Extended Detention Basin Factsheet

1.0 General Description

Figure 1. Extended Detention basin (Stormwater Partners SW Washington)

Potential Treatment Mechanisms								
I[1]	ET	FA	B	RH	S	F	P	T
✓					✓			✓

Legend:
I = Infiltration
ET = Evapotranspiration
FA = Filtration and/or Adsorption
B = Biochemical Transformation
RH = Rainfall and Runoff Harvest
S = Sedimentation
F = Floatation
P = Plant Uptake
T = Trash Capture

[1] *For unlined systems only; these systems are sometimes constructed with a liner*

Extended detention basins are designed to capture rainfall and runoff and hold it for a maximum time (e.g., up to 72 hours), after which the basin fully drains and returns to being a dry basin. The maximum drain time (via orifice drain and infiltration) is specified to prevent mosquito breeding and to restore capacity for subsequent storm events. A minimum drain time is sometimes specified to encourage quiescent conditions for particle sedimentation. An orifice on the outlet riser typically meters out treated water. A riser or overflow weir is typically provided to route flood flows. A schematic of a basic detention basin is shown in Figure 2.

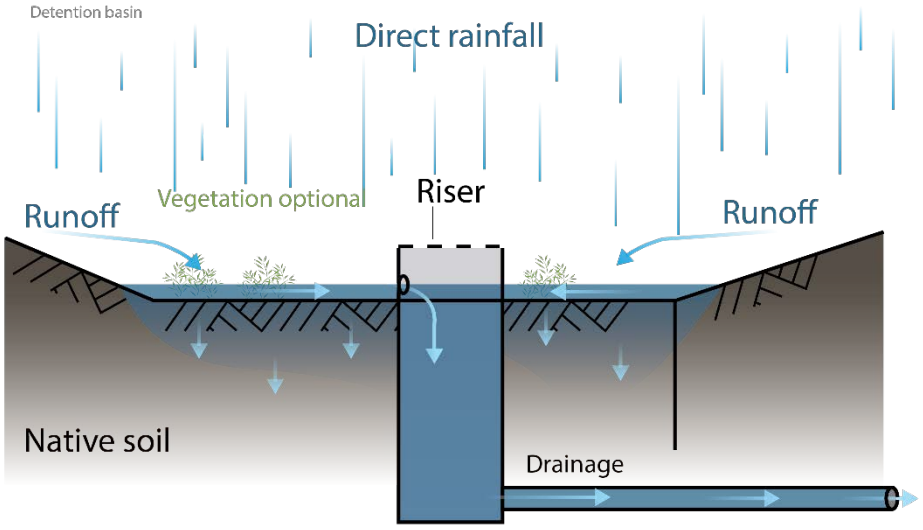

Figure 2. Schematic of a basic extended detention baisn

1.1 Variations and Alternative Names

- Detention ponds
- Detention basins
- Dry extended detention basins or ponds
- Dry ponds

2.0 Advantages & Limitations

2.1 Advantages

- ✓ Provides flood control as well as stormwater runoff treatment, in some cases
- ✓ Can be inexpensive
- ✓ Can have relatively low maintenance

- ✓ Can be integrated into an aesthetically appealing landscape design, though access restriction may be required for public safety

2.2 Limitations

- × Moderate pollutant removal
- × May not be suited for areas where the water table is close to the ground surface
- × Requires elevation change between inlet and outlet

3.0 Siting

To avoid direct connection to groundwater, reduce mosquito breeding habitat, and avoid wetland habitat conditions, the bottom of the basin should be located sufficiently above the wet season water table. If the water table is high, an impermeable liner may be required.

According to the California Stormwater Quality Association, detention basins should not be used for contributing drainage areas (CDA) of less than 5 acres because such a small CDA may require an orifice size so small that it will clog easily (CASQA 2003).

4.0 Design Considerations

When designing a detention basin, the following parameters should be considered:

- ❑ Contributing drainage area
- ❑ Design volume
- ❑ Drawdown time
- ❑ Side slopes
- ❑ Length to width ratio (distance between inlet and outlet)
- ❑ Orifice diameter
- ❑ Slope stability
- ❑ Energy dissipation at inlet
- ❑ Maintenance and inspection areas
- ❑ Basin area and infiltration capacity
- ❑ Seepage collar (to prevent piping/internal erosion on bermed systems)
- ❑ Utility conflicts
- ❑ Buried manmade materials and past disposal practices

5.0 Construction Considerations

- ❑ Potholing is recommended to verify locations of buried infrastructure.

6.0 Maintenance

- ❑ Identify and remediate clogging issues at the orifice or outlet screens (may require special training)
- ❑ Plant management
- ❑ Litter removal (for areas prone to litter)
- ❑ Inspect for standing water to prevent mosquitos and other vector breeding

7.0 References

California Stormwater Quality Association (CASQA 2003). *Stormwater Best Management Practice Handbook: New Development and Redevelopment*. January 2003.

California Stormwater Quality Association (CASQA 2017). *Draft Stormwater Best Management Practice Handbook: New Development and Redevelopment*. April 2017.

Sacramento Stormwater Quality Partnership (SSQP 2018). *Stormwater Quality Design Manual*. July 2018.