

CHAPTER 5

FLOW CONTROL DESIGN

**CITY OF KENT
SURFACE WATER
DESIGN MANUAL**



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The City of Kent has made one minor change to Chapter 5 of the 1998 KCSWDM. Apart from this change, the King County version of Chapter 5 applies for proposals in the City of Kent. The City's change to the County document is as follows:

- **Section 5.3 DETENTION FACILITIES, Detention Ponds, Design Criteria, General (page 5-20 of the 1998 KCSWDM)**—The following items are added to this section:
 5. All retention/detention ponds shall have a minimum of one (1) foot free board above the maximum design water surface elevation.
 6. Outlets of all detention ponds shall be provided with suitable debris barriers designed to protect the outlet from blockage or plugging.
 7. The site and grading plans for open ponds shall clearly denote all elevations, dimensions, cross-section views (a minimum of one through each direction), soil preparation requirements, and other information necessary to construct the system as designed. The design plans shall also denote that the design engineer shall verify the pond volume and construction prior to landscaping.
 8. All ponds shall provide for the energy reduction of incoming flows.
- **Section 5.3 DETENTION FACILITIES, Detention Ponds, Design Criteria, Side Slopes (page 5-20 of the 1998 KCSWDM)**—This section is replaced with the following:
 1. Side slopes for earth-lined ponds shall not exceed three (3) feet horizontal to one (1) foot vertical, unless specifically approved by the Director.
 2. Ponds constructed with rock walls or retaining walls shall be designed by a licensed structural or civil engineer registered in the State of Washington. Walls shall not exceed 6' in height.
 3. All ponds shall include at least two (2) sloped surface with one (1) accessible for maintenance equipment at a maximum 6:1 slope.
- **Section 5.3 DETENTION FACILITIES, Detention Ponds, Design Criteria, Embankments (page 5-20 of the 1998 KCSWDM)**—Requirements 1 and 2 have been revised according to the following, and item 7 has been added:
 1. Any embankment for a pond in excess of four (4) feet must be designed by a licensed civil engineer and approved by the City.
 2. The top width of the berm shall be fifteen (15) feet, unless otherwise approved.

7. A licensed civil engineer experienced in soil mechanics shall inspect and certify the construction of the berm.
- **Section 5.3.1 DETENTION PONDS, Fencing** (*page 5-22 of the 1998 KCSWDM*)—Requirement 4 has been revised according to the following:
 4. An access gate for access roads is required and shall be structurally and aesthetically acceptable for the use and location proposed. An acceptable alternative to control traffic shall be removable posts spaced at a maximum four (4) foot center sin lieu of an access gate where fencing is not required, said posts shall be locked into position. Locks shall be keyed to City of Kent Specifications. (See Standard Detail 5-12(b) for access gates, 6-15(a), (b), (c), (d) and 6-16 for Bollards in Appendix “B”).
 - **Section 5.3.1 DETENTION PONDS, Right-of-Way** (*page 5-23 of the 1998 KCSWDM*)—Requirements 2 has been revised according to the following, and item 3 has been added:
 2. All storm water retention/detention systems and outlet control structures that service more than one legally defined property are required to be located within a recorded storm drainage easement. In some cases, the City may approve locating detention piping within the street right-of-way. If the detention facilities are not located adjacent to the roadway, a twelve (12) foot wide, all-weather surfaced access road shall be constructed to the facility. This access road shall be located within an easement and shall provide for unobstructed ingress and egress to the facility.
 3. A written restriction shall be added to the final plat drawing that “Prior approval must be obtained from the Department of Public Works before any structures, fill or obstructions, including fences, are located within any drainage easement or delineated flood plain area.”
 - **Section 5.3.2 DETENTION TANKS, Materials** (*page 5-33 of the 1998 KCSWDM*)— The following is added to this section:

Corrugated steel storage pipes shall be uniformly coated with APWA Treatment 1 asphalt or better. Corrugated aluminum or concrete pipe may be substituted without asphalt treatment. Aluminum shall be painted with two (2) coats of zinc chromate primer where it contacts concrete.

The City of Kent Fire Department shall be consulted during design of any underground facilities to ensure that outrigger placement (pointload) requirements are met.
 - **Section 5.3.3 DETENTION VAULTS, Structural Stability** (*page 5-37 of the 1998 KCSWDM*)— The following is added to this section:

The concrete structures shall be designed by a civil or structural engineer registered in the State of Washington, and be designed for at least HS-20 traffic loading conditions. Concrete vaults shall be designed in accordance with King County Surface Water Management Standard Details for detention vaults. A City building permit is required for vault structures.

The City of Kent Fire Department shall be consulted during design of any underground facilities to ensure that outrigger placement (pointload) requirements are met.
 - **Section 5.3.5 OTHER DETENTION OPTIONS, Use of Parking Lots for Additional Detention** (*page 5-51 of the 1998 KCSWDM*)—Replace this section with the following:
 1. Maximum depth for surface storage in parking lots shall be as follows:

- a. Commercial/multi-family parking and maneuvering areas – six (6) inches.
- b. Industrial truck loading/maneuvering areas – eighteen (18) inches.
2. Parking lots designed for detention shall not exceed slopes of 7% in areas of vehicular parking or maneuvering.
3. All parking lot ponds shall be designed and constructed in such a manner so as to provide 0.50 feet of free board between the maximum water surface elevation and adjacent driveways, landscaping or adjacent properties.
4. The maximum water surface elevation of any parking lot pond shall be a minimum of six (6) inches below the finished floor elevation of adjacent buildings. All ponding systems shall be designed to go to overflow conveyance prior to flooding structures.
5. Where parking lot ponding is to be utilized, the site grading and paving plans shall clearly denote all critical elevations, ponding, dimensions, and any other necessary information to construct the detention pond as designed. The design plan shall indicate that the respective details are critical for the storm drainage detention system operation and that the site grading must be verified.

- **Section 5.3.5 OTHER DETENTION OPTIONS, Use of Roofs for Detention (*page 5-51 of the 1998 KCSWDM*)**—Add the following items:

6. The maximum allowable depth of any rooftop detention facility shall be three (3) inches.
7. All rooftop detention facilities shall be provided with overflow scupper drains at the maximum water surface elevation.
8. Rooftop detention rings shall be installed in accordance with the manufacturer's specifications and shall be designed to restrict rooftop runoff rates not to exceed two (2) gallons per minute per 1000 sq. feet of roof areas.