



July 22, 2025

El Paso County

Planning and Community Development Department
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Attn: Brad Walters
Inspection Supervisor

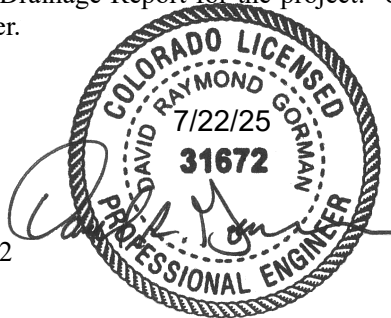
**Re: Bradley Storage (CON-19-064, PPR-17-011) – Stormwater Permanent Control Measures –
Engineer's Letter
Project No. 61071**

Dear Mr. Walters:

The stormwater Permanent Control Measures (PCMs) for Bradley Storage subdivision consists of one (1) private Full Spectrum Extended Detention Basin (FS-EDB) with associated concrete forebay, trickle channel, micro-pool, outlet structure, outlet pipe, and emergency spillway. These facilities were completed in 2020 and close-out documentation was not routed to El Paso County for unknown reasons. Based upon information gathered during periodic site visits to the project during significant/key phases of the stormwater PCM installation and pond verification survey data, M.V.E., Inc. is of the opinion that the stormwater PCM has been constructed in general compliance with the approved Grading and Erosion Control Plan prepared by M.V.E., Inc., as filed with the County.

Statement Of Engineer In Responsible Charge:

I, David R. Gorman, 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 state and declare 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 documentation, it is my professional opinion that the required Permanent Control Measures have been installed and are in general compliance with the approved Grading and Erosion Control Plan as filed with the El Paso County. Furthermore, the SF-EDB is constructed with adequate Water Quality Capture Volume (WQCV), Excess Urban Runoff Volume (EURV) and 100-year runoff storage volumes as specified on the approved plans and Final Drainage Report for the project. Updated pond volume and storm routing calculations are attached to this letter.



David R. Gorman, P.E. Colorado No. 31672
For and on Behalf of M.V.E., Inc.

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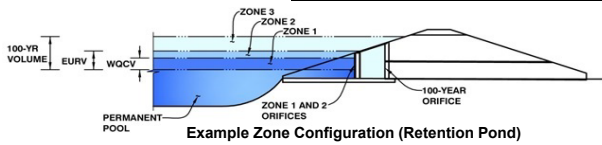
Engineers • Surveyors
1903 Lelaray Street, Suite 200 • Colorado Springs, CO 80909 • Phone 719-635-5736
Fax 719-635-5450 • e-mail mve@mvecivil.com

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Storage Time 61071

Basin ID: Pond 1 - AsBuilt



Required Volume Calculation

Selected BMP Type =	EDB
Watershed Area =	10.63 acres
Watershed Length =	1,000 ft
Watershed Slope =	0.010 ft/ft
Watershed Imperviousness =	83.80% percent
Percentage Hydrologic Soil Group A =	100.0% percent
Percentage Hydrologic Soil Group B =	0.0% percent
Percentage Hydrologic Soil Groups C/D =	0.0% percent
Desired WQCV Drain Time =	40.0 hours
Location for 1-hr Rainfall Depths =	User Input
Water Quality Capture Volume (WQCV) =	0.313 acre-feet
Excess Urban Runoff Volume (EURV) =	1.187 acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.823 acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.067 acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	1.285 acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	1.514 acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	1.731 acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	1.996 acre-feet
500-yr Runoff Volume (P1 = 3.2 in.) =	2.641 acre-feet
Approximate 2-yr Detention Volume =	0.781 acre-feet
Approximate 5-yr Detention Volume =	1.014 acre-feet
Approximate 10-yr Detention Volume =	1.208 acre-feet
Approximate 25-yr Detention Volume =	1.430 acre-feet
Approximate 50-yr Detention Volume =	1.560 acre-feet
Approximate 100-yr Detention Volume =	1.677 acre-feet

Optional User Override
1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.20	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.313	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.874	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.490	acre-feet
Total Detention Basin Volume =	1.677	acre-feet
Initial Surcharge Volume (ISV) =	user	ft³
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 _{LW}) =	user	

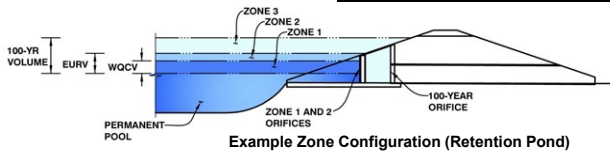
Depth Increment =		0.2	ft							
Stage - Storage Description		Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft²)	Optional Override Area (ft²)	Area (acre)	Volume (ft³)	Volume (ac-ft)
5840.55	Top of Micropool	--	0.00	--	--	--	25	0.001		
		--	0.20	--	--	--	80	0.002	17	0.000
	ISV 5840.88	--	0.40	--	--	--	190	0.004	61	0.001
		--	0.60	--	--	--	354	0.008	131	0.003
		--	0.80	--	--	--	581	0.013	215	0.005
		--	1.00	--	--	--	869	0.020	334	0.008
		--	1.20	--	--	--	1,221	0.028	530	0.012
		--	1.40	--	--	--	1,823	0.042	810	0.019
		--	1.60	--	--	--	2,425	0.056	1,182	0.027
		--	1.80	--	--	--	3,086	0.071	1,725	0.040
override		--	2.00	--	--	--	4,161	0.096	2,655	0.061
		--	2.20	--	--	--	6,347	0.146	4,245	0.097
		--	2.40	--	--	--	9,606	0.221	6,402	0.147
		--	2.60	--	--	--	13,720	0.315	9,308	0.214
	WQCV=5843.38	--	2.80	--	--	--	17,463	0.401	13,057	0.300
		--	3.00	--	--	--	22,207	0.510	17,662	0.405
		--	3.20	--	--	--	26,136	0.600	22,772	0.523
		--	3.40	--	--	--	29,868	0.686	28,633	0.657
		--	3.60	--	--	--	32,380	0.743	35,234	0.809
		--	3.80	--	--	--	33,696	0.774	41,990	0.964
	EURV=5844.63	--	4.00	--	--	--	35,165	0.807	48,900	1.123
		--	4.20	--	--	--	36,326	0.834	55,964	1.285
		--	4.40	--	--	--	37,751	0.867	63,182	1.450
	100YR=5845.22	--	4.60	--	--	--	38,258	0.878	70,554	1.620
		--	4.80	--	--	--	38,606	0.886	78,088	1.793
		--	5.00	--	--	--	38,783	0.890	85,776	1.969
		--	5.20	--	--	--	39,551	0.908	93,610	2.149
		--	5.40	--	--	--	40,392	0.927	101,604	2.333
		--	5.60	--	--	--	40,962	0.940	109,739	2.519
		--	5.80	--	--	--	41,725	0.958	118,008	2.709
		--	6.00	--	--	--	42,491	0.975	126,430	2.902
		--	6.20	--	--	--	43,258	0.993	135,005	3.099
		--	6.40	--	--	--	44,028	1.011	143,733	3.300
		--		--	--	--				
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Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Storge Time 61071

Basin ID: Pond 1 - AsBuilt



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.83	0.313	Orifice Plate
Zone 2 (EURV)	4.08	0.874	Orifice Plate
Zone 3 (100-year)	4.67	0.490	Weir&Pipe (Restrict)
		1.677	Total

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)

Invert 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 = 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	1.36	2.72					
Orifice Area (sq. inches)	1.17	1.17	4.31					

	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 Orifice

Vertical Orifice Area = ft²
Vertical Orifice Centroid = feet

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

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Slope = H:V (enter zero for flat grate)
Horiz. Length of Weir Sides = feet
Overflow Grate Open Area % = %, grate open area/total area
Debris Clogging % = %

Calculated Parameters for Overflow Weir

Height of Grate Upper Edge, H₁ = feet
Over Flow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area = should be ≥ 4
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 Plate

Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = radians

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

Routed Hydrograph Results

	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	3.20
Calculated Runoff Volume (acre-ft) =	0.313	1.187	0.823	1.067	1.285	1.514	1.731	1.996	2.641
OPTIONAL: Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.313	1.187	0.822	1.067	1.284	1.514	1.732	1.996	2.641
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.02	0.17	0.40	0.94
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.0	0.1	0.2	1.8	4.3	10.0
Peak Inflow Q (cfs) =	4.6	17.1	11.9	15.4	18.5	21.8	24.9	28.6	37.7
Peak Outflow Q (cfs) =	0.1	0.3	0.3	0.3	0.3	2.1	4.4	4.6	12.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	6.4	3.0	9.0	2.5	1.1	1.2
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.2	0.6	0.6	0.6
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) =	39	76	63	72	79	80	79	78	76
Time to Drain 99% of Inflow Volume (hours) =	41	81	67	77	84	85	85	85	84
Maximum Ponding Depth (ft) =	2.78	4.01	3.56	3.87	4.13	4.28	4.40	4.60	4.96
Area at Maximum Ponding Depth (acres) =	0.47	0.80	0.76	0.79	0.81	0.83	0.84	0.85	0.89
Maximum Volume Stored (acre-ft) =	0.286	1.131	0.771	1.011	1.228	1.351	1.442	1.611	1.925