# Permanent/Post Construction Stormwater Management

*The information and references in this document are subject to change.* Last Revised: 10/10/2024

**Plans shall be prepared in accordance with these standards, the approved Stormwater Management Plan for the applicable plat, the City's Overall SWMP. Plans are subject to City Stormwater Management Code 52.00 and all other City codes related to land development.**

1. **Rate Control**
   - 1.1 Existing discharge rates for the 2-year, 10-year, and 100-year 24-hour storm events shall not be increased.
     - 1.1.1 Discharge rates derived using the standard methods of the Natural Resource Conservation Service TR-55 or TR-20 as defined in the current Hydrology Guide for Minnesota or other hydrologic models included in the Minnesota Stormwater Manual or method subject to approval by the City Engineer.
     - 1.1.2 Discharge rates derived using NOAA Atlas 14 for hydrologic calculations.
     - 1.1.3 Discharge rates pre-existing conditions and post conditions clearly illustrated in table form on the plan set, along with the drainage report.
   - 1.2 Incorporation of the use of natural topography and land cover such as wetlands, ponds, natural swale and depressions as they exist before development.
   - 1.3 Combination of successive practices may be used to achieve the control requirement.
   - 1.4 Management practices investigated in the following descending order of preference:
     - 1.4.1 Natural infiltration of precipitation on-site.
     - 1.4.2 Flow attenuation by use of open vegetated swales and natural depressions.
     - 1.4.3 Stormwater infiltration, detention, and/or retention facilities.

2. **Water Quality Volume Treatment**
   - 2.1 Any project where the sum of the new impervious surfaces and/or fully reconstructed surfaces equals one or more acres shall provide treatment for the calculated water quality volume. Projects adding new and/or fully reconstructed surfaces shall be considered cumulative over the life of the property. Land disturbance activity applicable to this requirement will be determined with respect to all development and redevelopment that has occurred from the time of ordinance adoption.
     - 2.1.1 For non-linear projects, water quality volume must be calculated as one (1.0) inch times the sum of the new and the fully reconstructed surfaces.
     - 2.1.2 For linear projects, water quality volume must be calculated as the larger of one (1.0) inch times the new impervious surface OR one-half (0.5) inch times the sum of the new and/or fully reconstructed surfaces.
     - 2.1.3 The minimum impervious area draining to the treatment practice shall be equal to the sum of the new and/or fully reconstructed surfaces or to the maximum extent practicable as determined by the City Engineer.
     - 2.1.4 In the event the practice is not treating impervious surface equal to the new and/or fully reconstructed impervious surface areas, additional TP and TSS calculations shall be provided.
   - 2.2 As part of the drawing set submittal and stormwater management report, provide in table form as applicable to the practice/site, the following information:
     - 2.2.1 Total proposed site disturbance

2.2.2 Proposed fully reconstructed surfaces
2.2.3 Existing and proposed impervious areas
2.2.4 Existing and proposed pervious areas
2.2.5 Pre and Post discharge rates for each event
2.2.6 Required water quality volume
2.2.7 Water quality volume treated through infiltration practice
2.2.8 Impervious and pervious drainage areas directed to the BMP
2.2.9 Site infiltration rate and time of infiltration/filtration
2.2.10 Depth from system bottom to seasonally saturated soils, groundwater, and bedrock

2.3 Infiltration is prohibited in the following circumstances:
2.3.1 Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS Industrial Stormwater Permit issue by the Minnesota Pollution Control Agency.
2.3.2 Where vehicle fueling and maintenance occur.
2.3.3 With less than three (3) feet of separation distance from the bottom the system to elevation of seasonally saturated soils or top of bedrock.
2.3.4 Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater.

2.4 Infiltration is restricted**,** without higher engineer review, in the following circumstances:
2.4.1 Areas with predominately Hydrologic Soil Group D (clay) soils.
2.4.2 Within 1,000 feet up-gradient or 100 feet down-gradient of active karst features.
2.4.3 Within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13.
2.4.4 Where soil infiltration rates are more than 8.3 inches per hour.

**3. <u>Water Quality Mitigation Requirements - Linear Projects</u>**

3.1 For linear projects where the entire water quality volume requirements cannot be met on the site of the original construction activity, the owner must provide adequate documentation of attempts to acquire additional right of way or other permissions.

3.2 The owner must provide water quality volume to the maximum extent practicable. No further mitigation is required.

**4. <u>Water Quality Mitigation Requirements – Non-linear Projects</u>**

4.1 For non-linear projects where the owner cannot cost effectively provide the entire water quality volume requirements on the site of the original construction activity, the owner must provide adequate documentation.

4.2 Treatment shall be provided to the maximum extent practicable on site first. Stormwater discharges that do not meet water quality standards on the site of original construction activity must be met through mitigation.
4.2.1 The owner and/or operator must identify locations where mitigation projects can be completed.

4.3 Mitigation projects must meet the following criteria:
4.3.1 Project location must be selected in the following order of preference, in consultation and with approval by the City:
4.3.1.1 Locations yielding benefits to the same receiving water that receives runoff from the original construction activity.
4.3.1.2 Locations within the same Department of Natural Resources catchment area as the original activity.
4.3.1.3 Locations in the next adjacent DNR catchment area upstream.

4.3.1.4 Locations anywhere within the City boundary.

4.3.2 The project must involve the creation of new structural stormwater best management practice (BMP), the retrofit of existing structural stormwater BMP's, or the use of properly designed regional structural stormwater BMP's.

4.3.3 Routine maintenance of structural stormwater BMP's cannot be used to meet mitigation requirements.

4.3.4 Mitigation projects must be complete within 24 months after the start of original construction activity.

4.3.5 Written and recorded documentation of responsibility of long-term maintenance of the BMP must be included in the submission.

**5. <u>Permanent Ponds/ Wet Sedimentation/Retention Basins</u>**

5.1 Entire drainage/ service area shown (in report).

5.1.1 Hydraulic calculations for ponding provided. The plan clearly indicates 2-year HWL, 10-year HWL, 100-year HWL, and normal water level.

5.1.2 Grading plan includes pond cross section and all apron elevations (inlets and outlets) are shown.

5.2 As part of the drawing set submittal, *provide in table form*, the following information;

5.2.1 Elevation of normal water level (NWL);

5.2.2 Elevation of high water level (HWL), with respective discharge rate;

5.2.3 Elevation of water quality level, with respective rate, pond water surface area in sq. ft.;

5.2.4 Sediment storage volume (for sediment accumulation during construction and 20 years thereafter)

5.3 Forebay clearly shown on plan at inlets as applicable, designed to remove coarse-grained particles.

5.4 Vegetated buffer strip no less than 15 feet shall be provided. In some cases, 25 feet is may be necessary.

5.5 A minimum protective bench of 10:1 provided for the first 1' of depth below normal water elevation.

5.6 Permanent pool must meet the following;

5.6.1 Average permanent pool depth of 3' to 10'.

5.6.2 Permanent volume of 1,800 cubic feet per acre drained (minimum).

5.6.3 Must attempt to maintain 3:1 or greater length to width ratio.

5.7 Pond outlet must meet the following;

5.7.1 Designed to prevent short-circuiting.

5.7.2 Designed with skimming device to prevent discharge of floating debris, grease, and oil.

5.7.3 Sized to discharge water quality volume at no more than 5.66 cfs per acre of pond surface area.

5.7.4 Incorporation of multi-staged outlets where necessary.

5.7.5 Outlets have energy dissipation indicated on plan.

5.8 Stabilized emergency overflow spillway is indicated on plan.

5.8.1 Designed to accommodate storms greater than the 100-year event.

5.8.2 High point elevation and direction of overflow are clearly marked.

5.8.3 Top of berm is 1' above emergency overflow spillway.

5.8.4 Properly located to protect adjacent property and large fill sections.

5.9 Adequate maintenance access is indicated on plan.

5.9.1 12ft. wide minimum with turn-around area for maintenance vehicles.

5.9.2 Pond access is included in a minimum 15-foot wide portion of the pond outlot. If access is in an easement across private property, a 12-foot wide access road is provided.

5.10 Planting and landscaping plan included in plan set.

5.10.1 Developed using guidelines from Minnesota Department of Transportation, Minnesota Board of Water and Soil Resources, and Minnesota Stormwater Manual.

5.11 Ponds shall not be located in a wetland unless mitigated for.

**6. <u>Infiltration/Filtration</u>**

6.1 All infiltration practices require soil borings and infiltration testing by professional.

6.2 Extra precautions shall be taken in karst areas as required by the Geotechnical Engineer.

6.3 Infiltration/Filtration options include, but are not limited to: infiltration basins, infiltrations trenches, rainwater gardens, sand filters, organic filters, bioretention areas, natural or enhanced swales, dry storage ponds with underdrain discharge, off-line retention areas, and natural depressions. For different designs refer to the Minnesota Stormwater Manual.

6.3.1 Method removes settleable solids, floating materials, oils, and grease from the run-off to the maximum extent practicable before entering the infiltration/filtration system.

6.3.2 Method shall meet rate and water quality standards set by the City and the State.

6.3.3 Calculate water quality volume to be infiltrated or filtered from both pervious and impervious surfaces.

6.3.4 Areas to be infiltrated or filtered shall be delineated on the plan.

6.3.5 Calculations or computer model results that demonstrate the design adequacy of the infiltration/filtration system must be included with the plan submission.

6.3.6 Filtration systems must be designed to remove 80% TSS at a minimum.

6.3.7 Provide scaled drawing of infiltration or filtration BMP, with typical detail and typical cross section. Outline area which run-off is directed to the BMP.

6.3.8 Engineered soil media shall be consistent with Soil Mix C or D only, as found in MN SW Manual.

6.4 System must not be excavated to final grade (or within three (3) feet of final grade) until the contributing drainage area has been constructed and fully stabilized.

6.4.1 During construction, rigorous erosion prevention and sediment controls (e.g. diversion berms) should be used to keep sediment and run-off completely away from the system.

6.4.2 The area must be staked off and marked so that heavy construction equipment will not compact the soils in the system area.

6.5 Pretreatment device must be used such as a vegetated filter strip, small sedimentation basin, or water quality inlet (e.g. grit chamber, hydrodynamic separator) to settle particles before the stormwater discharges into the infiltration/filtration system.

6.6 Infiltration/filtration system discharges water quality volume routed to the system through the soil surface or filter media within 48 hours or less.

6.6.1 Additional flows that cannot be infiltrated or filtered in 48 hours must be routed to bypass the system through a stabilized discharge point.

6.7 A method to visually verify that the system is operating as designed must be provided.

6.8 Appropriate onsite testing consistent with the recommendations found in the Minnesota Stormwater Manual to verify soil type and to ensure a minimum of three (3) feet of separation from the seasonally saturated soils or bedrock, and the bottom of the proposed system.

6.8.1 Filtration systems with less than three (3) feet of separation must have an impermeable liner.

6.9 Adequate maintenance access must be provided (typically 12 ft. wide) along with a maintenance plan identifying who will be performing future maintenance and inspections of the system.

6.10 Planting and landscaping plan included in plan set.

6.10.1 Developed using guidelines from Minnesota Department of Transportation, Minnesota Board of Water and Soil Resources, and Minnesota Stormwater Manual.

Assessment Tool Results have been submitted.

**7. Alternative and Combined Practices**

7.1 Full calculations and plans included (narrative in drainage report)

7.2 Must follow requirements of the State and recommendations in the Minnesota Stormwater Manual.

**8. Long-term Maintenance for All Stormwater Management Facilities**

8.1 Owners and/or operators of private structural stormwater facilities shall submit the City's Stormwater Facility Maintenance Agreement after recording.

8.2 A long-term maintenance plan along with person(s) responsible for annual maintenance and inspections submitted with plan set.

8.2.1 Integrity and effectiveness of the stormwater management facility maintained to design capacity of original approval.

8.3 As-Built plans for permanent facility and all stormwater features/structures to be submitted prior to Certificate of Occupancy along with project's record drawing.

*Please us at stormwater@owatonna.gov or 507-774-7300 for further assistance.*