CHAPTER 6. STORM WATER MANAGEMENT

6.1 **Policy**. It is the policy of the District to manage, through permitting, stormwater and snowmelt runoff on a local, regional, and watershed basis to promote natural infiltration of runoff throughout the District to enhance water quality and minimize adverse natural resource impacts through the following principles:

A. Reduce adverse water quality impacts.
B. Preserve vegetation.
C. Decrease runoff volume and promote infiltration where suitable.
D. Prevent soil erosion and sedimentation.
E. Maintain existing flow patterns.
F. Store stormwater runoff on-site.
G. Avoid channel erosion.

6.2 **Applicability (Thresholds)**. Permits are required for the following activities:

A. Non-Linear Projects. Construction or reconstruction of impervious surface resulting in total impervious surface lot coverage (new and existing) of:

(1) More than twenty-five percent (25%) on riparian lots.

(2) More than seven thousand (7,000) square feet of lot coverage of riparian lots.

(3) Equal or greater than one (1) acre of impervious surface coverage.

(4) Projects requiring a variance from, or use of allowable mitigation within, the local shoreland zoning ordinance.

B. Residential subdivision or development of four (4) or more lots.

C. Construction or reconstruction of a private or public paved trail greater than two hundred (200) linear feet in length.

D. Projects or common plans of development or sale disturbing fifty (50) acres or more within one (1) mile of, and flow to, a special water or impaired water. A complete application and SWPPP must be submitted to the MPCA at least thirty (30) days prior to the start of construction activity.

E. Linear Projects. Projects that create or fully reconstruct more than one (1) acre of impervious surface as part of the same project.

6.3 **Exemptions.**

A. Exemptions from stormwater management permitting:

(1) Mill and overlay or full-depth reclamation projects where underlying soils are not disturbed.

(2) Areas that have a documented Local Stormwater Management Plan, that has been approved by the District.

6.4 **Criteria (Standards).**

A. Water Quality (Volume).

(1) The Water Quality Volume (WQV) is determined as follows:

(a) New Development Areas: Capture and retain on site 1.1 inches of runoff from all impervious surfaces on the site.

(b) Redevelopment Areas: Capture and retain on site 1.1 inches of runoff from the new and/or reconstructed impervious surfaces on the site.

(c) Linear projects: Capture and retain the larger of the following:

i. 0.55 inches of runoff from the new and fully reconstructed impervious surfaces on the site; or

ii. 1.1 inches of runoff from the net increase impervious area on the site.

(2) Infiltration must be used, if feasible:

(a) Treatment volume within infiltration basins is measured from the bottom of the basin to the lowest outlet.

(b) Infiltration areas will be designed to drain within forty-eight (48) hours. Infiltration rates follow the current version of the MPCA Stormwater Manual. Field measured infiltration rates will be divided by two (2) for design infiltration rates.

(c) Soils with infiltration rates higher than 8.3 inches/hour must be amended if infiltration is to be used, otherwise see Section 6.4(A)(4) below for non-infiltration BMP options.

(d) Runoff entering an infiltration BMP must be pretreated.

(e) At least one (1) soil boring or test pit completed by a licensed professional is required within the footprint of each proposed infiltration BMP.

(f) The basin bottom elevation must have three (3) feet of separation above the season high water table.

(g) Design and placement of infiltration BMPs must follow any and all additional NPDES General Construction Stormwater Permit and MPCA Construction Stormwater Permits, as applicable.

(3) Infiltration will be considered infeasible if infiltration is prohibited by MPCA requirement. Common factors prohibiting infiltration include but are not limit to the following:

(a) Bedrock within three (3) vertical feet of the bottom of the infiltration basin.

(b) Seasonal High-Water Levels within three (3) vertical feet of the bottom of the infiltration basin.

(c) Site has predominantly Hydrological Soil Group D (clay) soils.

(d) Contaminated soils on site.

(e) Drinking Water Source Management Areas or within two hundred feet (200') of public drinking water well.

(f) Documentation, such as soil borings and or well maps are required upon permit submittal stating why infiltration is infeasible. Final feasibility to be confirmed by District Engineer.

If infiltration is infeasible a non-infiltrating BMP must be implemented.

Biofiltration with Underdrain at Bottom

A small amount of the runoff that flows into the basin and does not overflow into an overflow structure is abstracted from the stormsewer system through infiltration or evapotranspiration; the remainder is filtered by the growing medium but then leaves via an underdrain.

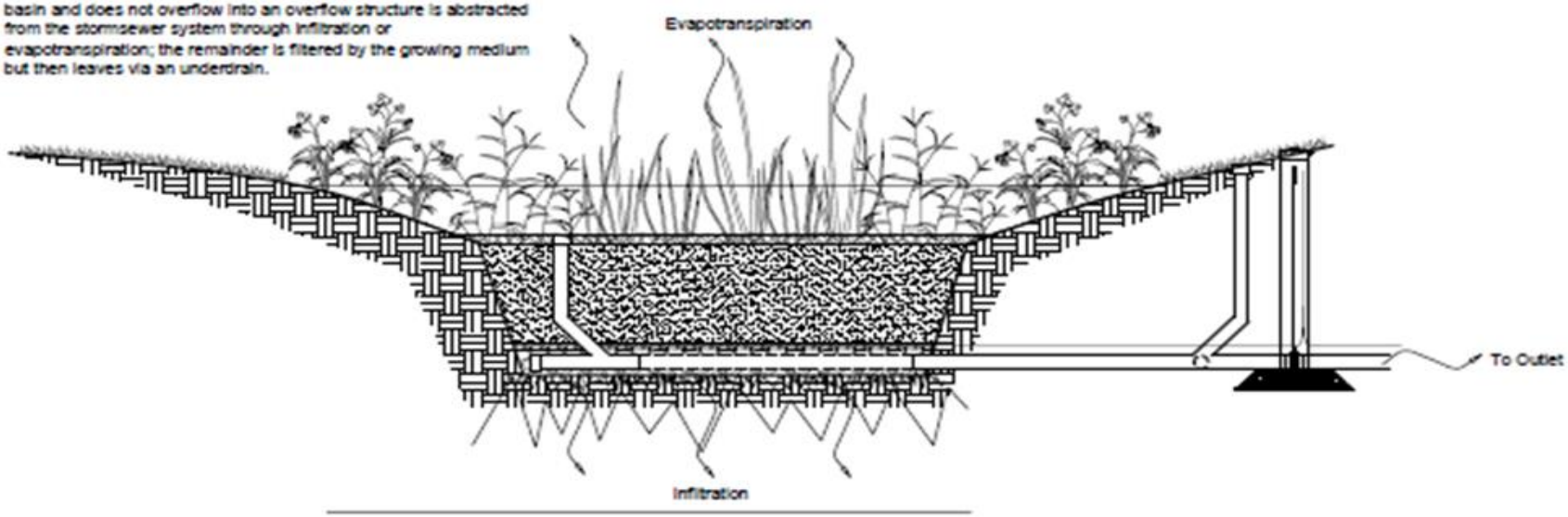
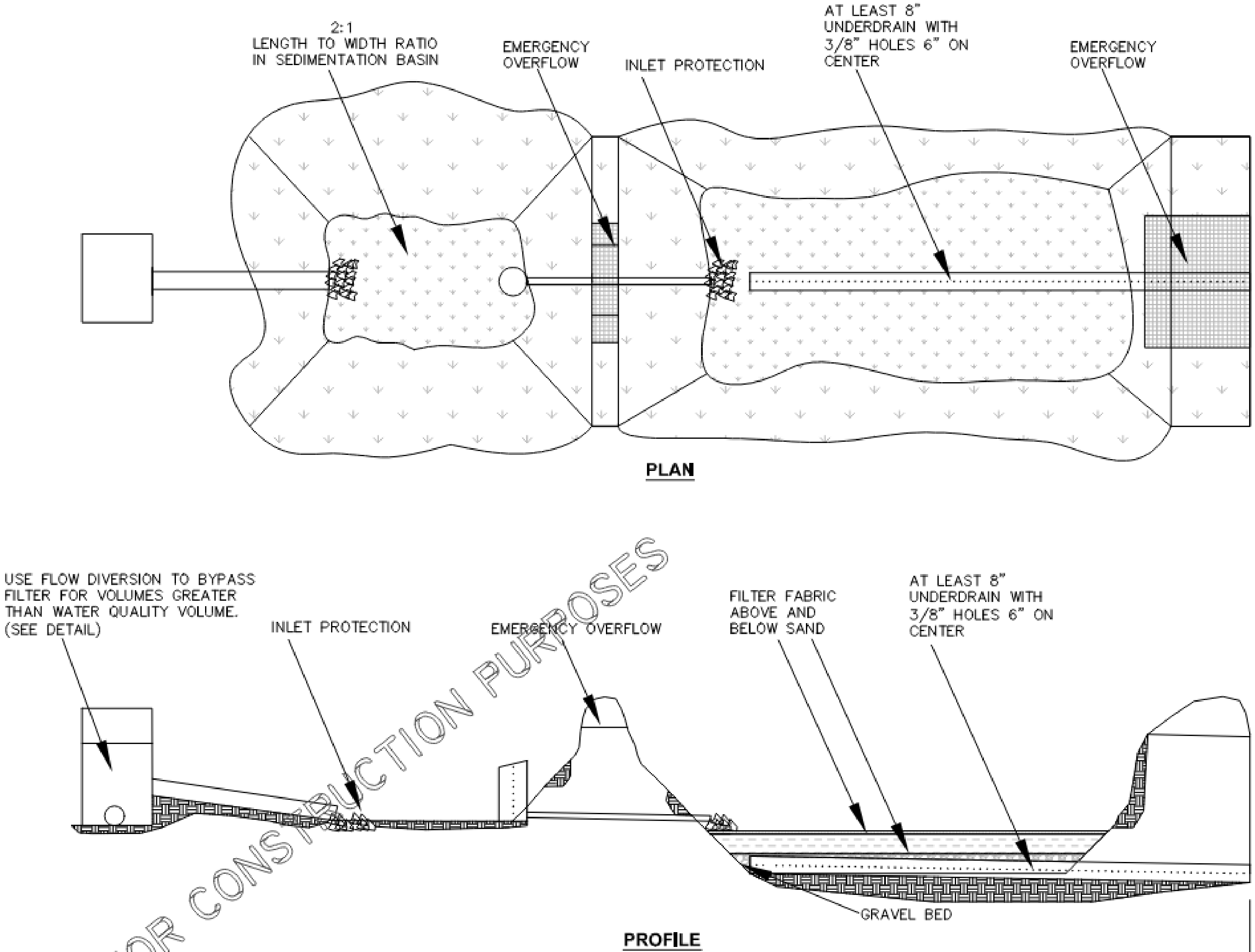


Figure 2-2: Biofiltration with Underdrain at Bottom

Not To Scale

NOT FOR CONSTRUCTION PURPOSES



SURFACE SAND FILTER DETAILS

NOT TO SCALE

CONSTRUCTION SEQUENCING:

1. PERFORM CONTINUOUS INSPECTIONS OF EROSION CONTROL PRACTICES.
2. INSTALL SILT FENCE ALONG THE PERIMETER OF THE SITE TO PREVENT SEDIMENT FROM LEAVING THE SITE DURING THE CONSTRUCTION PROCESS.
3. ALL DOWNGRADIENT PERIMETER SEDIMENT-CONTROL BMPS MUST BE IN PLACE BEFORE ANY UP GRADIENT LAND-DISTURBING ACTIVITY BEGINS.
4. REMOVE TOPSOIL FROM THE SITE AND PLACE IN TEMPORARY STOCKPILE LOCATION. TEMPORARY SEED THE STOCKPILE.
5. INSTALL UNDERGROUND UTILITIES (WATER, SANITARY SEWER, ELECTRIC AND PHONES) TAKING THE LOCATION AND FUNCTION OF STORM WATER BMPS INTO CONSIDERATION.
7. SEED AND MULCH DISTURBED AREAS ON SITE.
8. CONSTRUCT THE ROADS TAKING THE LOCATION AND FUNCTION OF STORM WATER BMPS INTO CONSIDERATION.
9. PERFORM ALL OTHER SITE IMPROVEMENTS TAKING THE LOCATION AND FUNCTION OF THE STORM WATER BMPS INTO CONSIDERATION.
10. FINAL GRADE THE SITE.
11. STABILIZE THE SITE BY IMPLEMENTING THE NATIVE SEEDING AND PLANTING PORTION OF THE LANDSCAPING PLAN.
12. INSTALL THE EROSION CONTROL BLANKET
13. REMOVE THE SILT FENCE AFTER THE SITE IS STABILIZED PER PROJECT ENGINEER APPROVAL.

GENERAL NOTES:

1. INSTALL ALL TEMPORARY EROSION CONTROL MEASURES (IN ACCORDANCE WITH MnDOT GENERAL CONDITIONS 2573) PRIOR TO THE START OF ANY CONSTRUCTION OPERATION THAT MAY CAUSE ANY SEDIMENTATION OR SILTATION AT THE SITE.
2. INSTALL STORM DRAIN INLET PROTECTION TO PREVENT CLOGGING OF THE STORM SEWER AND SEDIMENT LOADS TO DOWNSTREAM STORM WATER FACILITIES OR WATERBODIES.
5. EXCAVATE THE INFILTRATION BASIN TO THE SPECIFIED DEPTH (ELEVATION). IT IS RECOMMENDED THAT ALL SUB MATERIAL BELOW THE SPECIFIED ELEVATION SHALL BE LEFT UNDISTURBED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
6. GRADE TO THE DEPTH (ELEVATION) SPECIFIED IN THE CONSTRUCTION DOCUMENTS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
7. IN THE EVENT THAT SEDIMENT IS INTRODUCED INTO THE BMP DURING OR IMMEDIATELY FOLLOWING EXCAVATION, THIS MATERIAL WILL NEED TO BE REMOVED FROM THE BASIN PRIOR TO INITIATING THE NEXT STEP IN THE CONSTRUCTION PROCESS. SEDIMENT THAT HAS BEEN WASHED INTO THE BASIN DURING THE EXCAVATION PROCESS CAN SEAL THE PERMEABLE MATERIAL, SIGNIFICANTLY REDUCING THE INFILTRATION CAPACITY OF THE SOILS.
9. **NON-STANDARD COMPONENT:** CLEAN, WASHED 1.5 TO 3.5-INCH GRAVEL SHALL BE PLACED IN THE BOTTOM OF THE BASIN TO THE DEPTH OF AT LEAST 12 INCHES OR AS SPECIFIED IN THE CONSTRUCTION DOCUMENTS. GRAVEL SHOULD BE PLACED IN LIFTS AND LIGHTLY COMPACTED WITH PLATE COMPACTORS.
10. **NON-STANDARD COMPONENT:** THE PERFORATED PIPE (UNDERDRAIN) SHALL BE LAID DIRECTLY ON THE GRAVEL BED. GRADE AND ALIGNMENT SHALL NOT VARY FROM THE PRESCRIBED GRADE BY MORE THAN 0.03 FEET (9 MM) AT ANY POINT. THE JOINTS BETWEEN SECTIONS OF PIPE SHALL BE CONNECTED IN A FASHION ACCEPTABLE TO ENGINEER. ONCE THE PIPE IS IN PLACE, IT SHALL BE COVERED IMMEDIATELY WITH GRANULAR MATERIAL AS SPECIFIED IN THE CONSTRUCTION DOCUMENTS. THE GRANULAR MATERIAL SHALL BE OF UNIFORM DEPTH ON BOTH SIDES OF THE PIPE. SPECIAL INLETS AND SPECIAL DEVICES AT THE OUTLET END OF THE PIPE SHALL BE CONSTRUCTED AS SHOWN IN THE PLANS.
14. SEEDING AND INSTALLATION OF EROSION CONTROL BLANKET SHALL BE COMPLETED WITHIN 48 HOURS OF FINAL GRADING.

NO.	REVISION DESCRIPTION	DATE	BY

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Print Name:

Sign Name:

Date: License No.

Date

Designed By

Drawn By

Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul MN 55155-4194
Phone: (651) 296-6300
TTY: (651) 282-5332
WEBSITE: www.pca.state.mn.us/

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SURFACE SAND FILTER DETAILS

Sheet No. of Sheets

(g) Wet Ponds as necessary:

i. Permanent pool volume below the pond's runout elevation must have a minimum volume of one thousand eight hundred (1,800) cubic feet per contributing acre or equivalent to the volume produced by a 2.5-inch storm event over the pond's contributing area.

ii. Ponds must be designed with a minimum three-to-one (3:1) length-to-width ratio to prevent short-circuiting. Inlets must be a minimum of seventy-five feet (75') from the pond's outlet.

iii. The WQV is measured from the top of the permanent pool elevation to the emergency overflow elevation.

(h) MIDS Flexible Treatment Options (FTO) can also be used but follow the sequencing before with:

i. FTO #1:

a. Achieve at least 0.55 inch volume reduction goal.
b. Remove seventy-five percent (75%) of the annual total phosphorus load.
c. Options considered and presented shall examine the merits of relocating project elements to address varying soil conditions and other constraints across the site.

ii. FTO #2:

a. Achieve volume reduction to the maximum extent practicable, as determined by the District.
b. Remove sixty percent (60%) of the annual total phosphorus load.
c. Options considered and presented shall examine the merits of relocating project elements to address varying soil conditions and other constraints across the site.

iii. FTO #3:

a. Off-site mitigation (including banking or cash or treatment on another project, as determined by the District) equivalent to the volume reduction performance goal can be used in areas selected by the District.

(i) Pretreatment must be provided for all filtration practices but is not necessary for wet ponds.

(j) Design and placement of stormwater BMPs must be done in accordance with MPCA requirements and are recommended to follow guidance from the Minnesota Stormwater Manual.

(4) **Exceptions**:

(a) Single-family or twin home construction or modification on lots outside of the Shoreland District are exempt from providing permanent water quality treatment.

(b) Trails that provide a five-foot (5') vegetated buffer prior to reaching a conveyance (i.e. swale, ditch, or curb and gutter) are exempt from providing permanent water quality treatment.

6.5 BMP High-Water Level Management.

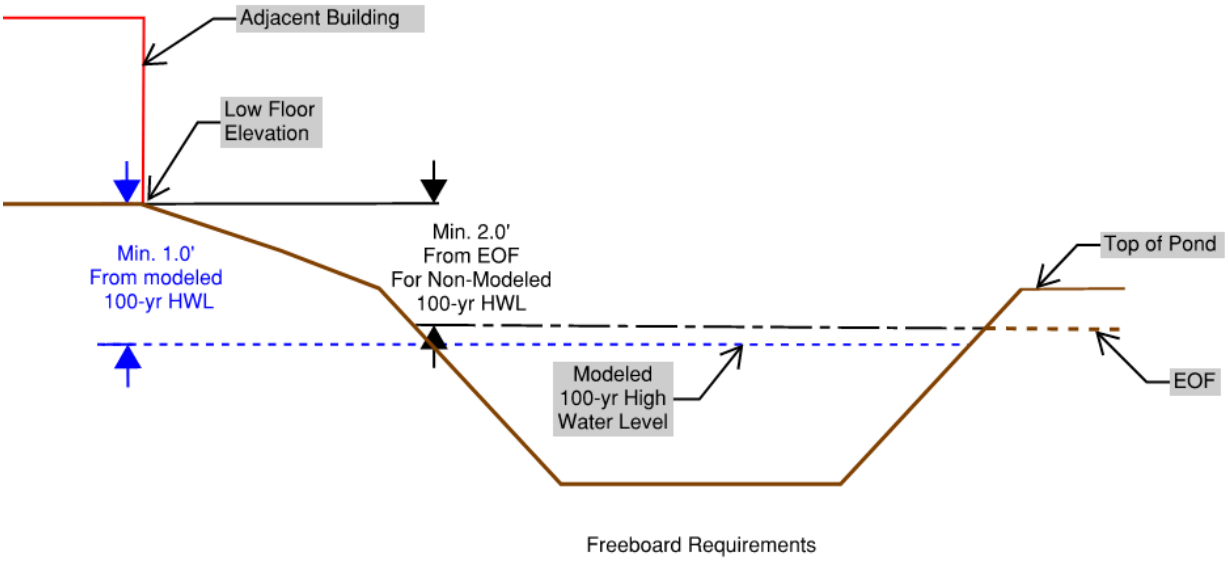
A. Where one hundred (100) year high water levels are driven by local, onsite drainage, rather than a FEMA floodplain not related to development, the following criteria must be met:

(1) Low floor: at least one foot (1') above the modeled one hundred (100) year high water level of the basin.

(a) Alternatively, the low floor elevation may be two feet (2') above the EOF of the basin to demonstrate compliance where modeling is not available.

(2) Applicants must use precipitation depths from Atlas 14 using MSE-3 storm distribution in quantifying the one hundred (100) year high water level in the basin.

Figure 6-1



Freeboard Requirements

6.6 Erosion Control.

A. Natural project site topography and soil conditions must be specifically addressed to reduce erosion and sedimentation during construction and after project completion.

B. Site erosion and sediment control practices must be consistent with MPCA requirements.

C. The project must be phased to minimize disturbed areas and removal of existing vegetation, until it is necessary for project progress.

D. The District may require additional erosion and sediment control measures on areas with a slope to a sensitive, impaired, or special waterbody, stream, public drainage system, or Wetland to assure retention of sediment on-site.

E. Erosion control must include features adequate to protect facilities to be used for post- construction stormwater infiltration.

F. Required erosion control BMPs must be in-place prior to any site disturbance.

G. Erosion prevention must be done in accordance with the following:

(1) Stabilize all exposed soil areas (including stockpiles) with temporary erosion control (seed and mulch or blanket) within fourteen (14) days (or seven (7) days for all projects within one (1) mile of an impaired water) after construction activities in the area have permanently or temporarily ceased on any portion of the site and will not resume for a period exceeding fourteen (14) calendar days.

(2) Exposed soil areas within the Shoreland Impact Zone must be stabilized within forty-eight (48) hours of work having suspended for more than seventy-two (72) hours or when work has permanently ceased.

(3) For projects that increase the drainage area to a point of discharge at the site boundary by more than ten percent (10%) and the runoff does not drain to an onsite, permitted BMP prior to leaving the site, the applicant must demonstrate that site runoff will not adversely impact the capacity, stability, or function of the receiving lands or conveyance.

H. Sediment control must be done in accordance with the following:

(1) Sediment control practices will be placed down-gradient before up-gradient land disturbing activities begin.

(2) Vehicle tracking practices must be in place to minimize track out of sediment from the construction site. Streets must be cleaned if tracking practices are not adequate to prevent sediment from being tracked onto the street.

I. Dewatering must be done in accordance with the following:

(1) Dewatering turbid or sediment laden water to surface waters (Wetlands, streams, or lakes) and stormwater conveyances (gutters, catch basins, or ditches) is prohibited.

J. Inspections and maintenance must be done in accordance with the following:

(1) Applicant must inspect all erosion prevention and sediment control practices to ensure integrity and effectiveness. Nonfunctional practices must be repaired, replaced, or enhanced the next business day after discovery.

(2) Erosion control plans must include contact information including email and a phone number of the person responsible for inspection and compliance with erosion and sediment control.

K. Pollution prevention must be done in accordance with the following:

(1) Solid waste must be stored, collected, and disposed of in accordance with state law.

(2) Provide effective containment for all liquid and solid wastes generated by washout operations (concrete, stucco, paint, form release oils, curing compounds).

(3) Hazardous materials that have potential to leach pollutants must be under cover to minimize contact with stormwater.

L. Final stabilization must be done in accordance with the following:

(1) For residential construction only, individual lots are considered final stabilized if the structures are finished and temporary erosion protection and downgradient sediment control has been completed.

(2) Grading and landscape plans must include soil tillage and soil bed preparation methods that are employed prior to landscape installation to a minimum depth of eight inches (8”) and incorporate amendments to meet the Minnesota Stormwater Manual predevelopment soil type bulk densities.

6.7 **Maintenance.**

A. Long-term maintenance agreements between the District and the landowner are required for all permanent stormwater BMPs.

B. The maintenance agreement shall be submitted prior to permit issuance. It is recommended that a draft maintenance agreement be submitted with application materials.

C. Upon issuance of the permit, the District will record the maintenance agreement on the parcel containing the BMP.

6.8 **Required Exhibits.**

A. Applicants of permits required under Chapter 6 will be required to submit the following:

(1) A permit application form as detailed in the Rules.

(2) Site plans signed by a Minnesota licensed professional. Site plans must contain sheets that at a minimum address the following:

(a) Property lines and delineation of lands under ownership of the applicant.

(b) Existing and proposed elevation contours, maximum two-foot (2') interval.

(c) Identification of normal and ordinary high-water elevations of waterbodies and stormwater features shown in the plans.

(d) Proposed and existing stormwater facilities' location, alignment, and elevation.

(e) Depiction of on-site Wetlands, shoreland, and floodplain areas.

(f) Construction plans and specifications of all proposed stormwater BMPs.

(g) Details will be required for all outlet control structures, Emergency Overflows, graded swales, and pond/basin cross sections.

(h) Details must show all elevation for pipe, weirs, orifices, or any other control devices.

(i) SWPPP identifying location, type, and quantity of temporary erosion prevention and sediment control practices. SWPPP that at a minimum meets the requirements of the NPDES construction permit.

(j) Site drawing showing the type, location, and dimensions of all permanent and temporary erosion control BMPs.

(3) Drainage narrative including: project summary, existing and proposed impervious area, existing and proposed drainage patterns including direction and routing of roof drainage, and stormwater model reports as required in relevant sections.

(a) Acceptable computer modeling software must be based on NRCS Technical Release #20 (TR-20), as required in relevant sections.

(b) Model output for both existing and proposed conditions is required. The District Engineer may require a copy of the electronic model to be submitted if the software used does not provide easily reviewed output reports.

(4) Soil boring report or test pit documentation identifying location of the boring or test pit, Seasonal High Water Level, and depth of each soil type found as required in Section 6.4(A)(2)(e). Soil borings and test pits must be completed to a minimum depth of five feet (5') below the bottom of the proposed BMP.

(5) If infiltration is not being used, justification must be provided.