

El Paso County  
Engineering Development Review Team  
2880 International Circle  
Colorado Springs, CO 80910

September 2022

RE: MDG Project No. 19.886.008 – Trails at Aspen Ridge: Certification of West SF Pond

Dear Sir or Madam,

This letter certifies that the dimensions, elevations and volume of the Trails at Aspen Ridge - West SF Pond substantially comply with the plan documents and Final Drainage Report (FDR: Approved January 2020).

As-built survey of the West SF Pond by a third-party Professional Land Surveyor and a detention pond site walkthrough indicate that the pond volume, filter area, emergency spillway and outlet structure, as constructed and surveyed, are in substantial conformance with the construction plans.

The West Pond contours as surveyed for this certification and outlet structure provide the required storage volume and will meet the required release rates as documented by the attached UDFCD/MHFD Design Spreadsheets.

Caveats: Because the certifier was not involved with construction administration of the pond, the compaction of earthwork in the pond embankment, placement of buried rip rap in the emergency spillway, and/or any other items not specifically mentioned are not certified in this letter. Submittal reviews during the construction phase of the project indicate that the appropriate material submittals were made, but do not certify that these actual materials were placed or whether appropriate means of storage were utilized prior to installation.

Additionally, the West SF Pond will be upgraded to a Full Spectrum EDB as development of the Trails at Aspen Ridge proceeds. Depending on the speed of progress for the development, this means the pond may no longer match the contours surveyed for this certification. Another certification will be provided once the full buildout of the pond has been completed.

From the Colorado Springs Pond certification checklist (“Yes” indicates substantial compliance):

	<u>West Pond</u>
• <b>Grading</b>	
• Grading and Slopes Completed per approved plans	Yes

**Soil Mixes**

- Proper storage of soil mix prior to placement (*see above*) N/A
- Soil Mix Correct per approved plans (*See above*) N/A

**Forebay**

- Built per approved plans N/A
- Forebay Volume per approved plans N/A

**Outlet Works**

- Built per approved plans Yes

**Spillway structure**

- Built per approved plans (*Caveats for West Pond noted above*) Yes w/ caveat

**WQCV and Elevations**

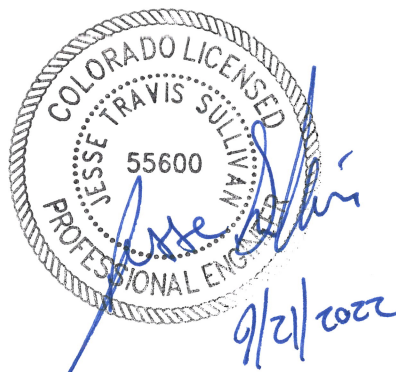
- WQCV per approved plans Yes
- All elevations per approved plans Yes

**As built Plans for Permanent BMP**

- Built per approved plans (*see caveats above*) Yes

If there are any questions regarding this certification, please feel free to contact me by phone: 719-575-0100 or email: [jesse.sullivan@matrixdesigngroup.com](mailto:jesse.sullivan@matrixdesigngroup.com).

Thank you,

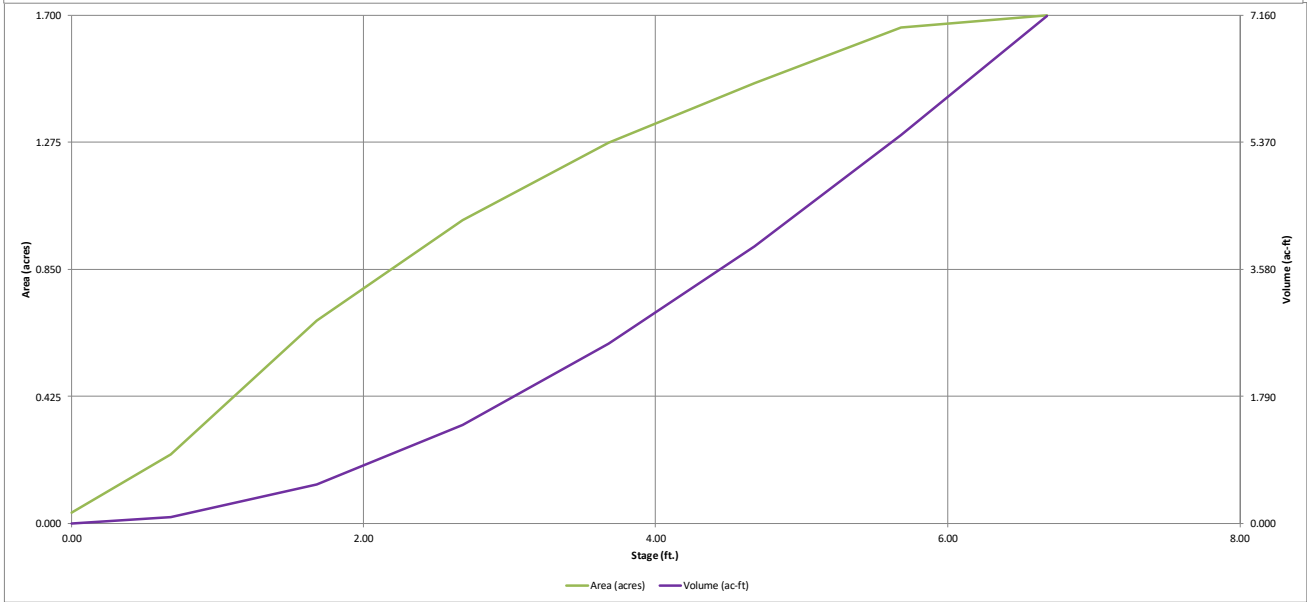
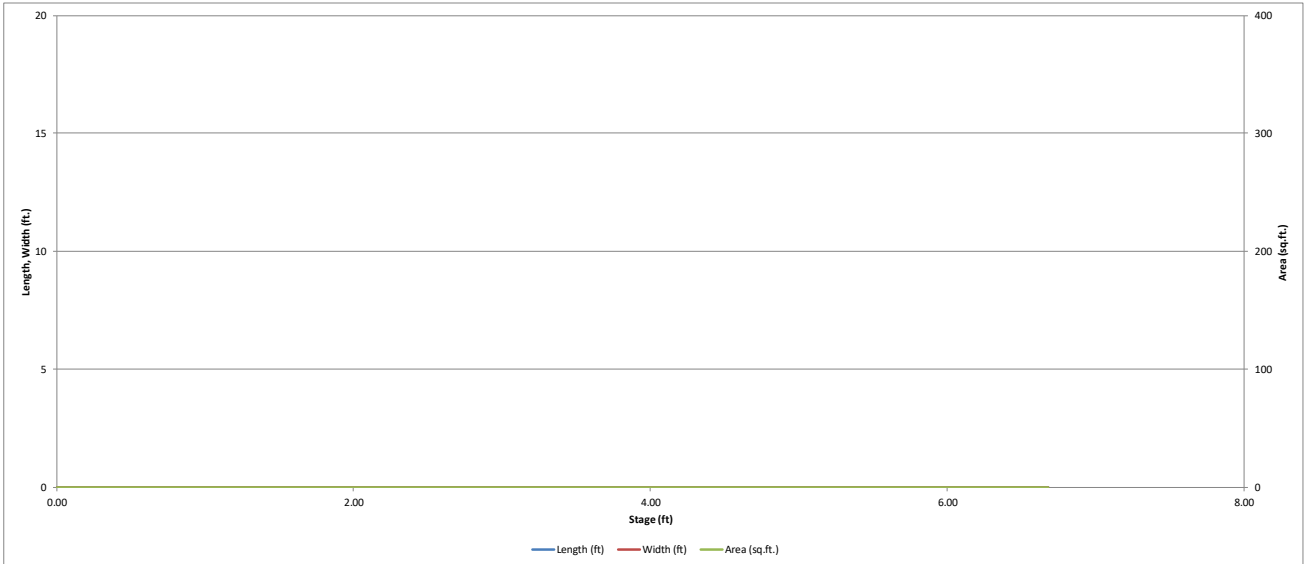


Jesse Sullivan, P.E.



**DETENTION BASIN STAGE-STORAGE TABLE BUILDER**

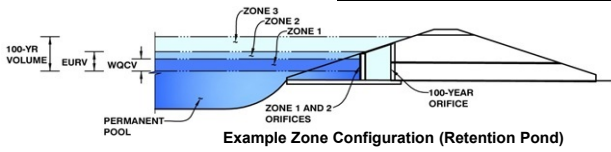
UD-Detention, Version 3.07 (February 2017)



## Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Trails at Aspen Ridge Filing No. 1 Buildout: West Pond  
 Basin ID: Big Johnson Reservoir



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	0.56	0.065	Filtration Media
Zone 2 (EURV)	0.76	0.046	Orifice Plate
Zone 3 (100-year)	2.04	0.700	Weir&Pipe (Restrict)
		0.811	Total

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

Underdrain Orifice Invert Depth =	1.92	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	0.70	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	0.0	ft <sup>2</sup>
Underdrain Orifice Centroid =	0.03	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 =	0.56	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	3.50	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	0.80	inches
Orifice Plate: Orifice Area per Row =	2.66	sq. inches (diameter = 1-13/16 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row =	1.847E-02	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)	0.56	0.64	0.70	1.50				
Orifice Area (sq. inches)	2.66	2.66	2.66	648.00				

	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
Vertical Orifice Centroid =	N/A	N/A

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H <sub>o</sub> =	3.32	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	6.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	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>i</sub> =	4.32	N/A
Over Flow Weir Slope Length =	4.12	N/A
Grate Open Area / 100-yr Orifice Area =	5.51	N/A
Overflow Grate Open Area w/o Debris =	17.32	N/A
Overflow Grate Open Area w/ Debris =	8.66	N/A

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 =	2.37	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	24.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected
Outlet Orifice Area =	3.14	N/A
Outlet Orifice Centroid =	1.00	N/A
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

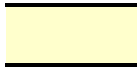
Spillway Invert Stage =	4.70	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	40.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth =	0.50	feet
Stage at Top of Freeboard =	6.20	feet
Basin Area at Top of Freeboard =	1.68	acres

### Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52
One-Hour Rainfall Depth (in) =	0.065	0.111	0.071	0.137	0.499	1.729	2.512	3.566
Calculated Runoff Volume (acre-ft) =								
OPTIONAL Override Runoff Volume (acre-ft) =								
Inflow Hydrograph Volume (acre-ft) =	0.065	0.110	0.071	0.137	0.499	1.729	2.512	3.567
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.14	0.45	0.63	0.87
Predevelopment Peak Q (cfs) =	0.0	0.0	0.3	0.7	4.7	15.6	21.8	30.1
Peak Inflow Q (cfs) =	0.8	1.4	0.9	1.8	6.3	21.7	31.3	44.2
Peak Outflow Q (cfs) =	0.0	0.1	0.0	0.1	0.9	13.4	18.4	23.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.2	0.9	0.8	0.8
Structure Controlling Flow =	Filtration Media	Plate	Filtration Media	Plate	Plate	Plate	Plate	Plate
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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) =	40	51	43	52	63	41	29	23
Time to Drain 99% of Inflow Volume (hours) =	41	52	44	54	70	62	57	51
Maximum Ponding Depth (ft) =	0.53	0.71	0.56	0.79	1.50	1.87	2.19	2.67
Area at Maximum Ponding Depth (acres) =	0.19	0.24	0.20	0.28	0.60	0.74	0.85	1.01
Maximum Volume Stored (acre-ft) =	0.060	0.096	0.066	0.119	0.431	0.673	0.935	1.371



ft<sup>2</sup>  
feet



feet  
feet  
should be  $\geq 4$   
ft<sup>2</sup>  
ft<sup>2</sup>

e

ft<sup>2</sup>  
feet  
radians

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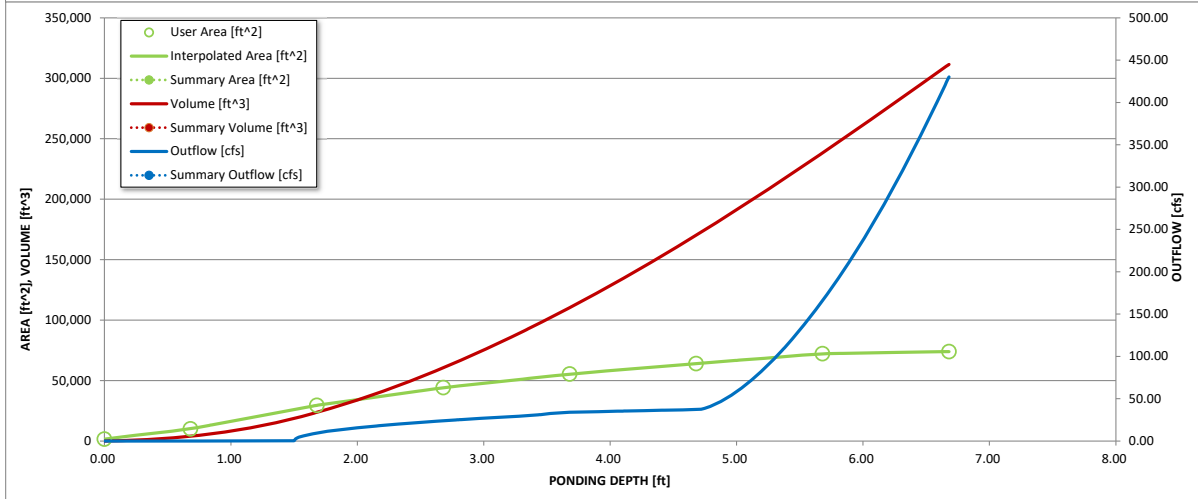
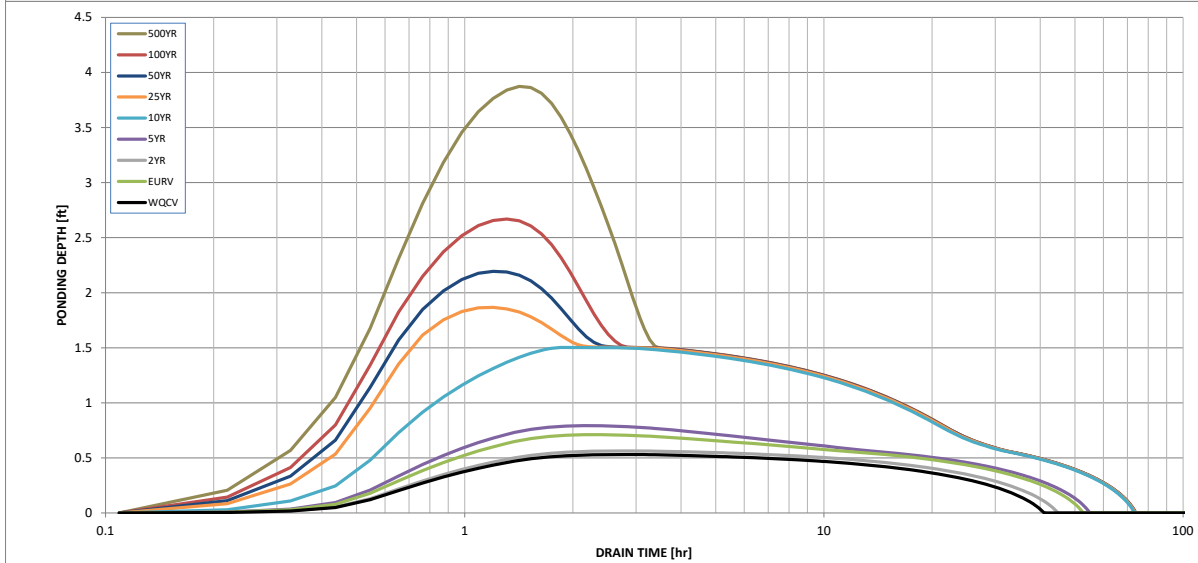
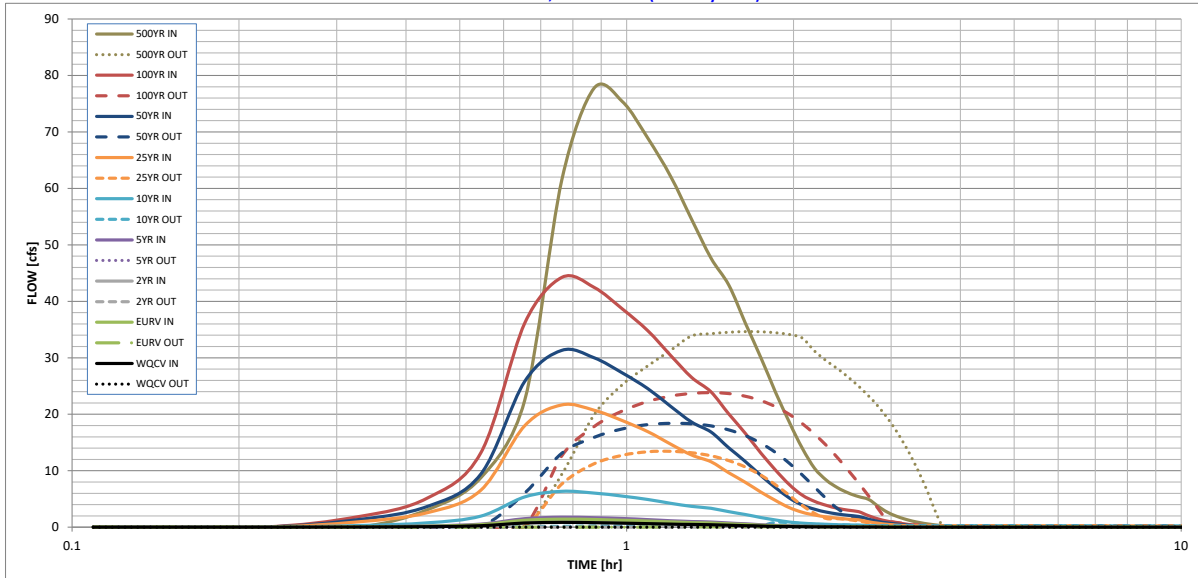
500 Year
3.55
6.349
6.344
1.48
51.4
77.7
34.6
0.7
Outlet Plate 1
0.0
N/A
16
34
3.87
1.31
2.780

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# 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			





