

**DOOR COUNTY
SOIL & WATER CONSERVATION DEPARTMENT
PROCEDURE POLICY**

Urban Storm Water Runoff Control Design Criteria
Construction Site Erosion Control and
Post Construction Storm Water

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Urban Storm Water Runoff Control Design Criteria

I. INTRODUCTION

The Storm Water Runoff Control Design Criteria Procedure Policy establishes the minimum criteria for urban storm water runoff control plans prepared by, or reviewed by, the Door County SWCD. The policy considers runoff quantity, quality, infiltration, and protective areas in the preparation of storm water runoff control plans and the design of detention and retention basins. The availability and/or adequacy of the downstream drainage system and outlet are also considered in the design. The policy meets the requirements of NR 151, Subchapter III- Non-agricultural Performance Standards. Also, criteria is included to deal with the special runoff conditions encountered in the high bedrock, karst areas found in Door County.

II. DEFINITIONS

1. "Infiltration" has two meanings depending on where it is used in the document. Generally it has the generic meaning of water running down through the soil to the ground water. In Door County this includes infiltration into the creviced limestone bedrock.

In the procedure section entitled "V.3. Infiltration" the meaning is more limited. This section sets forth criteria from NR 151 which specifies design procedures and limits for infiltration practices such as "Infiltration Basin" and "Bioretention for Infiltration". The practices standards for these practices are shown on the DNR website under Stormwater.

2. "Average annual rainfall" means a calendar year of precipitation, excluding snow, which is considered typical. For purposes of using the SLAMM model, average annual rainfall means measured precipitation in Green Bay, Wisconsin between March 29 and November 25, 1969. For the use of the P8 model the average rainfall is October 1, 1968 to September 30, 1969 for Green Bay. (If DNR specified different rainfall dates for the model, use the DNR specified dates.)
3. "Best management practice" or "BMP" means structural or non-structural measures, practices, techniques or devices employed to avoid or minimize sediment or pollutants carried in runoff to waters of the state.
4. "Connected imperviousness" means an impervious surface that is directly connected to a separate storm sewer or water of the state via an impervious flow path.
5. "Construction site" means an area upon which one or more land disturbing construction activities occur, including areas that are part of a larger

common plan of development or sale where multiple separate and distinct land disturbing construction activities may be taking place at different times on different schedules but under one plan. A larger common plan of development includes, but is not limited to, subdivision plats, certified survey maps, and other developments.

6. “Design storm” means a hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall. The TR-55, Type II, 24-hour design storms are: 1-year, [2.4] inches; 2-year, [2.4] inches; 5-year, [3.1] inches; 10-year, [3.6] inches; 25-year, [4.1] inches; 50-years [4.6] inches; and 100 –year, [4.9] inches.
7. “Development” means residential, commercial, industrial, institutional, or open space land uses and associated roads.
8. “Effective infiltration area” means the area of the infiltration system that is used to infiltrate runoff and does not include the area used for site access, berms or pretreatment. This definition refers to infiltration practices.
9. “Exceptional resource waters” means waters listed in s.NR 102.11, Wis. Adm. Code.
10. “Impervious surface” means an area that releases as runoff all or a large portion of the precipitation that falls on it, except for frozen soil. Rooftops, sidewalks, driveways, parking lots and streets are examples of areas that typically are impervious. Gravel driveway surfaces are considered impervious, unless specifically designed to encourage infiltration.
11. “Infiltration” means the entry of precipitation or runoff into or through the soil.
12. “Infiltration system” means a device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only.
13. “Karst feature” means an area or surficial geologic feature subject to bedrock dissolution so that it is likely to provide a conduit to groundwater, and may include caves, enlarged fractures, mine features, exposed bedrock surfaces, sinkholes, springs, seeps or swallets.
14. “Land disturbing construction activity” (or “disturbance”) means any man-made alteration of the land surface resulting in a change in the topography or existing vegetative or non-vegetative soil cover, that may result in runoff and lead to an increase in soil erosion and movement of sediment into waters of the state. Land disturbing construction activity includes clearing and grubbing, demolition, excavating, pit trench dewatering, filling and grading activities, and soil stockpiling.

15. “Maintenance agreement” means a legal document that provides for long-term maintenance of storm water management and best management practices.
16. “MEP” or “maximum extent practicable” means a level of implementing best management practices in order to achieve a performance standard specified in this ordinance which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions.
17. “Off-site” means located outside the property boundary described in the permit application.
18. “Ordinary high-water mark” has the meaning given in s. NR 115.03(6), Wis. Adm. Code.
19. “Outstanding resource waters” means waters listed in s. NR 102.10, Wis. Adm. Code.
20. “Percent fines” means the percentage of a given sample of soil, which passes through a # 200 sieve.

Note to Users: Percent fines can be determined using the “American Society for Testing and Materials”, volume 04.02, “Test Method C117-95 Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Material Aggregates by Washing”. Copies can be obtained by contacting the American society for testing and materials, 100 Barr Harbor Drive, Conshohocken, PA 19428-2959, or phone 610-832-9585, or on line at: [“http://www.astm.org/”](http://www.astm.org/).

21. “Performance standard” means a narrative or measurable number specifying the minimum acceptable outcome for a facility or practice.
22. “Pervious surface” means an area that releases as runoff a small portion of the precipitation that falls on it. Lawns, gardens, parks, forests or other similar vegetated areas are examples of surfaces that typically are pervious.
23. “Pollutant” has the meaning given in s. 283.01(13), Wis. Stats.
24. “Pollution” has the meaning given in s. 281.01(10), Wis. Stats.
25. “Post-development” means the extent and distribution of land cover types present after the completion of land disturbing construction activity and final site stabilization.
26. “Pre-development” means the extent and distribution of land cover types present before the initiation of land disturbing construction activity,

assuming that all land uses prior to development activity are managed in an environmentally sound manner.

27. "Routine maintenance" means that portion of a post-construction site where pre-development impervious surfaces are being maintained to preserve the original line and grade, hydraulic capacity, drainage pattern, configuration, or purpose of the facility. Remodeling of buildings and resurfacing of parking lots, streets, driveways, and sidewalks are examples of routine maintenance, provided the lower ½ of the impervious surface's granular base is not disturbed. The disturbance shall be classified as redevelopment if the lower ½ of the granular base associated with the pre-development impervious surface is disturbed or if the soil located beneath the impervious surface is exposed. For purposes of this ordinance, a post-construction site is classified as new development, redevelopment, routine maintenance, or some combination of these three classifications as appropriate.
28. "Runoff" means storm water or precipitation including rain, snow or ice melt or similar water that moves on the land surface via sheet or channelized flow.
29. "Site" means the entire area included in the legal description of the land on which the land disturbing construction activity occurred.
30. "Storm water management plan" means a comprehensive plan designed to reduce the discharge of pollutants from storm water after the site has under gone final stabilization following completion of the construction activity.
31. "Technical standard" means a document that specifies design, predicted performance and operation and maintenance specifications for a material, device or method.
32. "Top of the channel" means an edge, or point on the landscape, landward from the ordinary high-water mark of a surface water of the state, where the slope of the land begins to be less than 12% continually for at least 50 feet. If the slope of the land is 12% or less continually for the initial 50 feet, landward from the ordinary high-water mark, the top of the channel is the ordinary high-water mark.
33. "TR-55" means the United States Department of Agriculture, Natural Resources Conservation Service (previously Soil Conservation Service), Urban Hydrology for Small Watersheds, Second Edition, Technical Release 55, June 1986.
34. "Type II distribution" means a rainfall type curve as established in the "United States Department of Agriculture, Soil Conservation Service, Technical Paper 149, published 1973". The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern.
35. "Waters of the state" has the meaning given in s. 281.01(18), Wis. Stats.

III. GENERAL DESIGN REQUIREMENTS

1. A narrative shall be prepared for each development site discussing the conditions at the site and explaining how they will be managed in the proposed plan to adequately address the resource needs. Take particular care to set forth and discuss any unique site conditions and off-site impacts as set forth in items 2 and 3 below. State the impacts and what will be done about them.
2. The stormwater runoff control plan prepared in compliance with this procedure policy shall consider and design for conditions unique to the site. Unique site conditions may include, but are not limited to: steep slopes, active and apparent Karst features, high water table, limited downstream drainage system, no offsite drainage, previously altered conditions, shallow soils, and smaller sites with limited available space. The design criteria for such unique site conditions, and other innovative design proposals, shall be agreed upon by the designer and the governing municipality and the SWCD before the design and plan are completed.
3. All stormwater runoff control plans shall consider and design for the impacts of the development and stormwater practices to the channels and land drainage downstream. The proposed plan shall include practices to avoid downstream impacts or easements and/or permission to accommodate/permit the offsite impacts. Impacts can include:
 - Increased peak flows
 - Increased volume of runoff
 - Changes to downstream channel characteristics such as changing from dry channels to wet channels
 - Outlets sending water to new locations
 - Changes in outflow from sheet flow to concentrated flow
 - Discharges to closed depressions
 - Outletting water to different watersheds
4. All stormwater runoff control plans shall consider and design for the safety of the public. Safety shelves are required in all wet basins.
5. Sites which have an outlet without peak flow discharge limitations (i.e. some lake front sites) need not address peak flow reduction requirements. Water quality, infiltration, and protective area criteria still apply. (Note: Other regulatory agencies/units of government may still require peak flow reduction requirements and it is advised that the plan preparer confirm the status of this requirement.)
6. The design of stormwater runoff control plan facilities shall be adequately sized for the contributing drainage area. The designer may opt to include the offsite drainage area in the plan facilities or to safely divert or route the offsite drainage flow around the plan facilities. All land draining to the parcel being developed must be included in the design and analyzed using pre-settlement RCNs.

7. Erosion Control Plan- Proposed stormwater plans shall include a construction site erosion control plan using best management practices designed according to the standards and specifications shown on the DNR website.

<http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm#Construction>

8. No aggressive non-native plants are to be included in the erosion control or permanent planting specifications.

IV. TECHNICAL STANDARDS

1. CONSTRUCTION SITE EROSION CONTROL

- (1) DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS. Except where noted otherwise all BMP's required to comply with this Policy shall meet the design criteria, standards and specifications shown on the DNR website:

<http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm#Construction>

- (2) OTHER STANDARDS. Other technical standards not identified or developed in sub. (1). may be used provided that the methods have been approved by the SWCD.

2. STORMWATER (Post Construction)

Except where noted otherwise the following methods shall be used in designing and maintaining the water quality, peak discharge, infiltration, and protective area components of storm water practices.

- (1) Technical standards identified, developed or disseminated by the Wisconsin Department of Natural Resources under subchapter V of chapter NR 151, Wis. Adm. Code. They are located at:

<http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm#Construction>

- (2) Where technical standards have not been identified or developed by the Wisconsin Department of Natural Resources, other technical standards may be used provided that the methods have been approved by the Door County SWCD.

- (3) In this Policy, the following year and location has been selected as average annual rainfall for SLAMM: Green Bay, 1969 (Mar. 29-Nov. 25). For P8 use October 1, 1968 to September 30, 1969.

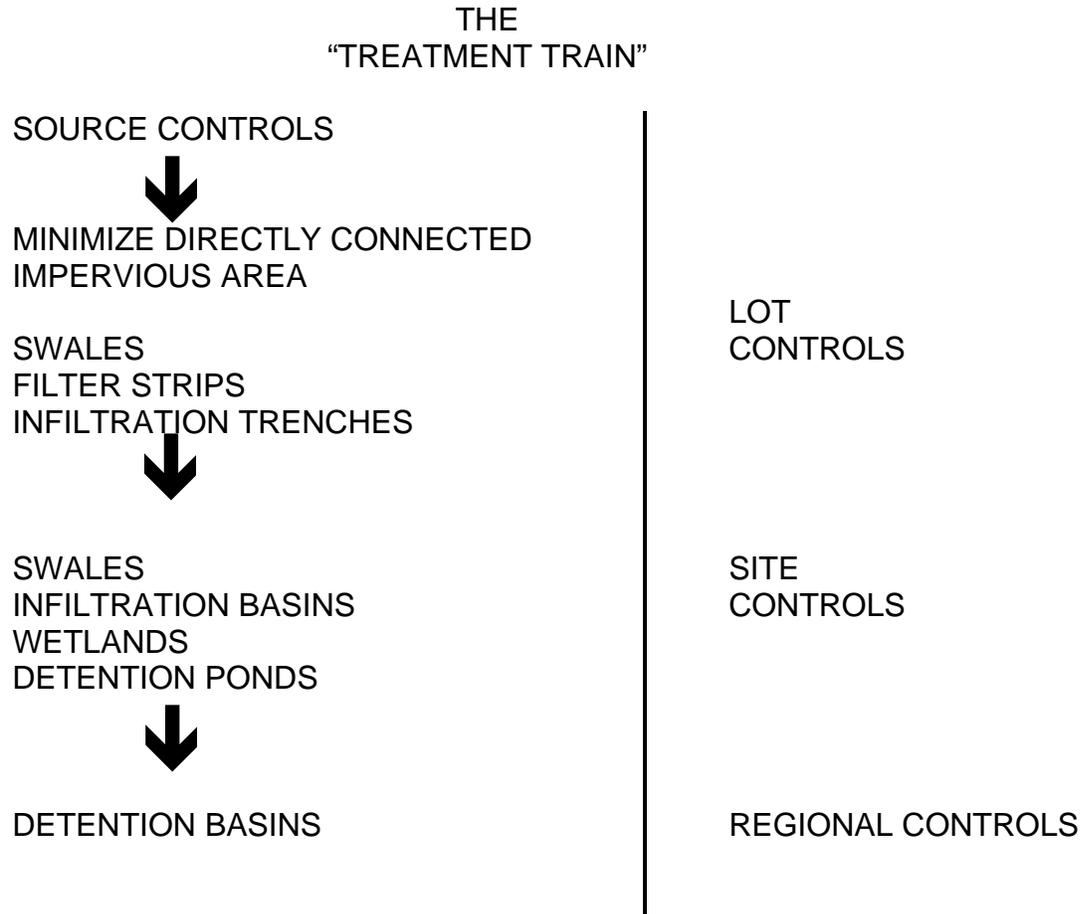
V. PERFORMANCE STANDARDS

Performance standards include water quality, quantity, infiltration, and protective areas. A narrative is required explaining how each performance standard is being met. The narrative shall include explanations of why particular practices have been chosen.

1. QUALITY

In order to help reduce the adverse impacts of the development on water quality, water will be released slowly and onto vegetation rather than onto pavement or into pipes. Water quality concerns include both surface runoff and infiltration. Design for water quality benefits by using these procedures:

- (1) Follow the Treatment Train



- (2) Have runoff water flow through vegetation.
- (3) Minimize the directly connected impervious areas. For instance, direct roof runoff, parking lot runoff and roadway runoff across vegetated areas rather than onto driveways or into pipes.
- (4) Preserve natural drainage ways, wetlands, and natural infiltration areas, provided water drainage to these areas is not a threat to surface or groundwater quality.
- (5) TOTAL SUSPENDED SOLIDS. BMP's shall be designed, installed and maintained to control total suspended solids carried in runoff from the post-construction site as follows. The total suspended solids reduction shall be based on the average annual rainfall, as compared to no runoff management controls.

- a. The following is required:
 - (i) Reduce the total suspended solids load by 80%
 - (ii) For post-construction sites with less than 1 acre of disturbance or other projects as approved by the SWCD, the 80% suspended solids requirement may be waived by the SWCD based on site conditions. However a Plan utilizing appropriate BMP's which adequately protect water quality is required.

(6) Wet and Dry Detention basins:

Design wet detention basins according to the DNR standard, Wet Detention Basin, (1001), SLAMM, or P8.

Wet pools are more effective for pollutant removal than dry pools. Detention basins shall have wet pools where possible. Dry detention basins shall only be used as part of a water quality control system designed using SLAMM or P8. The dry detention basin must have the same extended detention storage as wet detention basins. The pool depth for wetland type basins may be less than 3 feet if approved by the Door Co. SWCD.

Design of Detention Basins:

The bottom of the detention basin shall be 3' or more above bedrock if soils have a minimum of 20% fines (>200 sieve). For coarser soils or lesser separation distances an approved liner is required. Also, if the basin is to be blasted into the bedrock, the blasting must be approved by the SWCD, and an approved liner will be required. Where liners are designed, a liner placement plan is required.

Volume for sediment storage shall be included; 100 cubic feet per acre per ten years or comparable approved alternative.

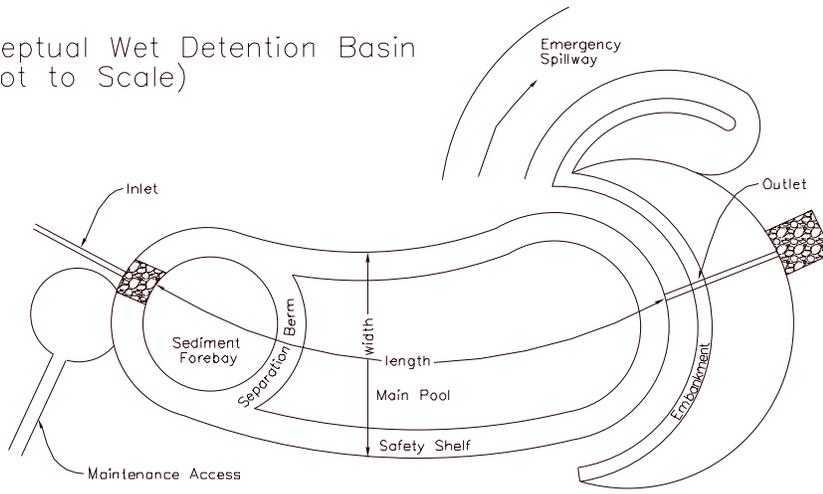
The shape of non-industrial site detention basins shall be designed to appear as natural water bodies to the extent practicable. Nonlinear undulating perimeters without extensive use of straight sections and square corners is required.

Side-slopes of non-industrial site detention basins shall be vegetative except in areas of erosion concern.

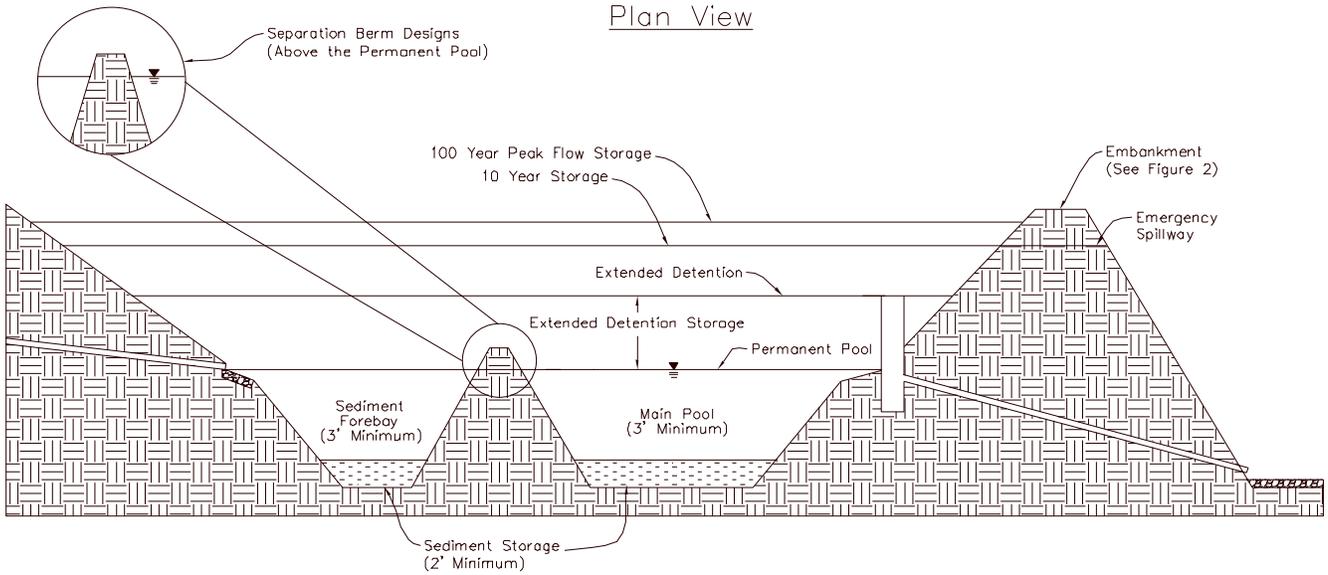
Water fountains and re-circulating systems shall not be installed unless it can be demonstrated that the water quality benefits and function of the detention basin are not compromised.

Operation and Maintenance Chemicals shall not be added to the basins unless it can be demonstrated that the water quality benefits and function of the detention basin are not compromised.

Figure 1: Conceptual Wet Detention Basin
(Not to Scale)

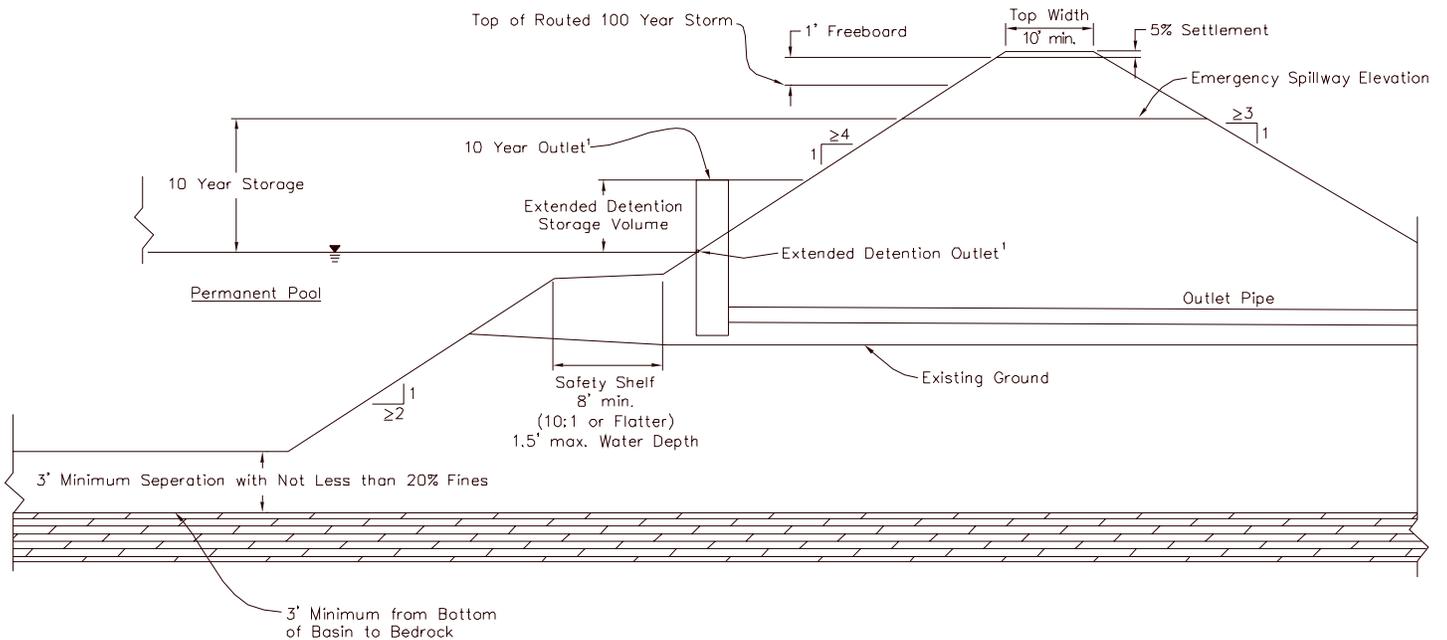


Plan View



Cross Section

Figure 2: Typical Embankment Cross Section for Wet Detention Basin (Not to Scale)



1. These are conceptual outlet locations to indicate the need to have different outlets for different purposes. Numerous outlet designs will meet the criteria of the standard.

- (7) **Groundwater Protection** – All infiltration and biofiltration practices shall have a minimum separation of three feet between bedrock and/or watertable and the bottom of the designed practice. The soil in the 3' separation must have at least 20% fines. If the 3' separation is achieved by blasting or rock cutting, special designs will be required to protect the groundwater quality. All practices within five feet of bedrock will be discussed and reviewed with the SWCD before being submitted as part of a design and stormwater plan.

Constructed stormwater BMP's shall not discharge directly into natural or man made bedrock openings or inflow points.

In areas of shallow soils, less than 2 feet above bedrock, the area around buildings shall have 18" of soil with 6" of topsoil for a distance of 30 feet from the building. Driveways, parking areas, roads and similar structures shall have 18" of soil with 6" of top soil for a distance of 10 feet from the downstream edge. Parking lots and similar structures shall have 2 feet of soil above bedrock for a distance of 30 feet from their downstream edge. The soil shall have a minimum of 20% fines.

In areas of shallow soil, less than 2 feet above bedrock, and where a hummocky surface indicates downward movement of rainfall into the bedrock, the surface soil and infiltration shall be maintained unless

approved by the Door Co. SWCD. This is not required if the runoff is considered a pollutant to groundwater.

2. QUANTITY

Peak Flow Controls where a surface outlet exists

If an outlet exists, peak outflow control is required. Volume control is not. The goal is to have the runoff peak outflow after development be no larger than the pre-settlement peak outflow. Reduction of the post development runoff peaks will generally be done by maintaining large amounts of vegetation, maintaining or increasing infiltration, and by practices such as detention basins, bioretention for infiltration, and infiltration basins.

- (1) The following is required:
 - a. The peak post-development discharge rate shall not exceed the peak pre-development discharge rate for the 2-year, 10-year, and 100-year, 24-hour design storms.
 - b. TR-55 methodology shall be used for peak discharge calculations, unless the administering authority approves an equivalent methodology. The meaning of “hydrologic soil group” and “runoff curve number” are as determined in TR-55. Peak pre-development discharge rates shall be determined using the following “meadow” runoff curve numbers:

| Maximum Pre-Development Runoff Curve Numbers – Meadow* | | | | |
|---|-----------|-----------|-----------|-----------|
| Hydrologic Soil Group | A | B | C | D |
| Runoff Curve Number | 30 | 58 | 71 | 78 |

*The aggregate minimum RCN for the total drainage area is 60 due to frozen conditions during spring runoff.

These curve numbers apply to the property being developed and other land draining onto it.

- (2) For sites with less than one acre of disturbance the peak post-development discharge rate standard in (1) above may be waived by the SWCD based on site conditions. However a Plan utilizing appropriate BMP’s which adequately protect from adverse impacts from runoff quantity and flow is required.
- (3) An adequate outfall shall be provided for each point of concentrated discharge from the post-construction site. An adequate outfall consists of the following:
 - a. Non-erosive discharge velocity for the 10-year, 24-hour design storm.

- b. Flow capacity to convey the 10-year, 24-hour design storm.
- c. Safely pass the [100]-year, 24-hour design storm.

(4) The storm duration shall be 24 hours. Twenty-four hour rainfall amounts are:

| Frequency, years | Rainfall, inches |
|------------------|------------------|
| 2 | 2.4 |
| 5 | 3.1 |
| 10 | 3.6 |
| 25 | 4.1 |
| 50 | 4.6 |
| 100 | 4.9 |

(5) Peak rates of flow, runoff volumes, and detention basin designs shall be done according to methods in the USDA Technical Release No. 55, Urban Hydrology for Small Watersheds, commonly known as TR 55 and in DNR practice standard 1001, Wet Detention Basin. The models SLAMM and P8 may also be used for design.

(6) The hydrologic group for Namur, Summerville, Longrie, Bonduel, Duel variant, and Kolberg is B rather than C or D unless there is obvious evidence of ponding on the bedrock at the site. In most cases the creviced dolomite acts as a drain rather than an impedence to flow. Areas of shallow soils, less than 2 feet above bedrock, and where a hummocky surface indicates downward movement of rainfall into the bedrock, shall have a hydrologic group of A.

(7) Flow through or diversion channels shall be designed for a minimum capacity and, stable velocities for Q10, and flood control for Q100. Culverts will require special design criteria set and/or approved by the governing municipality or SWCD.



Volume Controls where no surface outlet exists

This is the criteria where no surface outlet exists and accumulation of increased volumes of runoff water due to development would cause flooding, erosion, or other problems on adjacent property.

- (1) The general goal is to retain (retention basins) all increased runoff on the site until the extra water evaporates, is transpired by plants, infiltrates, or is removed by pumping.
- (2) Design of RETENTION Basins (See Figure 3):
 - a. Design the retention basin according to practice standard 1001, Wet Detention Basin, except the runoff storage volume shall be as specified below. Volume for sediment storage shall be included; 100 cubic feet per acre per ten years or comparable approved alternative. No credit will be given for infiltration

unless approved by the SWCD.

- b. Runoff storage for period from Nov 1 to June 1 (7 mo.) This runoff storage is in addition to the sediment storage. The top of the runoff storage volume shall be used to set the emergency outlet level (if any) and the flood pool level. Any building structures in the watershed shall be constructed 2' above the flood pool level unless approved by the SWCD. Determine pre and post RCN's based on the previous RCN table and the expected future conditions.
 - From Runoff Table find 7 month runoff depth for each RCN (Interpolate as needed)

c. RUNOFF TABLE

| On Site RCN | Average Runoff (Nov 1 - June 1) |
|-------------|---------------------------------|
| 90 | 9.5" |
| 85 | 8.0" |
| 80 | 6.7" |
| 75 | 5.4" |
| 70 | 3.9" |
| 65 | 2.6" |
| 60 | 1.2" |

- Subtract pre depth from post depth
- Multiply by 1.5 to account for wetter than average years and differing winter conditions.

For instance: Post Pre
 RCN 70 60

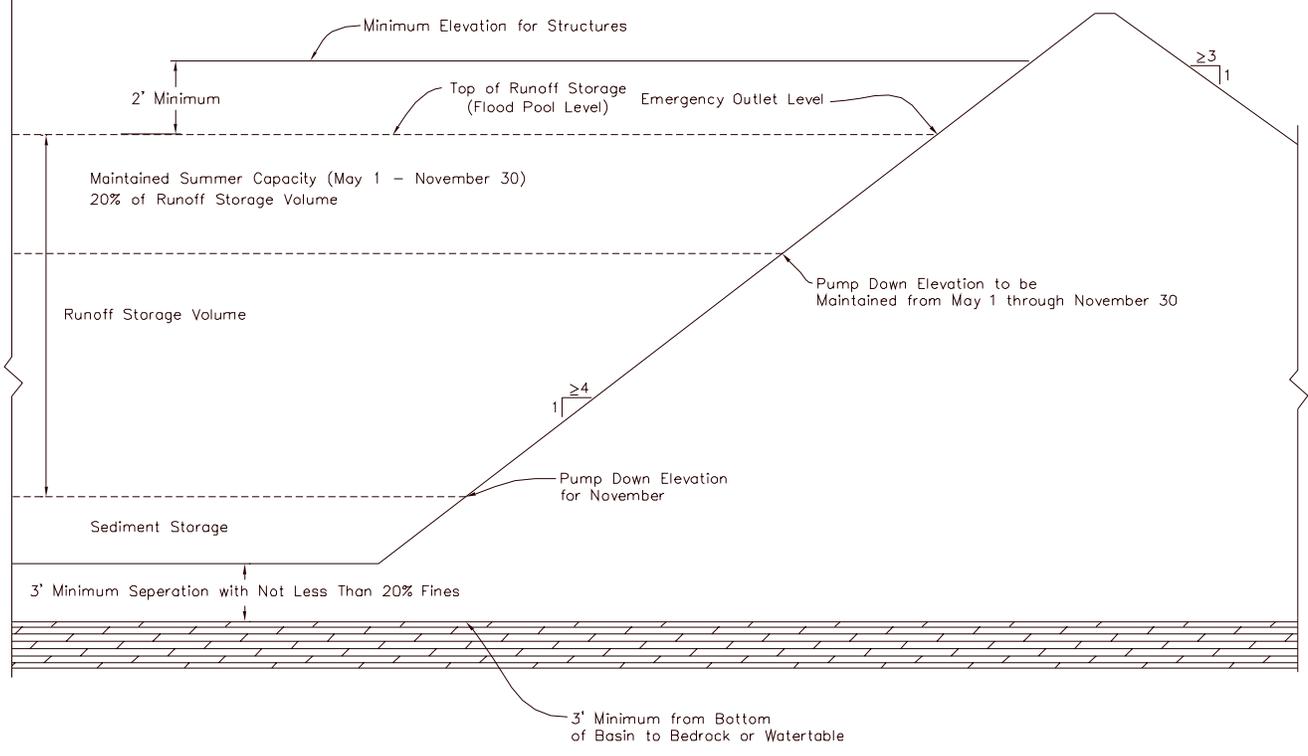
$$\text{Runoff depth } 3.9 - 1.2 = 2.7 \quad \times 1.5 = 4.05''$$

$$\text{Volume} = 4.05 / 12 \times 43560 = 14,702 \text{ cu. ft./ac of draining area}$$

(3) Include these items in the Operation and Maintenance Plan

- a. Basins are to be emptied in November so that they are ready to accept the winter and spring runoff.
- b. During the May -November period the water level in the basin is to be kept below the 80% volume capacity elevation level so that there is always 20% of the basin capacity available to accept the extra runoff from a storm event.
- c. The sediment is to be cleaned out every 10 years or as needed to maintain sediment storage capacity.

Figure 3: Retention Basin
 No Outlet Exists
 (Not to Scale)



3. INFILTRATION

BMP's shall be designed, installed, and maintained to infiltrate runoff in accordance with the following.

- (1) For residential developments, one of the following shall be met:
 - a. Infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 90% of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 1% of the project site is required as an effective infiltration area.
 - b. Infiltrate 25% of the post-development runoff from the 2 year -24 hour design storm with a type II distribution. Separate curve numbers for pervious and impervious surfaces shall be used to calculate runoff volumes and not composite curve numbers as defined in TR-55. However, when designing appropriate infiltration systems to meet this requirement, no more than 1% of the project site is required as an effective infiltration area.
- (2) For non-residential developments, including commercial, industrial and institutional development, one of the following shall be met:

- a. Infiltrate sufficient runoff volume so that the post-development infiltration volume shall be at least 60% of the pre-development infiltration volume, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 2% of the project site is required as an effective infiltration area.
 - b. Infiltrate 10% of the runoff from the 2 year - 24 hour design storm with a type II distribution. Separate curve numbers for pervious and impervious surfaces shall be used to calculate runoff volumes, and not composite curve numbers as defined in TR-55. However, when designing appropriate infiltration systems to meet this requirement, no more than 2% of the project site is required as an effective infiltration area.
- (3) Pre-development condition shall assume “good hydrologic conditions” for appropriate land covers as identified in TR-55 or an equivalent methodology approved by the administering authority. The meaning of “hydrologic soil group” and “runoff curve number” are as determined in TR-55. Use the RCN’s as required for Quantity above.

Note to Users: A model that calculates runoff volume, such as SLAMM, P8, or an equivalent methodology may be used.

- (4) For residential and non-residential developments with less than one acre of disturbance, the SWCD may waive the standards in (1) & (2) above based on site conditions. However a Plan utilizing appropriate BMP’s which adequately infiltrate runoff volume is required. BMP’s are listed on the DNR website.
- (5) Prohibited Areas for Infiltration
- a. Areas associated with tier 1 industrial facilities identified in s. NR 216.21(2)(a), Wis. Adm. Code, including storage, loading, rooftop and parking.

- b. Storage and loading areas of tier 2 industrial facilities identified in s. NR 216.21(2)(b), Wis. Adm. Code.

Note to Users: Runoff from tier 2 parking and rooftop areas may be infiltrated but may require pretreatment.

- c. Fueling and vehicle maintenance areas.
- d. Areas within 1000 feet of karst and/or bedrock solution features and/or surface expressions or indicators of underlying karst and/or bedrock solution features unless discussed with and approved by the SWCD.
- e. Areas with less than 3 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.

- f. Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.
 - g. Areas within 400 feet of a community water system well as specified in s. NR 811.16(4), Wis. Adm. Code, or within 100 feet of a private well as specified in s. NR 812.08(4), Wis. Adm. Code, for runoff infiltrated from commercial, industrial and institutional land uses or regional devices for residential development.
 - h. Areas where contaminants of concern, as defined in s. NR 720.03(2), Wis. Adm. Code are present in the soil through which infiltration will occur.
 - i. Any area where the soil does not exhibit one of the following soil characteristics between the bottom of the infiltration system and the seasonal high groundwater and top of bedrock: at least a 3-foot soil layer with 20% fines or greater; or at least a 5-foot soil layer with 10% fines or greater. This does not apply where the soil medium within the infiltration system provides an equivalent level of protection.
- (6) Exemptions. Infiltration of runoff from the following areas are not required to meet the infiltration requirements of this paragraph:
- a. Areas where the infiltration rate of the soil is less than 0.6 inches/hour measured at the site.
- (7) Where alternate uses of runoff are employed, such as for toilet flushing, laundry or irrigation, such alternate use shall be given equal credit toward the infiltration volume required by this paragraph.
- (8) a. Infiltration systems designed in accordance with this paragraph shall, to the extent technically and economically feasible, minimize the level of pollutants infiltrating to groundwater and shall maintain compliance with the preventive action limit at a point of standards application in accordance with ch. NR 140, Wis. Adm. Code. However, if site specific information indicates that compliance with a preventive action limit is not achievable, the infiltration BMP may not be installed or shall be modified to prevent infiltration to the maximum extent practicable.
- b. Notwithstanding subd. par. a., the discharge from BMP's shall remain below the enforcement standard at the point of standards application.

4. PROTECTIVE AREAS

- (1) "Protective area" means an area of land that commences at the top of the channel of lakes, streams and rivers, or at the delineated boundary of wetlands, and that is the greatest of the following widths, as measured horizontally from the top of the channel or delineated wetland boundary to the closest impervious surface. However, in this paragraph, "protective area" does not include any area of land adjacent to any stream enclosed within a pipe or culvert, such that runoff cannot enter the enclosure at this location.
 - a. For outstanding resource waters and exceptional resource waters, and for wetlands in areas of special natural resource interest as specified in s. NR 103.04, 75 feet.
 - b. For perennial and intermittent streams identified on a United States geological survey 7.5-minute series topographic map, or a county soil survey map, whichever is more current, 50 feet.
 - c. For lakes, 50 feet.
 - d. For highly susceptible wetlands, 50 feet. Highly susceptible wetlands include the following types: fens, sedge meadows, bogs, low prairies, conifer swamps, shrub swamps, other forested wetlands, fresh wet meadows, shallow marshes, deep marshes and seasonally flooded basins.
 - e. For less susceptible wetlands, 10 percent of the average wetland width, but no less than 10 feet nor more than 30 feet. Less susceptible wetlands include degraded wetlands dominated by invasive species such as reed canary grass.
 - f. In subd. (1) a., d. and e., determinations of the extent of the protective area adjacent to wetlands shall be made on the basis of the sensitivity and runoff susceptibility of the wetland in accordance with the standards and criteria in s. NR 103.03.
 - g. For concentrated flow channels with drainage areas greater than 130 acres, 10 feet.
- (2) Wetlands shall be delineated. Wetland boundary delineations shall be made in accordance with s. NR 103.08(1m). This paragraph (d) does not apply to wetlands that have been completely filled in accordance with all applicable state and federal regulations. The protective area for wetlands that have been partially filled in accordance with all applicable state and federal regulations shall be measured from the wetland boundary delineation after fill has been placed.
- (3) The following requirements shall be met:
 - a. Impervious surfaces shall be kept out of the protective area to the maximum extent practicable. (Examples of allowed impervious surfaces include structures that cross or access

surface waters such as boat landings, bridges and culverts.) The storm water management plan shall contain a written site-specific explanation for any parts of the protective area that are disturbed during construction.

- b. Where land disturbing construction activity occurs within a protective area, and where no impervious surface is present, adequate sod or self-sustaining vegetative cover of 70% or greater shall be established and maintained. The adequate sod or self-sustaining vegetative cover shall be sufficient to provide for bank stability, maintenance of fish habitat and filtering of pollutants from upslope overland flow areas under sheet flow conditions. Non-vegetative materials, such as rock riprap, may be employed on the bank as necessary to prevent erosion, such as on steep slopes or where high velocity flows occur.

The seeding of non-aggressive vegetative cover shall be used in the protective areas. Vegetation that is flood and drought tolerant and can provide long-term bank stability because of an extensive root system is required. Vegetative cover can be measured using the line transect method described in the University of Wisconsin Extension publication number A3533, titled "Estimating Residue Using the Line Transect Method".

- c. Best management practices such as filter strips, swales, or wet detention basins, that are designed to control pollutants from non-point sources may be located in the protective area.

Note to Users: Other regulations, such as ch. 30, Wis. Stats., and chs. NR 103, 115, 116 and 117, Wis. Adm. Code, and their associated review and approval process may apply in the protective area.

VI. STORMWATER MANAGEMENT PLAN

1. PLAN REQUIREMENTS.

The storm water management plan for Erosion Control and Post-construction Stormwater shall contain at a minimum the following information:

- (1) A narrative explaining the site, the resource conditions, concerns, and impacts, and the BMP's employed.
- (2) Name, address, and telephone number of the landowner and responsible parties.
- (3) A legal description of the property proposed to be developed.
- (4) A pre-development site map with property lines, disturbed limits, and drainage patterns.
- (5) A post-development site map with property lines, disturbed limits, and drainage patterns including planned practices.
- (6) Total area of disturbed impervious surfaces within the site

- (7) Total area of new impervious surfaces within the site.
- (8) Performance standards applicable to the site.
- (9) Proposed best management practices with design computations.
- (10) Groundwater, bedrock, and soil limitations.
- (11) Separation distances. The stormwater management practices shall be adequately separated from wells to prevent contamination of drinking water.
- (12) Provide an operation and maintenance plan for the installed practices. Specify how it will be assured that the operation and maintenance plan will be carried out and by whom.
- (13) Easements to practices for operation and maintenance.
- (14) Location of a permanent elevation bench mark within 100 feet of a detention and/or retention basin.

VII. VARIANCES and ALTERNATIVE PRACTICES

The SWCD may grant a variance to the technical requirements of this Policy or approve an alternative practice provided surface and ground water quality is protected and runoff quantity and flow adverse impacts are prevented to an extent equal or greater than the technical requirements included in this Policy.

(NOTE: It is the proposed plan preparer's responsibility to obtain approval from any other regulatory agencies/units of government of the proposed variance and/or alternative practice.)