

## **STANDARD DESIGN CRITERIA**

### **1 GENERAL**

These technical specifications address the design criteria necessary for stormwater management. The purpose of stormwater management is to prevent flooding, minimize property damage, prevent erosion, eliminate nuisance conditions, lower overall costs, and improve overall water quality.

Stormwater management is required to provide protection from flooding by limiting the post-developed peak rate of discharge (volume, velocity, & concentration shall also be considered); recharge where possible by allowing for retention of runoff where soils are compatible; and pollution abatement by retention with percolation or detention without infiltration (wet detention).

### **2 DEVELOPMENT WITHIN AREAS OF THE 100-YEAR FLOODPLAIN**

#### **2.1 NATIONAL FLOOD INSURANCE PROGRAM**

Projects located within the 100-year floodplain of a river or stream come under the jurisdiction of the Flood Hazard Regulatory Authority as found in Part 31, Water Resources Protection of the Natural Resource and Environmental Protection Act, Act 451 of the Public Acts of 1994. A permit needs to be filed with the Department of Environmental Quality (DEQ) for projects that involve construction, filling, and grading within a floodplain area.

The objectives of Part 31 are: a) to ensure that the flood carrying capabilities of the rivers and streams is maintained such that the floodways are not obstructed and that flood elevations are not increased or flow diverted, and b) to ensure that the floodway portion of floodplains are not inhabited.

Many communities in Kent County also participate in the National Flood Insurance Program (NFIP). The program makes flood insurance available in those communities agreeing to regulate future floodplain construction. Associated with the program are community floodplain mapping, building standards, federal lending restriction, and flood insurance rates supportive of local floodplain regulation. In order for a community to participate in the NFIP local regulations must be in force to:

1. Require that new construction and substantial improvements in flood prone areas be designed and anchored to prevent flotation, collapse, or lateral movement, be constructed with materials and utility equipment resistant to flood damage, and be constructed by methods and practices to minimize flood damages.
2. Require, where flood elevation data are available, that

- a. All new construction and substantial improvements of residential structures located in flood hazard areas have the lowest floor (including basement) elevated to or above the 100-year flood level.
  - b. All new construction and substantial improvements of nonresidential structures in flood hazard areas have the lowest floor (including basement) elevated or dry floodproofed to or above the 100-year flood level. A registered professional engineer or architect must certify Floodproofing.
3. Require anchoring of mobile homes in flood prone areas.
  4. Maintain a record of all lowest floor elevations to which new buildings have been constructed or existing buildings have been floodproofed when the structures are located in a flood hazard area.

Floodplains are mapped for most communities that participate in the FIPF. Floodplain maps are available for inspection in city, village, and township offices, or may be obtained from the Department of Environmental Quality (DEQ). The DEQ may also be able to provide estimates of flood elevations in many streams, and in communities where maps do not exist.

In Kent County, the following communities participate in the NFIP and may have a floodplain map:

Cities of: East Grand Rapids, Grand Rapids, Grandville, Kentwood, Lowell, Walker, and Wyoming.

Village of Sparta

Townships of: Ada, Algoma, Caledonia, Cannon, Cascade, Plainfield, and Sparta.

## **2.2 FLOODPLAIN MITIGATION**

Natural floodway filling or alteration shall not be allowed without review and approval by the Kent County Drain Commission and compliance with the Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) on watercourses with contributing drainage area of 2 square miles or greater. If a floodway has not been mapped, the applicant's consultant shall provide the floodway delineation to the Kent County Drain Commission for approval.

Natural floodway fringe filling or alteration shall not be allowed without review and approval by the Kent County Drain Commission and compliance with the Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994

PA 451, as amended (NREPA) on watercourses with contributing area of 2 square miles or greater. If a floodplain has not been mapped, the applicant's consultant shall provide the floodplain delineation including the floodway to the Kent County Drain Commission for approval.

To provide for streambank stability a buffer zone is to be established and called out on a recorded plat, an approved block grading plan, a site plan, or an improvement plan. This zone shall consist of existing natural tree and vegetation slope protection within a minimum of 25 feet from the ordinary high water mark. This buffer zone shall be maintained as is, that is, no earth change or disturbance is to take place.

Replacement of lost floodplain shall meet the following criteria.

1. Replacement of the loss of floodplain storage volume at a 1 to 1 ratio unless watershed conditions warrant a higher ratio. This applies to floodplain associated with rainfall events up to a 100-year frequency. The grading plan shall provide for an equivalent volume of storage for floodplains associated with more frequent events such as 10 and 25 year frequencies.
2. Storm water detention does not apply toward the replacement volume.
3. Floodplain storage volume shall be computed above the seasonal high ground water level only.
4. The inflow and outflow rates to the area shall be consistent with predevelopment rates.
5. Up to 50 percent of the floodplain mitigation storage volume may be used for snow storage.
6. The proximity of the floodplain mitigation area shall provide for an equivalent hydrologic impact to the receiving stream and adjacent parcels.

### **3 DESIGN CRITERIA**

The basis of design for the stormwater management facilities are governed by the following criteria:

#### **3.1 DESIGN STORM DURATION AND DISTRIBUTION**

The design storm serves as the basis for design. The selection of the storm duration and distribution affects the resulting runoff volume and peak discharge rate. Total storm volume and distribution has been selected to produce total runoff volume and peak runoff rates that are independent of the tributary area. The following characteristics of the design storm have been selected: