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June 22, 2026

El Paso County Planning and Community Development Department  
2880 International Circle  
Colorado Springs, CO 80910

**SUBJECT: Walden Preserve 2 Filing No. 4 (SF-18-034)  
Engineer's Certification Letter – Permanent Control Measures**

Ladies and Gentlemen:

Drainage Permanent Control Measures (PCM's) for this project include upgrades to one private Detention Basin (Pond B) and construction of one private Rain Garden (RG-C2). The constructed facilities provide the required storage volume and meet the required release rates, as documented by the attached MHFD design forms. The As-Built drawings accurately depict the installation of the PCM improvements and verify that adequate detention volume has been provided.

Based upon information gathered from periodic site visits to the project, JPS Engineering, Inc. is of the opinion that the Permanent Control Measures have been constructed in general compliance with the approved design plans as filed with El Paso County.

The site and adjacent properties (as affected by work performed under the County permit) appear to be stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and the improvements (public improvements, common development improvements, site grading and paving) meet or exceed the minimum design requirements.

Sincerely,  
**JPS Engineering, Inc.**

John P. Schwab, P.E.  
Colorado P.E. No. 29891



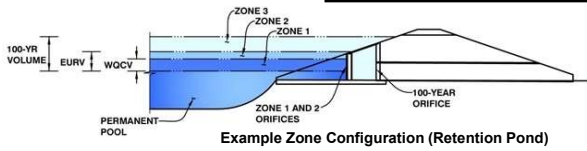


## Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **WALDEN PRESERVE**

Basin ID: **POND B**



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.25	2.331	Orifice Plate
Zone 2 (EURV)	2.12	1.752	Orifice Plate
Zone 3 (100-year)	5.94	9.305	Weir&Pipe (Restrict)
<b>Total</b>		<b>13.388</b>	

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 <sup>2</sup>
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 =	2.12	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	8.30	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft <sup>2</sup>
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft <sup>2</sup>

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	0.71	1.41					
Orifice Area (sq. inches)	100.00	1.23	1.23					
	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 =	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 <sup>2</sup>
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, Ho =	4.00	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	6.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	0.00	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 <sub>g</sub> =	4.00	N/A	feet
Over Flow Weir Slope Length =	0.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	0.00	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	0.00	N/A	ft <sup>2</sup>
Overflow Grate Open Area w/ Debris =	0.00	N/A	ft <sup>2</sup>

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

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	4.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	48.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	36.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	10.11	N/A	ft <sup>2</sup>
Outlet Orifice Centroid =	1.66	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.09	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	6.00	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	50.00	feet
Spillway End Slopes =	3.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

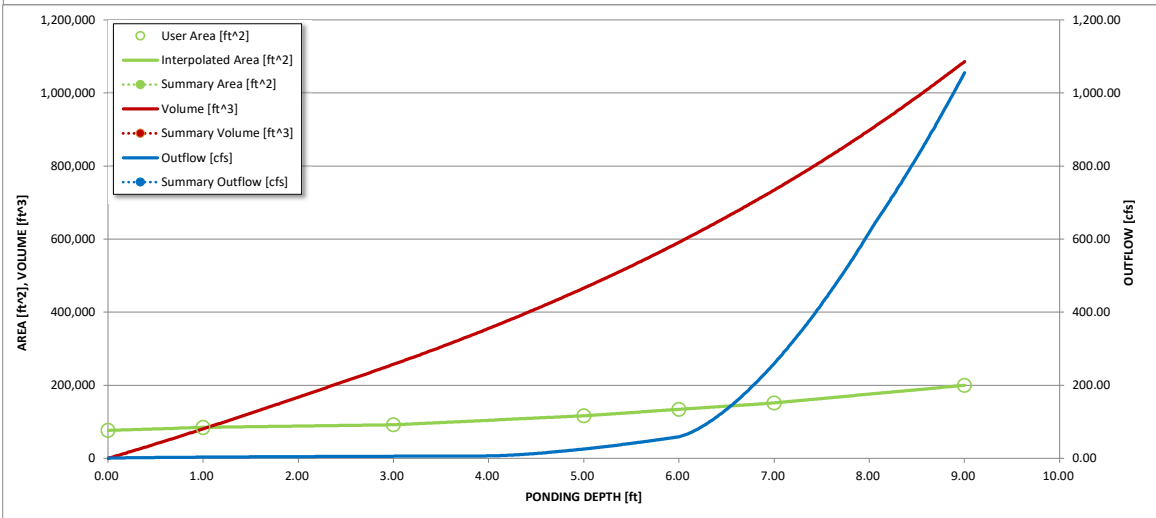
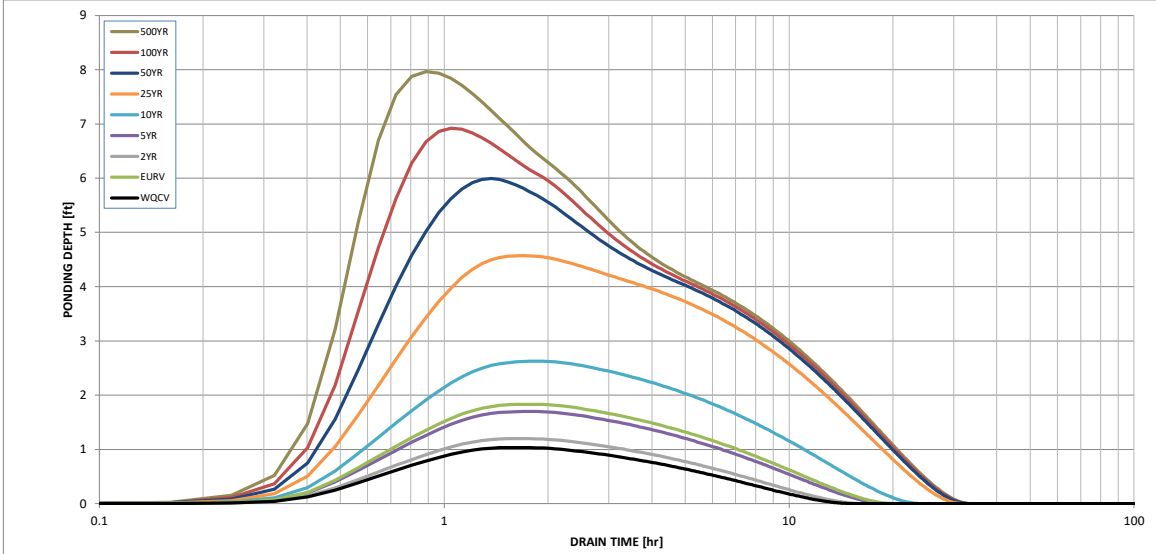
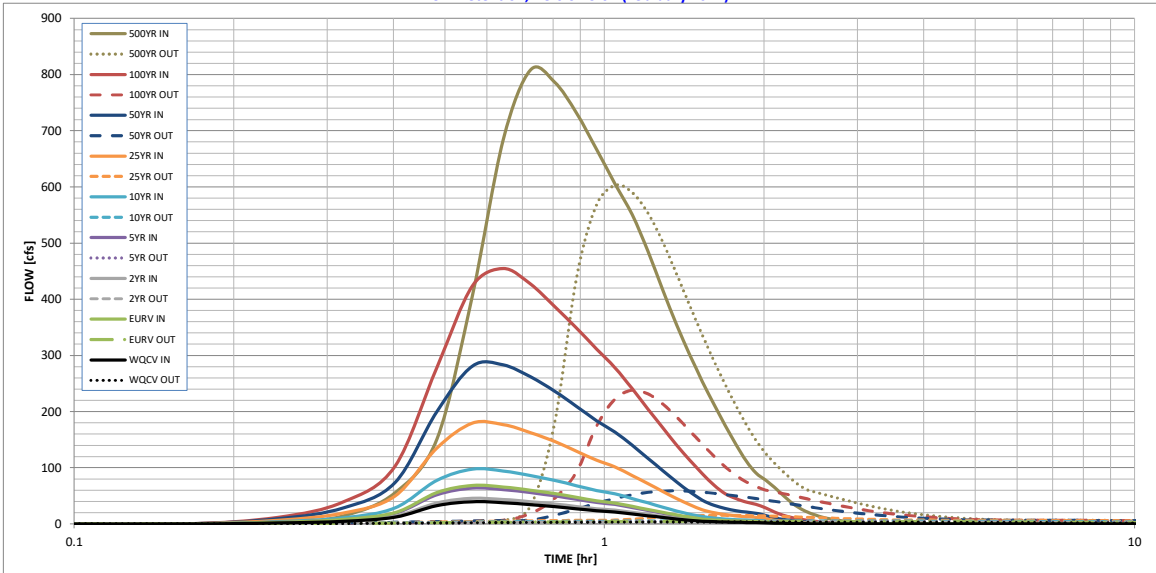
Spillway Design Flow Depth =	1.97	feet
Stage at Top of Freeboard =	8.97	feet
Basin Area at Top of Freeboard =	4.57	acres

### 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	1.50	1.75	2.00	2.25	2.52	3.14
Calculated Runoff Volume (acre-ft) =	2.331	4.083	2.688	3.790	5.852	10.973	17.533	29.086	55.540
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	2.329	4.081	2.687	3.788	5.850	10.970	17.527	29.076	55.515
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.01	0.05	0.14	0.34	0.64	1.26
Predevelopment Peak Q (cfs) =	0.0	0.0	1.4	4.1	23.7	72.8	170.2	321.2	635.5
Peak Inflow Q (cfs) =	39.4	68.5	45.4	63.7	97.4	179.4	283.1	454.8	808.1
Peak Outflow Q (cfs) =	3.4	4.6	3.7	4.4	5.5	15.1	59.0	237.9	602.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.1	0.2	0.2	0.3	0.7	0.9
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Gate 1	Overflow Gate 1	Spillway	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Gate 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) =	13	17	14	16	20	26	26	25	21
Time to Drain 99% of Inflow Volume (hours) =	14	18	15	18	22	29	29	28	27
Maximum Ponding Depth (ft) =	1.04	1.83	1.20	1.70	2.63	4.57	5.99	6.92	7.96
Area at Maximum Ponding Depth (acres) =	1.95	2.01	1.96	2.00	2.08	2.55	3.08	3.45	4.02
Maximum Volume Stored (acre-ft) =	1.912	3.497	2.225	3.216	5.114	9.573	13.545	16.580	20.457

# 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			

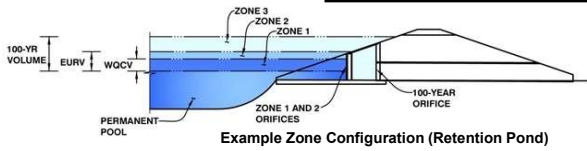




## Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **Walden Preserve 2 - Filing No. 4**  
 Basin ID: **Rain Garden C2 - As-Built**



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.82	0.150	Filtration Media
Zone 2 (User)	3.00	0.510	Weir&Pipe (Restrict)
Zone 3			
		0.660	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 =  ft<sup>2</sup>  
 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 =  inches

**Calculated Parameters for Plate**

WQ Orifice Area per Row =  ft<sup>2</sup>  
 Elliptical Half-Width =  feet  
 Elliptical Slot Centroid =  feet  
 Elliptical Slot Area =  ft<sup>2</sup>

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

	Row 1 (optional)	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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**User Input: Vertical Orifice (Circular or Rectangular)**

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

**Calculated Parameters for Vertical Orifice**

	Not Selected	Not Selected	
Vertical Orifice Area =			ft <sup>2</sup>
Vertical Orifice Centroid =			feet

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

	Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, H <sub>o</sub> =	0.82		ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	3.00		feet
Overflow Weir Slope =	0.00		H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	6.00		feet
Overflow Grate Open Area % =	70%		% grate open area/total area
Debris Clogging % =	50%		%

**Calculated Parameters for Overflow Weir**

	Zone 2 Weir	Not Selected	
Height of Grate Upper Edge, H <sub>g</sub> =	0.82		feet
Over Flow Weir Slope Length =	6.00		feet
Grate Open Area / 100-yr Orifice Area =	1478.51		should be ≥ 4
Overflow Grate Open Area w/o Debris =	12.60		ft <sup>2</sup>
Overflow Grate Open Area w/ Debris =	6.30		ft <sup>2</sup>

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

	Zone 2 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.00		ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	1.25		inches
Restrictor Plate Height Above Pipe Invert =	6.00		inches

**Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate**

	Zone 2 Restrictor	Not Selected	
Outlet Orifice Area =	0.01		ft <sup>2</sup>
Outlet Orifice Centroid =	0.05		feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

**User Input: Emergency Spillway (Rectangular or Trapezoidal)**

Spillway Invert Stage =	1.00	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	15.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

**Calculated Parameters for Spillway**

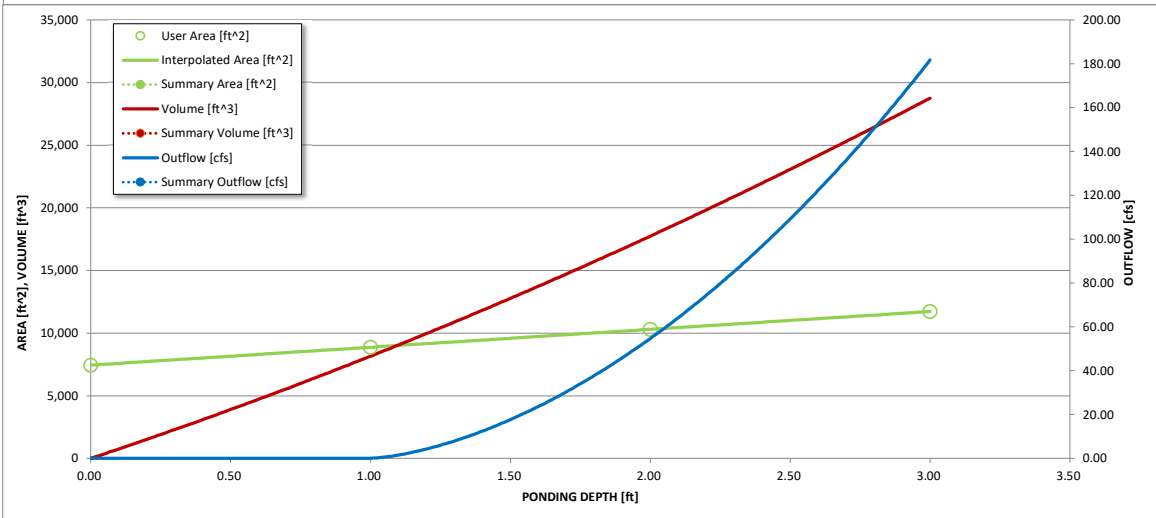
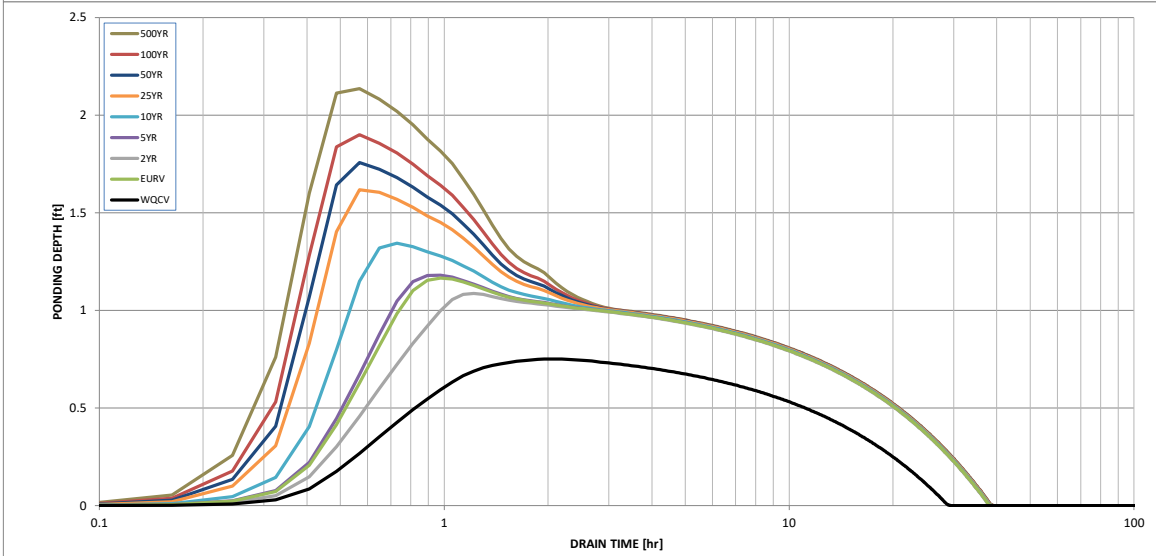
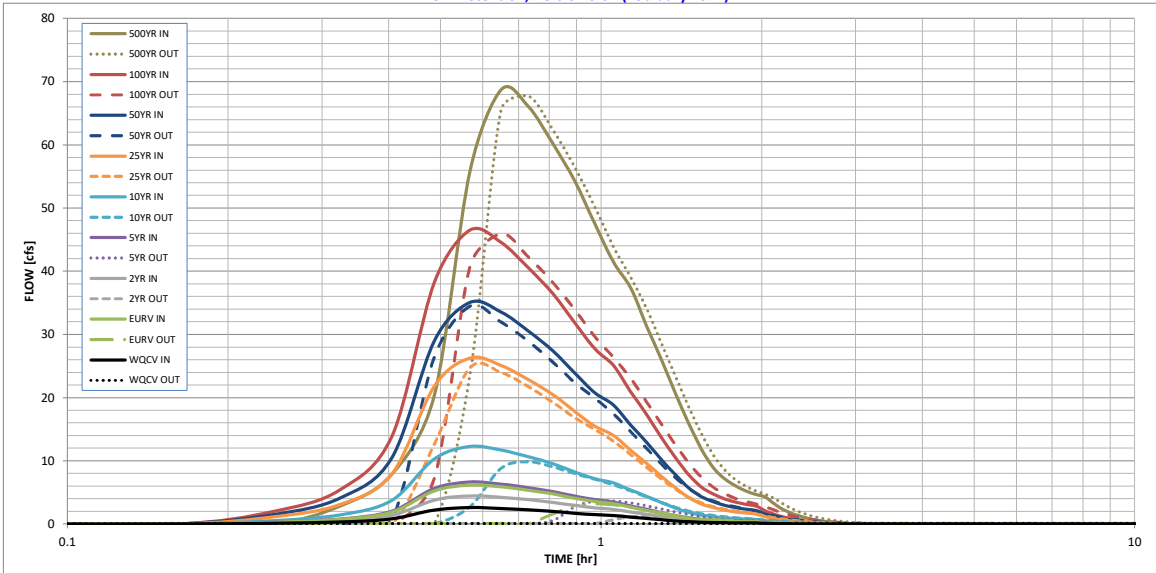
Spillway Design Flow Depth =	0.90	feet
Stage at Top of Freeboard =	2.90	feet
Basin Area at Top of Freeboard =	0.27	acres

### 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	1.50	1.75	2.00	2.25	2.52	3.14
Calculated Runoff Volume (acre-ft) =	0.150	0.359	0.259	0.388	0.721	1.556	2.086	2.779	4.134
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.149	0.359	0.258	0.387	0.719	1.555	2.084	2.776	4.130
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.20	0.66	0.91	1.23	1.82
Predevelopment Peak Q (cfs) =	0.0	0.0	0.3	0.5	4.5	15.1	20.8	28.0	41.4
Peak Inflow Q (cfs) =	2.6	6.2	4.4	6.6	12.2	26.2	35.0	46.5	68.7
Peak Outflow Q (cfs) =	0.1	3.2	1.2	3.6	9.8	24.7	34.5	45.9	67.7
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	7.7	2.2	1.6	1.7	1.6	1.6
Structure Controlling Flow =	Outlet Plate 1	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	-0.01	-0.01	0.0	0.0	0.0	0.0	0.0	0.0
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) =	28	36	37	36	34	29	26	22	15
Time to Drain 99% of Inflow Volume (hours) =	29	37	38	37	37	35	34	33	30
Maximum Ponding Depth (ft) =	0.75	1.17	1.09	1.18	1.34	1.62	1.76	1.90	2.14
Area at Maximum Ponding Depth (acres) =	0.20	0.21	0.21	0.21	0.21	0.22	0.23	0.23	0.24
Maximum Volume Stored (acre-ft) =	0.137	0.220	0.204	0.224	0.258	0.318	0.349	0.384	0.438

# 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			

