Dry Well Factsheet

1.0 General Description

Figure 1. Dry well (Torrent Resources)

Potential Treatment Mechanisms								
I	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

Dry wells are stormwater infiltration devices typically constructed of a vertical pipe that extends deep into the subsurface without contacting the groundwater table. A typical installation has a 3-foot diameter with a depth of 20–50 feet. The EPA defines dry wells as infiltration facilities that are deeper than they are wide. Perforations are located along the length of the pipe and/or at the bottom to permit stormwater to flow from various parts of the well into the surrounding soils (Figure 2). There are many varieties in construction and design practices that affect the placement of perforations, use of geotextiles, and use of internal gravel or rocks. Dry wells can be used in a variety of situations, but have unique advantages in areas with shallow clay or hardpan soils because they facilitate the movement of stormwater runoff below these types of constricting layers to facilitate infiltration. Multiple dry wells can be installed to create treatment trains for large drainage areas.

Typically, runoff is initially directed to a pretreatment facility—such as a bioretention planter, biostrip, bioswale, proprietary device, or sedimentation chamber (sometimes with screens or hydrophobic sponges or pillows)—to remove sediment and other pollutants that could clog the well or subsurface soils, or pose risks to groundwater. Pretreatment can also accommodate spill response. After pretreatment, a conveyance pipe directs treated runoff into the system's primary chamber, the dry well. The dry well may be constructed of concrete or other material. The lower section includes a pervious shaft which may be an open shaft with or within aggregate backfill or it may be comprised of perforations within the casing material. Before reaching groundwater, it is beneficial for runoff to pass through layers of silt or clay to help sequester contaminants before they reach groundwater (OWP et al 2018).

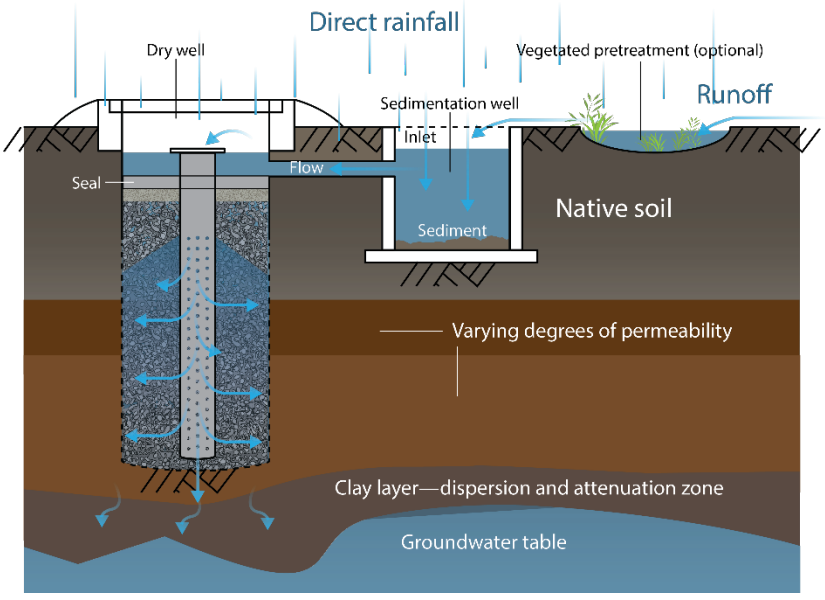

Figure 2. Basic schematic of a dry well

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1.1 Variations and Alternative Names

- Underground injection control (UIC)

2.0 Advantages & Limitations

2.1 Advantages

- ✓ Well suited for areas where near-surface infiltration is restricted
- ✓ Minimal area requirements
- ✓ Can be used for groundwater recharge
- ✓ Reduces runoff flow rates and volumes
- ✓ Can be relatively easy to maintain

2.2 Limitations

- × Not yet efficient at treating some water soluble contaminants and non-aqueous phase liquids that may be present in stormwater
- × Not suitable for areas with steep slopes, a water table that is near the ground surface, or soil or groundwater that has been contaminated
- × Unclear local regulations in some areas

3.0 Siting

Dry wells should not be installed too close to drinking water wells to minimize the risk of contamination or in areas where soil or groundwater has been contaminated to avoid flushing contamination into groundwater. They should also not be installed in or near sites where contamination by dissolved pollutants is likely (e.g., auto repair shops).

The soil composition should be inspected prior to installation to ensure that the dry well is well past any impermeable layers or layers in which the water will not infiltrate adequately.

Dry wells should be set back from buildings and other foundations and should not be installed in areas with steep slopes.

All dry well locations should be registered with EPA.

4.0 Design Considerations

When designing a dry well, the following parameters should be considered:

- ❑ Contributing drainage area
- ❑ Depth
- ❑ Volume
- ❑ Sedimentation chamber/well
- ❑ Pretreatment (may be necessary in some areas)

5.0 Construction Considerations

- ❑ Erosion control around the hole to prevent contamination and clogging during installation
- ❑ Watch for any unexpected fluid, colors, or odors coming from the drill site to avoid installing the dry well in an unknown contaminated area

6.0 Maintenance

- ❑ Inspections and cleaning of sedimentation chamber to prevent buildup and/or clogging
- ❑ Inspections of dry well for clogged filter screens or other issues that may arise
- ❑ Street sweeping for dry wells that are set into a roadway to prevent excess loading of sediment and debris

7.0 REFERENCES

Office of Water Programs at California State University, Sacramento; Booth D.; Ellison-Lloyd D.; Washburn B.; Werder C. (OWP et al. 2018). *The American River Basin Stormwater Resource Plan, Appendix L - Design Guidance for Drywell Implementation in the ARB Region*. 2018.