

2.2.10 Multi-Purpose Detention Areas



Description: A facility designed primarily for another purpose, such as parking lots and rooftops that can provide water quantity control through detention of stormwater runoff

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Adequate grading and drainage must be provided to allow full use of facility's primary purposes following a storm event.

ADVANTAGES / BENEFITS:

- Allows for multiple uses of site areas and reduces the need for downstream detention facilities
- Can be used in conjunction with water quality structural control

DISADVANTAGES / LIMITATIONS:

- Controls for stormwater quantity primarily – not intended to provided water quality protection
- Localized flooding of area is intended may lead to property damage and additional liability

STORMWATER MANAGEMENT SUITABILITY

- Water Quality Protection
- Streambank Protection
- On-Site Flood Control
- Downstream Flood Control

IMPLEMENTATION CONSIDERATIONS

- Land Requirement
 - Capital Cost
 - Maintenance Burden
- Residential Subdivision Use: Yes
 Hi Density/Ultra-Urban: Yes
 Drainage Area: No restrictions
 Soils: No restrictions

L = Low M = Moderate H = High

2.2.10.1 General Description

Multi-purpose detention areas are site areas primarily used for one or more specific activities that are also designed to provide for the temporary storage of stormwater runoff to reduce downstream water quantity impacts. Example of multi-purpose detention areas include:

- Parking Lots
- Rooftops
- Sports Fields
- Recessed Plazas

Multi-purpose detention areas are normally dry between rain events, and by their very nature must be useable

for their primary function the majority of the time. As such, multi-purpose detention areas should not be used for extended detention (SP_v control).

Multi-purpose detention areas are not intended for water quality protection and must be used in a treatment train approach with other structural controls that provide treatment of the WQ_v (see Section 2.1).

2.2.10.2 Design Criteria and Specifications

Location

- Multi-purpose detention areas can be located upstream or downstream of other structural stormwater controls providing treatment of the water quality protection volume (WQ_v). See Section 2.1 for more information on the use of multiple structural controls in a treatment train.

General Design

- Multi-purpose detention areas are sized to temporarily store a portion or all of the volume of runoff required to control the 100-year storm, if required.

Routing calculations must be used to demonstrate that the storage volume is adequate.

See Section 4.5 (*Storage Design*) for procedures on the design of detention storage.

- All multi-purpose detention facilities must be designed to minimize potential safety risks, potential property damage, and inconvenience to the facility's primary purposes. Emergency overflows are to be provided for storm events larger than the design storm. The overflow must not create a significant adverse impact to downstream properties or the conveyance system.

Parking Lot Storage

- Parking lot detention can be implemented in areas where portions of large, paved lots can be temporarily used for runoff storage without significantly interfering with normal vehicle and pedestrian traffic. Parking lot detention can be created in two ways: by using ponding areas along sections of raised curbing, or through depressed areas of pavement at drop inlet locations.
- The maximum depth of detention ponding in a parking lot, except at a flow control structure, should be 6 inches for a 10-year storm, and 9 inches for a 100-year storm. The maximum depth of ponding at a flow control structure is 12 inches for a 100-year storm.
- The storage area (portion of the parking lot subject to ponding) must have a minimum slope of 0.5% towards the outlet to ensure complete drainage following a storm. A slope of 1% or greater is recommended.
- Fire lanes used for emergency equipment must be free of ponding water for runoff events up to the extreme storm (100-year) event.
- Flows are typically backed up in the parking lot using a wye inlet.

Rooftop Storage

- Rooftops can be used for detention storage as long as the roof support structure is designed to address the weight of ponded water and is sufficiently waterproofed to achieve a minimum service life of 30 years. All rooftop detention designs must meet Texas State Building Code and local building code requirements.
- The minimum pitch of the roof area subject to ponding is 0.25 inches per foot.
- The rooftop storage system must include another mechanism for draining the ponding area in the event that the primary outlet is clogged.

Sports Fields

- •Athletic facilities such as football and soccer fields and tracks can be used to provide stormwater detention. This is accomplished by constructing berms around the facilities, which in essence creates very large detention basins. Outflow can be controlled through the use of an overflow weir or other appropriate control structure. Proper grading must be performed to ensure complete drainage of the facility.

Public Plazas

- In high-density areas, recessed public common areas such as plazas and pavilions can be utilized for

stormwater detention. These areas can be designed to flood no more than once or twice annually, and provide important open recreation space during the rest of the year.

2.2.10.3 Inspection and Maintenance Requirements

Table 2.2.10-1. Typical Maintenance Activities for Multi-Purpose Detention Areas	
Activity	Schedule
<ul style="list-style-type: none"> • Remove debris from ponding area to minimize outlet clogging and improve aesthetics. 	Annually and following significant storm events
<ul style="list-style-type: none"> • Remove sediment buildup. • Repair and revegetate eroded areas. • Perform structural repairs to inlet and outlets. 	As needed based on inspection
<ul style="list-style-type: none"> • Perform additional maintenance activities specific to the type of facility. 	As required
(Based on: Denver Urban Storm Drainage Manual, 1999)	

Multi-pupose detention – end