



January 19, 2026

El Paso County  
Planning & Community Development  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

Attn.: Project Manager

RE: Crossroads Mixed Use Filing No. 1  
Private Detention/Stormwater Quality Pond

Dear Project Manager:

Per the approved construction drawings for "Crossroads Mixed Use Filing No. 1" improvements were made to construct a water quality facility in compliance with the current El Paso County Drainage Criteria and with the approved Final Drainage Report for this project. It should be noted that at the onset of construction, the Colorado Department of Transportation requested that all permanent drainage structures associated with the project be removed from the Highway 24 Rights-of-Way. The provided as-builts reflect the "field changes" associated with the revision. It should be noted that modification of the outlet works do not affect the intended functionality of the facility nor do they negatively affect downstream facilities and or water quality.

Based upon this information and periodic site visits to the project during significant/key phases of the stormwater BMP installation, M&S Civil Consultants, Inc. is of the opinion that the stormwater BMPs have been constructed in general compliance with the approved design plans, and specifications as filed with El Paso County.

Statement Of Engineer In Responsible Charge

To the best of my knowledge, information and belief, for the referenced project above, the improvements have been constructed in general compliance with the approved design plans and specifications as filed with El Paso County to provide the required storage volume and meet the required release rates documented by the SDI design form, the stage areas, elevations and outlet dimensions. In addition, to the best of my knowledge, information and belief, for the referenced project above, the site and adjacent properties (as affected by work performed under the County permit) are stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and that the improvements (public improvements, common development improvements, site grading and paving) meet or exceed the minimum design requirements.



Virgil A. Sanchez  
Colorado P.E. No.37160  
For and on behalf of M&S Civil  
Consultants, Inc.

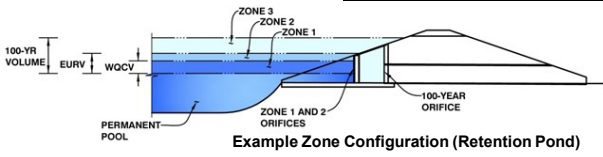


# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-*Detention, Version 4.03 (May 2020)*

**Project: CROSSROADS MIXED USE**

**Basin ID: POND 1**



**Example Zone Configuration (Retention Pond)**

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.35	0.859	Orifice Plate
Zone 2 (EURV)	6.08	2.433	Orifice Plate
Zone 3 (100-year)	7.38	1.430	Weir&Pipe (Restrict)
<b>Total (all zones)</b>		<b>4.723</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 =	6.18	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	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	2.23	4.37					
Orifice Area (sq. inches)	3.98	6.49	12.57					

	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 with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))**

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.35	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	5.71	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	2.91	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>1</sub> =	6.35	N/A	feet
Overflow Weir Slope Length =	2.91	N/A	feet
Grate Open Area / 100-yr Orifice Area =	13.62	N/A	
Overflow Grate Open Area w/o Debris =	11.63	N/A	ft <sup>2</sup>
Overflow Grate Open Area w/ Debris =	5.81	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 =	0.23	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	8.76		inches

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

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.85	N/A	ft <sup>2</sup>
Outlet Orifice Centroid =	0.42	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.54	N/A	radians

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

Spillway Invert Stage =	7.65	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	35.00	feet
Spillway End Slopes =	3.00	H:V
Freeboard above Max Water Surface =	1.00	feet

**Calculated Parameters for Spillway**

Spillway Design Flow Depth =	0.82	feet
Stage at Top of Freeboard =	9.47	feet
Basin Area at Top of Freeboard =	1.34	acres
Basin Volume at Top of Freeboard =	6.06	acre-ft

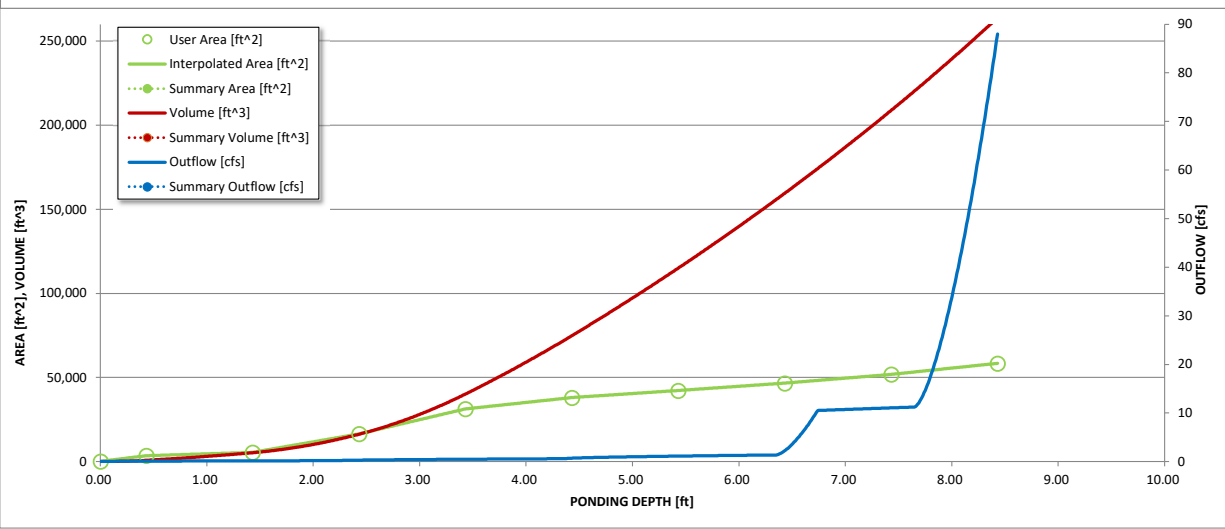
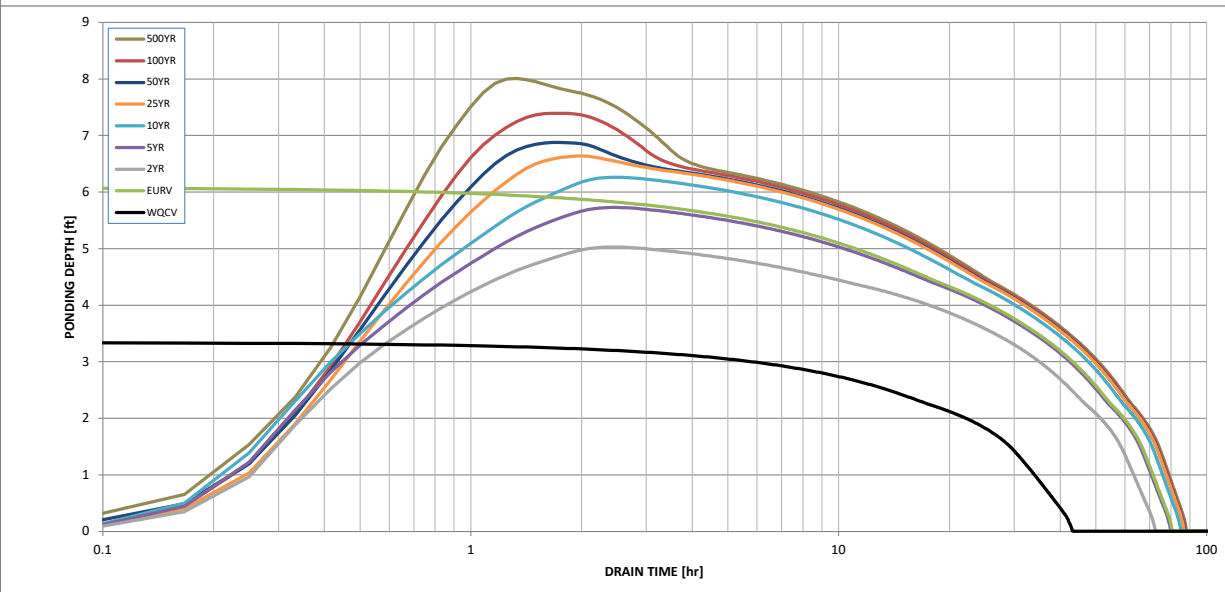
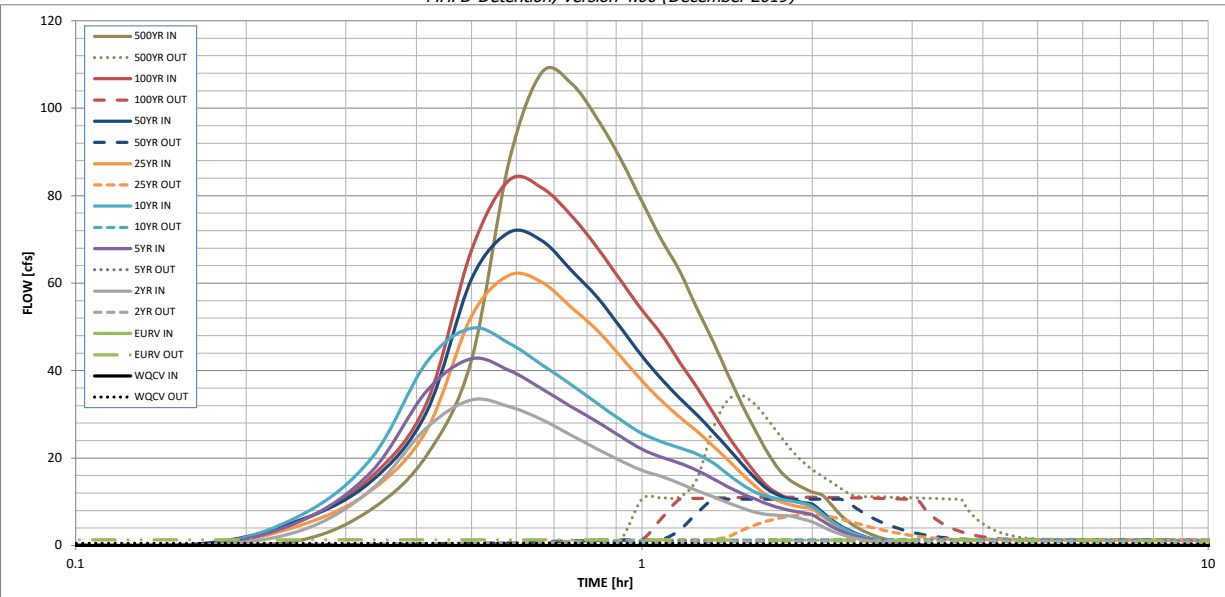
**Routed Hydrograph Results**

*The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =			1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	N/A	N/A	2.407	3.122	3.696	4.394	5.058	5.833	7.551
CUHP Runoff Volume (acre-ft) =	0.859	3.293	2.407	3.122	3.696	4.394	5.058	5.833	7.551
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.407	3.122	3.696	4.394	5.058	5.833	7.551
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.2	0.3	0.5	5.1	9.2	14.8	26.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.01	0.01	0.16	0.29	0.46	0.82
Peak Inflow Q (cfs) =	N/A	N/A	33.3	42.7	49.7	61.8	71.7	83.5	108.3
Peak Outflow Q (cfs) =	0.5	1.3	1.0	1.2	1.3	7.1	10.6	11.0	34.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	3.6	2.9	1.4	1.2	0.7	1.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.5	0.8	0.8	0.8
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) =	39	69	63	69	73	73	72	71	68
Time to Drain 99% of Inflow Volume (hours) =	41	76	68	75	80	81	80	80	79
Maximum Ponding Depth (ft) =	3.35	6.09	5.03	5.73	6.26	6.64	6.87	7.39	8.01
Area at Maximum Ponding Depth (acres) =	0.69	1.04	0.93	1.00	1.05	1.10	1.12	1.19	1.28
Maximum Volume Stored (acre-ft) =	0.865	3.303	2.251	2.926	3.470	3.878	4.144	4.745	5.495

# DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.00 (December 2019)*



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











