

# Drainage Criteria Manual - Rule R161-20.10 adopted 7/24/2020

## 1.2.4 - Drainage System

- A. All drainage system components that are within public right of way or public drainage easements shall be manufactured and installed in compliance with the City of Austin Standard Specifications and Standards and shall comply with all applicable portions of the City of Austin's Transportation Criteria Manual published by the Department of Transportation, unless:
  - 1. Those components receive stormwater runoff solely from private property.
  - 2. That property consists solely of the property being developed, and
  - 3. Those components are privately maintained.
- B. Construction plans for proposed reinforced concrete box culverts, bridges and related structures may be adaptations of the Texas Department of Transportation (TxDOT) Standards.
- C. For bridges and culverts crossing local streets, runoff from the fully developed 100-year frequency storm shall not produce a headwater elevation at the roadway greater than either twelve (12) inches above the roadway crown elevation or any top of upstream curb elevation, whichever is lower.
- D. For bridges and culverts crossing streets other than a local street, runoff from the fully developed 100-year frequency storm shall not produce a headwater elevation at the roadway greater than six (6) inches above the roadway crown elevation or six (6) inches above any top of upstream curb elevation, whichever is lower.

### E. Introduction

Drainage facilities, referred to as stormwater control measures (SCMs) throughout this section, include but are not limited to headwalls, open channels, storm drains, area inlets, easements, detention ponds, retention ponds, water quality controls, and their appurtenances. In addition to this section all SCMs shall comply with the following requirements in; DCM Section 8.3, Stormwater Management Ponds, ECM Section 1.6.3, Maintenance and Construction Requirements, and applicable City of Austin Standard Specifications and Standards manuals.

The following table lists which requirements apply to residential development (single family/duplex) and which requirements apply to commercial development. Throughout this section residential development is defined as single family and duplex development and commercial development is defined as all development other than open space and residential development (pursuant to the definition in LDC Section 25-8-1). The requirements below shall apply to all City maintained SCMs and all SCMs for residential development regardless of whether they are publicly or privately maintained.

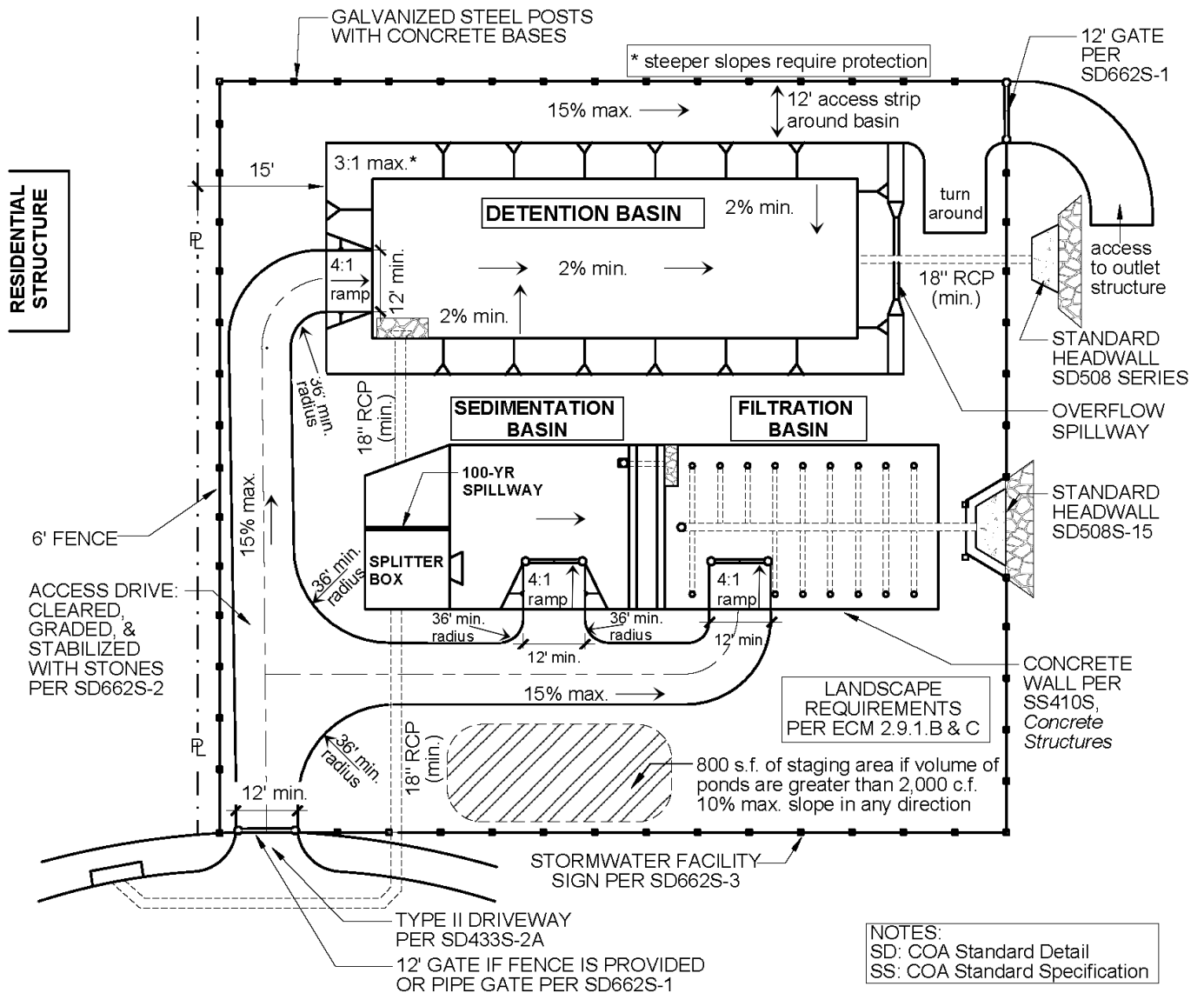
The requirements of this section do not apply to rainwater harvesting, porous pavement, and subsurface ponds, unless otherwise stated in ECM 1.6.2.E, Subsurface Ponds.

The requirements of subsections 1-Access, 2-Staging Area, 6-Gates (a only), and 10-Signage do not apply if the combined total storage volume of all ponds is less than or equal to 5,000 cubic feet and the maximum ponding depth is less than or equal to three (3) feet.

The requirements below are organized by the typical phase of permitting (preliminary plan, final plat, subdivision construction plan, and site plan) when these items will need to be addressed.



**Figure 1.2.4.E.1 Conceptual Layout (not to scale)** – The layout of this figure is only conceptual, and code should be used as guidance for design.



1. **Access** - This section provides the minimum requirements for reasonable access into SCMs for maintenance and inspection activities for both residential and commercial developments.
  - a. Maintenance access drives and ramps shall be cleared, graded and stabilized with rock and comply with Standard Detail 662S-2 (Pond Maintenance Road Typical Cross Section).

- b. For residential development, access from the right of way (ROW) to the SCM shall comply with Standard Detail 433S-2 (Type II Driveway) approach and curb cut on the abutting street.
  - c. Residential development shall provide a maintenance access drive around the perimeter of the SCM. The Director of the Watershed Protection Department may approve a maintenance access drive that does not follow the entire perimeter of the SCM if the applicant demonstrates that access is provided to all key components, including but not limited to basins, inlets, and outlets.
  - d. Maintenance access drives shall also be provided for facilities that will be maintained by the City when access is proposed between single family lots or when access from any other location exceeds a grade of twenty percent (20%).
  - e. Maintenance access drives shall meet the following requirements:
    - i. A minimum horizontal width of twelve (12) feet,
    - ii. A minimum vertical clearance of fourteen (14) feet from existing and proposed vegetation and all other objects,
    - iii. Be located outside the toe of any fill slope and the top of any cut slope, and
    - iv. An inside turning radius of no less than thirty-six (36) feet,
    - v. A means for equipment to turn around when located more than 200 feet from the public ROW.
    - vi. A maximum longitudinal slope of fifteen (15) percent,
    - vii. A maximum transverse slope of five (5) percent,
    - viii. A maximum vertical grade break of twelve percent (12%), and
    - ix. A maximum vertical curve grade change of one percent (1%) per horizontal foot.
  - f. Both residential and commercial developments shall provide maintenance access ramps into each basin of a SCM and shall meet the following requirements:
    - i. Have a longitudinal slope no steeper than 4:1, and
    - ii. Have a clear distance of fifteen (15) feet from the bottom of the ramp to any interior slope.
2. **Staging Area** – A staging area is required in order to allow for storage of materials and equipment during inspection and maintenance operations.
- The staging area must meet the following requirements:
- a. Be at least 800 square feet in area with no dimension less than twenty (20) feet,
  - b. Be located within 100 feet of the SCM basin,
  - c. Be adjacent to the access drive and within an access or drainage easement,
  - d. No portion can be located within any ponding area, interior slope of the facility, or access drive,
  - e. Have a vertical clearance from existing and proposed vegetation and all other objects of no less than fourteen (14) feet, and

- f. Have no finished slope greater than ten (10) percent.

### **3. Drainage Easements**

- a. Drainage or drainage access easements are required per LDC 25-7-151 and 25-7-152.
- b. Drainage or drainage access easements that are required along property lines shall be located adjacent to a property line and shall not be centered on a property line.

### **4. Setbacks**

- a. For any new development, the SCM basin shall have a minimum fifteen (15) foot setback from any property line adjacent to a residential development. This requirement does not apply to rain gardens that use no concrete per LDC 25-2-1062.
- b. The setback shall be measured from the outside edge of the SCM basin. If the basin is an earthen embankment the outside edge is measured from the toe of the slope on the outside (dry side) of the basin.

### **5. Fencing - This section applies to all residential and commercial development.**

- a. A six (6) foot high fence is required when:
  - i. A portion of the SCM basin has an interior slope or wall steeper than three (3) feet horizontal to one (1) foot vertical with a height exceeding one (1) foot, or,
  - ii. An exterior slope or wall steeper than three (3) feet horizontal to one (1) foot vertical with a height exceeding three (3) feet above adjacent ground,
- b. Fence Location
  - i. Fencing is allowed on top of vertical walls to achieve the six (6) foot minimum requirement. The total combined height of the wall and fence must be a minimum of six (6) feet above the exterior finished grade, or
  - ii. If the fence is not placed on top of the vertical walls, the fence shall be located no less than twenty (20) feet past the toe of the embankment or to the edge of the property line.
- c. Materials – Allowable fence materials include, but are not limited to, chain link, solid wood, masonry, stone or wrought iron.
  - i. Metal components of the fence shall be corrosion resistant and wood components of the fence shall be weather resistant.
  - ii. Any fence posts used shall be galvanized steel with a concrete footing of at least twelve (12) inches in diameter and at least eighteen (18) inches in depth (see Standard Specification No. 701).
- d. Handrail option – SCMs with a total ponding depth less than or equal to three (3) feet and that require fencing per (a) above may provide a pedestrian handrail in lieu of the six (6)

foot high fence. The design must meet the requirements in Standard Details 707S-1 or 707S-2 (Pedestrian Handrail).

## **6. Gates**

- a. For residential development, a pipe gate is required at the end of the driveway at the ROW. The design must meet the requirements in Standard Detail 662S-1 (Pond Pipe Gate at Ramp Detail).
  - i. No pipe gate is required if an access gate for a fully fenced pond or SCM is located within twenty-five (25) feet of the ROW.
- b. All fences shall have at least one gate, which shall open fully inward and outward and shall be at least twelve (12) feet in width.
- c. The first gate shall provide access to the SCM from either the easement or ROW. Access to the outfall structures is required for inspection and maintenance.
- d. If the fencing prohibits access to the outfall structure, then a second gate shall be provided allowing access to the outfall structure.

## **7. Outfalls** - Discharge from storm drain outfalls shall not cause channel, bluff, or stream bank erosion. If the storm drains discharge to an open channel system; creeks, channels, or ditches that convey stormwater (as determined by the City), the applicant shall show:

- a. Acceptable nonerosive conveyance from the SCM per section 5.8.0.
- b. That the angle of intersection between the outfall flow path and the channel flow path is not greater than 45-degrees.
- c. That storm drains that discharge into open channels conform to the design guidelines in Standards 508S-13 or 508S-16 through 508S-20, as appropriate for site specific conditions and,
- d. Appropriately designed outfalls including adequate energy dissipation, which may include stream stabilization.

## **8. Slopes**

- a. All side slopes, earthen embankments, and pond bottoms, shall be compacted to ninety-five (95) percent of maximum density in accordance with established embankment construction requirements (Standard Specification 132S).
  - i. The bottom of the SCM is not required to meet the compaction requirements above if the design proposes a SCM that is fully reliant on infiltration to meet water quality standards.

- b. Side slopes for earthen embankments shall not exceed three (3) horizontal to one (1) vertical.
- c. Rock slopes may exceed these limits if a geotechnical report warrants a deviation. Actual field conditions may override the geotechnical report.
- d. Detention ponds with earthen berms shall have a minimum bottom slope of two (2) percent.
- e. Detention ponds with full concrete bottoms shall have a minimum slope of one-half (0.5) percent.

## **9. Pilot Channels**

- a. The pilot channel shall be at least four (4) feet wide and two (2) inches deep. Refer to DCM Section 6.4.1.C.
- b. Pilot channels are not permitted in water quality SCMs due to short-circuiting and standing water problems.

**10. Signage** - Signs are required on each side of a residential or City-maintained stormwater control measure. The design must meet the requirements shown in Storm Water Facility Sign (Standard Detail 662S-3).

**11. Mechanical SCMs** – Mechanical SCMs include, but are not limited to, detention, rainwater harvesting, and retention irrigation SCMs that utilize pump systems to redistribute stormwater to meet a required discharge rate.

- a. All mechanical SCMs to be maintained by the City shall meet City of Austin Water and Wastewater criteria as stated in the Utilities Criteria Manual, Section 2.
- b. OSHA confined space requirements must be met for any facility determined to be a confined space or that is subsurface. For subsurface SCMs, refer to ECM Section 1.6.2.E, Subsurface Ponds, for specific design standards.

## **12. Landscaping**

- a. The landscaping requirements of ECM Section 2.9.1 apply to SCMs for residential development or for such facilities that will be maintained by the City. This requirement may only be provided via screening types B or C.
- b. Landscaping and other vegetation shall not encroach into or impede use of any access drive or access strip, based upon the size of the landscaping or vegetation at maturity.

F. Any concentrated flow necessitates the dedication of a drainage easement to the larger of following: the limits of the fully developed 100-year storm water surface elevation, or minimum easements widths as required in this Drainage Criteria Manual.

G. An easement or right-of-way as required in this Drainage Criteria Manual must be of sufficient width to provide continuous access for the operation, maintenance, or repair of a drainage facility or conveyance of stormwater.

(1) A minimum of 25 feet in width for an open drainage system; or

(2) See information below for an enclosed drainage system.

Minimum Easement Width (feet) Based on Depth of Invert of Pipe or Box Culvert (feet)												
Pipe Inside Diameter or Box Span (inches)	Depth of Invert of Pipe or Box Culvert (feet)											
		5	6	7	8	9	10	11	12	13	14	15
18		20	20	20	20	25	25	30	30	30	35	35
24		20	20	20	20	25	25	30	30	30	35	35
30			20	20	25	25	25	30	30	35	35	35
36			20	20	25	25	25	30	30	35	35	35
42				20	25	25	30	30	30	35	35	40
48				20	25	25	30	30	30	35	35	40
54					25	30	30	35	35	35	35	40
60					25	30	30	35	35	35	35	40
66						30	30	35	35	35	40	40
72						30	30	35	35	35	40	40

Notes:

1. Minimum easement widths for depths or pipe sizes not shown in this table must be approved by the Director of the Watershed Protection Department.

2. If the enclosed drainage system is parallel to the right of way the easement width outside of the right of way may be reduced to the to one-half of the width listed in the Table if the drainage system is located in the right of way.