



February 7, 2023

El Paso County Stormwater  
Christina Prete, P.E.  
Stormwater Engineer II  
ChristinaPrete@elpasoco.com

**RE: Widefield Water and Sanitation District  
Rolling Hills 2 MG Potable Water Tank  
File # PPR216**

To Whom it May Concern:

This letter is being submitted on behalf of Widefield Water and Sanitation District per the request of the El Paso County Stormwater in accordance with ECM Chapter 5.10.6.B. I, being the Engineer of Record for the Widefield Water and Sanitation District Rolling Hills 2 MG Potable Water Tank confirm that the site and all adjacent properties (as affected by work performed under the El Paso County Permit PPR-21-006) are stable with respect to settlement and subsidence, sloughing of cut and fill slopes, and that the improvements which include a sand filter basin that detains developed flows and releases them at or below historic rates for the 10-yr and 100-yr storm events, as well as provides WQCV treatment meet or exceed the minimum design requirements. The sand filter basin constructed on the tank site 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.

Regarding revegetation or other ground cover, I completed a site walk on January 16, 2023. I did not see any visible erosion due to stormwater runoff but there are areas where the revegetation has not achieved an "uniform vegetative cover with individual plant density of 70 percent of pre-disturbance level established or equivalent permanent alternative stabilization method". The revegetation will be reevaluated this spring when the grass at the site is alive and Widefield will require the contractor that completed the construction to reseed any areas that have not met the 70% of pre-disturbance level.

Sincerely,

Gwen Dall, P.E. - Design Engineer of Record

Elizabeth Steffens, P.E. - Design Engineer for Drainage Plan and Report

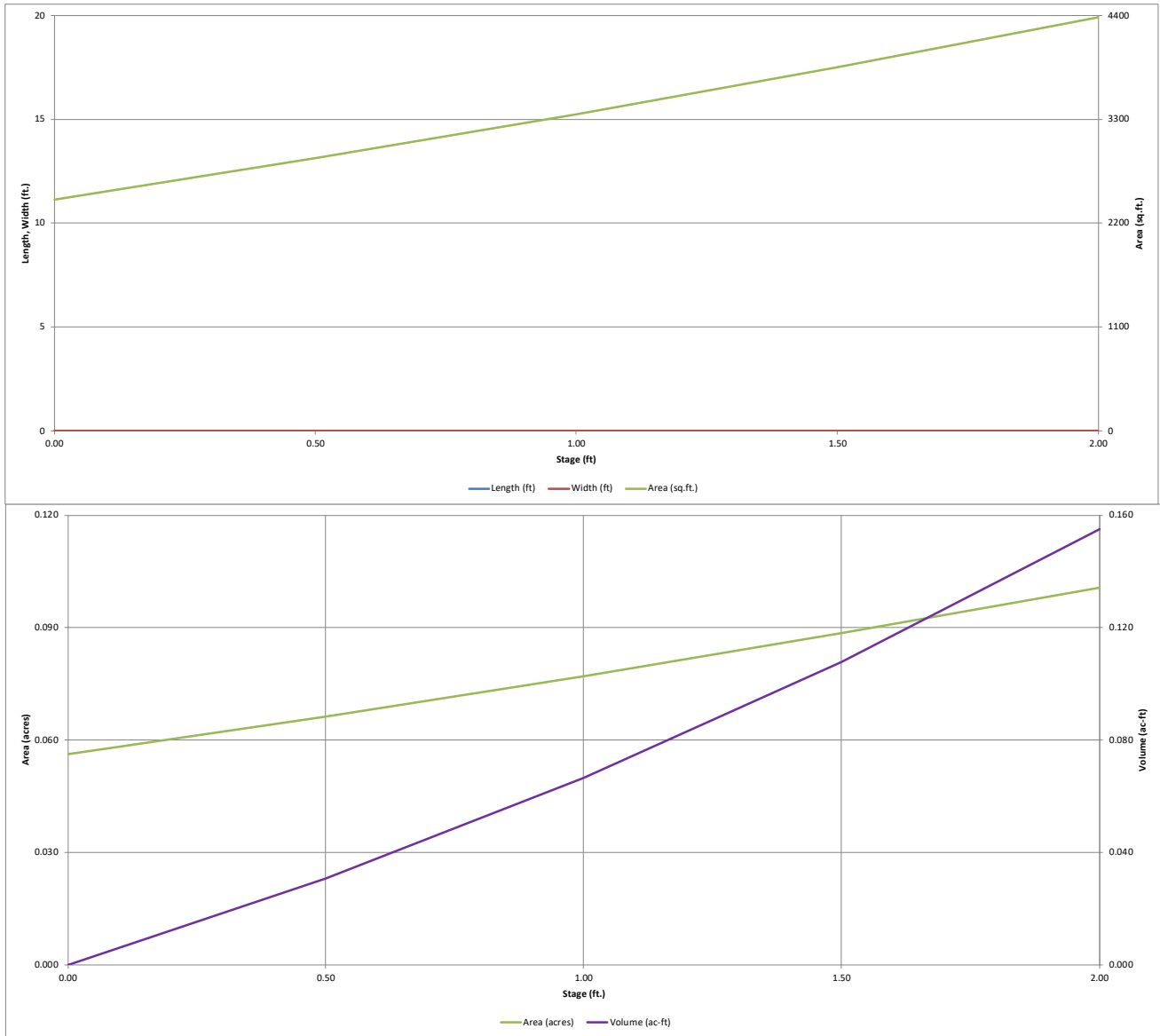
Enclosure: UDFCD Design Form  
cc: Robert Bannister, P.E. - District Engineer, Widefield Water and Sanitation District

5540 TECH CENTER DRIVE  
SUITE 100  
COLORADO SPRINGS, CO 80919  
719.227.0072



# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

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

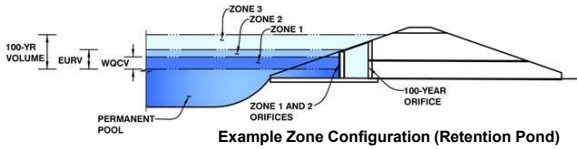


# DETENTION BASIN OUTLET STRUCTURE DESIGN

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

**Project: Widefield Water and Sanitation District - Rolling Hills Tank**

**Basin ID: Subbasin C**



**Example Zone Configuration (Retention Pond)**

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.34	0.020	Filtration Media
Zone 2 (EURV)	0.90	0.039	Circular Orifice
Zone 3 (100-year)	1.73	0.070	Weir&Pipe (Circular)
Total (all zones)		0.128	

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

Underdrain Orifice Invert Depth =	1.83	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	0.35	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	0.0	ft <sup>2</sup>
Underdrain Orifice Centroid =	0.01	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 =	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	N/A	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 (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)

	Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	0.05	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	0.50	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	1.50	N/A	inches

Calculated Parameters for Vertical Orifice

	Zone 2 Circular	Not Selected	
Vertical Orifice Area =	0.01	N/A	ft <sup>2</sup>
Vertical Orifice Centroid =	0.06	N/A	feet

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H <sub>o</sub> =	0.30	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Gate Slope =	3.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Gate Open Area % =	70%	N/A	%, gate open area/total area
Debris Clogging % =	0%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Gate Upper Edge, H <sub>t</sub> =	1.63	N/A	feet
Overflow Weir Slope Length =	4.22	N/A	feet
Grate Open Area / 100-yr Orifice Area =	153.92	N/A	
Overflow Gate Open Area w/o Debris =	11.81	N/A	ft <sup>2</sup>
Overflow Gate Open Area w/ Debris =	11.81	N/A	ft <sup>2</sup>

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

	Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	1.92	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	3.75	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Circular	Not Selected	
Outlet Orifice Area =	0.08	N/A	ft <sup>2</sup>
Outlet Orifice Centroid =	0.16	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 =	0.75	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	1.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth =	0.36	feet
Stage at Top of Freeboard =	2.11	feet
Basin Area at Top of Freeboard =	0.10	acres
Basin Volume at Top of Freeboard =	0.16	acre-ft

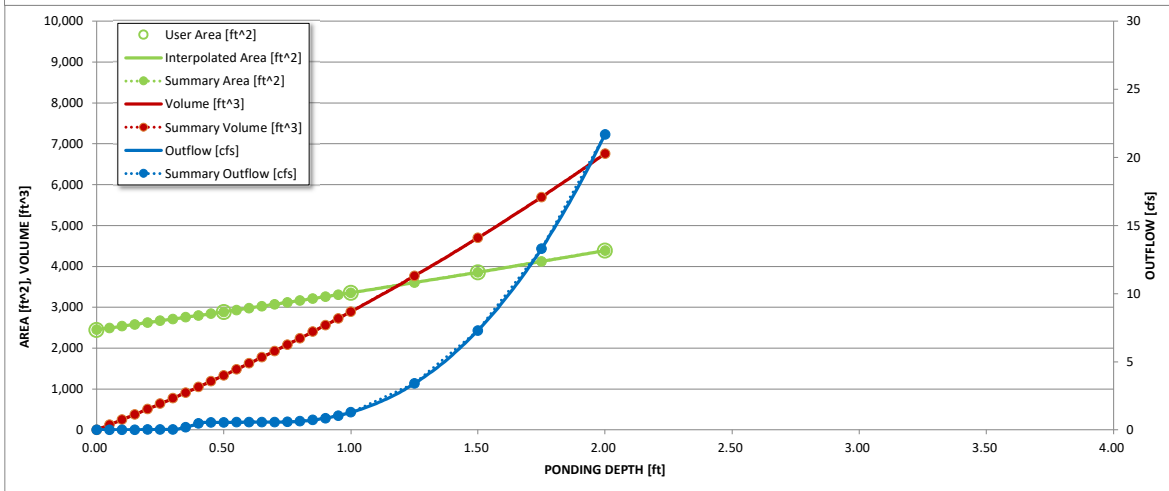
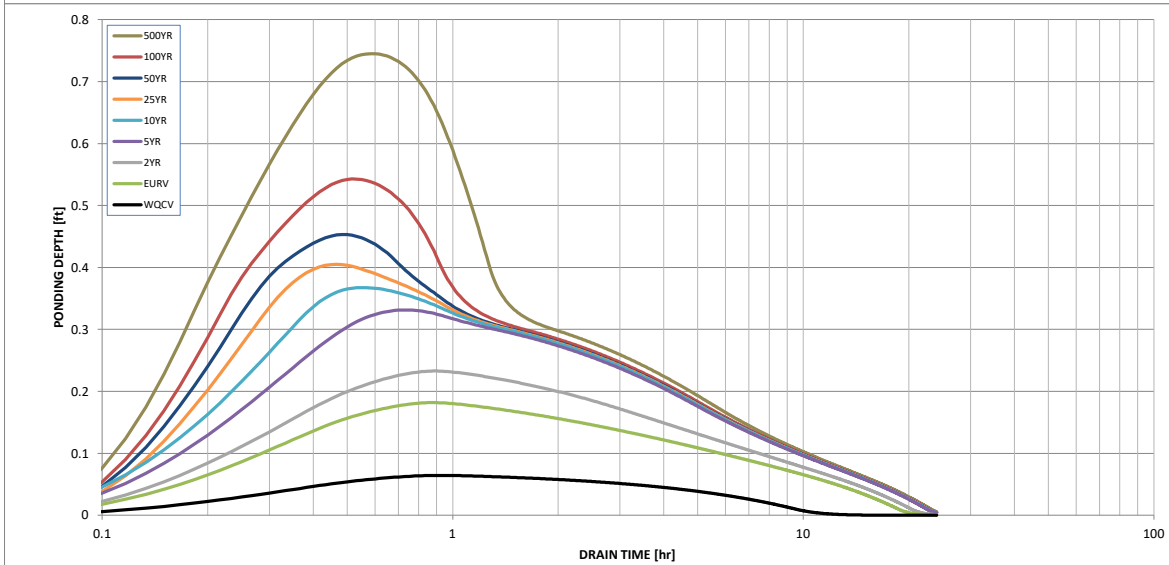
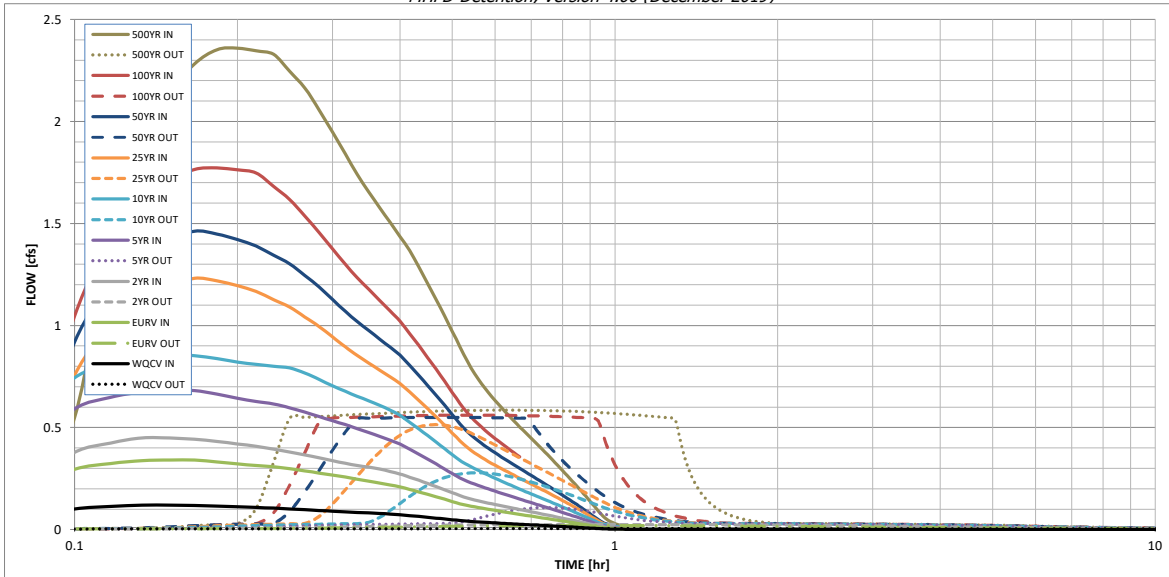
## Routed Hydrograph Results

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 =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft) =	0.020	0.058	0.075	0.116	0.151	0.195	0.233	0.280	0.376
Inflow Hydrograph Volume (acre-ft) =	0.004	0.012	0.015	0.023	0.030	0.039	0.047	0.056	0.075
CUHP Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.3	0.4	0.7	0.8	1.1	1.5
OPTIONAL Override Predevelopment Peak Q (cfs) =	0.0	0.0							
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.08	0.17	0.24	0.38	0.47	0.62	0.86
Peak Inflow Q (cfs) =	0.1	0.3	0.4	0.7	0.9	1.2	1.5	1.8	2.4
Peak Outflow Q (cfs) =	0.005	0.020	0.0	0.1	0.278	0.5	0.5	0.561	0.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.4	0.7	0.8	0.7	0.5	0.4
Structure Controlling Flow =	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0
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) =	12	19	21	22	22	21	20	20	18
Time to Drain 99% of Inflow Volume (hours) =	14	21	22	24	24	23	23	23	23
Maximum Ponding Depth (ft) =	0.06	0.18	0.23	0.33	0.37	0.41	0.45	0.54	0.75
Area at Maximum Ponding Depth (acres) =	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07
Maximum Volume Stored (acre-ft) =	0.003	0.010	0.013	0.020	0.022	0.024	0.027	0.033	0.047

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



