

DESIGN CONSIDERATIONS FOR STORMWATER MANAGEMENT

Architects & Engineers

Architects and Design Engineers need to take special considerations to ensure protection of the environment when designing storm water facilities. This sheet describes some post construction storm water management aspects to consider.

Drywells: A common structural Best Management Practice (BMP) used for stormwater management, supplements the use of retention areas which naturally percolate and allow the storm water to infiltrate the soils naturally. The preferred percolation rate is greater than one inch per hour. If the preferred percolation rate is not achievable, or for other site constraints, drywells can assist in increasing the percolation of stormwater. It is not the preferred method of stormwater disposal because drywells can act as a groundwater injection well if pollutants are introduced to the well, either through storm water runoff carrying pollutants from hazardous material spills or direct discharge of hazardous materials into the well.

The site location of a drywell is important. Drywells should never be located in drainage areas where hazardous substances are used, stored, loaded, or treated; or located in drainage areas that are adjacent to or accept storm water runoff from fueling stations (including emergency generator fueling). Drywells installed in these areas require coverage under the Aquifer Protection permit (APP) requirements from the Arizona Department of Environmental Quality (ADEQ). The location of a drywell in a drainage area that has the potential of being impacted by this surrounding use should be taken as a last resort and only if approved in advance by ADEQ.

It is preferable to avoid whenever possible the direct piping of stormwater into a drywell. This provides added protection of the drywell from contaminants and sediment. Sediment and pollutants in the “first flush” should be directed to catch basins or retention basins prior to discharging to a drainage area with a drywell. There are situations when it may be necessary to direct pipe storm drainage to a drywell, such as significantly lower elevation of outfalls. When this scenario is required due to site constraints, every precaution should be taken to minimize the potential for contaminants to reach the drywell. If this type of impact will be a normal or likely occurrence, a drywell designed to contain these contaminants should be installed. Anything other than storm drain components should not be direct piped to a drywell.

Additionally, the drywell grate should be two inches above the final grade of any basin to allow sediments to drop out before entering the drywell. Drywells are required to be registered with ADEQ and are subject to long-term maintenance. It is important that this information is transferred to the Project Owner to ensure compliance.

Storm Water Runoff Quality: Most municipalities have on-site retention requirements that must be met. The water quality of the runoff should also be considered when evaluating disposal options. For example, runoff from a parking lot is likely to contain petroleum hydrocarbons and other automotive pollutants. Catch basins from these areas may be required to be equipped with oil/water separators, petroleum filters, or sediment traps prior to discharging to a retention basin with a drywell. This requirement would be necessary to ensure compliance.

Volume & Velocity of storm water flow from building downspouts and retention basin inlets should be considered during design. Directing roof runoff and air conditioning condensation to landscaped areas (water harvesting) is preferred over wasting water by discharging to the sanitary sewer system.

Landscape areas that receive flow from downspouts and outlets from paved areas (such as parking lots or roads) should be stabilized with river rock or other material to decrease storm water velocity. Flows over an unprotected surface can cause soil erosion that can decrease the calculated capacity of the retention basin by changing the elevations or increase sediment impact can fill the drywells thereby decreasing their efficiency.

Direct Piping of Stormwater to other “water bodies” such as canals, washes, and floodways requires additional permitting and authorizations from the “operator” or owner of the water body. It is important to contact the municipality’s Storm Water Management Program Coordinator prior to initiating any of these types of projects.

Due to municipal wastewater treatment system capacity issues, storm water is usually prohibited from being discharged into the sanitary sewer system. Outdoor sanitary sewage drains should be evaluated for storm water inflow potential and steps taken to mitigate that occurrence.

Operational Activities: This is not an exhaustive list, but intended to give you a basic frame work for evaluating operational activities for storm water impacts.

Trash Dumpsters are typically not liquid tight. In areas where “wet” wastes (such as food waste) are stored, containment sumps or trenches should be considered to prevent leaked pollutants from entering the storm drainage system. Maintenance of these sumps or trenches can be performed in conjunction with routine inspections of the trash area.

Hose Bibs provide a source of water for a variety of uses. However, washing “dirty” outdoor areas, equipment, parts, etc. onto pavement is prohibited since the resulting wastewater is likely to contain pollutants that could enter the storm drain system. Evaluate the intended use of each hose bib and its location relative to potential contaminants of a water system.

Outdoor Material Storage Areas should be evaluated to determine what types of materials may be stored. Materials that may contribute pollutants in a storm event should be covered. Typically, a metal awning is used. These areas should also contain any potentially polluted storm water. This can be done by constructing a sealed berm or sloping the area to a low point or lined sump area that can be inspected and maintained.

Vehicle & Equipment Repair activities should occur indoors whenever possible. Outdoor areas should be designed to limit the area that could be potentially impacted by a spill and designed to contain any spillage. Pretreatment devices (such as petroleum filters) can prove to be useful during a storm event in these areas. These devices help to remove pollutants before they enter the storm drain system.