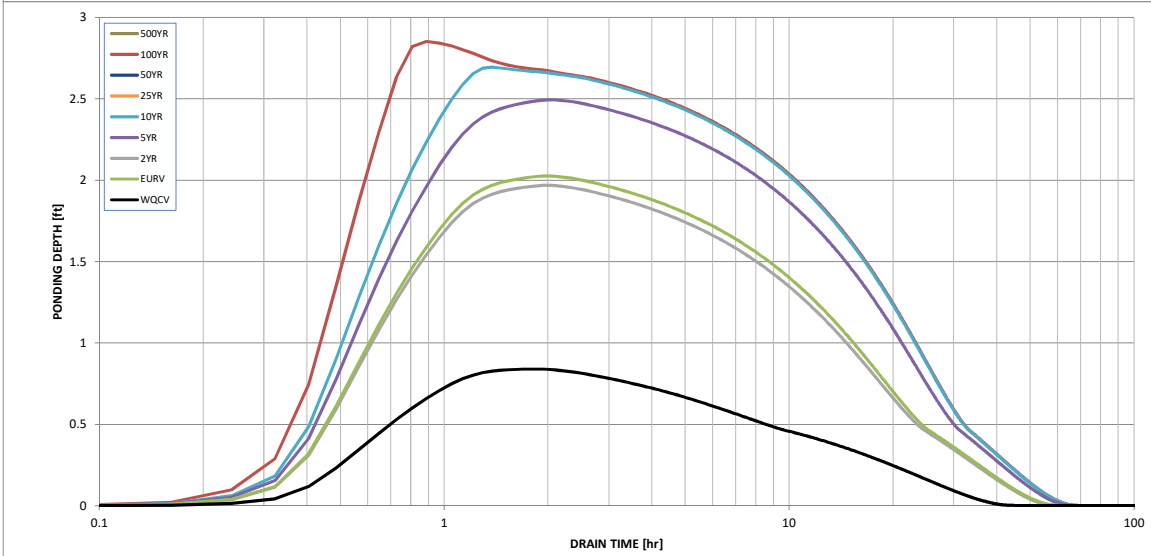
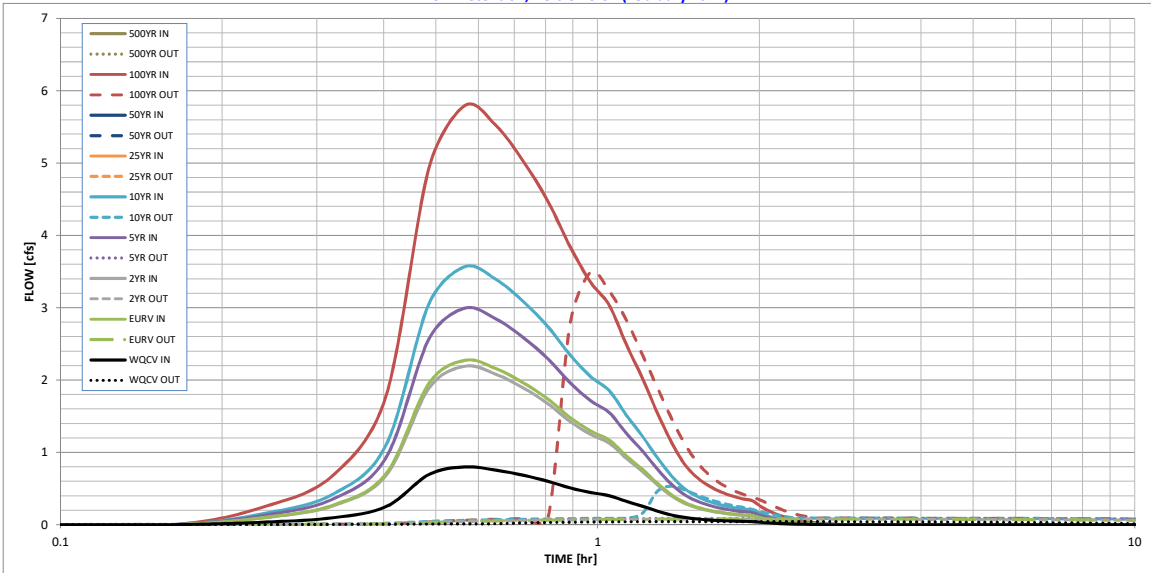
Spillway Design Flow Depth =		feet
Stage at Top of Freeboard =		feet
Basin Area at Top of Freeboard =		acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.51	1.75	0.00	0.00	2.52	0.00
Calculated Runoff Volume (acre-ft) =	0.045	0.130	0.125	0.172	0.206	0.000	0.000	0.336	0.000
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.045	0.130	0.125	0.172	0.205	#N/A	#N/A	0.336	#N/A
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.12	0.34	0.00	0.00	1.36	0.00
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.2	0.6	0.0	0.0	2.3	0.0
Peak Inflow Q (cfs) =	0.8	2.3	2.2	3.0	3.6	#N/A	#N/A	5.8	#N/A
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.1	0.5	#N/A	#N/A	3.5	#N/A
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.9	#N/A	#N/A	1.5	#N/A
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	#N/A	#N/A	Overflow Grate 1	#N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	#N/A	#N/A	0.0	#N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	#N/A	#N/A	N/A	#N/A
Time to Drain 97% of Inflow Volume (hours) =	36	45	45	49	49	#N/A	#N/A	44	#N/A
Time to Drain 99% of Inflow Volume (hours) =	40	52	51	56	57	#N/A	#N/A	55	#N/A
Maximum Ponding Depth (ft) =	0.84	2.03	1.97	2.49	2.69	#N/A	#N/A	2.85	#N/A
Area at Maximum Ponding Depth (acres) =	0.05	0.08	0.08	0.09	0.10	#N/A	#N/A	0.10	#N/A
Maximum Volume Stored (acre-ft) =	0.039	0.119	0.114	0.159	0.178	#N/A	#N/A	0.194	#N/A

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



S-A-V-D Chart Axis Override

	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename: _____

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

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

	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	#N/A	#N/A	WORKBOOK	#N/A
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
4.85 min	0:00:00	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	0:04:51	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
Hydrograph Constant	0:09:42	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	0:14:33	0.04	0.10	0.10	0.14	0.16	#N/A	#N/A	0.26	#N/A
1.031	0:19:24	0.10	0.28	0.27	0.36	0.43	#N/A	#N/A	0.70	#N/A
	0:24:15	0.25	0.71	0.68	0.93	1.11	#N/A	#N/A	1.79	#N/A
	0:29:06	0.69	1.95	1.88	2.56	3.05	#N/A	#N/A	4.92	#N/A
	0:33:57	0.80	2.27	2.19	2.99	3.57	#N/A	#N/A	5.80	#N/A
	0:38:48	0.75	2.16	2.08	2.84	3.39	#N/A	#N/A	5.52	#N/A
	0:43:39	0.68	1.96	1.89	2.59	3.08	#N/A	#N/A	5.02	#N/A
	0:48:30	0.60	1.74	1.67	2.29	2.74	#N/A	#N/A	4.47	#N/A
	0:53:21	0.51	1.48	1.43	1.96	2.35	#N/A	#N/A	3.84	#N/A
	0:58:12	0.45	1.30	1.25	1.72	2.05	#N/A	#N/A	3.35	#N/A
	1:03:03	0.40	1.17	1.13	1.55	1.85	#N/A	#N/A	3.04	#N/A
	1:07:54	0.32	0.95	0.92	1.26	1.51	#N/A	#N/A	2.49	#N/A
	1:12:45	0.25	0.76	0.74	1.02	1.22	#N/A	#N/A	2.02	#N/A
	1:17:36	0.19	0.57	0.55	0.77	0.92	#N/A	#N/A	1.54	#N/A
	1:22:27	0.13	0.41	0.40	0.56	0.67	#N/A	#N/A	1.13	#N/A
	1:27:18	0.10	0.30	0.29	0.41	0.49	#N/A	#N/A	0.83	#N/A
	1:32:09	0.08	0.24	0.23	0.32	0.39	#N/A	#N/A	0.64	#N/A
	1:37:00	0.07	0.20	0.19	0.27	0.32	#N/A	#N/A	0.53	#N/A
	1:41:51	0.06	0.17	0.16	0.23	0.27	#N/A	#N/A	0.45	#N/A
	1:46:42	0.05	0.15	0.14	0.20	0.24	#N/A	#N/A	0.40	#N/A
	1:51:33	0.05	0.14	0.13	0.18	0.22	#N/A	#N/A	0.36	#N/A
	1:56:24	0.04	0.13	0.12	0.17	0.20	#N/A	#N/A	0.33	#N/A
	2:01:15	0.03	0.09	0.09	0.12	0.15	#N/A	#N/A	0.24	#N/A
	2:06:06	0.02	0.07	0.07	0.09	0.11	#N/A	#N/A	0.18	#N/A
	2:10:57	0.02	0.05	0.05	0.07	0.08	#N/A	#N/A	0.13	#N/A
	2:15:48	0.01	0.04	0.03	0.05	0.06	#N/A	#N/A	0.10	#N/A
	2:20:39	0.01	0.02	0.02	0.03	0.04	#N/A	#N/A	0.07	#N/A
	2:25:30	0.01	0.02	0.02	0.02	0.03	#N/A	#N/A	0.05	#N/A
	2:30:21	0.00	0.01	0.01	0.02	0.02	#N/A	#N/A	0.03	#N/A
	2:35:12	0.00	0.01	0.01	0.01	0.01	#N/A	#N/A	0.02	#N/A
	2:40:03	0.00	0.00	0.00	0.01	0.01	#N/A	#N/A	0.01	#N/A
	2:44:54	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.01	#N/A
	2:49:45	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	2:54:36	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	2:59:27	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:04:18	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:09:09	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:14:00	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:18:51	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:23:42	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:28:33	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:33:24	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:38:15	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:43:06	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:47:57	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:52:48	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	3:57:39	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:02:30	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:07:21	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:12:12	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:17:03	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:21:54	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:26:45	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:31:36	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:36:27	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:41:18	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:46:09	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:51:00	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	4:55:51	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:00:42	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:05:33	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:10:24	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:15:15	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:20:06	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:24:57	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:29:48	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:34:39	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:39:30	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:44:21	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A
	5:49:12	0.00	0.00	0.00	0.00	0.00	#N/A	#N/A	0.00	#N/A

Markup Summary

8/12/2019 1:37:50 PM (1)



Subject: Text Box
Page Label: 1
Author: Daniel Torres
Date: 8/12/2019 1:37:50 PM
Color: ■

Please fill out the SDI data sheet and submit. Note that there is a link(<https://maperture.digitaldataservices.com/gvh/?viewer=cswdif#>) to this SDI data sheet form on the MS4 post construction detention form.