


INF-5: Drywell

Drywells are similar to infiltration trenches in their design and function, but generally have a greater depth to footprint area ratio and can be installed at relatively large depths. A drywell is a subsurface storage facility designed to temporarily store and infiltrate runoff, primarily from rooftops or other impervious areas with low pollutant loading. A drywell may be either a small excavated pit filled with aggregate or a prefabricated storage chamber or pipe segment. Drywells can be used to reduce the volume of runoff from roofs and other relatively clean surfaces. While roofs are generally not a significant source of stormwater pollutants, they can be a major contributor of runoff volumes. Therefore, drywells can indirectly enhance water quality by reducing the water quality design volume that must be treated by other, downstream stormwater management facilities. *Note: A drywell is considered a "Class V Injection Wells" under the federal Underground Injection Control (UIC) Program regulated in California by U.S. EPA Region 9. A UIC permit may be required (for details see <http://www.epa.gov/region9/water/groundwater/uic-classv.html>).*

<i>Also known as:</i>
<ul style="list-style-type: none"> <li>➤ Soakaway Pits</li> <li>➤ Infiltration Sumps</li> <li>➤ Rock Sumps</li> <li>➤ Underground Injection Controls</li> </ul>

<p>Drywell Source: K&amp;A Enterprises</p>

**Feasibility Screening Considerations**

- Drywells shall pass infiltration infeasibility screening criteria ([TGD Section 2.4.2.4](#)) to be considered for use.
- Dry wells provide a more direct pathway for stormwater to groundwater, therefore pose a greater risk to groundwater quality than surface infiltration systems.

**Opportunity Criteria**

- Drywells may be used to infiltrate roof runoff, either directly or from the overflow from a cistern.
- Soils are adequate for infiltration or can be amended to provide an adequate infiltration rate.
- Space available for pretreatment (biotreatment or treatment control BMP as described below).
- The drywell must be located in native soil; over-excavated by at least one foot in depth and replaced uniformly without compaction.
- Potential for groundwater contamination can be mitigated through isolation of pollutant sources, pretreatment of inflow, and/or demonstration of adequate treatment capacity of underlying soils.
- Infiltration is into native soil, or depth of engineered fill is ≤ 5 feet from the bottom of the facility to native material and infiltration into fill is approved by a geotechnical professional.

**OC-Specific Design Criteria and Considerations**

- Must comply with local, state, and federal UIC regulations; a permit may be required.
- Minimum set-backs from foundations and slopes should be observed

- Infiltration should not cause geotechnical concerns related to slope stability, liquefaction, or erosion.
- Minimum separation to mounded seasonally high groundwater of 10 feet shall be observed.
- Drywells should not receive untreated stormwater runoff, except rooftop runoff. Pretreatment of runoff from other surfaces is necessary to prevent premature failure that results from clogging with fine sediment, and to prevent potential groundwater contamination due to nutrients, salts, and hydrocarbons.
- Design infiltration rate should be determined with an infiltration test at each drywell location.
- Drywell should be encased by 1 foot of coarse (3/4" to 2 1/2"), round river rock on sides and bottom of facility.
- Maximum facility depth is 25 feet with the approval of a geotechnical professional; preferred depth less than 10 feet does not require geotechnical approval.
- If inlet is an underground pipe, a fine mesh screen should be installed to prevent coarse solids from entering drywell.
- An overflow route must be installed for flows that overtop facility.

#### **Sizing Criteria for Drywells**

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Drywell sizing is highly site-specific. Sizing calculations shall demonstrate via the methods described in [Appendix III](#) or via project-specific methods that the system captures and fully discharges the DCV within 48 hours following the end of precipitation, or captures and infiltrates 80 percent of average annual runoff volume.

#### **Configuration for Use in a Treatment Train**

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- Drywells may be preceded in a treatment train by HSCs in the drainage area, which would reduce the required volume of the drywell.
- Drywells treating any areas other than roof tops must be preceded by a robust biotreatment or conventional treatment capable of addressing all potentially generated pollutants.
- Drywells may be used in conjunction with other infiltration BMPs to increase the infiltration capacity of the entire treatment train system.

#### **Additional References for Design Guidance**

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- Stormwater Management in Western Washington (Volume III: Hydrologic Analysis and Flow Control Design BMPs) <http://www.ecy.wa.gov/pubs/0510031.pdf>
- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: [http://www.laschools.org/employee/design/fs-studies-and-reports/download/white\\_paper\\_report\\_material/Storm\\_Water\\_Technical\\_Manual\\_2009-opt-red.pdf?version\\_id=76975850](http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850)
- City of Portland Stormwater Management Manual (Drywell, page 2-87) <http://www.portlandonline.com/bes/index.cfm?c=47954&a=202883>
- San Diego County LID Handbook Appendix 4 (Factsheet 25): <http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf>
- City of Santa Barbara Storm Water BMP Guidance Manual, Chapter 6: [http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual\\_071008\\_Final.pdf](http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf)