Civil Engineer
Stormwater Best Management Practice (permanent) Certification Letter

October 27, 2026

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

Attn.: Brad Walters, Inspections Supervisor

RE: **Rising Moon Filing No. 1**

The permanent stormwater Best Management Practices (BMPs) for the **Rising Moon Filing No. 1** consists of a Private Full Spectrum Extended Detention Basin. This facility is described by the following:

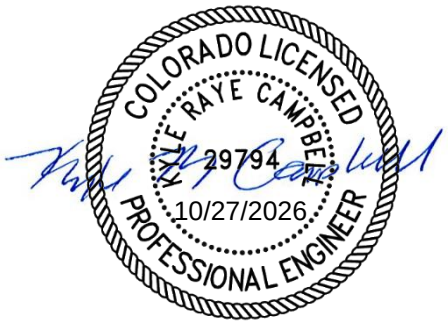
Pond 1 within Tract A, Rising Moon Filing No. 1

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, site grading and paving) meet or exceed the minimum design requirements. The detention/stormwater quality facility provides the required storage volume and will meet the required release rates (as documented by the attached UDFCD design form submitted with the original application), the stage areas, elevations and outlet dimensions.

Statement Of Engineer In Responsible Charge:

I, Kyle R. Campbell, a registered Professional Engineer in the State of Colorado, in accordance with Sections 5.2 and 5.3 of the Bylaws and Rules of the State Board of Registration for Professional Engineers and Professional Land Surveyors, do hereby certify that I or a person under my responsible charge periodically observed the construction of the above-mentioned project. Based on the on-site

field observations and review of pertinent as-built documentation, it is my professional opinion that the required permanent BMP has been installed and is in general compliance with the approved Construction Plans, and Specifications as filed with El Paso County. For BMPs with a Water Quality Capture Volume (WQCV), I have attached the post-construction As-Built drawings and calculations. The As-Built drawings accurately depict the final installation of the stormwater BMP.



Seal & Signature of P.E. Goes Here
Kyle R. Campbell, P.E.
Colorado No. 29794

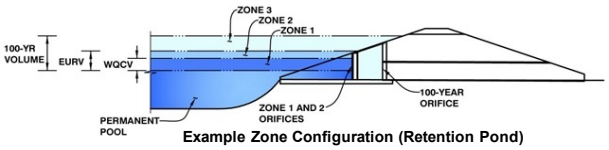
kc/250603/letters/PE CERT POND – RISING MOON 1.doc

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.08 (April 2026)

Project: **Rising Moon Filing No. 1 - PCM POND 1**

Basin ID: **Pond Certification As-built Model - Corrected (Interim Condition)**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected SCM Type =	**EDB**	
Watershed Area =	10.36	acres
Watershed Length =	675	ft
Watershed Length to Centroid =	300	ft
Watershed Slope =	0.060	ft/ft
Watershed Imperviousness =	41.10%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Denver - Capitol Building	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.158	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.448	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.413	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.614	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	0.794	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	1.050	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	1.250	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	1.511	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.1 in.) =	1.995	acre-feet	3.10	inches
Approximate 2-yr Detention Volume =	0.331	acre-feet		
Approximate 5-yr Detention Volume =	0.462	acre-feet		
Approximate 10-yr Detention Volume =	0.632	acre-feet		
Approximate 25-yr Detention Volume =	0.705	acre-feet		
Approximate 50-yr Detention Volume =	0.739	acre-feet		
Approximate 100-yr Detention Volume =	0.844	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.158	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.290	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.396	acre-feet
Total Detention Basin Volume =	0.844	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_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

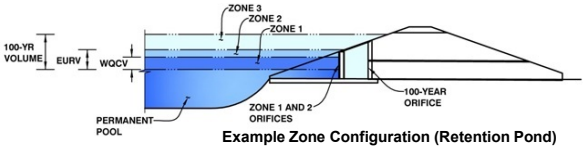
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	429	0.010		
5833	--	1.00	--	--	--	3,527	0.081	1,978	0.045
5834	--	2.00	--	--	--	10,906	0.250	9,194	0.211
5835	--	3.00	--	--	--	17,170	0.394	23,232	0.533
5836	--	4.00	--	--	--	19,898	0.457	41,766	0.959
5837	--	5.00	--	--	--	22,391	0.514	62,911	1.444
5838	--	6.00	--	--	--	25,068	0.575	86,640	1.989
5839	--	7.00	--	--	--	27,841	0.639	113,095	2.596
5840	--	8.00	--	--	--	30,746	0.706	142,388	3.269
5840.86	--	8.86	--	--	--	33,853	0.777	170,166	3.906

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)

Project: **Rising Moon Filing No. 1 - PCM POND 1**

Basin ID: **Pond Certification As-built Model - Corrected (Interim Condition)**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.77	0.158	Orifice Plate
Zone 2 (EURV)	2.78	0.290	Orifice Plate
Zone 3 (100-year)	3.75	0.396	Weir&Pipe (Restrict)
Total (all zones)		0.844	

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

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft²
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

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

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft²
Depth at top of Zone using Orifice Plate =	2.78	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft²

Calculated Parameters for Plate

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	1.00	2.00					
Orifice Area (sq. inches)	1.00	1.25	1.50					

	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			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft²
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

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			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	4.02	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	5.02	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	4.12	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	2.34	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	11.48	N/A	ft²
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	5.74	N/A	ft²
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.68	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	4.91	N/A	ft²
Outlet Pipe Diameter =	30.00	N/A	inches	Outlet Orifice Centroid =	1.25	N/A	feet
Restrictor Plate Height Above Pipe Invert =	30.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	7.39	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.84	feet
Spillway Crest Length =	12.00	feet	Stage at Top of Freeboard =	9.23	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.78	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	3.91	acre-ft

Calculated Parameters for Spillway

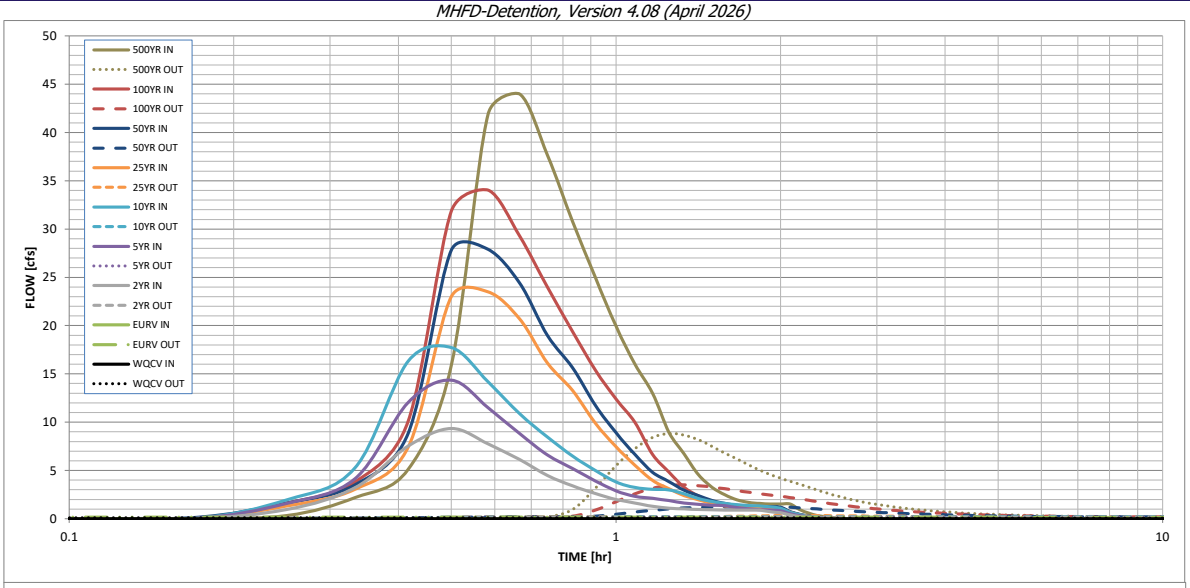
Routed Hydrograph Results

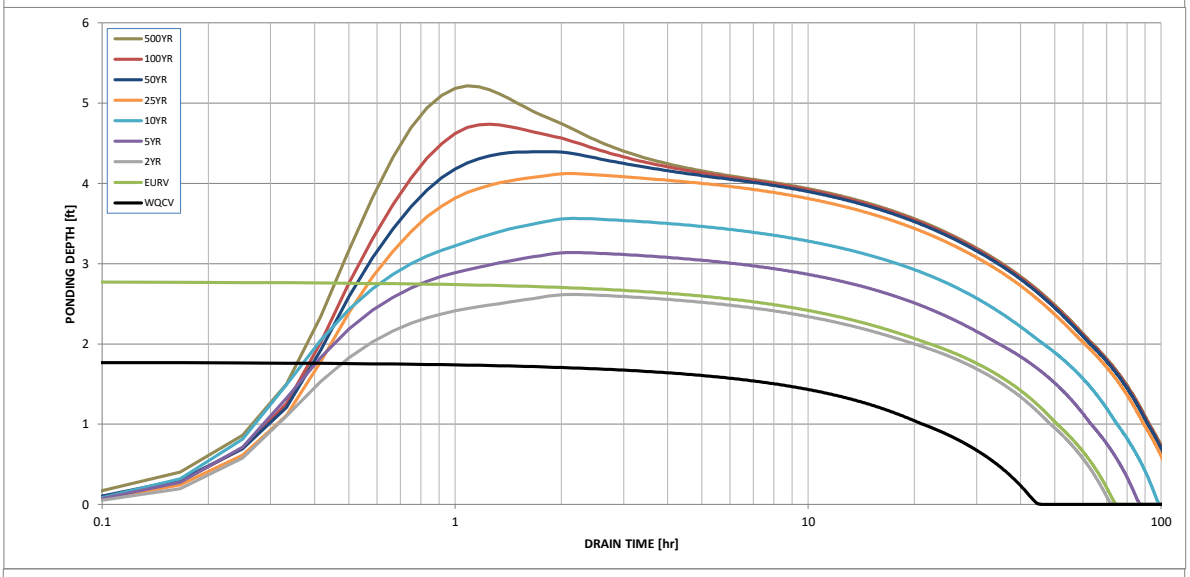
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

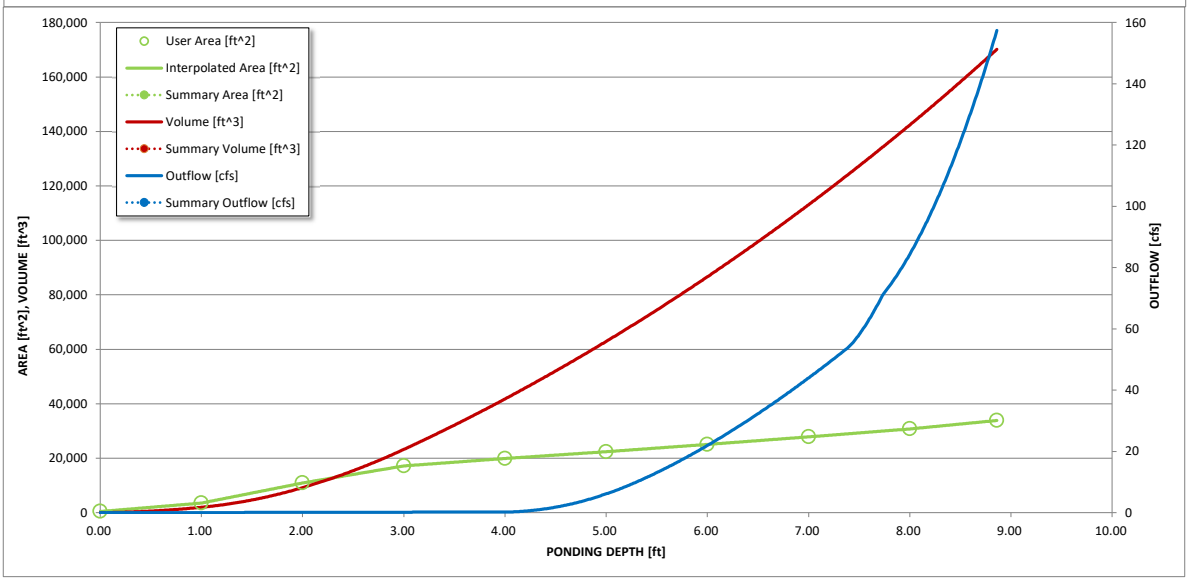
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.10
CUHP Runoff Volume (acre-ft) =	0.158	0.448	0.413	0.614	0.794	1.050	1.250	1.511	1.995
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.413	0.614	0.794	1.050	1.250	1.511	1.995
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	2.3	5.8	8.4	13.6	17.0	21.4	29.1
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.22	0.56	0.82	1.32	1.65	2.07	2.81
Peak Inflow Q (cfs) =	N/A	N/A	9.4	14.3	17.7	23.5	27.9	34.0	44.0
Peak Outflow Q (cfs) =	0.1	0.2	0.1	0.2	0.2	0.3	1.2	3.5	8.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.0	0.0	0.0	0.1	0.2	0.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.0	0.1	0.3	0.7
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) =	40	64	63	74	84	95	95	92	89
Time to Drain 99% of Inflow Volume (hours) =	**42**	70	68	81	92	104	106	105	103
Maximum Ponding Depth (ft) =	1.78	2.78	2.61	3.14	3.56	4.12	4.39	4.74	5.21
Area at Maximum Ponding Depth (acres) =	0.21	0.36	0.34	0.40	0.43	0.46	0.48	0.50	0.53
Maximum Volume Stored (acre-ft) =	0.160	0.450	0.391	0.585	0.764	1.014	1.141	1.308	1.554

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)







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:

Inflow Hydrographs

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

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
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]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.01	0.33
	0:15:00	0.00	0.00	0.97	1.58	1.96	1.32	1.62	1.61	2.19
	0:20:00	0.00	0.00	3.20	4.15	5.25	3.05	3.52	3.81	5.10
	0:25:00	0.00	0.00	7.53	12.04	16.30	7.38	8.83	10.08	15.87
	0:30:00	0.00	0.00	9.35	14.34	17.73	22.98	27.82	31.84	41.88
	0:35:00	0.00	0.00	7.74	11.49	14.17	23.50	27.88	34.02	43.98
	0:40:00	0.00	0.00	6.12	8.80	10.87	20.68	24.38	29.25	37.62
	0:45:00	0.00	0.00	4.46	6.58	8.45	16.10	18.96	23.96	30.79
	0:50:00	0.00	0.00	3.39	5.20	6.48	13.27	15.64	19.40	25.02
	0:55:00	0.00	0.00	2.61	3.92	5.01	9.92	11.77	15.42	19.93
	1:00:00	0.00	0.00	2.00	2.89	3.81	7.47	8.90	12.39	16.01
	1:05:00	0.00	0.00	1.63	2.32	3.23	5.54	6.65	9.97	13.00
	1:10:00	0.00	0.00	1.28	2.11	3.04	3.96	4.82	6.67	8.96
	1:15:00	0.00	0.00	1.10	1.87	2.98	3.12	3.85	4.82	6.70
	1:20:00	0.00	0.00	1.01	1.63	2.57	2.39	2.94	3.25	4.53
	1:25:00	0.00	0.00	0.96	1.49	2.09	1.97	2.39	2.34	3.26
	1:30:00	0.00	0.00	0.92	1.40	1.78	1.58	1.89	1.78	2.47
	1:35:00	0.00	0.00	0.90	1.34	1.57	1.33	1.58	1.41	1.96
	1:40:00	0.00	0.00	0.88	1.14	1.45	1.18	1.38	1.21	1.67
	1:45:00	0.00	0.00	0.88	1.01	1.36	1.11	1.28	1.14	1.57
	1:50:00	0.00	0.00	0.88	0.94	1.31	1.06	1.22	1.12	1.52
	1:55:00	0.00	0.00	0.72	0.89	1.22	1.04	1.20	1.11	1.52
	2:00:00	0.00	0.00	0.61	0.82	1.08	1.03	1.18	1.11	1.52
	2:05:00	0.00	0.00	0.38	0.51	0.67	0.65	0.74	0.70	0.95
	2:10:00	0.00	0.00	0.24	0.31	0.41	0.40	0.46	0.43	0.58
	2:15:00	0.00	0.00	0.14	0.18	0.24	0.24	0.27	0.25	0.34
	2:20:00	0.00	0.00	0.07	0.11	0.14	0.14	0.16	0.15	0.20
	2:25:00	0.00	0.00	0.04	0.06	0.07	0.07	0.08	0.08	0.10
	2:30:00	0.00	0.00	0.01	0.02	0.02	0.03	0.03	0.03	0.04
	2:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.08 (April 2026)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Elevation [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).