

Permanent Extended Detention Basin Certification Letter

October 30, 2024

Project: Electronic Storage

Site Location: 7717 Electronic Drive, Colorado Springs, CO

Sand Filter Location: Southeast corner of site

Discussion: The permanent full spectrum detention structure for Electronic Storage is an extended detention basin. The required storage volume was calculated to be 0.202 ac-ft. Based upon as-built surveys by Edward-James Surveying and site inspections, the extended detention basin provides the volume required.

The following notable discrepancies were identified when the surveyed/as-built pond was compared to the approved plans:

- Steps were not installed in the outlet structure.
- The trash rack installed is different than that called out on the plans.
- Additional riprap was installed on the southeast side of the pond.
- The top of the outlet structure was constructed 6" high.
 - Per the design spreadsheet the storage volume and flow rates are still acceptable in this condition.
- The inlet orifice plate bottom orifice was constructed 3" high.
 - Per the design spreadsheet the 99% drain times all look fine in this condition. The 5 year, 97% drain time has been flagged as being too slow.

This must be installed. See my comment on the as-builts for related criteria.

This must be provided so that we can review the as-built conditions.

More detailed information about these discrepancies, and additional minor discrepancies, has been documented on the Extended Detention Basin As-Built.

Based on periodic site visits to the project during significant/key phases of the installation and the survey, Terra Nova Engineering is of the opinion that the extended detention basin has been constructed in general compliance with the approved Grading, Erosion, & Sediment Control Plan; Construction Plans; and Specifications as filed with this project.

Revise/provide Pond Certification Letter with required statements listed in ECM Section 5.10.6.B (something similar is even required for Runoff Reduction):

"The site and adjacent properties (as affected by work performed under the County permit) are stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and that the improvements (public improvements, common development improvements, site grading and paving) meet or exceed the minimum design requirements."

For sites including detention and/or water quality facilities, the certification letter shall include a statement that the facilities provide the required storage volume and will meet the required release rates (as documented by an attached MHFD design form submitted with the original application), the stage areas, elevations, and outlet dimensions.

Please update the MHFD-Detention Spreadsheet with the updated as-built information (pond elevations, spillway length, orifice hole elevations, etc.) to confirm that the pond is functioning as intended. The updated Spreadsheet should be attached to the Pond Certification Letter.

Statement of Engineer in Responsible Charge: I, Dane Frank, 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 documentation, it is my professional opinion that the required stormwater treatment facilities have been installed and are in general compliance with the approved Grading, Erosion, & Sediment Control Plan; Construction Plans; and Specifications as filed with El Paso County; provide the required storage volume; and will meet the required release rates with the possible exception of the 97% drain time discrepancy noted above. For structures with a Water Quality Capture Volume (WQCV), I have attached the post-construction As-Built drawings. The As-Built drawings accurately depict the final installation of the stormwater facilities and verify the WQCV.

PREPARED BY:
TERRA NOVA ENGINEERING, INC.

Dane Frank

Dane Frank, P.E.
Colorado #50207
Project Engineer



Jobs/197100/Drainage/Pond Cert/197100 Pond PE Cert.docx

Attachments

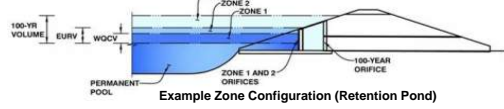
- Extended Detention Basin As-Built, 2024/10/30
- Original UD-Detention Spreadsheet
- As-Built UD-Detention Spreadsheet

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Electronic Storage

Basin ID: EDB



Original Design Spreadsheet

Watershed Information

Selected BMP Type =	EDB
Watershed Area =	1.77 acres
Watershed Length =	340 ft
Watershed Length to Centroid =	170 ft
Watershed Slope =	0.060 ft/ft
Watershed Imperviousness =	62.00% percent
Percentage Hydrologic Soil Group A =	98.0% percent
Percentage Hydrologic Soil Group B =	2.0% 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.

Water Quality Capture Volume (WQCV) =	0.036	acre-feet	Optional User Overrides		acre-feet
Excess Urban Runoff Volume (EURV) =	0.134	acre-feet			acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.091	acre-feet	1.19		inches
5-yr Runoff Volume (P1 = 1.5 in.) =	0.120	acre-feet	1.50		inches
10-yr Runoff Volume (P1 = 1.75 in.) =	0.143	acre-feet	1.75		inches
25-yr Runoff Volume (P1 = 2 in.) =	0.175	acre-feet	2.00		inches
50-yr Runoff Volume (P1 = 2.25 in.) =	0.205	acre-feet	2.25		inches
100-yr Runoff Volume (P1 = 2.52 in.) =	0.242	acre-feet	2.52		inches
500-yr Runoff Volume (P1 = 3 in.) =	0.305	acre-feet	3.00		inches
Approximate 2-yr Detention Volume =	0.087	acre-feet			
Approximate 5-yr Detention Volume =	0.114	acre-feet			
Approximate 10-yr Detention Volume =	0.138	acre-feet			
Approximate 25-yr Detention Volume =	0.167	acre-feet			
Approximate 50-yr Detention Volume =	0.184	acre-feet			
Approximate 100-yr Detention Volume =	0.202	acre-feet			

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.036	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.098	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.068	acre-feet
Total Detention Basin Volume =	0.202	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	--	--	--	15	0.000		
	--	0.25	--	--	--	15	0.000	4	0.000
Bottom of Pond	--	0.50	--	--	--	1,174	0.027	152	0.003
	--	0.75	--	--	--	1,339	0.031	466	0.011
	--	1.00	--	--	--	1,504	0.035	822	0.019
	--	1.25	--	--	--	1,668	0.038	1,218	0.028
Top of WQ +/-	--	1.50	--	--	--	1,833	0.042	1,656	0.038
	--	1.75	--	--	--	2,015	0.046	2,137	0.049
	--	2.00	--	--	--	2,197	0.050	2,663	0.061
	--	2.25	--	--	--	2,378	0.055	3,235	0.074
	--	2.50	--	--	--	2,560	0.059	3,852	0.088
	--	2.75	--	--	--	2,771	0.064	4,519	0.104
	--	3.00	--	--	--	2,982	0.068	5,238	0.120
Top of EURV +/-	--	3.25	--	--	--	3,192	0.073	6,009	0.138
	--	3.50	--	--	--	3,403	0.078	6,834	0.157
	--	3.75	--	--	--	3,644	0.084	7,715	0.177
Top of 100 Yr +/-	--	4.00	--	--	--	3,884	0.089	8,656	0.199
	--	4.25	--	--	--	4,125	0.095	9,657	0.222
	--	4.50	--	--	--	4,365	0.100	10,718	0.246
	--	4.75	--	--	--	4,633	0.106	11,843	0.272
	--	5.00	--	--	--	4,901	0.113	13,034	0.299
	--	5.25	--	--	--	5,169	0.119	14,293	0.328
	--	5.50	--	--	--	5,437	0.125	15,619	0.359
	--	5.75	--	--	--	5,737	0.132	17,016	0.391
	--	6.00	--	--	--	6,037	0.139	18,487	0.424
	--	6.25	--	--	--	6,337	0.145	20,034	0.460
Top of Berm	--	6.50	--	--	--	6,637	0.152	21,656	0.497

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

