

## SECTION 5 – STORMWATER MANAGEMENT PLAN

This Section of the Stormwater Management Design Standards describes the methods and criteria necessary to integrate infiltration, water quality, and flow control stormwater facilities into a comprehensive stormwater management plan.

### 5.1 PLAN REVIEW REQUIREMENT THRESHOLDS

#### 5.1.1 Stormwater Management Plan $\geq$ 5,000 sqft of Impervious Area

All development that results in 5,000 square feet or more of new impervious surface and/or a modification of existing impervious surfaces is subject to these Standards including: stormwater management, natural resource protection, and erosion control requirements.

#### 5.1.2 Stormwater Management Plan $\leq$ 5,000 sqft of Impervious Area

All development that results in less than 5,000 square feet of new impervious surface and/or a modification of existing impervious surfaces which is not being phased or segmented in such a manner to avoid the requirements of these Standards is required to meet all provisions herein, including Section 4 – Natural Resources and Vegetated Buffers. All development per Section 5.1.2 that results in less than 5,000 square feet are exempted from the following Sections:

- a) Section 5.3 - Stormwater Water Quality Treatment Standards;
- b) Section 5.4 - Stormwater Infiltration Standards;
- c) Section 5.5 - Stormwater Quantity / Flow Control Standards.

#### 5.1.3 Erosion Control Plan and NPDES 1200-C Permits

Within the boundaries of the District, any grading or soil disturbance associated with a development activity which disturbs 800 square feet or greater is required to obtain an Erosion Control permit from the District. For erosion control requirements see Section 6 of these Standards.

Any development activity in unincorporated Clackamas County not governed by a local authority will be required to obtain a National Pollutant Discharge Elimination System (NPDES) 1200-C Permit for any grading or soil disturbance associated with a development activity which disturbs 1 acre or greater area. The District has an agreement with DEQ to serve as the Agent of DEQ for these permits in the unincorporated area of Clackamas County. This includes plan review, permitting, inspection and enforcement of NPDES 1200-C permit requirements.

### 5.2 STORMWATER WATER QUALITY TREATMENT STANDARDS

#### Water Quality Treatment Facilities

All new developments and re-developments shall provide on-site water quality facilities, as required by the District. Water quality facilities shall be designed to capture and treat the first 1-inch of stormwater runoff from a 24 hour storm event. The water quality facility shall use either vegetation for treatment or a proprietary device in accordance with *Appendix F - Proprietary Stormwater Treatment Technology Policy*. Accepted types of vegetated treatment facilities include vegetated swales, filter strips, constructed wetlands, wet ponds and extended dry detention ponds. Alternative systems may be used with approval by the District and shall be designed to provide equivalent treatment as is provided with a vegetated system, as described in the Standards *Appendix H -*

*Vegetated Stormwater Quality Facility Design Criteria* and the “Surface Water Quality Facilities Technical Guidance Handbook”, developed by Portland and Lake Oswego, Clackamas County, and the Unified Sewerage Agency, now known as Clean Water Services. See Appendix F for the acceptable uses of proprietary stormwater treatment technologies (devices).

### **5.3 STORMWATER INFILTRATION STANDARDS**

#### Infiltration/Retention Systems

Infiltration systems are required for all new developments and redevelopments to infiltrate all runoff from storm events up to one-half inch of rainfall in 24 hours. Treatment shall occur prior to or concurrent with infiltration systems in accordance with Section 5.2. Infiltration system capacity may be incorporated into the detention system design, in order to reduce the required detention volume with appropriate professional on-site infiltration rate testing. Infiltration facilities shall be sized to infiltrate the design runoff volume within a maximum of 96 hours for the one-half inch requirement and 36 hours for the detention requirement.

Infiltration requirements may be waived, or reduced, if it can be demonstrated by a registered professional engineer that infiltration will destabilize the soil, cause adverse structural or environmental impacts, or due to site constraints such as high groundwater, springs, or impermeable soils.

### **5.4 STORMWATER QUANTITY / FLOW CONTROL STANDARDS**

#### 5.4.1 Conveyance Standards

Surface water collection systems with the potential to serve areas up to 10 acres of land must be sized for the post-developed 10-yr storm, using the Rational Method. All other surface water conveyance systems shall be sized for post-developed conditions in accordance with the following criteria:

- 5.4.1.1 Storm sewers and outfall pipes draining less than 640 acres: 25-yr, 24-hr design storm.
- 5.4.1.2 Storm sewers and outfall pipes draining greater than 640 acres: 50-year, 24-hour design storm.
- 5.4.1.3 Creek or stream channels draining less than 250 acres: 25-year, 24-hour design storm.
- 5.4.1.4 Creek or stream channels draining greater than 250 acres: 50-year, 24-hour design storm.
- 5.4.1.5 Creek or stream channels draining greater than 640 acres: 100-year, 24-hour design storm.

Areas draining greater than 10 acres of land may use alternate methods such as SBUH, HEC 1, HSPF, or SWMM, or others as approved by the District.

Exceptions must be documented and approved by the District.

Instream or in-line detention can only be used in locations approved by the Oregon Department of State Lands and US Army Corps of Engineers, and any other authorized Federal, State, or Local agency.

#### 5.4.2 Springs and Groundwater

It shall be the responsibility of the owner to provide a drainage system for all water on site and for water entering the property from off-site. Surface water, springs, and groundwater shall be incorporated into the drainage design. Existing problems shall be addressed in plans submitted for review and approval. Groundwater and springs that are encountered during development shall be the responsibility of the developer to address. Plans for drainage of these waters shall be submitted to the District for review and approval prior to construction.

#### 5.4.3 Curb Drains

Where a drainage system of catchbasins and pipes is available, all drains that extend to the curb must be directly connected to the storm system. No drainage will be allowed into the street or roadway where a drainage system is available.

#### 5.4.4 Onsite Detention Design Criteria

Onsite storm quantity detention facilities shall be designed to capture, detain, and release runoff as follows (Access Road shall be designed and specified in accordance with *Appendix I – Detention Access Standards*):

- 5.4.4.1 Flow Control Design Criteria: 2-year, 24-hour post-developed runoff rate to a  $\frac{1}{2}$  of the 2 year, 24-hour pre-developed discharge rate.
- 5.4.4.2 Precipitation-Frequency Estimates. The following storm precipitation estimates for the 2-year, 25-year and 100-year recurrence interval storm events shall be used within the North Clackamas Service Area of the District. All other areas of the District shall use the NOAA Atlas 2, Volume 10 isopluvial maps.
  - 2-year 24-hour equates to a 2.60-inches of rainfall.
  - 25-year 24-hour equates to a 4.00-inches of rainfall.
  - 100-year 24-hour equates to a 4.80-inches of rainfall.
- 5.4.4.3 In areas with limited downstream capacity that cannot be upgraded, (see Appendix G for maps of specific areas), detention shall be designed to reduce the 25 year, 24-hour, post-developed runoff rate to a 2 year, 24-hour pre-developed discharge rate, and, from the 2 year, 24-hour, post developed runoff rate, to  $\frac{1}{2}$  of the 2-year, 24-hour pre-developed discharge rate.
- 5.4.4.4 Downstream analysis shall demonstrate adequate conveyance capacity to the distance where the project site contributes less than 15% of the upstream drainage area OR 1500 feet downstream of the project, whichever is greater. If the downstream analysis crosses the jurisdictional boundary of another surface water management agency, that agency must be notified by the Developer or Owner and given the opportunity to review and comment on the analysis.

- 5.4.4.5 For residential subdivisions and partitions of parcels with the potential to create more than two additional lots as currently zoned and proposing to create impervious surface area as outlined in Section 5.1 - Plan Review Requirement Threshold will be developed in accordance with these Standards including the infiltration, water quality and flow control requirements to mitigate the stormwater runoff.

For 2 and 3 lot partitions proposing to create impervious surface area as outlined in Section 5.1 - Plan Review Requirement Threshold which cannot be further partitioned under current zoning, detention is not required if there are no downstream impacts.

All subdivisions and partitions must include a drainage plan for each proposed lot. Infiltration facilities are required where soil conditions permit. Open detention facilities shall be planted with vegetation per the City of Portland Plant List. Planting plan and facilities operation and maintenance plan shall be approved by the District.

#### 5.4.5 Onsite Detention Design Method

The procedure for determining the detention quantities is set forth in Chapter 4.4, Retention/Detention Facility Analysis and Design, King County, Washington, Surface Water Design Manual Version 4.21. The Design Manual and associated software are no longer available online. The manual and software procedure can be viewed in it's entirety at our office or, upon request; we can email you the relevant sections of the manual and program files. This manual shall be used for procedure only. Local rainfall data and information shall apply. The design criteria shall be as noted herein.

- 5.4.5.1 Engineers desiring to utilize a procedure other than that set forth herein shall obtain the approval of the District prior to submitting calculations utilizing the proposed procedure.
- 5.4.5.2 For all developments other than single family and duplex, the sizing of stormwater quantity detention facilities shall be based on the impervious area to be created by the development, including structures and all roads and impervious areas.
- 5.4.5.3 For single family and duplex residential subdivisions or partitions, stormwater quantity detention facilities shall be sized for the impervious areas to be created by the subdivision or partitions, including all residences on individual lots at a rate of one ESU of impervious surface area per dwelling unit, plus all roads. If actual impervious area is to be greater than one ESU per dwelling unit, then the actual impervious numbers shall be used. Such facilities shall be constructed as a part of the subdivision or partition.
- 5.4.5.4 Redevelopment of sites shall require detention for the areas impacted by construction.

#### 5.4.6 Subregional Detention

Subregional detention and water quality facilities are encouraged. Where topographically feasible, detention and water quality facilities may be sized and constructed to provide detention and treatment for more than one development. Maintenance and sharing agreements must be provided for the facility. Easements and access must also be provided.

5.4.6.1 In-lieu-of fees for detention and water quality may be requested by the developer and applied under the following conditions:

- A subregional or regional detention and treatment facility downstream is available and has been identified.
- Downstream detention and treatment facility is constructed or an agreement has been approved by the District on construction of a downstream detention and treatment facility.
- Fees for “in- lieu-of” detention and treatment would be applied as a percentage of facility costs, including engineering and administration. Percentage of costs would be based on percentage of use of facility.
- Maintenance of facility is provided.

### 5.5 GENERAL

#### 5.5.1 Stream Crossings

All stream crossings must be approved by the Oregon Department of State Lands, US Army Corps of Engineers, and any other authorized Federal, State, or Local agency if the waterway is impacted by the crossing.

#### 5.5.2 Traversed by any Water Course

In the event a development or any part thereof is traversed by any water course, channel, stream or creek, gulch or other natural drainage channel, adequate easements for surface water drainage purposes shall be provided to the District. This does not imply a maintenance obligation by the District.

#### 5.5.3 Channel Obstructions

Channel obstructions are not allowed except with District approval.

#### 5.5.4 Drainage Management Plans

Facilities developed on site shall be constructed in a manner consistent with basinwide or subbasin drainage management plans.

#### 5.5.5 Specifications of the District

All surface water facilities, storm conveyance pipes, vaults, detention facilities or other water quality or quantity facilities shall be designed and constructed to the specifications of the District.

#### 5.5.6 Phase Development

Development projects shall not be phased or segmented in such a manner to avoid the requirements of these Standards.

5.5.7 Redevelopment

All developments and redevelopments shall provide water quantity, water quality and infiltration facilities as specified in accordance with the Stormwater Standards.

5.5.8 Engineering Services

Stormwater management plans and calculations must be stamped and signed by a civil engineer licensed by the State of Oregon and meet the standards of the District. The construction, specifications, and testing must be completed under the direction of the engineer.

5.5.9 Plan Review and Approval

All applicants proposing stormwater management plans shall be governed by the District Regulations and shall submit the plans, reports, studies, and information as required by District Regulations. The submittals shall be reviewed and approved by the District. All stormwater conveyance facilities shall be located within the public right-of-way wherever possible.

5.5.10 Maintenance

Maintenance is required for all on-site surface water facilities. A commercial or industrial user having ownership or control of onsite detention facilities shall maintain such facilities in compliance with these Standards and provide documentation of annual maintenance. The maintenance program must be approved by the District. All surface water facilities shall be maintained as needed and as approved by the District. Proof of maintenance shall be annually submitted in accordance with a schedule approved by the District. If the facility is not maintained, the District may perform the maintenance and charge the owner of the facility.

5.5.11 Easements

A stormwater management plan shall provide easements and access for construction, operation and maintenance in accordance with the District Regulations.

5.5.12 Licensed Contractor

Stormwater management facilities shall be constructed by a contractor duly licensed by the State of Oregon and any other licensing political subdivision having jurisdiction over the work.

5.5.13 Inspection

Inspection of surface water facilities and approval of shop drawings shall be provided by the developer's engineer.

5.5.14 Asbuilt Plans

Asbuilt plans of facilities, easements for all facilities, and approved maintenance plans shall be provided to the District upon completion of construction.

5.5.15 Construction Certification

Following completion of construction, the engineer shall submit a document, stamped by a professional engineer, indicating all surface water systems have been inspected and installed per approved plans and approved changes.

5.5.16 Construction Acceptance

Upon the completion of construction and certification by the engineer the District shall inspect and approve the construction of the stormwater management and storm drainage facilities in accordance with the approved plans.

5.5.17 Warranty / Surety Bond

The District shall require a warranty bond or surety in the amount of 25% of the cost of construction for a period of one-year on an approved District bond form in accordance with the Stormwater Standards. At the end of the warranty period, the residual bond amount shall be released and remitted to the owner. Nothing herein shall limit the owner's responsibility for repair and maintenance to the amount of the bond.

5.5.18 Performance Bond

If the project is not completed in accordance with Section 5, the permittee shall provide a performance bond or other surety acceptable to the District prior to recording of the plat for residential developments or the issuance of building permits for commercial or industrial developments. The amount of the performance bond shall be 125% of the engineer's cost estimate for all approved but uncompleted surface water, storm drainage, and Buffer improvements and submitted on an approved bond form.