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October 3, 2025

El Paso County Engineering Division
Department of Public Works
3275 Akers Drive
Colorado Springs, Colorado 80922

Re: Professional Engineer's Certification of Permanent Control Measure
Flying Horse North Filing No. 4, Pond B

This letter serves as a Pond Certification for the constructed Full Spectrum Detention Facility "Pond B" located in Flying Horse North Filing No. 4. The permanent control measure is located north of Old Stagecoach Road, east of Lot 38, and west Lots 39 and 40 within the Flying Horse North subdivision, Filing No. 4, El Paso County, Colorado.

The detention facility was designed by a Colorado Licensed Professional Engineer of HR Green Development, LLC. and the design is within the County approved Construction Drawings dated February 20, 2025 and is referred to as "Pond B" within Tract B of the development. A Colorado Licensed Professional Surveyor conducted an as-built survey of the facility in September of 2025 to verify the basin and infrastructure dimensions, elevations, materials, inverts, and slopes as required for determination of inflow and outflow hydraulics.

The as-built conditions of the basin and its infrastructure were assessed and compared to the approved Construction Drawings and design worksheets within the approved Final Drainage Report. The facility was found to be in general compliance with the design, and it is anticipated that the facility will function as intended with no negative impacts to surrounding and downstream developments, property, or infrastructure. General compliance allows for construction tolerances and is based on the information provided by the as-built survey.

The September 2025 as-built conditions required a new orifice plate to control outflow conditions to meet the required hours for WQCV, EURV, and 100-year storm events. The new orifice plate was installed in October of 2025.

The facility is in a stabilized condition and there are no proposed modifications required at this time.

Sincerely,

HR GREEN, INC.

Richard D. Lyon

Richard D. Lyon, PE
Project Manager, Civil Engineer
HR Green Development, LLC.



MHFD-Detention, Version 4.06 (July 2022)

Basin ID: POND B



Total detention volume is less than 100-year volume.

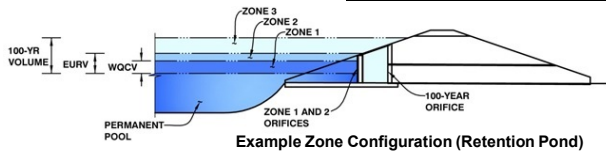
10/3/2025, 9:23 AM

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **FLYING HORSE NORTH FILING NO. 4**

Basin ID: **POND B**



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.54	0.500	Orifice Plate
Zone 2 (EURV)	3.07	0.307	Circular Orifice
Zone 3 (User)	5.08	1.513	Weir&Pipe (Restrict)
Total (all zones)		2.320	

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)

Centroid 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 = 1-5/8 inches)

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	0.80	1.60					
Orifice Area (sq. inches)	2.19	2.19	2.19					

	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)

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 Orif
Zone 2 Circular Not Selected
Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Type =
Debris Clogging % = %

Calculated Parameters for Overflow W
Zone 3 Weir Not Selected
Height of Grate Upper Edge, H_g = ft
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area =
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

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

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = inches
Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pl
Zone 3 Restrictor Not Selected
Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = degrees

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
Basin Volume at Top of Freeboard = acre-ft

Routed Hydrograph Results

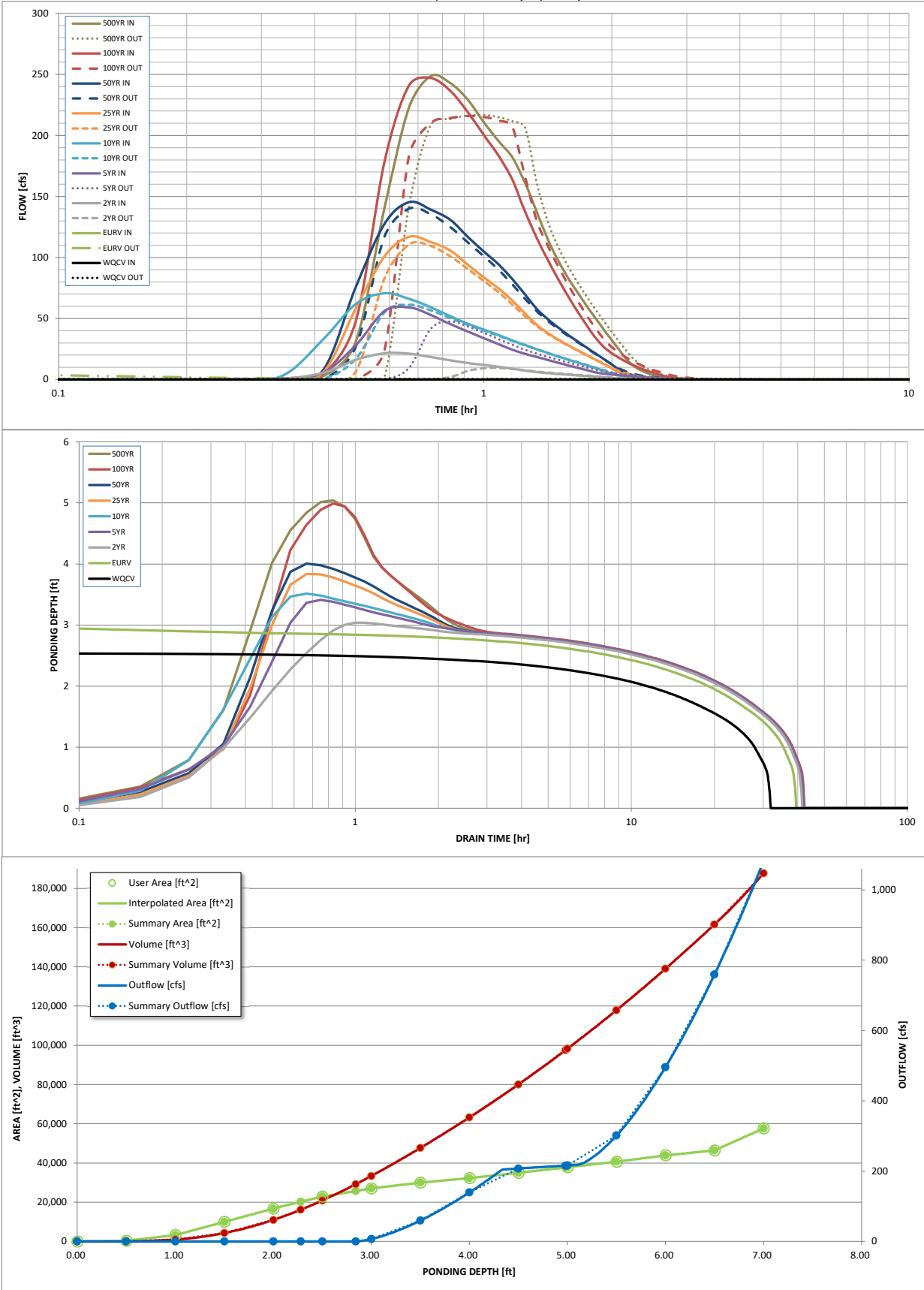
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through A)

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft)	0.500	0.807	1.270	2.932	4.609	7.657	9.710	12.690
User Override Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.270	3.472	4.609	7.657	9.710	17.082
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	14.9	41.7	63.1	109.6	138.0	172.8
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A						216.0
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.14	0.39	0.60	1.04	1.31	2.04
Peak Inflow Q (cfs)	N/A	N/A	21.5	59.1	70.7	116.9	145.3	247.1
Peak Outflow Q (cfs)	0.3	8.2	9.5	47.4	61.2	110.6	139.9	215.9
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	1.1	1.0	1.0	1.0	1.0
Structure Controlling Flow	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1
Max Velocity through Grate 1 (fps)	N/A	0.11	0.09	0.5	0.6	1.0	1.3	2.1
Max Velocity through Grate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	29	36	36	31	28	23	20	10
Time to Drain 99% of Inflow Volume (hours)	31	38	39	37	36	33	31	26
Maximum Ponding Depth (ft)	2.54	3.07	3.04	3.41	3.51	3.83	4.00	4.99
Area at Maximum Ponding Depth (acres)	0.53	0.63	0.63	0.68	0.69	0.72	0.74	0.87
Maximum Volume Stored (acre-ft)	0.50	0.81	0.79	1.03	1.10	1.33	1.45	2.24
Elevation (ft)	7528.54	7529.07						7530.99
Pond Bottom (ft)	7526.00							

SWMM volume

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-*Detention*, Version 4.06 (July 2022)



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	USER	CUHP	CUHP	CUHP	USER	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	0.02	0.00	0.00	0.01	0.03	0.05
	0:15:00	0.00	0.00	0.13	0.29	0.25	0.17	0.22	0.32	0.32
	0:20:00	0.00	0.00	0.50	0.84	2.56	0.51	0.61	0.81	2.42
	0:25:00	0.00	0.00	5.28	5.28	32.00	5.01	6.58	4.04	31.16
	0:30:00	0.00	0.00	16.15	28.18	61.85	58.31	75.74	47.72	140.12
	0:35:00	0.00	0.00	21.48	55.99	70.65	100.78	127.30	177.86	222.60
	0:40:00	0.00	0.00	21.19	59.11	66.12	116.93	145.33	240.83	248.61
	0:45:00	0.00	0.00	18.41	52.91	59.32	112.63	139.24	247.06	242.92
	0:50:00	0.00	0.00	15.77	45.39	51.88	105.76	130.83	236.61	229.34
	0:55:00	0.00	0.00	13.51	39.31	45.74	94.10	116.93	219.08	210.73
	1:00:00	0.00	0.00	11.89	33.91	40.89	83.71	104.89	200.33	195.31
	1:05:00	0.00	0.00	10.45	28.93	36.47	74.57	94.22	183.22	182.16
	1:10:00	0.00	0.00	8.87	24.45	32.13	64.62	82.26	163.76	160.97
	1:15:00	0.00	0.00	7.27	21.11	28.23	54.18	69.62	137.51	137.05
	1:20:00	0.00	0.00	6.00	18.47	24.80	44.69	57.74	115.66	114.12
	1:25:00	0.00	0.00	5.21	15.99	21.68	37.99	49.23	97.45	96.67
	1:30:00	0.00	0.00	4.56	13.64	18.77	32.53	42.20	81.53	82.47
	1:35:00	0.00	0.00	3.98	11.47	16.17	27.90	36.24	67.41	70.56
	1:40:00	0.00	0.00	3.40	9.51	13.77	23.69	30.82	54.87	59.85
	1:45:00	0.00	0.00	2.83	7.57	11.49	19.86	25.89	43.86	50.04
	1:50:00	0.00	0.00	2.28	5.83	9.29	16.17	21.17	33.94	40.82
	1:55:00	0.00	0.00	1.71	4.79	7.07	12.63	16.64	26.61	32.21
	2:00:00	0.00	0.00	1.15	4.12	4.87	9.19	12.28	21.52	24.12
	2:05:00	0.00	0.00	0.67	3.56	3.31	5.81	7.96	17.61	16.50
	2:10:00	0.00	0.00	0.42	3.01	2.45	3.59	5.15	14.31	11.29
	2:15:00	0.00	0.00	0.30	2.51	1.89	2.28	3.44	11.60	7.89
	2:20:00	0.00	0.00	0.23	2.04	1.47	1.48	2.35	9.28	5.46
	2:25:00	0.00	0.00	0.18	1.60	1.14	0.95	1.58	7.30	3.68
	2:30:00	0.00	0.00	0.13	1.18	0.86	0.62	1.08	5.61	2.39
	2:35:00	0.00	0.00	0.10	0.81	0.63	0.40	0.71	4.07	1.45
	2:40:00	0.00	0.00	0.07	0.55	0.45	0.25	0.46	2.75	0.84
	2:45:00	0.00	0.00	0.06	0.40	0.31	0.17	0.31	1.87	0.55
	2:50:00	0.00	0.00	0.05	0.31	0.21	0.12	0.22	1.28	0.38
	2:55:00	0.00	0.00	0.04	0.24	0.15	0.09	0.17	0.88	0.30
	3:00:00	0.00	0.00	0.03	0.19	0.11	0.06	0.13	0.58	0.24
	3:05:00	0.00	0.00	0.02	0.15	0.08	0.05	0.09	0.37	0.18
	3:10:00	0.00	0.00	0.01	0.12	0.06	0.03	0.07	0.23	0.13
	3:15:00	0.00	0.00	0.01	0.09	0.03	0.02	0.05	0.15	0.09
	3:20:00	0.00	0.00	0.01	0.07	0.02	0.01	0.03	0.11	0.05
	3:25:00	0.00	0.00	0.00	0.05	0.01	0.01	0.02	0.08	0.03
	3:30:00	0.00	0.00	0.00	0.04	0.00	0.00	0.01	0.07	0.01
	3:35:00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.05	0.00
	3:40:00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.00
	3:45:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00
	3:50:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	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

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

	Stage	Area	Area	Volume	Volume	Total
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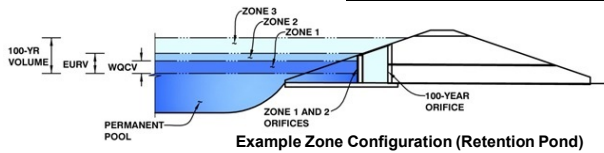
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: FLYING HORSE NORTH FILING NO. 4

Basin ID: POND B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.54	0.500	Orifice Plate
Zone 2 (EUR)	3.07	0.307	Circular Orifice
Zone 3 (User)	5.08	1.513	Weir&Pipe (Restrict'g)
	Total (all zones)	2.320	

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

Underdrain Orifice Area =

N/A

 ft²

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)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)

WQ Orifice Area per Row = 1.146E-02 ft²

Depth at top of Zone using Orifice Plate = 2.28 ft (relative to basin bottom at Stage = 0 ft)

Elliptical Half-Width = N/A feet

Orifice Plate: Orifice Vertical Spacing = 9.20 inches

Elliptical Slot Centroid = N/A feet

Orifice Plate: Orifice Area per Row = 1.65 sq. inches (diameter = 1-7/16 inches)

Elliptical Slot Area =

N/A

 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	0.80	1.60					
Orifice Area (sq. inches)	1.65	1.65	1.65					
	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)

Calculated Parameters for Vertical Orif

	Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.28	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	2.84	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	1.00	N/A	inches

	Zone 2 Circular	Not Selected
Vertical Orifice Area =	0.01	N/A
Vertical Orifice Centroid =	0.04	N/A

Vertical Orifice Centroid =	0.04	N/A
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User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Calculated Parameters for Overflow W

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected
Overflow Weir Front Edge Height, H _o =	2.85	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H _i =	2.85	N/A
Overflow Weir Front Edge Length =	30.00	N/A	feet	Overflow Weir Slope Length =	5.00	N/A
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	5.89	N/A
Horiz. Length of Weir Sides =	5.00	N/A	feet	Overflow Grate Open Area w/o Debris =	104.40	N/A
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	52.20	N/A
Debris Clogging % =	50%	N/A	%			

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

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plg

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected
Depth to Invert of Outlet Pipe =	3.70	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	17.71	N/A
Outlet Pipe Diameter =	60.00	N/A	inches	Outlet Orifice Centroid =	2.28	N/A
Restrictor Plate Height Above Pipe Invert =	50.75		inches	Half-Central Angle of Restrictor Plate on Pipe =	2.33	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage=	5.10	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.86	feet
Spillway Crest Length =	100.00	feet	Stage at Top of Freeboard =	6.96	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	1.30	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	4.26	acre-ft

Routed Hydrograph Results

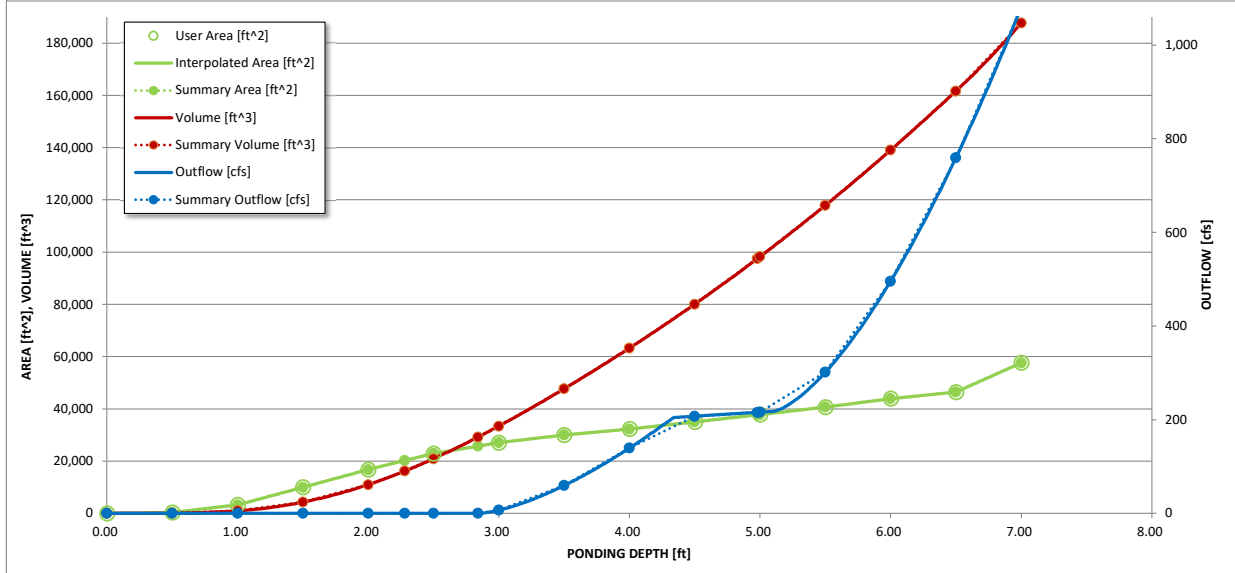
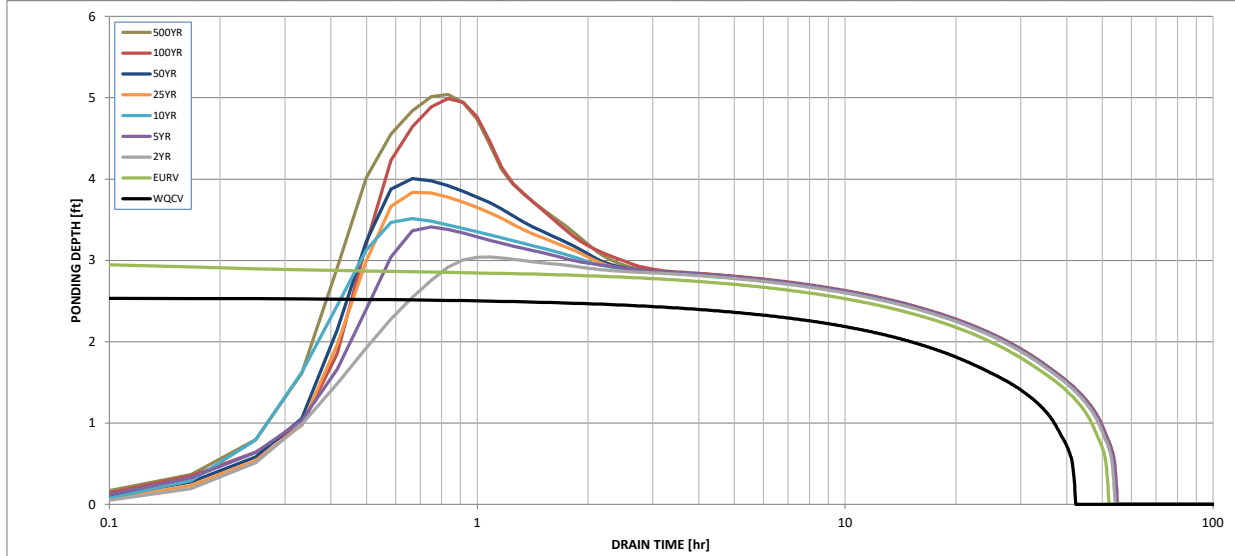
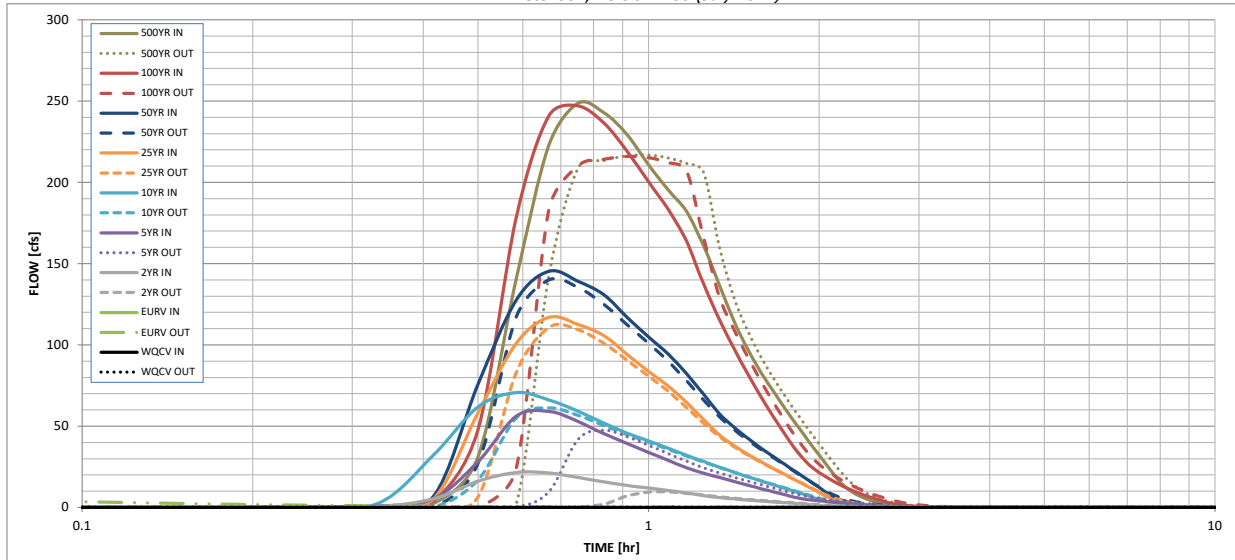
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI)

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.500	0.807	1.270	2.932	4.609	7.657	9.710	12.690
User Override Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.270	3.472	4.609	7.657	9.710	17.082
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	14.9	41.7	63.1	109.6	138.0	172.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						216.0
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.14	0.39	0.60	1.04	1.31	2.04
Peak Inflow Q (cfs) =	N/A	N/A	21.5	59.1	70.7	116.9	145.3	247.1
Peak Outflow Q (cfs) =	0.2	8.1	9.5	47.5	61.2	110.6	139.9	215.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.1	1.0	1.0	1.0	1.0
Structure Controlling Flow =	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	0.11	0.09	0.5	0.6	1.1	1.3	2.1
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	47	47	40	36	29	25	12
Time to Drain 99% of Inflow Volume (hours) =	41	50	51	48	46	43	40	34
Maximum Ponding Depth (ft) =	2.54	3.07	3.04	3.41	3.51	3.84	4.00	4.99
Area at Maximum Ponding Depth (acres) =	0.53	0.63	0.63	0.68	0.69	0.72	0.74	0.87
Maximum Volume Stored (acre-ft) =	0.50	0.81	0.79	1.03	1.10	1.33	1.45	2.24
Elevation (ft) =	7528.54	7529.07						7530.99
Pond Bottom (ft) =	7526.00							

SWMM volume	103,808
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-*Detention*, Version 4.06 (July 2022)



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	USER	CUHP	CUHP	CUHP	USER	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	0.02	0.00	0.00	0.01	0.03	0.05
	0:15:00	0.00	0.00	0.13	0.29	0.25	0.17	0.22	0.32	0.32
	0:20:00	0.00	0.00	0.50	0.84	2.56	0.51	0.61	0.81	2.42
	0:25:00	0.00	0.00	5.28	5.28	32.00	5.01	6.58	4.04	31.16
	0:30:00	0.00	0.00	16.15	28.18	61.85	58.31	75.74	47.72	140.12
	0:35:00	0.00	0.00	21.48	55.99	70.65	100.78	127.30	177.86	222.60
	0:40:00	0.00	0.00	21.19	59.11	66.12	116.93	145.33	240.83	248.61
	0:45:00	0.00	0.00	18.41	52.91	59.32	112.63	139.24	247.06	242.92
	0:50:00	0.00	0.00	15.77	45.39	51.88	105.76	130.83	236.61	229.34
	0:55:00	0.00	0.00	13.51	39.31	45.74	94.10	116.93	219.08	210.73
	1:00:00	0.00	0.00	11.89	33.91	40.89	83.71	104.89	200.33	195.31
	1:05:00	0.00	0.00	10.45	28.93	36.47	74.57	94.22	183.22	182.16
	1:10:00	0.00	0.00	8.87	24.45	32.13	64.62	82.26	163.76	160.97
	1:15:00	0.00	0.00	7.27	21.11	28.23	54.18	69.62	137.51	137.05
	1:20:00	0.00	0.00	6.00	18.47	24.80	44.69	57.74	115.66	114.12
	1:25:00	0.00	0.00	5.21	15.99	21.68	37.99	49.23	97.45	96.67
	1:30:00	0.00	0.00	4.56	13.64	18.77	32.53	42.20	81.53	82.47
	1:35:00	0.00	0.00	3.98	11.47	16.17	27.90	36.24	67.41	70.56
	1:40:00	0.00	0.00	3.40	9.51	13.77	23.69	30.82	54.87	59.85
	1:45:00	0.00	0.00	2.83	7.57	11.49	19.86	25.89	43.86	50.04
	1:50:00	0.00	0.00	2.28	5.83	9.29	16.17	21.17	33.94	40.82
	1:55:00	0.00	0.00	1.71	4.79	7.07	12.63	16.64	26.61	32.21
	2:00:00	0.00	0.00	1.15	4.12	4.87	9.19	12.28	21.52	24.12
	2:05:00	0.00	0.00	0.67	3.56	3.31	5.81	7.96	17.61	16.50
	2:10:00	0.00	0.00	0.42	3.01	2.45	3.59	5.15	14.31	11.29
	2:15:00	0.00	0.00	0.30	2.51	1.89	2.28	3.44	11.60	7.89
	2:20:00	0.00	0.00	0.23	2.04	1.47	1.48	2.35	9.28	5.46
	2:25:00	0.00	0.00	0.18	1.60	1.14	0.95	1.58	7.30	3.68
	2:30:00	0.00	0.00	0.13	1.18	0.86	0.62	1.08	5.61	2.39
	2:35:00	0.00	0.00	0.10	0.81	0.63	0.40	0.71	4.07	1.45
	2:40:00	0.00	0.00	0.07	0.55	0.45	0.25	0.46	2.75	0.84
	2:45:00	0.00	0.00	0.06	0.40	0.31	0.17	0.31	1.87	0.55
	2:50:00	0.00	0.00	0.05	0.31	0.21	0.12	0.22	1.28	0.38
	2:55:00	0.00	0.00	0.04	0.24	0.15	0.09	0.17	0.88	0.30
	3:00:00	0.00	0.00	0.03	0.19	0.11	0.06	0.13	0.58	0.24
	3:05:00	0.00	0.00	0.02	0.15	0.08	0.05	0.09	0.37	0.18
	3:10:00	0.00	0.00	0.01	0.12	0.06	0.03	0.07	0.23	0.13
	3:15:00	0.00	0.00	0.01	0.09	0.03	0.02	0.05	0.15	0.09
	3:20:00	0.00	0.00	0.01	0.07	0.02	0.01	0.03	0.11	0.05
	3:25:00	0.00	0.00	0.00	0.05	0.01	0.01	0.02	0.08	0.03
	3:30:00	0.00	0.00	0.00	0.04	0.00	0.00	0.01	0.07	0.01
	3:35:00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.05	0.00
	3:40:00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.00
	3:45:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00
	3:50:00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	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 4.06 (July 2022)

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.

[illegible]