City of Fond du Lac Stormwater Reference Guide

Construction Site Erosion Control Ordinance &

Post-Construction Stormwater Management Ordinance

DATE: October 20, 2008

REVISED: November 14, 2024

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City of Fond du Lac

Reference Guide for the

Construction Site Erosion Control Ordinance

DATE: November 12, 2007

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Executive Summary

The City of Fond du Lac Stormwater Reference Guide (Reference Guide) has been created to act as a companion to Chapter 325 Erosion Control and Stormwater Management of the Code of the City of Fond du Lac. The code cites the Reference Guide as the resource for details that were omitted from the code. Items in the Reference Guide are typically administrative and/or technical and do not affect the code's intent and requirements. The Reference Guide is organized similar to Chapter 325 of the code for ease of relating the comments in the Reference Guide to the appropriate sections in the code.

Table 1: Construction Site Erosion Control Applicability Requirements

Site	≥4,000 Square Feet Disturbance	<4,000 Square Feet Disturbance
All Non-Exempt Construction Sites	Permit required	No permit required [a]
One- and Two-Family Residential Dwellings [b]	Exempt	Exempt
Agricultural Activity Areas	Exempt	Exempt
Silviculture Activities	Exempt	Exempt

a Construction sites with less than 4,000 square feet of disturbance are not required obtain a permit. These sites are required to follow the performance standards for non-permitted sites in § 325-12.A.

b Subdivisions and other larger common of development sites are required to obtain a permit. One- and two-family residential dwellings that result in one acre or more of disturbance are also required to obtain a permit.

Table 2: Construction Site Erosion Control Plan and Performance Standard Requirements

Disturbed Area	Requirements			
	Erosion and Sediment Control Plan	Erosion and Sediment Control Practices [c]	Sediment Performance Standards	Preventive Measures
<4,000 Square Feet	No	Yes	No numeric standard	No
≥4,000 Square Feet & <1 Acre	Yes	Yes	No numeric standard	Yes [d]
≥1 Acre	Yes	Yes	5 tons per acre per year	Yes [d]

c The specific erosion and sediment control practice requirements can be found in § 325-12.A(2) for non-permitted sites and in § 325-12.B.(3)(a) for permitted sites.

d The specific preventive measure requirements can be found in § 325-12.B.(3)(c).

ARTICLE I
General Provisions

§ 325-1. Findings of fact.

§ 325-2. Purpose and intent.

§ 325-3. Definitions.

As used in this guide, the following terms will have the meanings indicated:

CODE — The ordinances of the City of Fond du Lac of a general and permanent nature adopted by the City Council of the City of Fond du Lac, as revised, codified and consolidated into chapters and sections by General Code, and consisting of Chapters 1 through 720.

CONCRETE WASHOUT — The residue and contaminants from washing concrete trucks, pumps, mixers, chutes, hand tools, and wheelbarrows. Cementitious products (like grout, mortar, plaster, and stucco) and activities (like saw-cutting, coring, grinding, and grooving) can also result in concrete washout.

GUIDANCE DOCUMENT — Any formal or official document or communication, including a manual, handbook, directive, or informational bulletin, that provides guidance or advice that explains the implementation of the erosion control and stormwater management ordinances.

§ 325-4. Abbreviations.

The following abbreviations shall have the designated meanings:

DSPS	Wisconsin Department of Safety and Professional Services
NAVD88	1988 North American Vertical Datum
USGS	United States Geological Survey
WisDOT	Wisconsin Department of Transportation

§325-4.1. Drainage plans.

§ 325-5. Fee schedule.

Review fees can be found on the fee schedule on the City of Fond du Lac Engineering & Traffic Division website at https://www.fdl.wi.gov/engineering/permits-fees/. Site plan review fees are considered a "non-residential drainage fee".

§ 325-6. Appeals.

§ 325-7. Reserved.

§ 325-8. Reserved.

ARTICLE II
Construction Site Erosion Control

§ 325-9. Authority.

§ 325-10. Applicability and jurisdiction.

A. Applicability.

Activities that are directed and supervised by WisDOT are subject to a Transportation Separate Storm Sewer System general permit and are exempt from this chapter of the code.

Activities directed and supervised by the City of Fond du Lac, including disturbances to connecting highways, are covered by this chapter of the code.

B. Jurisdiction.

C. Exclusions.

§ 325-11. Technical standards.

A. Design criteria, standards and specifications.

Below is a list of technical standards and guidance documents that shall be used to satisfy performance standards contained in the code. Technical standards specify the minimum criteria for a BMP. Guidance documents contain recommendations and additional "how to" guidance. Performance standards take precedence over technical standards and technical standards take precedence over guidance documents. Follow the requirements of the latest version of technical standards and guidance documents unless approved otherwise by the administering authority.

Technical standards.

The following are applicable DNR technical standards:

- 1050 Land Application of Additives for Erosion Control
- 1051 Water Application of Additives for Sediment Control
- 1052 Non-Channel Erosion Mat
- 1053 Channel Erosion Mat
- 1054 Vegetative Buffer for Construction Sites
- 1055 Sediment Bale Barrier (Non-Channel)
- 1056 Silt Fence
- 1057 Trackout Control Practices
- 1058 Mulching for Construction Sites
- 1059 Seeding for Construction Site Erosion Control
- 1060 Storm Drain Inlet Protection for Construction Sites
- 1061 Dewatering Practices for Sediment Control
- 1062 Ditch Check
- 1063 Sediment Trap
- 1064 Sediment Basin
- 1066 Construction Site Diversion
- 1067 Temporary Grading Practices for Erosion Control
- 1068 Dust Control on Construction Sites
- 1069 Turbidity Barrier
- 1070 Silt Curtain
- 1071 Interim Manufactured Perimeter Control and Slope Interruption Products

These standards may be found on the DNR website.

Local modifications to technical standards.

The following are local requirements which are intended to supplement, clarify, or supersede DNR technical standards:

No modifications noted.

Guidance documents.

The following are the applicable guidance documents:

- DNR publications and guidance for construction sites & municipalities including:
  - "Construction Site Definition – Common Plan of Development" Section NR 216.002(2), Wis. Adm. Code
  - Implementation of 2013 Wisconsin Act 20 for Construction Site Erosion Control and Storm Water Management
  - Guidance for the Establishment of Protective Areas for Wetlands in Runoff Management Rules, Wisconsin Administrative Code NR 151
  - Erosion Control Notes
  - Construction Site Soil Loss and Sediment Discharge Calculation Guidance
  - Applicability of Chapter NR 216 Subchapter III to Mill and Crush Operations
- Estimating Residue Using the Line Transect Method (UW-Extension A3533).
- WisDOT Erosion Control Product Acceptability List (PAL)
- WisDOT Facilities Development Manual
- WisDOT Standard Specifications for Highway and Structure Construction
- DSPS Chapter SPS 325 Appendix A Erosion & Sediment Control Procedures & Standards excluding DNR technical standards
- Other national publications approved by the administering authority

B. Other standards.

§ 325-12. Performance standards.

A. Non-permitted sites.

(1) *Responsible party.*

(2) *Erosion and sediment control practices.*

Culvert pipe checks- Culvert pipe checks are used to prevent sediment from entering, accumulating in and being transferred by a culvert and associated drainage system prior to permanent stabilization of a disturbed project area. Install culvert pipe checks at the inlets of culverts and other open pipe inlets. Culvert pipe checks consist of rock filled bags designed to pond runoff water and trap sediment in front of the culvert pipe inlet and can be installed in accordance with WisDOT standard detail drawing 08E15 Culvert Pipe Check.

Materials- No sediment or solid materials, including building materials, may be discharged in violation of the following federal, state, and local regulations:

- Navigation, dams, & bridges (Ch. 30 and Ch. 31, Wis. Stats.)
- Wetland water quality standards (Ch. NR 103)
- Wetlands (US Army Corps of Engineers Section 404 regulations)
- Shoreland management (Ch. NR 115, Ch. NR 117, & local regulations)
- Floodplain management (Ch. NR 116 & local regulations)

Materials management- BMPs that should be employed to manage chemicals, cement, and other building compounds and materials include covering or placing materials indoors until usage; removing excess materials or waste from site after usage or installation; concrete washout management; and immediately cleaning up any spills.

Concrete washout management- To prevent concrete washout from harming the environment use the following best management tips:

- Train employees and subcontractors so they do not dump concrete washout on the ground or allow it to enter storm drains, ditches, streets, and waterways.
- When feasible, truck washout should occur at the concrete plant.
- When washout is needed on a construction site, use designated temporary storage facilities large enough to contain all the liquid and concrete waste generated by washout operations.
- Keep washout areas at least 50-feet from storm drains, ditches, and water bodies and install signs instructing operators to use the facility.
- One containment option is to use manufactured, watertight, portable washout containers.
- Alternatively, a plastic-lined containment area such as a holding pit, bermed basin, roll-off bin, or portable tank that prevents runoff from entering it can be constructed. The liner should be at least 10 millimeters and leak free.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to use the property facilities.
- Where pavement is absent, construct a stabilized vehicle entrance to the containment area.
- Keep containment areas away from construction traffic to reduce the likelihood of accidental damage and spills.
- Inspect the containment areas daily to insure the sidewalls are intact, leaks are absent, and adequate capacity remains.
- Cover the containment area before rainstorms to prevent overflows.
- Washout facilities must be cleaned, or new facilities constructed and ready for use, once the washout container is 75% full.
- Hardened solids can be crushed and hauled away for recycling or disposed in accordance with local construction waste management regulations.
- Place new plastic in the containment facility each time it is cleaned and complete other needed repairs before using the containment facility again.

(3) *Location.*

(4) *Implementation.*

(5) *Alternative requirements.*

B. Permitted sites.

(1) *Responsible party.*

(2) *Erosion and sediment control plan.*

(3) *Erosion and other pollutant control requirements.*

Design clarifications.

Erosion control practices- Erosion control practices are used to prevent sediment particles from becoming dislodged and suspended in runoff. Erosion control practices include land application of additives for erosion control, mulching, seeding, and erosion mats. Grading practices can be used to supplement these practices.

Sediment control practices- Sediment control practices are used to remove sediment particles that are suspended in runoff and being transported. Sediment control practices used for sheet flow conditions include vegetative buffers, sediment bale barriers (non-channel), silt fence and manufactured perimeter control and slope interruption products. Sediment control practices used for concentrated flow conditions include storm drain inlet protection (< 1 acre), ditch checks (< 1 acre), sediment traps (< 5 acres), sediment basins (< 100 acres), and water application of additives for sediment control. Sediment control practices used for lakes, rivers, and streams include turbidity barriers and silt curtains.

Trackout control practices- Trackout control practices are used to prevent, reduce, or mitigate trackout of sediment. Trackout is the relocation of material from its intended location to off-site surfaces by vehicles.

Construction site diversions- Construction site diversions are used to divert clear-water runoff away from disturbed areas. Construction site diversions are also designed to convey sediment-laden runoff from disturbed areas to sediment control practices such as ditch checks, sediment traps, and sediment basins.

Dust control practices- Dust control practices are used to reduce or prevent the surface and air transport of dust during construction.

Dewatering- Dewatering practices are used to remove sediment from ponding surface water or groundwater. A DNR permit is required for pumping 70 gpm or more. Additional information is available on the DNR webpage under the high capacity wells section of the wells topic.

Culvert pipe checks- Culvert pipe checks are used to prevent sediment from entering, accumulating in and being transferred by a culvert and associated drainage system prior to permanent stabilization of a disturbed project area. Install culvert pipe checks at the inlets of culverts and other open pipe inlets. Culvert pipe checks consist of rock filled bags designed to pond runoff water and trap sediment in front of the culvert pipe inlet and can be installed in accordance with WisDOT standard detail drawing 08E15 Culvert Pipe Check.

Non-erosive flows- Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive flow from the structure to a water course so that the natural, physical, and biological characteristics and functions are maintained and protected. Velocity dissipation devices could include erosion mat (channel), riprap, drop structures, stilling basins, and other energy dissipation devices.

Maximum Permissible Velocities for Channels			
Channel Cover	**Slope Range %**	**Erosion-resistant soils**	**Easily eroded soils**
Bare soil	0-5	3-6 fps*	1.5-2 fps*
	Do not use on slopes steeper than 5%, except for side slopes in a combination channel.		
Bermuda grass	0-5	8 fps	6 fps
	5-10	7 fps	5 fps
	>10	6 fps	4 fps
Buffalo grass, Kentucky bluegrass, Smooth brome, blue grama	0-5	7 fps	5 fps
	5-10	6 fps	4 fps
	>10	5 fps	3 fps
Grass mixture	0-5	5 fps	4 fps
	5-10	4 fps	3 fps
	Do not use on slopes steeper than 10%, except for side slopes in a combination channel.		
Lespedeza sericea, weeping love grass Ischaemum (yellow bluestem), kudzu, alfalfa, crabgrass	0-5	3.5 fps	2.5 fps
	Do not use on slopes steeper than 5%, except for side slopes in a combination channel.		
Annuals – used on mild slopes or as temporary protection until permanent covers are established, common lespedeza, Sudan grass	0-5	3.5 fps	2.5 fps
	Use on slopes steeper than 5% is not recommended.		

* Maximum permissible velocities depend on specific soil properties and shear stress. Typically, the maximum velocity for sand = 1.5 fps, silt and loam = 1.7 to 2.5 fps, fine gravel = 2.5 fps, clay = 3.7 fps, coarse gravel = 4.0 fps, cobbles = 3.7 to 5.0 fps, and shale / hard pan = 6.0 fps.

Source – Chow Open Channel Hydraulics & Civil Engineering Reference Manual for the PE Exam, Ninth Edition

Materials- No sediment or solid materials, including building materials, may be discharged in violation of the following federal, state, and local regulations:

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- Train employees and subcontractors so they do not dump concrete washout on the ground or allow it to enter storm drains, ditches, streets, and waterways.

- When feasible, truck washout should occur at the concrete plant.
- When washout is needed on a construction site, use designated temporary storage facilities large enough to contain all the liquid and concrete waste generated by washout operations.
- Keep washout areas at least 50-feet from storm drains, ditches, and water bodies and install signs instructing operators to use the facility.
- One containment option is to use manufactured, watertight, portable washout containers.
- Alternatively, a plastic-lined containment area such as a holding pit, bermed basin, roll-off bin, or portable tank that prevents runoff from entering it can be constructed. The liner should be at least 10 millimeters and leak free.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to use the property facilities.
- Where pavement is absent, construct a stabilized vehicle entrance to the containment area.
- Keep containment areas away from construction traffic to reduce the likelihood of accidental damage and spills.
- Inspect the containment areas daily to insure the sidewalls are intact, leaks are absent, and adequate capacity remains.
- Cover the containment area before rainstorms to prevent overflows.
- Washout facilities must be cleaned, or new facilities constructed and ready for use, once the washout container is 75% full.
- Hardened solids can be crushed and hauled away for recycling or disposed in accordance with local construction waste management regulations.
- Place new plastic in the containment facility each time it is cleaned and complete other needed repairs before using the containment facility again.

Wetland delineations- Wetland delineations shall be performed by a DNR assured wetland delineator, professional soil scientist, professional hydrologist, or other qualified individual approved by the administering authority. Delineations made by someone other than an assured delineator must receive DNR concurrence. The individual performing the delineation shall classify the wetland as a less susceptible wetland, highly susceptible wetland, other wetland, exceptional resource water, or outstanding resource water.

Protective areas- Protective areas may be disturbed as part of a construction project, if necessary. Disturbed areas must be stabilized from erosion and restored with a self-sustaining vegetation. BMPs (ponds, swales, etc.) may be located in protective areas.

Protective area vegetation- It is recommended that seeding of non-invasive vegetative cover be used in the protective areas. Vegetation that is flood and drought tolerant and can provide long-term bank stability because an extensive root system is preferable. 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”.

Adjacent property owners- If a stream or channel is permanently placed or relocated along a property line, an easement or letter of permission is required from any property owners impacted by the protective area’s new location. Also, if a stormwater facility or structure is proposed within an onsite stream or channel, 100-year flood elevations shall be evaluated to determine if off-site property owners are impacted by backwater or a flood elevation increase. An easement or letter of permission is required from any property owners impacted by backwater. Changes to a stream, wetland, or channel should be discussed

during the pre-design meeting. Changes to a navigable stream, wetland or other waters of the state will require permits from the DNR, Army Corps of Engineers, and local municipality.

Agricultural activity areas- Agricultural activity areas (i.e. farm fields and other cropland areas) are exempt from the code.

Agricultural production areas- The Fond du Lac County Land & Water Conservation Department may be available to prepare erosion & sediment control plans for farm structures and disturbances in the non-cropland areas. Construction of farm structures and disturbances in non-cropland areas one acre or greater must also be covered by a Ch. NR 216 permit.

Wastewaters- Wastewaters, such as concrete truck washout, need to be properly managed to limit the discharge of pollutants to waters of the state or the MS4. A separate permit may be needed from the DNR where a wastewater discharge has the potential to adversely impact waters of the state. The appropriate DNR wastewater specialist shall be contacted to determine if wastewater permit coverage is needed where wastewater will be discharged to waters of the state.

Sediment performance standards.

The DNR recommends that permittees use the USLE model spreadsheet to estimate soil loss and effectiveness of planned erosion and sediment control practices. A guidance document and copy of the USLE spreadsheet are available on the DNR website under the stormwater topic.

Provide a map with the sediment control performance standard calculations. Include the following information on the map: site soil map, site sub soil texture, existing and proposed contours at a minimum of 2' intervals, and the location of sediment control practices and prescriptive compliance areas. Show the representative worst case slope location, length and steepness. Show the representative worst case scenario during each phase of construction whenever the location, length, or steepness changes. Include all areas which were used to determine the representative worst case scenarios.

The erosion and sediment control plan sheets shall include all construction site scheduling activities included on the USLE spreadsheet along with the proposed construction site activity beginning and ending dates. The construction schedule should clearly note any dates which are used to achieve compliance with the sediment performance standards. The plan designer is encouraged to provide adequate time to complete activities.

Include the following note with the construction site schedule: "The Contractor shall contact the City of Fond du Lac two weeks prior to the ending date of any proposed construction site activity unless activity has already been completed. It may be necessary to install additional sediment control practices, install temporary seeding or stabilization, or to provide revised sediment control performance standard calculations."

A minimum duration of 60 days is required to establish vegetation during the growing season. The growing season is considered to be April 15th to October 15th. The compliance period for the soil loss and sediment discharge calculations may extend to the following year for projects where the site is stabilized in the fall. Provide information on watering or other steps used to establish vegetation on the erosion and sediment control plan if vegetation

will be established during the hot season. The hot season is generally considered to be June 15th to August 15th. The applicant may contact the city to discuss any unique site scheduling requirements.

Slopes.

Non-channel erosion mat shall be provided at any location with a slope 3:1 or greater.

(4) *Location.*

A regional wet detention pond (post-construction site) may be used as a sediment basin (construction site) until final stabilization of the wet detention pond and expiration of the erosion control permit associated with construction of the regional wet detention pond. While regional stormwater management facilities are appropriate for control of post-construction pollutants, they should not be used for construction site sediment removal at other construction sites located within the wet detention pond's watershed.

(5) *Implementation.*

(6) *Targeted performance standards.*

(7) *Alternate requirements.*

§ 325-13. Permitting requirements, procedures and fees.

A. Permit required.

B. Permit application and fees.

C. Review and approval of permit application.

Meetings between the permit applicant, designer, and plan reviewer are encouraged during the pre-design, design, and plan review process. The meetings are used to educate each other about regulatory requirements, environmentally sensitive areas, and design challenges. The number of meetings held is typically commensurate with the size and complexity of the project. Meetings can be face-to-face or via telephone.

One copy of the grading, erosion control and stormwater management plans are required for the initial submittal, each certified, signed and sealed as noted below along with a copy of any supporting calculations, copies of permits, etc. Provide the plans and supporting documents in the PDF file format or other approved electronic file format. Plans, along with a completed erosion control and stormwater management permit application and appropriate review fee, shall be submitted to the City of Fond du Lac Engineering Division, 4th floor of the City/County building located at 160 S. Macy Street, Fond du Lac, WI. Upon approval of the plans, provide four copies of the approved plans and provide the plans and supporting documents in the PDF file format or other approved electronic file format.

Site plan review is required for commercial, industrial, institutional and/or educational development, single family condominiums, multifamily development, and for other uses and development as specified by the City of Fond du Lac Zoning Code. A site plan is required for the first-time development of a property, for additions to existing buildings and other new

construction and site modifications, and for parking lots and parking lot expansions. Relative to the scope of a project, such as a proposal for a minor building addition or small parking lot, a site plan may be eligible for administrative review by Planning and Engineering to streamline the process. Approval of a site plan is a prerequisite for the issuance of a building permit. Site plan review requirements can be obtained from the City of Fond du Lac Planning Division.

D. Financial guarantee.

Construction sites with 1 acre or more of land disturbance are required to have a financial guarantee. The financial guarantee includes the cost associated with erosion and sediment control BMPs, site inspections, project administration, and contingencies. Financial guarantees shall be a cash escrow or irrevocable letter of credit unless approved otherwise.

Construction sites with less than 1 acre of land disturbance are not typically required to have a financial guarantee.

Portions of the financial guarantee may be released as the construction project progresses. The last portion of the financial guarantee is not released until the municipal inspector performs a final inspection and the permit applicant pays final inspection fees.

E. Permit requirements.

A pre-construction conference is encouraged before the start of all construction projects. For sites with 1 acre or more of land disturbance, a pre-construction conference is required. The permit applicant, designer, plan reviewer, contractor, and inspector are encouraged to attend. The purpose of the meeting is to exchange contact information, review the erosion & sediment control plan, and identify individuals responsible for permit compliance, plan amendments, weekly inspection reports, and issue the certificate of permit coverage.

Weekly inspections and inspections within 24-hours after a rainfall event of 0.5-inches or more are required to be entered by the contractor, applicant, or other responsible party on the City of Fond du Lac PermiTrack site. The PermiTrack application is accessible at http://www.mypermitrack.com/. If the inspection results indicate that the site was not in compliance with city or state erosion and sediment control requirements, the corrective actions that will be taken to bring the site into compliance shall be noted. Additional information and instructions can be found on the document Erosion and Sediment Control (ESC) Inspection Documentation Using PermiTrack.

F. Permit conditions.

G. Permit duration.

H. Maintenance.

I. Alternate requirements.

§ 325-14. Erosion and sediment control plan.

A. Plan requirements.

Erosion and sediment control plan.

The erosion and sediment control plan shall address pollution caused by soil erosion and sedimentation during construction and up to final stabilization of the site. The erosion and sediment control plan shall contain, at a minimum, the following information:

(1) An erosion and sediment control plan narrative briefly describing the site, the development schedule, and the BMPs that will be used to meet the requirements of the code.
(2) The name, contact person, title, mailing address, e-mail address, and telephone number of the following individuals or organizations: permit applicant, owner, consultant or plan preparer, and contractor (if known).
(3) Anticipated project start date and projected project end date.
(4) Description of the construction site and the nature of the land disturbing construction activity.
(5) Description of the intended sequence of major land disturbing construction activities for major portions of the construction site, including stripping and clearing; rough grading; construction of utilities, infrastructure, and buildings; and final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, areas of clearing, installation of temporary erosion and sediment control measures, and establishment of permanent vegetation.
(6) Estimates of the total area of the construction site and the total area of the construction site that is expected to be disturbed by land disturbing construction activities.
(7) Calculations to show the compliance with the performance standard in § 325-12.B.(3)(b)[1].
(8) Available data describing the surface soil as well as subsoils, including representation of the limits of land disturbance on a NRCS soils map.
(9) Whenever permanent infiltration systems will be employed or were evaluated, the depth to the nearest seasonal high groundwater elevation or top of bedrock shall be identified.
(10) Name of the immediate named receiving water from the USGS 7.5 minute series topographic maps.
(11) Cost estimate for the installation, operation, and maintenance of the proposed erosion and sediment control BMPs. The cost estimate shall include proposed quantities and an estimated unit price for each of the required BMPs. Construction sites with less than one acre of disturbance are exempt from this requirement.

Site map.

The erosion and sediment control plan shall include a site map. The site map shall include the following items and shall be at a scale not greater than 100-feet per inch and at a contour interval not to exceed one-feet:

(1) Provide a legend sufficient to convey the meaning of all lines, symbols, and abbreviations. Proposed information shall be shown differently from existing information.
(2) Show graphic scale and properly oriented north arrow.
(3) Existing topography, vegetative cover, natural and engineered drainage systems, roads, and surface waters. Lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site shall be shown. Any identified 100−year flood plains, flood fringes, and floodways shall also be shown.
(4) Existing and proposed improvements and features for the site and adjacent to the property including pavements, curb and gutter, sidewalks, and existing and proposed

utilities.

(5) Property and right-of-way lines including bearings, dimensions and right-of-way widths.

(6) Existing and proposed public and private easements for utility, drainage, or other purposes.

(7) Boundaries of the construction site.

(8) Benchmarks used for the site. All elevations on the plans shall correspond to the NAVD88 datum.

(9) Drainage patterns and approximate slopes anticipated after major grading activities.

(10) Areas of soil disturbance, including soil stockpile locations.

(11) Location of major structural and non-structural controls identified in the erosion and sediment control plan.

(12) Location of areas where stabilization BMPs will be employed.

(13) Areas that will be vegetated following land disturbing construction activities.

(14) Areas and locations of wetland on the construction site, and locations where stormwater is discharged to a surface water or wetland within one-quarter mile downstream of the construction site.

(15) Areas used for infiltration of post-construction stormwater runoff.

(16) Person or firm that is preparing the grading plan shall affix the certification (stamp) and signature of a professional engineer, professional land surveyor, or architect as described in Chapter A-E of the Wis. Adm. Code and required by the Department of Safety and Professional Services certifying existing conditions of the site on the grading plan at the time of grading plan submittal.
The elevation certification shall be of the following form, and shall be placed on the face of the grading plan sheet:
I hereby certify that the elevations shown on this drawing are a true and correct representation of the existing conditions as obtained by field survey on _____, 20_.

_____.
Name, Registration No.

BMP description.

Each erosion and sediment control plan shall include a description of appropriate control BMPs that will be installed and maintained at the construction site to prevent pollutants from reaching waters of the state or the MS4. The erosion and sediment control plan shall clearly describe the appropriate erosion and sediment control BMPs for each major land disturbing construction activity and the timing during the period of land disturbing construction activity that the erosion and sediment control BMPs will be implemented. The description of erosion and sediment control BMPs shall include, when appropriate, all of the following minimum requirements:

(1) Description of interim and permanent stabilization practices, including a BMP implementation schedule. The erosion and sediment control plan shall ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized.

(2) Description of structural practices to divert flow away from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from the construction site. Unless otherwise specifically approved in writing by the administering authority, structural measures shall be installed on upland soils.

(3) Management of overland flow at all areas of the construction site, unless otherwise controlled by outfall controls.

(4) Trapping of sediment in channelized flow.

(5) Staging land disturbing construction activities to limit exposed soil areas subject to erosion.

(6) Protection of downslope drainage inlets where they occur.
(7) Minimization of tracking at all vehicle and equipment entry and exit locations of the construction site.
(8) Clean up of off-site sediment deposits.
(9) Proper disposal of building and waste material.
(10) Stabilization of drainage ways.
(11) Installation of permanent stabilization practices as soon as possible after final grading.
(12) Minimization of dust to the maximum extent practicable.
(13) Standard detail drawings and specifications where appropriate.

B. Amendments.

C. Alternate requirements.

§ 325-15. Inspection.

§ 325-16. Enforcement; violations and penalties.

§ 325-17. Reserved.

§ 325-18. Reserved.

City of Fond du Lac

Reference Guide for the

Post-Construction Stormwater Management Ordinance

DATE: November 12, 2007

REVISED: November 14, 2024

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Executive Summary

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Table 1: Post-Construction Stormwater Management Performance Standard Requirements, Part 1

Site		Performance Standard [a]				
		Sediment (TSS)	Total Phosphorus (TP)	Peak Discharge	Protective Area	Fueling & Vehicle Maintenance Areas
< 20,000 ft² Impervious Surface [b, c, d]		No numeric standard	No numeric standard	No numeric standard	Width varies	No visible petroleum sheen
≥ 20,000 ft² Impervious Surface	New Development	80%	60%	1/2/5/10/100-yr, 24-hr design storms	Width varies	No visible petroleum sheen
	Redevelopment	40%	30%	1/2/5/10/100-yr, 24-hr design storms	Potentially exempt	No visible petroleum sheen
	Routine Maintenance Area	40% [e]	30% [e]	None, unless discharging into a BMP	Potentially exempt	No visible petroleum sheen
Agricultural Production Areas		No numeric standard	No numeric standard	1/2/5/10/100-yr, 24-hr design storms	Width varies	No visible petroleum sheen
Transportation Facilities [f]		-Swales shall be vegetated. -Swales shall comply with DNR Technical Standard 1005 "Vegetated Infiltration Swale."				

a The specific post-construction stormwater management requirements can be found in § 325-22.

b The impervious surface areas created after September 10, 2008 are cumulative. For example, if a site first adds 18,000 ft² of parking and then adds a 2,001 ft² building the following year, the site is held to the >20,000 ft² requirements at that time.

c Post-construction sites with 1 acre or more of land disturbance are required to meet the numeric performance standards regardless of the amount of impervious surface area.

d Post-construction sites within a watershed subject to a TMDL or targeted performance standard may be required to meet TSS or TP numeric performance standards. Verify the requirements with the City of Fond du Lac.

e Routine maintenance areas that are part of a post-construction site with less than 5 acres of disturbance are exempt from this requirement. BMP design must account for changes in BMP efficiency from exempted routine maintenance areas.

f Provides alternative criteria for transportation facilities with grass swale drainage systems. The alternative criteria may be used by the applicant to satisfy § 325-22 Performance Standards. The alternative criteria may not be used for transportation facilities that are part of a larger common plan of development.

Table 2: Post-Construction Stormwater Management Performance Standard Requirements, Part 2				
Site		**Performance Standard [g]**		
		Infiltration		
		Low Imperviousness (≤40% connected)	**Moderate Imperviousness (40% - 80% connected)**	**High Imperviousness (>80% connected)**
< 20,000 ft² Impervious Surface		No numeric standard	No numeric standard	No numeric standard
≥ 20,000 ft² Impervious Surface	**New Development**	90% of pre-development infiltration volume Maximum infiltration area = 1%	75% of pre-development infiltration volume Maximum infiltration area = 2%	60% of pre-development infiltration volume Maximum infiltration area = 2%
	Redevelopment	Exempt	Exempt	Exempt
	Routine Maintenance Area	Exempt	Exempt	Exempt
Agricultural Production Areas		Exempt	Exempt	Exempt

g The specific post-construction stormwater management requirements can be found in § 325-22.

Table 3: 24-hr Precipitation Depths	
Design Storm	**Depths (Inches)**
1-year	2.23
2-year	2.55
5-year	3.13
10-year	3.69
100-year	6.16

ARTICLE I
General Provisions

§ 325-1. Findings of fact.

§ 325-2. Purpose and intent.

§ 325-3. Definitions.

As used in this guide, the following terms will have the meanings indicated:

AS-BUILT DRAWING or RECORD DRAWING — A drawing, certified by a professional engineer, submitted upon completion of construction of all stormwater BMPs documenting the constructed BMP features. As part of the record drawings, the professional engineer may need to verify BMP performance using computer modeling or provide material certifications or other certifications.

BIOFILTRATION SYSTEM — A bioretention system which does not qualify for any infiltration credit pursuant to § 325-22.C.(3) of the code.

CODE — The ordinances of the City of Fond du Lac of a general and permanent nature adopted by the City Council of the City of Fond du Lac, as revised, codified and consolidated into chapters and sections by General Code, and consisting of Chapters 1 through 720.

GUIDANCE DOCUMENT — Any formal or official document or communication, including a manual, handbook, directive, or informational bulletin, that provides guidance or advice that explains the implementation of the erosion control and stormwater management ordinances.

LEVEL SPREADER —A device used to disperse concentrated flows back over a wide area, dissipating the energy of the runoff and promoting sheet flow. Common types of level spreaders include vegetated, earthen or stone berms; weirs; stone trenches; and stone trenches with level perforated pipe.

STAY-ON — Runoff that does not leave the site via surface discharge including infiltration, evapotranspiration, and runoff reuse for alternative uses.

STRUCTURAL HEIGHT — The difference in elevation, in feet, between the point of lowest elevation of the top of the embankment before overtopping and the lowest elevation of the downstream toe of embankment.

TARGET STAY-ON DEPTH — The amount of stay-on required on an annual average basis.

VEGETATED TREATMENT AREA or VTA — An area of permanent vegetation used for agricultural wastewater treatment.

Computer modeling.

The following models may be used to evaluate compliance with the performance standards:

HEC-HMS — Hydrologic Modeling System by US Army Corps of Engineers Hydrologic Engineering Center.

HYDRAFLOW — Hydraflow Hydrographs Extension for Autodesk Civil 3D, Hydraflow Storm Sewers

Extension for Autodesk Civil 3D, and Hydraflow Express Extension for Autodesk Civil 3D by Autodesk, Inc.

HYDROCAD — HydroCAD by HydroCAD Software Solutions LLC.

OPENFLOWS — OpenFlows PondPack, OpenFlows CivilStorm, and OpenFlow CulvertMaster by Bentley Systems, Incorporated.

P8 — P8 Urban Catchment Model by William W. Walker, Jr.

RECARGA — The RECARGA model by UW-Madison Civil & Environmental Engineering Water Resources Group.

SSA — Autodesk Storm and Sanitary Analysis by Autodesk.

WINSLAMM — Source Loading and Management Model for Windows by PV & Associates, LLC.

XPSWMM — XPSWMM by Innovyze.

§ 325-4. Abbreviations.

The following abbreviations shall have the designated meanings:

CN	Runoff curve number
CSP	Corrugated steel pipe
EIA	Effective infiltration area
FEMA	Federal Emergency Management Agency
NAVD88	1988 North American Vertical Datum
PE	Polyethylene plastic
PVC	Polyvinyl chloride plastic
RCP	Reinforced concrete pipe
T_c	Time of concentration
USDA	United States Department of Agriculture
VTA	Vegetated treatment area
WisDOT	Wisconsin Department of Transportation

§ 325-4.1. Drainage plans.

§ 325-5. Fee schedule.

Review fees can be found on the fee schedule on the City of Fond du Lac Engineering & Traffic Division website at https://www.fdl.wi.gov/engineering/permits-fees/. Site plan review fees are considered a “non-residential drainage fee”.

§ 325-6. Appeals.

§ 325-7. Reserved.

§ 325-8. Reserved.

ARTICLE III

Post-Construction Stormwater Management

§ 325-19. Authority.

§ 325-20. Applicability and jurisdiction.

A. Applicability.

Activities that are directed and supervised by WisDOT are subject to a Transportation Separate Storm Sewer System general permit and are exempt from this chapter of the code.

Activities directed and supervised by the City of Fond du Lac, including disturbances to connecting highways, are covered by this chapter of the code.

B. Jurisdiction.

C. Exclusions.

§ 325-21. Technical standards.

Below is a list of technical standards and guidance documents that shall be used to satisfy performance standards contained in the code. Technical standards specify the minimum criteria for a BMP. Guidance documents contain recommendations and additional "how to" guidance. Performance standards take precedence over technical standards and technical standards take precedence over guidance documents. Follow the requirements of the latest version of technical standards and guidance documents unless approved otherwise by the administering authority.

A. Technical standards.

The following are applicable DNR technical standards:

- 1001 Wet Detention Pond
- 1002 Site Evaluation for Storm Water Infiltration
- 1003 Infiltration Basin
- 1004 Bioretention for Infiltration
- 1005 Vegetated Swale
- 1006 Method for Predicting the Efficiency of Proprietary Storm Water Sedimentation Devices
- 1007 Infiltration Trench
- 1008 Permeable Pavement
- 1009 Rain Garden
- 1010 Proprietary Storm Water Filtration Devices
- 1100 Interim Turf Nutrient Management

These standards may be found on the DNR website.

The following are applicable NRCS Conservation Practice Standards:

- 313 Waste Storage Facility
- 350 Sediment Basin

- 378 Pond
- 607 Surface Drain, Field Ditch
- 635 Vegetated Treatment Area

These standards may be found in the NRCS Field Office Technical Guide.

B. Local modifications to technical standards.

The following are local requirements which are intended to supplement, clarify, or supersede DNR technical standards:

- **1001 – Wet Detention Pond**
  - Pond watershed
    - Wet ponds are not recommended for small watersheds (<15 acres in clay soil). A wet pond located in a small watershed may develop stagnation problems and become a public nuisance. Public acceptance of stormwater BMPs is important to the success of a local stormwater program. Dry ponds, biofiltration, proprietary devices and other BMPs are recommended for small watersheds.
  - Soil borings
    - Soil borings or test pits are required at the location of proposed wet detention ponds. Information obtained from the soil borings and test pits shall be documented in the site stormwater management report following the requirements found in the infiltration and groundwater evaluation checklist and Technical Standard 1001 (Wet Detention Pond). Include any information known about karst features or direct conduits to groundwater.
  - 100-year floodplain
    - Wet and dry detention ponds shall not be located in a 100-year floodway or 100-year flood storage area unless a hydrologic and hydraulic study is conducted in accordance with Ch. NR 116. Easements will be required if the flood study indicates the 100-year floodway or flood storage area is impacted by the pond or its embankment. Ponds shall not impede 100-year flood conveyance along navigable streams and non-navigable channels.
  - Permanent pool
    - Pool shape: A minimum length to width ratio of 3:1 is required between the principal inlet and principal outlet. The applicant may request a waiver if site characteristics create a hardship. Redevelopment and pond retrofit projects may be eligible for a waiver. Typically, new development is not eligible for a waiver.
  - Peak flow control
    - Do not use table 1 in Technical Standard 1001 (Wet Detention Pond). Use the maximum pre-development runoff curve numbers contained in § 325-22.C.(2) of

the code.

- It is recommended that the developer and designer contact the city to discuss peak discharge requirements for the site early in the design process. The city may have adopted alternative peak discharge requirements for the site which are different than the code. At a minimum, the peak discharge requirements contained in Ch. NR 151 shall be met.

o Inflows

- Pipe inlets shall be protected from soil washouts due to seepage along the pipe's granular bedding and backfill. Rip-rap or other protection shall be placed around the entire pipe perimeter. Also, consider using joint ties for storm sewer pipes and endwalls that are susceptible to joint separation.

- Other inflow points shall be protected from scour and erosion.

o Principal outlet

- All flows shall pass through the principal outlet during the 1-year, 2-year, 5-year, and 10-year, 24-hour design storms. The principal outlet shall consist of one or more flow control structures and discharge pipes.

- Pipes: Generally RCP, PVC or CSP are the preferred pipe materials. Corrugated PE will tend to jack-up due to frost heave and flotation. The minimum recommended pipe diameter is 12-inches.

- Orifices: Orifices smaller than 4-inches are not recommended due to the potential for clogging. Consider using a 6-inch perforated drain pipe and restrictor plate. Refer to Section V.B.8 of Technical Standard 1004 (Bioretention for Infiltration) for guidance. The total opening area of all perforation holes combined shall be sufficient to allow the drain pipe to discharge at full capacity, as would occur if there were no orifice restriction. Backfilling the drain pipe with 1-inch washed stone provides protection from clogging.

- Trash racks or other equivalent litter control devices are required for all outlet openings that control the 1-year and 2-year, 24-hour design storm. The maximum bar spacing shall be less than 2-inches and less than ½ the smallest opening dimension, whichever is more restrictive. The minimum surface area for the trash rack shall be 5 to 10 times the outlet's cross sectional area to prevent clogging. Trash racks keep litter and debris in the pond and prevent it from discharging into streams, rivers and lakes.

- Trash racks are also required for other outlet openings that have a width, height or diameter less than 12-inches. The maximum bar spacing shall be less than ½ the smallest opening dimension. The minimum surface area for the trash rack shall be at 5 to 10 times the outlet's cross sectional area to prevent clogging.

- Reverse-sloped pipes and other underwater outlets may impact a wet pond's pollutant removal efficiency. Outlets that draw water from below the permanent pool's surface elevation reduce the effective surface area and depth

of the permanent pool. If reverse-sloped pipes and other underwater outlets are used, special consideration is required for WinSLAMM and P8 modeling to ensure accurate water quality results.

- Use joint ties, encase pipe in a concrete collar, or provide other means to keep partially or fully submerged pipes from dislodging during frost movement. Also, consider using joint ties for outlet pipes and endwalls that are susceptible to joint separation.

- Flap gates and check valves

  - Flap gates or check valves are required if the 1-year, 2-year, 5-year, or 10-year, 24-hour design storm flows backward through the principal outlet. Backwater from a downslope conveyance system may impact a pond's water quality and/or flood control performance.

  - Flap gates or check valves are not required if the permanent pool's water surface elevation is higher than the 10-year water elevation at the pond outlet (i.e. tailwater).

  - Flap gates or check valves may be required if the permanent pool's water surface elevation is lower than the 10-year water elevation at the pond outlet (i.e. tailwater). If hydrographs are available for the tailwater condition, an evaluation can be performed to determine if flap gates or check valves are required due to backwater. If hydrographs are not available, flap gates or check valves are required.

  - Flap gates and check valves shall not impede flow in downslope channels or streams.

  - Ice accumulation within the downslope conveyance system shall be considered during flap-gate/check valve and principal outlet design.

- Tailwater

  - Tailwater conditions shall be evaluated at the pond outlet.

  - Tailwater conditions along lakes, rivers and streams may be obtained from available 100-year floodplain studies.

  - Tailwater conditions may require that 1-year, 2-year, 5-year, 10-year and/or 100-year, 24-hour runoff volumes be held in the pond, without release, until the downslope hydrograph allows the pond and flap gate to discharge flow.

  - It is recommended that the designer contact the city to discuss tailwater conditions early in the design process. The city may have information available to assist with the tailwater evaluation.

- Emergency spillway

  - The routed 1-year, 2-year, 5-year and 10-year, 24-hour design storm may not

pass through the emergency spillway. The routed 100-year, 24-hour design storm may not pass through the emergency spillway if the pond is designed to have a:

- □ Structural height > 6-feet and flood storage capacity >50 acre-feet, or
- □ Structural height > 25-feet and flood storage capacity > 15 acre-feet.

- Backwater from a downslope conveyance system may not pass through the emergency spillway during the 1-year, 2-year, 5-year or 10-year, 24-hour design storm. Also, a backwater may not pass through the emergency spillway during the 100-year, 24-hour design storm, unless a hydrologic and hydraulic evaluation indicates the site's peak discharge requirements are still satisfied, despite the backwater.

- When feasible, the emergency spillway should not be constructed on an embankment or over fill material. Spillways constructed on an embankment or over fill material are more prone to failure.

- The emergency spillway shall be constructed of permanent materials (i.e. poured concrete, grouted rip rap, articulated concrete block, etc.) if the spillway is constructed on an embankment. The permanent material shall extend from the top of embankment to the downslope toe of embankment. The permanent material shall be shaped to contain flows and reduce potential for erosion and embankment failure.

o <u>Topsoil and seeding</u>

- Topsoil is required in the safety shelf to encourage wetland plant growth (12-inch minimum thickness).

- When feasible, install a wetland seed mix or mature plants in the safety shelf to improve pond safety, reduce wave erosion along the shoreline, improve pollutant removal and discourage geese residence. Use non-invasive species.

- When feasible, maintain a high grass buffer around the permanent pool's perimeter. The high grass buffer will further improve pond safety and control of geese. Also, the perimeter of the permanent pool is typically the most difficult area to mow due to saturated soil conditions.

o <u>Dry detention ponds</u>

- Dry detention ponds shall be designed to meet the requirements in Technical Standard 1001 (Wet Detention Pond), except criteria related to permanent pool, safety shelf, sediment storage, sediment forebay and aerators/fountains.

- Dry detention ponds shall be designed to meet the local modifications provided for Technical Standard 1001 (Wet Detention Pond), except permanent pool and soil boring criteria.

- Dry detention ponds may receive pollutant removal credit when modeled in WinSLAMM using a "wet detention device" with a bottom area of the pond at stage 0.01-feet. The following conditions shall be met:

- □ Inlet energy dissipation to prevent energy from entering main basin using baffles, plunge pool, stone weeper, gabion and/or similar functioning structure. A rip rap apron alone is generally not adequate except for small inlet pipes such as 6-inch diameter.
- □ A stone weeper, gabion, or similar structure is placed around the primary outlet to help limit sediment from reaching the outlet.
- □ No low flow "pilot" channel.
- □ Basin shall be vegetated, and vegetation shall be maintained in good condition.
- □ Maximum water surface water elevation rise in the pond should not exceed 5-feet for the 1-year, 24-hour rainfall event.
- □ Basin should be designed to draw down within 24 hours for the 1-year, 24-hour rainfall event.

- Dry detention ponds shall have a minimum bottom slope to the principal outlet of 1%. The applicant may request a waiver if site characteristics create a hardship.

- As part of the operation and maintenance plan, sediment accumulation in the dry pond shall be monitored. Accumulated sediment shall be removed when 5% to 10% of the storage volume is lost for the 2-year, 24-hour design storm.

- The design shall address liners, depth to bedrock, separation from wells, karst and test pits/borings.

- o <u>As-built drawings</u>

  - Provide surveyed as-built drawings upon completion of construction of all wet and dry ponds. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **<u>1002 – Site Evaluation for Stormwater Infiltration</u>**

  - o A site layout should not be developed until Step B is complete. Information obtained from Step B is used to:
    - Identify soil textures within the site.
    - Identify infiltration exclusions and exemptions.
    - Develop a site layout and identify potential infiltration device locations.

  - o For Step B, the <u>minimum</u> number of initial test pits or soil borings required for a new development area are as follows:
    - Two for the initial 10 acres, plus one per 10 acres thereafter.
    - One per soil unit. Soil units are depicted on NRCS Soil Survey Maps.

EXAMPLE CALCULATIONS

- 4 acres with 1 soil unit = min. of 2 test pits or soil borings
- 20 acres with 2 soil units = min. of 3 test pits or soil borings
- 20 acres with 5 soil units = min. of 5 test pits or soil borings
- 34 acres with 3 soil units = min. of 4 test pits of soil borings

- Upon completion of Step B, it is recommended that the developer and designer meet with the city to discuss infiltration requirements for the development to avoid redesign during permit submittal.

- Information obtained from Step C is used to design each infiltration device. As part of Step C, a second set of test pits or soil borings are required. Refer to Table 1, Technical Standard 1002 (Site Evaluation for Stormwater Infiltration) for test pit or soil boring requirements.

- Information obtained from the site evaluation for stormwater infiltration shall be documented in the site stormwater management report following the requirements found in the infiltration and groundwater evaluation checklist and Technical Standard 1002 (Site Evaluation for Stormwater Infiltration). The site evaluation for stormwater infiltration is required for all sites with ≥ 20,000 sq. ft. of impervious surface disturbance or > 1-acre of land disturbance and all sites with proposed infiltration practices.

- **1003 – Infiltration Basin**

  - Provide surveyed as-built drawings upon completion of construction of all infiltration basins. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **1004 – Bioretention for Infiltration**

  - Design bioretention devices with a side infiltration rate of zero or as small as the model allows to account for smearing, compaction, and soils less conducive to infiltration along the side of the facility.

  - Biofiltration systems shall be designed to meet requirements in Technical Standard 1004 (Bioretention for Infiltration), except for the storage layer and sand/native soil interface layer.

  - WinSLAMM, P8 or approved equivalent methodology shall be used to evaluate the pollutant reduction associated with a bioretention or biofiltration BMP.

  - Provide surveyed as-built drawings upon completion of construction of all bioretention and biofiltration devices. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted

demonstrating that the BMP performance meets the applicable site performance standards. Also, as part of the as-built drawings, the contractor shall certify that the bioretention or biofiltration device was constructed in accordance with the approved construction plans and that the installed engineered soil complies with the material specifications.

- **1005 – Vegetated Swale**

  - P8 gives pollutant removal credit for swales via infiltration and settling without accounting for sediment resuspension or scour. Calculate the TSS and TP removal efficiency in P8 as follows:
    - Set the "Particle Removal Scale Factor" to zero in the swale device dialog box to obtain the TSS and TP remaining following swale treatment by infiltration only.
    - Multiply the annual load remaining by 16% for TSS and 11% for TP to obtain the percent which is settled.
    - Subtract the settlement credit calculated from the TSS and TP load remaining to get the revised TSS and TP load remaining and adjust the percent removal accordingly.
    - The additional credit for settlement may not be taken if the swale discharges to another treatment device which would result in double counting of particles removed.

  - Minimum longitudinal slope for a grass swale is 1%. The applicant may request a waiver if site characteristics create a hardship.

  - Grass swales shall be designed for a 2-inch lawn height. If an alternative height is desired, it is recommended that the developer and designer contact the city early in the design process to obtain approval. The city may have ordinances or other design criteria which dictate the allowable mowing height.

  - Driveway culverts shall be considered when the swale length (density) is determined for purposes of WinSLAMM or P8 modeling. The maximum allowable culvert length for each lot shall be specified on the plans.

  - Minimize or mitigate soil compaction during grading activities.

  - Grassed swales shall be designed for the proper drainage area. Generally, it will be best to have one or two sizes to be used wherever needed throughout the development. The design shall be based on the largest drainage area served.

  - Grassed swales shall be designed according to the planned vegetation type and maintenance that will be provided. Generally, grassed channels will be designed to have stable velocities when the vegetation is shortest and adequate capacity when the vegetation is longest.

  - The operation and maintenance plan shall include a map showing the location of all grass swales used to meet the performance standards for a post-construction site.

  - Provide surveyed as-built drawings upon completion of construction of all vegetated swales used to meet the performance standards for a post-construction site. Refer to the as-built / record drawing plan review checklist for requirements. If the

constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **1006 – Proprietary Storm Water Sedimentation Devices**

  - WinSLAMM shall be used to evaluate the pollutant reduction associated with a proprietary storm water sedimentation device.

  - The operation and maintenance plan shall include a map showing the location of all proprietary storm water sedimentation devices, hydrodynamic devices and catch basins or manholes with sumps used to meet the performance standards for a post-construction site.

  - Provide surveyed as-built drawings upon completion of construction of all proprietary storm water sedimentation devices, hydrodynamic devices and catch basins or manholes with sumps. Provide shop drawings or certifications for the structures and devices. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **1007 – Infiltration Trench**

  - The operation and maintenance plan shall include a map showing the location of all infiltration trenches used to meet the performance standards for a post-construction site.

  - Provide surveyed as-built drawings upon completion of construction of all infiltration trenches. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **1008 – Permeable Pavement**

  - The operation and maintenance plan shall include a map showing the location of all permeable pavement used to meet the performance standards for a post-construction site.

  - Provide surveyed as-built drawings upon completion of construction of all permeable pavements. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **1009 – Rain Gardens**

  - The operation and maintenance plan shall include a map showing the location of all rain gardens used to meet the performance standards for a post-construction site.

- Provide surveyed as-built drawings upon completion of construction of all rain gardens. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

- **1010 – Proprietary Storm Water Filtration Devices**

  - The operation and maintenance plan shall include a map showing the location of all stormwater filtration devices used to meet the performance standards for a post-construction site.

  - Provide surveyed as-built drawings upon completion of construction of all stormwater filtration devices. Provide shop drawings or certifications for the structures and devices. Refer to the as-built / record drawing plan review checklist for requirements. If the constructed features do not closely follow the proposed design, calculations or computer modeling may be submitted demonstrating that the BMP performance meets the applicable site performance standards.

C. Guidance documents.

The following are the applicable guidance documents:

- DNR specifications including:
  - S100 Compost for Storm Water Management
- DNR technical notes clarifying DNR technical standards including:
  - Technical Note for Sizing Infiltration Basins and Bioretention Devices
  - Technical Note for Conducting Pavement Surface Infiltration Rate, Pollutant Load and Runoff Volume Reduction Modeling
  - General Filter Inspection and Maintenance
- DNR publications and guidance for construction sites & municipalities including:
  - Meeting Infiltration Performance Standard of ch. NR 151, Wis. Adm. Code
  - "Construction Site Definition – Common Plan of Development" Section NR 216.002(2), Wis. Adm. Code
  - Implementation of 2013 Wisconsin Act 20 for Construction Site Erosion Control and Storm Water Management
  - Guidance for the Establishment of Protective Areas for Wetlands in Runoff Management Rules, Wisconsin Administrative Code NR 151
  - Design Considerations for Post-Construction Performance Standards for Public Trails near Waterways or Wetlands
  - Modeling Post-Construction Storm Water Management Treatment
  - Wetland Screening and Delineation Procedures
  - Nonfederal Wetland Exemptions
  - Artificial Wetland Exemptions
- Rain Gardens: A guide for homeowners and landscapers
- Estimating Residue Using the Line Transect Method (UW-Extension A3533).
- The Wisconsin Stormwater Manual
- WisDOT Facilities Development Manual
- WisDOT Standard Specifications for Highway and Structure Construction
- FEMA Technical Bulletins
- Other national publications approved by the administering authority

D. Local easement requirements.

- Easements are typically required for BMPs and conveyance systems that serve more than one property owner or lot. Conveyance systems include storm sewers, grass swales, channels, streams and overland relief paths. Easement widths will vary.
- An ingress/egress easement or direct access to a public street is typically required for BMPs that serve more than one property owner or lot.
- It is recommended that the developer and designer contact the city early in the design process to discuss easements and width requirements.

§ 325-22. Performance standards.

A. Responsible party.

B. Plan.

C. Requirements.

(1) *Water quality.*

Post-construction sites with 20,000 sq. ft. or more of impervious surface disturbance since September 10, 2008, post-construction sites with 1-acre or more of land disturbance, and sites located within a watershed subject to a TMDL or targeted performance standard are required to meet the code's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in § 325-22.C.(8) for sites with less than 20,000 sq. ft. of impervious surface disturbance.

Computer models.

Pollutant loading models such as WinSLAMM, P8 or an approved equivalent methodology may be used to evaluate the efficiency of the design in reducing pollutants. Information on how to access WinSLAMM and P8 is available on the DNR website.

Use the most recent version of WinSLAMM and P8. The applicant may request a waiver of this requirement.

Provide the following information in the stormwater management report when using WinSLAMM:

- Input data (File – Print Input Data)
- Drainage system image. Use separate program that can create screen captures.
- Outfall output summary (Run – Output Summary tab – Print Output to Summary to Text File). Include the pollutants particulate solids and total phosphorus.
- Maps showing the following:
  - New development, redevelopment, and routine maintenance areas.
  - Drainage basins for each BMP and uncontrolled areas.

P8 does not account for scour or sediment resuspension for any of its modeled treatment devices. Maintain a 3-foot minimum permanent pool depth over the sediment storage

depth. Calculate the pollutant removal efficiency of BMPs with less than a 3-foot permanent pool depth using a straight line depreciation such that a pond with a 1.5-foot deep permanent pool would be eligible for one half the pollutant removal efficiency that would be credited due to settling. The sediment storage depth does not count toward the permanent pool depth.

Start a model run one year before the "keep dates" when using P8.

Design clarifications.

No controls- "No Controls" is the baseline condition for each site. No TSS or TP credit is provided for meeting the baseline condition. The baseline condition is defined as follows:

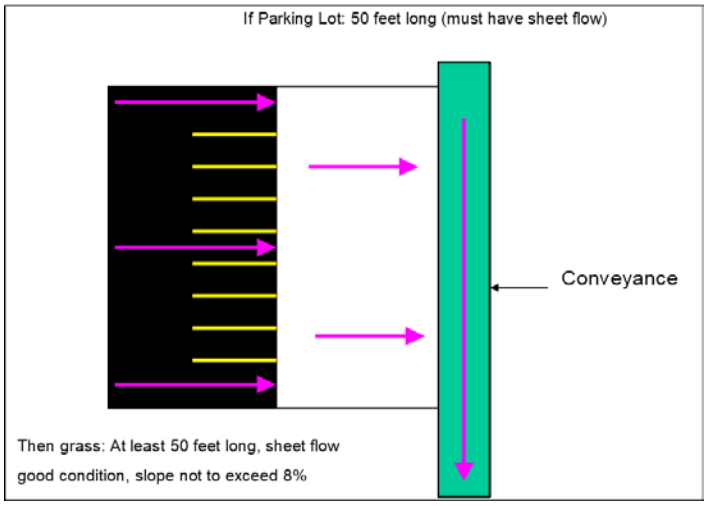
- Assume site is stabilized (no erosion).
- Assume proposed impervious surfaces are in place. Impervious surface reductions (e.g. reduced street width, etc.) cannot be used to claim TSS or TP credit; however; impervious surface reductions will lower runoff volumes which will reduce the required size for stormwater management BMPs.
- Assume no stormwater management BMPs.
- Assume curb and gutter/storm sewer drainage system in fair condition.
- If the applicant intends to claim TSS or TP credit for disconnecting an impervious surface, the "No Controls" condition shall be based on the "typical" percent connected impervious values established by the DNR:

Land Use	% Connected
Open space / undeveloped	5
Suburban residential	7
Park	10
Cemetery	12
Low density residential	14
Medium density residential – with alley	25
Medium density residential – no alley	28
Schools - institutional	39
High density residential – with alley	42
High density residential – no alley	42
Mobile home residential	47
Freeway	51
Multi-family residential	51
Miscellaneous institutional	59
Medium industrial	64
High rise residential	65
Light industrial	71
Office park – commercial	74
Hospital – institutional	76
Commercial strip mall	91
Shopping center – commercial	91
Commercial downtown	96

Disconnection- TSS and TP credit is provided for runoff volume reductions associated with disconnecting impervious surfaces beyond the "typical" percent connected impervious values established by the DNR. In order to consider an impervious surface as

"disconnected", the following criteria shall be met:

- The flow lengths shall not extend into vegetated swales, filter strips, areas of concentrated flow, or other stormwater treatment devices.
- Rooftops from one- and two- family residential dwellings.
  - Discharge runoff over a minimum 20-foot long pervious surface that is in good condition.
- Other impervious surfaces.
  - The source area flow length may not exceed 75-feet.
  - The pervious area must be covered with a self-sustaining vegetation in good condition and at a slope not exceeding 8%.
  - The pervious area flow length must be at least as long as the contributing impervious area flow length and there can be no additional runoff flowing into the pervious area other than the source area.
  - The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.



Source: DNR guidance document *Modeling Post-Construction Storm Water Management Treatment*

Street sweeping and catch basin cleaning- No TSS or TP credit is provided for street sweeping, catch basin cleaning or other management type BMPs in new developed areas.

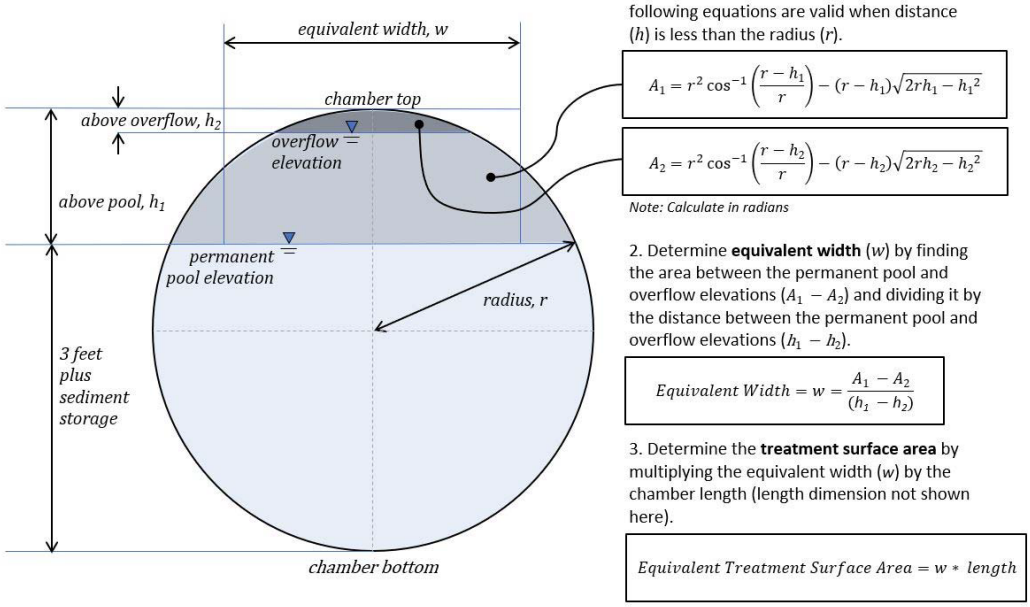
Catch basin and manhole sumps-

- Provide a minimum sump depth of 2-feet. A sump depth of 1.5-feet requires approval by the administering authority.
- Use a catch basin cleaning frequency of annually or less frequent in WinSLAMM for catch basins, manholes, or other structures with sumps. A cleaning frequency of greater than annually requires approval by the administering authority.

Underground settling tanks- Underground settling tanks, such as vaults, pipes, or chambers, may receive pollutant removal credit using a model used to determine the pollutant removal efficiency of wet ponds. The following criteria shall be met:

- The treatment surface area of circular pipes and arched chambers decreases as depth increases. Either use a model than directly evaluates this condition or calculate the treatment surface area at each stage above the permanent pool elevation.

Determining the Equivalent Treatment Surface Area for Underground Storage with Circular Cross Section



Source: DNR guidance document *Modeling Post-Construction Storm Water Management Treatment*

- Specify the sediment storage depth. Provide at least 3-feet of sediment storage depth unless WinSLAMM or other approved model that considers particle resuspension is used. The sediment storage depth is considered the depth between the bottom of the structure and the invert of the lowest outlet.
- Design the system such that the water elevation during any event does not reach the top of the structure.
- Include appropriately-spaced cleanouts for maintenance.
- Minimize joint leakage at locations where a Type A or B wet pond liner would be used in accordance with Technical Standard 1001 (Wet Detention Pond).

Filter strips- Filter strip treatment may be modeled in WinSLAMM for treating sheet flow runoff traveling less than 100-feet in the direction of flow. The operation and maintenance plan shall include a map showing the location of all filter strips used to meet the performance standards for a post-construction site.

Infiltration rate- The design infiltration rate for a BMP shall be based on the most confining soil layer within 5-feet of the BMPs bottom elevation. Infiltration rates shall be obtained from Technical Standard 1002 (Site Evaluation for Stormwater Infiltration).

Engineered soil and sand filters-

- The following TSS and TP removal credits are allowed:
  - 100% TSS and TP removal credit for the volume of runoff that is infiltrated into the underlying soil.
  - 80% TSS and 0% TP removal credit for the volume of runoff that is infiltrated into an engineered soil meeting the requirements of Section V.B.6.d. of Technical Standard 1004 (Bioretention for Infiltration) and that is discharged via an underdrain.

  - 0% removal credit for the volume of runoff that overflows or bypasses the filter.
  - 80% TSS and 35% TP removal credit when using a 100% sand filter meeting one of the gradation options in Section V.B.6.d. of Technical Standard 1004 (Bioretention for Infiltration) and following the other design requirements in Standard 1004 (Bioretention for Infiltration):
- The maximum allowable engineered soil infiltration rate is 3.6 inches/hour.
- The maximum allowable engineered soil void ratio is 0.27.
- The recommended rock or sand storage area void ratio is 0.33.

Uncontrolled areas- The performance standard for TSS and for TP is a site standard, not a BMP standard. Often, a site contains uncontrolled areas that do not flow through a BMP (e.g. wet pond, grass swale, etc.). Typically, it is necessary to increase the TSS or TP reduction provided by other on-site BMPs in order to offset or over-compensate for these uncontrolled areas.

Routine maintenance areas- No performance standard, TSS reduction, or TP reduction is required for routine maintenance areas with less than five acres of disturbance; however; the applicant is responsible for proper performance of on-site BMPs. In order to ensure proper BMP performance, the applicant has these two options:

- Divert the routine maintenance area around on-site BMPs, or
- Include runoff volumes from the routine maintenance area in on-site BMP calculations; however; no TSS or TP credit is provided for the routine maintenance area unless it is re-classified as redevelopment.

Off-site drainage areas- The applicant is not responsible for satisfying TSS or TP performance standards for off-site areas that drain into the project site; however, the applicant is responsible for proper performance of on-site BMPs. In order to ensure proper on-site BMP performance, the applicant has these two options:

- Divert off-site runoff around on-site BMPs, or
- Include off-site runoff volumes in on-site BMP calculations.
  - In WinSLAMM version 10.4 and subsequent versions, use the “other control device” to either give treatment credit or to remove pollutant loading using an option in ‘Tools – Program Options’.
  - Use three WinSLAMM model runs. First run, establish the TSS or TP load generated from onsite areas without any treatment practices including swales and drainage control. Second run, include both off-site and on-site areas without any treatment practices including swales and drainage control. Use an “other control device” and adjust the ‘pollutant concentration reduction’ so that the TSS or TP load generated is equal to the first run and the ‘water volume (flow) reduction’ is not reduced. Third run, use same parameters as the second run with BMPs included. Calculate the allowed reduction as follows:

    $$\text{Adjusted \% particulate solids reduction} = \left(1 - \frac{\text{Pollutant yield from third run}}{\text{Pollutant yield from first run}}\right) \times 100$$

EXAMPLE CALCULATIONS

The development site currently contains 30-acres of institutional land uses and 70-acres of agricultural land uses. The entire 100-acre site will be disturbed as part of the proposed project. Within the 100-acre site, the developer plans to:

- Redevelop 20-acres (existing institutional) into a new commercial area.
- Conduct routine maintenance on 10-acres of existing asphalt parking lot (existing institutional). Parking lot will be part of the new commercial area.
- Develop 70 acres (existing agriculture) into a new residential area

The "No Controls" or base TSS load is computed as follows:

- Commercial area (redevelopment): 20-acres x 600 lbs/acre = 12,000 lbs
- Commercial area (routine maintenance): 10-acres x 800 lbs/acre = 8,000 lbs
- Residential area: 70-acres x 400 lbs/acre = 28,000 lbs
- **"No Controls" TSS Load: 12,000 + 8,000 + 28,000 = 48,000 lbs**

The "TSS Reduction Required" is computed as follows:

- Commercial area (redevelopment): 12,000 lbs x 40% = 4,800 lbs
- Commercial area (routine maintenance): 8,000 lbs x 40% = 3,200 lbs
- Residential area: 28,000 lbs x 80% (new development) = 22,400 lbs
- **"TSS Reduction Required": (4,800 + 3,200 + 22,400)/48,000 = .63 or 63%**

A wet pond is proposed for the site. The pond achieves an 80% TSS reduction for its 130-acre watershed. The 130-acre watershed includes 20-acres of commercial area, 10-acres of commercial parking lot, 60-acres of residential area, and 40-acres of off-site residential area. In addition, 10-acres of residential area at the development site is uncontrolled and will not drain to the pond or any other BMP.

- Commercial area (20-acres): 12,000 lbs x 80% (wet pond) = 9,600 lbs
- Commercial parking lot (10-acres): 8,000 lbs x 80% (wet pond) = 6,400 lbs
- Residential area (60-acres): 24,000 lbs x 80% (wet pond) = 19,200 lbs
- Off-site residential area (40-acres): 16,000 lbs x 80% (wet pond) = 12,800 lbs
- **Pond TSS Reduction: (9,600 + 6,400 + 19,200 + 12,800)/60,000 = .80 or 80%**

The "TSS Reduction Provided" is computed as follows:

- Commercial Area (20-acres): 12,000 lbs x 80% (wet pond) = 9,600 lbs
- Commercial parking lot (10-acres): 8,000 lbs x 80% (wet pond) = 6,400 lbs
  SEE NOTE #1 BELOW
- Residential area (60-acres): 24,000 lbs x 80% (wet pond) – 19,200 lbs
- Residential area (10-acres): 4,000 lbs x 0% (uncontrolled) = 0 lbs
- Off-site residential area (40-acres): SEE NOTE #2 BELOW
- **"TSS Reduction Provided": (9,600 + 6,400 + 19,200 + 0)/48,000 = .73 or 73%**

73% > 63%, therefore the TSS requirement is satisfied

Note #1: Routine maintenance areas less than 5-acres are not required to achieve a TSS reduction. A routine maintenance area less than 5-acres may be included in the "TSS Reduction Required" and "TSS Reduction Provided" calculations if it was reclassified as redevelopment, as opposed to routine maintenance. The reclassification would allow the applicant to plan for future reconstruction of the routine maintenance area.

Note #2: In this example, the 40 acre off-site residential area could have been included in the "TSS Reduction Required" and "TSS Reduction Provided" calculations if it was a regional pond, as opposed to an on-site pond. A regional pond would have allowed the owner of the 40-acre off-site residential area to take credit for the TSS reduction provided by the wet pond.

(2) *Peak discharge.*

Post-construction sites with 20,000 sq. ft. or more of impervious surface disturbance since September 10, 2008 and post-construction sites with 1-acre or more of land disturbance are required to meet the code's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in § 325-22.C.(8) for sites with less than 20,000 sq. ft. of impervious surface disturbance. Agriculture BMPs and design clarifications are found in § 325-22.H.

Computer models.

Peak discharge rates shall be evaluated using TR-55 methodology and a computer model. The computer model shall be able to use the MSE4 rainfall distribution. Hydrology/pond routing software shall be approved by the city. Examples of acceptable programs includes HEC-HMS, Hydraflow, HydroCAD, OpenFlows, SSA, and XPSWMM.

Each pre-development watershed shall be evaluated for peak discharge. It is not accurate or necessary to "link" all of the pre-development watersheds to determine the ultimate allowable discharge for the site. The allowable discharge for each outfall shall be determined based on the individual pre-development watershed as discussed more in-depth below in "TR-55 methodology clarifications".

TR-55 methodology clarifications.

Time of concentration (T_c)-

- Pre-development requirements
  - The T_c route shall be the route that takes the longest time to reach the outfall and not necessarily the furthest point in the watershed.
  - The T_c route shall be shown to scale on the pre-development contours with each flow segment labeled.
  - The pre-development T_c should typically be at least 30 minutes. This may not apply to small sites.
  - A Manning's "n" value of 0.24 shall be used for sheet flow "meadow" conditions. For redevelopment areas, assume impervious surfaces do not exist.
  - The sheet flow length before development is usually 250-feet to 300-feet. This may not apply to small sites.
  - For shallow concentrated flow, "unpaved" or "paved" shall be used to represent vegetated swales and paved swales, respectively.
- Post-development requirements
  - The T_c route shall incorporate and represent the development. If the development is large, consider dividing the development into multiple watersheds.
  - T_c will almost always be shorter after development.
  - The T_c route shall be shown to scale on the post-development drainage plan with each flow segment labeled.
  - The sheet flow length after development will seldom be greater than 50-feet to 100-feet due to the grading around homes and buildings. A sheet flow length of greater than 100-feet requires approval from the administering authority (except for large, paved parking areas).
  - A Manning's "n" value of 0.24 is appropriate for sheet flow "lawn" conditions.
  - The minimum sheet flow slope shall be 2% for residential lawns.

- For shallow concentrated flow; "unpaved" or "paved" shall be used to represent vegetated swales and paved swales, respectively.
- The T_c flow path stops when it reaches the inflow of a wet or dry detention basin.
- The post-development T_c is important for determining the correct storage volume required. See the storage volume for detention basins section below.

Runoff curve numbers (CN)-

- Pre-development requirements
  - The following curve numbers shall be used:

Maximum Pre-Development Runoff Curve Numbers				
Vegetative cover	**Hydrologic soil group**			
	A	B	C	D
Meadow	30	58	71	78
Woodland	30	55	70	77

  - Soil units and the appropriate hydrologic soil groups are located on the NRCS Web Soil Survey website. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

    To get an online soils map and report, do the following:
    - Click the "Start WSS" button.
    - Zoom to the site on the interactive map.
    - Use one of the area of interest (AOI) tools to create an AOI for the site.
    - Select the "Soil Map" tab to create a soil map of the site.
    - Select the "Soil Data Explorer" tab.
    - Select the "Soil Reports" tab.
    - Expand the "Water Features" drop down under Soil Report.
    - Expand the "Water Features" drop down and select "View Soil Report".

- Post-development requirements
  - The runoff curve number for lawns shall be used for developed areas that will be vegetated. Woods, wetland or prairie areas preserved with a recorded document may be modeled as such.
  - Composite runoff curve numbers are allowed for pervious surfaces and disconnected impervious areas. Combining directly connected impervious areas with pervious areas and disconnected impervious areas is not allowed.
  - The post-development runoff curve number calculation shall be based on actual proposed impervious areas and not rely on the TR-55 general runoff curve number based on lot size.
  - The post-development runoff curve number calculation shall be summarized in the narrative of the plan clearly showing the proposed impervious for each lot, roadway, etc. for each proposed watershed.
  - The allowed impervious area for each lot shall be clearly labeled on the drainage plan.
  - The higher the assumed impervious area for each lot, the less restrictions for future lot owners.
  - The following table shall be used as a guideline for the minimum impervious area required for various lot sizes for use in the runoff curve number calculation:

Recommended Minimum Impervious Area for Proposed Residential Lots for Use in the Runoff Curve Number Calculation	
Lot Size	**Impervious Area**
0.25 acres	4,350 sq. ft.
0.5 acres	5,000 sq. ft.
1 acre	6,000 sq. ft.
1.5 acres	6,500 sq. ft.
2.0 acres	7,000 sq. ft.
>2 acres	Contact administering authority

Pre/Post-development curve number determined for permeable soils-

- Refer to the Site Evaluation for Stormwater Infiltration report to verify that soils mapped in hydrologic soil groups A or B are well drained. If not well drained, use the Web Soil Survey Soil Report hydrologic soil group explanation to determine the appropriate hydrologic soil group.
- If the existing site consists of multiple hydrologic soil groups, especially a combination of highly permeable and non-permeable, consideration shall be given to the proposed site balance cut/fill. See Appendix A of TR-55 for discussion on disturbed soil profiles as a result of urbanization.

EXAMPLE

The site consists of 30% hydrologic soil group A soils and 70% hydrologic soil group C soils. The following scenarios shall be handled as noted:

1) If the site earthwork does not balance within the respective hydrologic soil group and it is anticipated that the "C" soils will be filled on the "A" soils, the "C" soil CN shall be used.
2) If the site earthwork balances within each respective hydrologic soil group and it is anticipated that off-site fill will be required to achieve the desired dwelling elevations, the "C" soil CN shall be used.
3) If the site balances within each respective hydrologic soil group and no or minimal fill is anticipated on the "A" soils, compaction mitigation shall be provided.

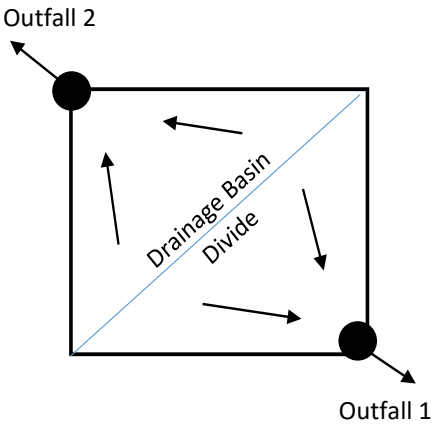
Drainage area-

- Pre-development requirements
  - Determine the total contributing drainage area to the development, including the off-site properties.
  - If the pre-developed site consists of multiple drainage basins, each outfall shall be evaluated for peak discharge.

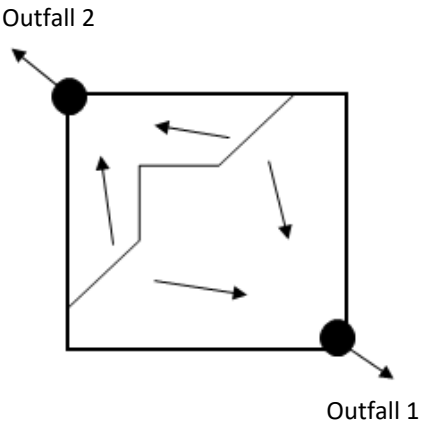
EXAMPLE

The pre-development site shown ***below (left)*** is 40-acres and consists of two drainage basins, each 20-acres in size. Each outfall has a peak discharge of 3, 4, 6, 8, and 12 cfs for the 1-, 2-, 5-, 10-, and 100-year design storms, respectively.

The post-development site shown ***below (right)*** is the same 40-acres; however, Outfall 1 now has 30-acres draining to it and Outfall 2 has 10-acres.



Pre-development drainage basins



Post-development drainage basins

The post-development discharges for Outfall 2 are 2, 3, 5, 6, and 9 cfs for the 1-, 2-, 5-, 10- and 100-year design storms, respectively. Outfall 2 meets the peak discharge requirements of the code because the post-development peak discharges are below the pre-development discharges for Outfall 2.

The post-development discharges for Outfall 1 are 9, 12, 18, 24, and 36 cfs for the 1-, 2-, 5-, 10-, and 100-year storms, respectively. Outfall 1 does not meet the peak discharge requirements of the code. Stormwater facilities have to be installed to lower the post-development peak discharges to the pre-development discharges of 3, 4, 6, 8, and 12 cfs for the 1-, 2-, 5-, 10-, and 100-year design storms, respectively.

Below is an example of appropriate stormwater management plan summary tables as required:

Design Storm	1-year	2-year	5-year	10-year	100-year
Pre-Development Peak Discharges					
Outfall 1	3 cfs	4 cfs	6 cfs	8 cfs	12 cfs
Outfall 2	3 cfs	4 cfs	6 cfs	8 cfs	12 cfs

Design Storm	1-year	2-year	5-year	10-year	100-year
Post-Development Peak Discharges					
Outfall 1 (undetained)	1.8 cfs (9 cfs)	3.6 cfs (12 cfs)	5.3 cfs (18 cfs)	7.5 cfs (24 cfs)	10.9 cfs (36 cfs)
Outfall 2	2 cfs	3 cfs	5 cfs	6 cfs	9 cfs

- Post-development requirements
  - The design of stormwater runoff control facilities shall be based on the total contributing drainage area, not just the area being developed. Any off-site drainage area must be included in the planned facilities or safely diverted around the planned facilities.
  - Off-site contributing areas that are not diverted must use the meadow condition runoff curve number for undeveloped off-site areas and current conditions for off-site areas already developed.
  - Off-site contributing areas that are diverted shall use the highest anticipated runoff curve number for the off-site area for a safe design. Also, the diversion shall provide adequate freeboard for the 100-year flow as determined by a professional engineer (0.3-feet recommended minimum) and assume 10% settlement for the fill area. The conveyance shall be contained within an easement. The discharge location for the diversion shall be at the pre-development outfall or at an adequate outfall as defined in § 325-22.C.(2)(f) of the code.
  - Evaluate directly connected impervious areas separately from pervious areas and disconnected impervious areas.
  - If more than 30% of the drainage area will be impervious, it will often be necessary to divide the drainage area into a pervious sub-area and impervious sub-area for correct computation of peak flow.

Peak discharge method-

- Use Atlas 14, MSE4 24-hour rainfall distribution for design storms.
- Natural depressions shall be evaluated or considered when determining peak discharge rates for the pre-development condition.

Storage volume for detention basins (TR-55)-

- The approximate storage-routing curves should not be used if the adjustment for ponding (discussed above in the peak discharge section) is used.
- This manual method is good for determining quick estimates of the effects of temporary detention on peak discharges. Computer programs that utilize TR-20 (Technical Release 20, NRCS 1983) provide more accurate methods of analysis and routing.
- The procedure should not be used to perform final design if an error in storage of 25% cannot be tolerated.
- When the peak outflow discharge is too close to post-development peak inflow discharge, parameters that affect the rate of rise of a hydrograph become especially significant.

Design clarifications.

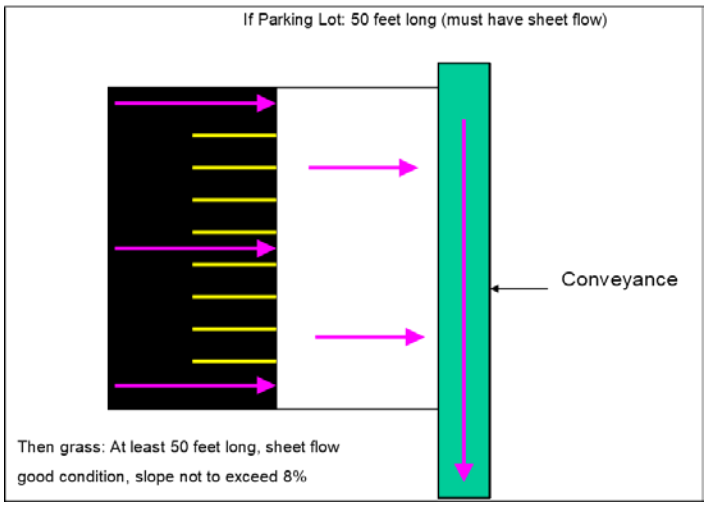
It is recommended that the developer and designer contact the city to discuss peak discharge requirements for the site early in the design process. The city may have adopted alternative peak discharge requirements for the site which are different than the post-construction stormwater management code. At a minimum, the peak discharge requirements contained in Ch. NR 151 shall be met.

Outfalls- Performance standards for peak discharge shall be satisfied at each outfall associated with the site. Written approval is required from downslope property owners if post-development peak discharge rates are not less than or equal to pre-development peak

discharge rates at each outfall.

Disconnection- Disconnecting impervious surfaces can help achieve the peak discharge requirement. Disconnecting impervious surfaces not only reduces runoff volumes, but also increases time of concentrations. In order to consider an impervious surface as "disconnected", the following criteria shall be met:

- The flow lengths shall not extend into vegetated swales, filter strips, areas of concentrated flow, or other stormwater treatment devices.
- Rooftops from one- and two- family residential dwellings.
  - Discharge runoff over a minimum 20-foot long pervious surface that is in good condition.
- Other impervious surfaces.
  - The source area flow length may not exceed 75-feet.
  - The pervious area must be covered with a self-sustaining vegetation in good condition and at a slope not exceeding 8%.
  - The pervious area flow length must be at least as long as the contributing impervious area flow length and there can be no additional runoff flowing into the pervious area other than the source area.
  - The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.



Source: DNR guidance document *Modeling Post-Construction Storm Water Management Treatment*

Uncontrolled areas- The performance standard for peak discharge is an outfall standard. Often, a site contains an uncontrolled area for each outfall that does not flow through a BMP (e.g. wet pond, etc.). Typically, it is necessary to increase the peak discharge control provided by the on-site BMP in order to offset or over-compensate for the uncontrolled area.

Routine maintenance areas- No performance standard or peak discharge reduction is required for routine maintenance areas; however, the applicant is responsible for proper performance of on-site BMPs. In order to ensure proper BMP performance, the applicant has these two options:

- Divert the routine maintenance area around any on-site BMPs, or
- Include runoff volumes from the routine maintenance area in on-site BMP

calculations. For the pre-development condition, routine maintenance areas shall be modeled as a meadow land use. For the post-development condition, routine maintenance areas shall be modeled using the actual site conditions.

Adequate outfalls.

Discharges of storm water runoff shall meet the following requirements:

- Consist of non-erosive discharge velocities.
  - Do not exceed the maximum permissible shear stress for the channel material during the 100-year design storm.
  - Discharge velocities may be reduced using riprap, grouted riprap, drop structures, stilling basins, and other energy dissipation devices.
  - Channels may be armored using turf reinforcement mats, cellular confinement structures, and articulated concrete blocks.
- Discharge to one of the following locations. Performance standards for peak discharge shall be satisfied at each outfall associated with the site:
  - Infiltrate runoff where site conditions allow.
  - A MS4 storm sewer or ditch.
  - Waters of the state. Obtain any applicable DNR waterway permits.
  - A private storm sewer in an easement and with the permission of the property owner.
  - A drainage easement. Obtain the permission of the property owner if any off site disturbance is required.
  - Off site with the permission of the downstream property owner when the post-development concentrated discharge was sheet flow during the pre-development condition.
  - Off site sheet flow discharge where the pre-developed discharge was sheet flow. A level spreader or other means may be required to diffuse concentrated flows.
    - Additional information on level spreaders can be found in DNR Technical Standard 1003 (Infiltration Basin).
    - Provide enough length to distribute the flows from the 100-year design storm.
    - Level spreaders should not be located in constructed fill.
    - The condition of the area downhill of a level spreader shall be considered including, the slope, density and condition of vegetation, natural topography, and the slope length in the direction of flow.
  - Off site where the pre-developed discharge was concentrated and the other discharge options are not feasible. A level spreader or other means may be required to diffuse concentrated flows.
- Contain a means, such as trash racks and underwater outlets, to keep floatable debris within all BMPs.

Shallow bedrock and shallow groundwater levels.

The following considerations are recommended at sites with shallow bedrock or shallow groundwater levels. It is recommended that the developer and designer contact the city early in the design process to discuss site requirements. Sites with an expected bedrock depth of 5-feet or less are shown on the Regional Bedrock Map. Exact conditions need to be field verified. Specific requirements may vary based on site conditions:

- Conduct thorough geotechnical investigations in areas with suspected or

documented shallow bedrock or shallow groundwater levels. Only on-site soil profile elevations at each lot at the depths proposed for basement construction can confirm actual soil and groundwater conditions. A minimum basement depth of 8-feet is recommended.

- Use Ch. SPS 385 to determine soil profile elevations.
- Provide means to reduce wetness in or near walkout basements and finished lower levels due to groundwater seepage, surface water runoff, or a combination of both.
  - Provide a minimum 1-foot vertical separation between the lowest floor surface and the high groundwater level or bedrock.
  - Avoid constructing basements in areas with hydric soils.
  - Flood proof basements constructed below the high groundwater level in accordance with § 690-11.E.
    - Ensure that the lowest opening into a basement is at a higher level than the groundwater level.
    - Construct the basement floor at an elevation no more than 5-feet below the groundwater elevation.
  - Provide recommended sump pump sizing calculations when foundation tiles and sump pumps are expected.
    - Use a granular drainage layer beneath the floor slab.
    - Use a pump rated at four times the estimated seepage rate.
- Foundation tiles and sump pumps are susceptible to loss of power, pump failure, plugged tiles, and complaints about the discharge water. Other practices are recommended to reduce basement wetness.
- In areas of shallow soils, less than 2-feet above bedrock, provide 18-inches of soil with 6-inches of topsoil for a distance of 30-feet around buildings. At driveways, parking areas, roads and similar structures provide 18-inches of soil with 6-inches of topsoil for a distance of 10-feet from the downstream edge. At parking lots and similar structures provide 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.
- Special consideration shall be given when blasting or rock cutting is required to construct the lowest floor of a building.
- All BMPs shall be indicated on the drainage plan. An amendment to recommended elevations may be made upon additional on-site soils evaluation and written acceptance by the city.

Surface water flooding.

The following considerations are recommended to minimize surface flooding and basement wetness:

- Provide a minimum 2-foot vertical separation between the lowest exposed building surface and the peak water surface elevation produced by the 100-year, 24-hour design storm from wetlands, ponds, BMPs, and internally drained areas.
- Provide a minimum 50-foot horizontal setback from the 100-year, 24-hour design storm elevation from wetlands, ponds, BMPs, and internally drained areas.
- Use the following procedures to determine the vertical separation and horizontal setbacks for internally drained areas:
  - Calculate the total runoff volume produced by the 100-year, 24-hour design storm using the entire watershed draining to the internally drained area. Use a runoff curve number of 98 to reflect frozen ground conditions.
  - Conduct a detailed topographic survey of the internally drained area.
  - Apply the calculated runoff volume to internally drained area to determine the

peak water surface elevation. When establishing this elevation, assume no outflow rate to account for frozen ground periods. Outflow rates are only allowed for gravity flows from the internally drained area.
    - Add 2-feet to the 100-year peak water elevation to determine the minimum lowest exposed building surface elevation.
    - Delineate a 50-foot setback from the 100-year peak water elevation.
- If a basement is constructed at an elevation below the peak water surface elevation produced by the 100-year, 24-hour design storm, follow the basement construction guidance in FEMA Technical Bulletin 10-01.

Direct conduits to groundwater.

The following considerations are recommended at sites with direct conduits to groundwater. It is recommended that the developer and designer contact the city early in the design process to discuss site requirements. Sites with an expected carbonate bedrock depth of 50-feet or less are shown on the Regional Bedrock Map. Exact conditions need to be field verified. Specific requirements may vary based on site conditions:

- Conduct thorough geotechnical investigations in areas with suspected or documented direct conduits to groundwater.
- Avoid directly discharging stormwater BMPs to direct conduits to groundwater.
    - Discharge BMPs to storm sewers, ditches, or waters of the state when feasible.
    - Storm sewers and ditches shall not discharge to direct conduits to groundwater downstream of the BMP.
    - Infiltration BMPs shall meet the separation distance and soil characteristic requirements in § 325-22.C.(8) S.07(3)(l).
- Preserve the maximum length of natural swales as possible at the site to increase the infiltration and accommodate flows from extreme storms.
- Consider lining constructed ditches and channels to minimize discharges to direct conduits to groundwater.
- Minimize the area of impervious surfaces at the site.
- Capture the runoff in a series of small runoff reduction practices where sheet flow is present. This technique will help keep the stormwater runoff from becoming channelized and will disperse the flow over a broad area. Practices such as vegetated swales, biofiltration devices, settling devices, media filters, and filter strips should be considered first at a site. However, not all sites lend themselves to this type of management approach. Adequate precautions should be taken to assure that runoff water is adequately pretreated.
- Design BMPs such that volumes of runoff greater than the capacity of the BMP are bypassed around the BMP. This approach will minimize the volume of water to the direct conduit to groundwater.
- Install multiple small BMPs instead of large BMPs.
- Minimize site disturbance during BMP construction. Seek the recommendations of a geotechnical engineer for management of heavy equipment, temporary storage of materials, changes to the soil profile - including cuts, fills, excavation and drainage alteration - on sites that have been found to contain a direct conduit to groundwater.
- Report sinkholes as soon as possible after the first observation of sinkhole development. The sinkhole(s) should then be repaired or the stormwater management facility abandoned, adapted, managed and/or observed for future changes, whichever of these is most appropriate.
- Develop a contingency plan for how to manage the stormwater should a BMP fail as

a result of the development of a direct conduit to groundwater.

- If a direct conduit to groundwater is encountered report to the DNR and city. These known occurrences should be surveyed for specific location and permanently recorded on the property deed. An easement or reserve area should be identified on the development plats for the project so that all future landowners know of the presence of direct conduits to groundwater on their property.

(3) *Infiltration.*

Post-construction sites with 20,000 sq. ft. or more of impervious surface disturbance since September 10, 2008 and post-construction sites with 1-acre or more of land disturbance are required to meet the code's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in § 325-22.C.(8) for sites with less than 20,000 sq. ft. of impervious surface disturbance.

Computer models.

A model that calculates runoff volume, such as RECARGA, WinSLAMM, P8, TR-55 or an approved equivalent methodology may be used to evaluate the efficiency of the infiltration design. Information on how to access RECARGA, WinSLAMM or P8 is available on the DNR website.

Use the most recent version of RECARGA, WinSLAMM and P8. The applicant may request a waiver of this requirement.

Depending on the type of infiltration device, groundwater mounding may need to be evaluated. A model that calculates groundwater mounding is available on the DNR website.

Pre-development runoff volume- The pre-development runoff volume may be calculated as follows:

- In WinSLAMM:
  - By entering the predevelopment acreage and curve number in the "Pre-Development Runoff Volume" located under the "Tools" tab. The results are produced in the model output summary under the "Outfall" and "Runoff Volume" tabs.
- In RECARGA:
  - By entering the existing condition tributary area, percent impervious and pervious CN, with a facility area of 0.01 sq. ft.

Design clarifications.

Maximum EIA- Maximum required EIA is calculated as follows:

- For developments with up to 40% connected imperviousness, the EIA cap is 1% of the project site. The project site is defined as the area of land disturbance.
- For developments with greater than 40% connected imperviousness, the EIA cap is 2% of the project site.
- Excluded and exempted areas are included in the EIA cap calculation.
- The maximum required EIA cap may be voluntarily exceeded.

Source area prohibitions- Infiltration from source areas or at locations identified in § 325-

22.C.(3)(i) of the code is not prohibited. Rather, credit will not be given toward achieving the infiltration requirement. Runoff from excluded areas does not have to be included in calculating the infiltration goal; however, if runoff from an excluded area flows through an infiltration BMP, the following is required:

- Use caution. These source areas and locations are excluded from the code's infiltration requirement due to groundwater contamination concerns. The City of Fond du Lac is not responsible for the applicant's decision to infiltrate this runoff. The applicant is solely responsible for Ch. NR 140 compliance and groundwater protection.
- The BMP design must take runoff from excluded areas into account to assure the device can safely handle the additional flow and volume.

Exemptions- Infiltration from source areas or at locations identified in § 325-22.C.(3)(j) of the code is not required. Despite the code, the applicant may choose to infiltrate exempted runoff. If exempted runoff is infiltrated, credit will be given toward achieving the infiltration requirement. Runoff from exempted areas does not have to be included in calculating the infiltration goal; however, if runoff from an exempted area flows through an infiltration BMP, the BMP design must take it into account to assure the device can safely handle the additional flow and volume.

Groundwater protection- It is the applicant's sole responsibility to protect groundwater. Compliance with preventive action limits contained in Ch. NR 140 must be maintained. Also, infiltration system discharges must remain below enforcement standards contained in Ch. NR 140. DNR technical standards should meet these groundwater protection requirements.

Maximum extent practicable (MEP)-

- Pumping- To achieve the infiltration requirement, maximum extent practicable should not be interpreted to require stormwater pumping.
- Measured infiltration rate- The infiltration rate exemptions in § 325-22.C.(3)(m) of the code apply to infiltration rates measured in the field at the bottom of the infiltration system.
- Excavation to suitable soil- To achieve the infiltration requirement, remove unsuitable soils up to 5-feet below ground level to access suitable soils.
- Fill for suitable soil- The infiltration requirements are based on the native soil conditions prior to October 1, 2004. Filling and compaction activities performed afterwards do not justify an exemption from the infiltration requirements.

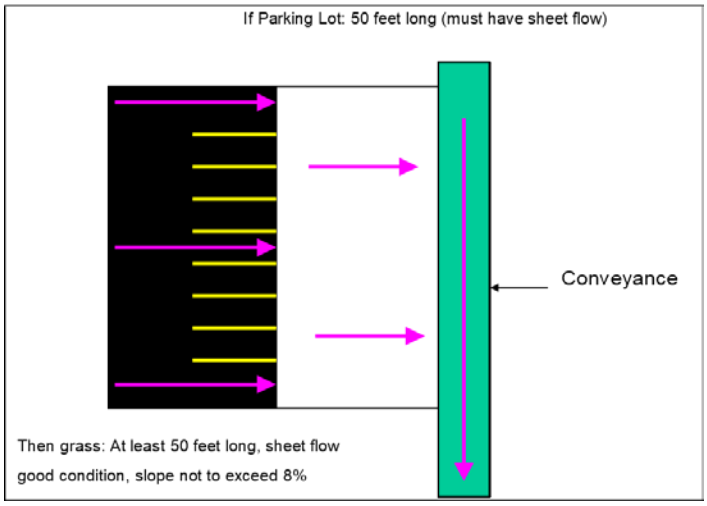
Roof runoff- To minimize potential groundwater impacts, it is desirable to infiltrate the cleanest runoff. To achieve this, a design may propose greater infiltration of runoff from low pollutant sources, such as roofs, and less from higher pollutant source areas, such as parking lots.

Filtering layer- The engineered soil defined in Section V.B.6.d. of Technical Standard 1004 (Bioretention for Infiltration) qualifies as a filtering layer when mixed with compost. Till 2- to 3-inches of compost into the top 6- to 12-inches of native sand for it to qualify as an acceptable filtering layer.

Disconnection- Disconnecting impervious surfaces can help achieve the infiltration requirement; however, disconnection is not considered to be part of an infiltration system. Therefore, disconnected areas do not count toward the maximum effective infiltration area calculation. In order to consider an impervious surface as "disconnected", the following

criteria shall be met:

- The flow lengths shall not extend into vegetated swales, filter strips, areas of concentrated flow, or other stormwater treatment devices.
- Rooftops from one- and two- family residential dwellings.
  - Discharge runoff over a minimum 20-foot long pervious surface that is in good condition.
- Other impervious surfaces.
  - The source area flow length may not exceed 75-feet.
  - The pervious area must be covered with a self-sustaining vegetation in good condition and at a slope not exceeding 8%.
  - The pervious area flow length must be at least as long as the contributing impervious area flow length and there can be no additional runoff flowing into the pervious area other than the source area.
  - The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.



Source: DNR guidance document *Modeling Post-Construction Storm Water Management Treatment*

Runoff curve numbers (CN)-

- Do not use composite runoff curve numbers for different land conditions when determining compliance with the infiltration requirements.
- Use a runoff curve number of 100 for the EIA of an infiltration BMP.

Routine maintenance areas- No performance standard or infiltration requirement is provided for routine maintenance areas; however, the applicant is responsible for proper performance of on-site BMPs. In order to ensure proper BMP performance, the applicant has two options:

- Divert the routine maintenance area around on-site BMPs, or
- Include runoff volumes from the routine maintenance area in on-site BMP calculations. The applicant will receive credit for infiltrating runoff from the routine maintenance area provided it is not a prohibited area.

Off-site drainage areas- The applicant is not responsible for satisfying infiltration performance standards for off-site areas that drain into the project site; however, the applicant is responsible for proper performance of on-site BMPs. In order to ensure proper

on-site BMP performance, the applicant has two options:

- Divert off-site runoff around on-site BMPs, or
- Include off site runoff volumes in the on-site BMP calculations. The amount of on-site credit is determined by pro-rating the infiltration volume. The applicant will not receive credit for infiltrating off-site runoff unless the BMP is a regional facility.

Alternative uses- The volume of runoff used for alternative uses will be credited towards the infiltration requirement. Alternative uses may include toilet flushing, laundry and irrigation (e.g. cisterns, rain barrels, green roofs, etc.). In addition to the stormwater benefits, these alternative uses may also reduce municipal invoices for drinking water.

EXAMPLE CALCULATIONS

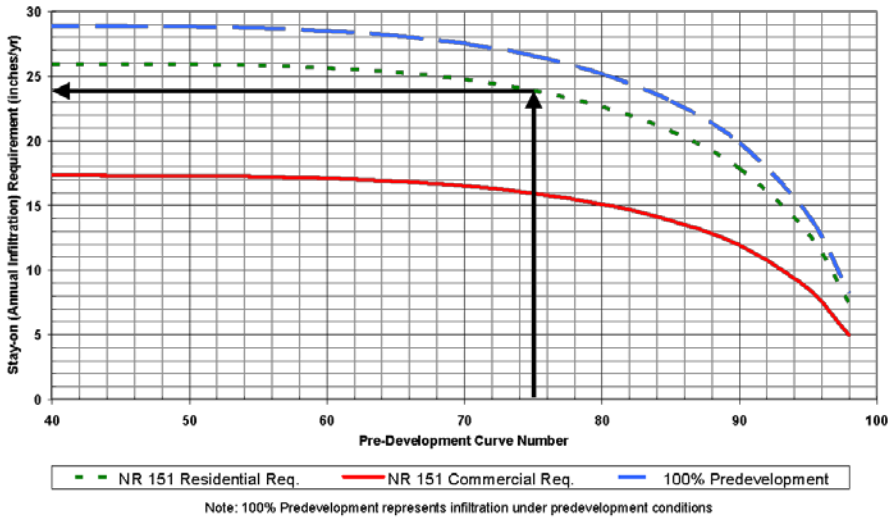
The site is currently 100-acres of cropland. Following development, the site will be 30-acres medium residential, 20-acres commercial and 50-acres cropland. Native soils in the area to be developed are sandy loams, silt loams and silty clay loams. Hydrologic soil groups are B and C with an average pre-development curve number of 75. A site investigation using Step B of the DNR Technical Standard 1002 (Site Evaluation for Stormwater Infiltration), determined that 10 of the acres to be developed into medium residential have an infiltration rate of 0.10 in/hr and are therefore exempt from the infiltration requirements. The site investigation also determined that 10 acres to be developed into commercial are prohibited from infiltrating runoff. The post-development curve number for pervious portions of the residential and commercial components will be 80, based on TR-55. The residential component will be 40% impervious. The commercial component will be 80% impervious.

The residential and commercial components will meet the infiltration requirements using two infiltration basins. Upon completion of a preliminary site layout, two locations were chosen for investigation using Step C of Technical Standard 1002 (Site Evaluation for Stormwater Infiltration). The first location investigated was in the residential area that is not exempt from the infiltration requirements. The soil texture at the residential infiltration basin site is a sandy loam with a design infiltration rate of 0.5 in/hr. The second location investigated was in the commercial area that is not prohibited from infiltrating runoff. The soil texture at the commercial infiltration basin is a loamy sand with a design infiltration rate of 1.63 in/hr.

Step 1: Determine Infiltration Basin Size – Residential Component

Step 1A: Determine Target Stay-on Depth – Residential
Using Chart 1, the target stay-on depth is ***24-inches/year***.

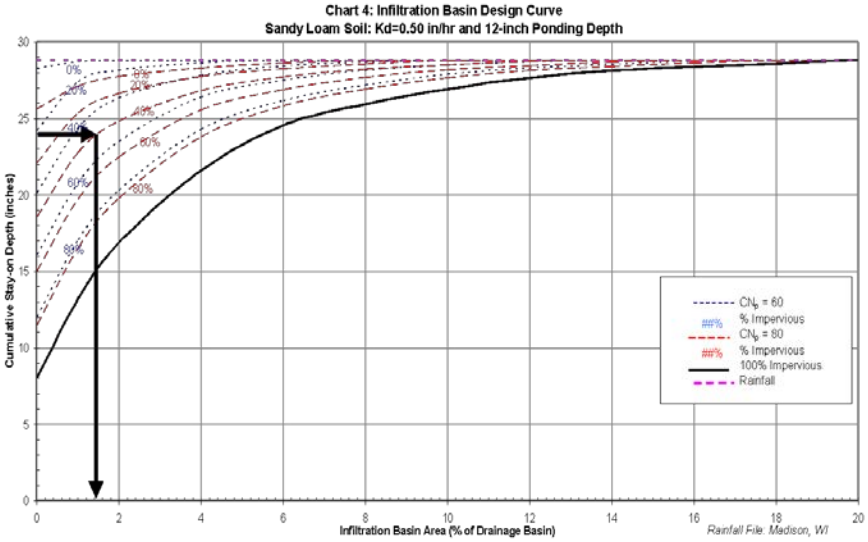
CHART 1 - TARGET STAY-ON (ANNUAL INFILTRATION) REQUIREMENT
Based on the annual 1981 Rainfall for Madison, WI



Note: 100% Predevelopment represents infiltration under predevelopment conditions

EXAMPLE CALCULATIONS, CON'T

Step 1B: Determine Preliminary Effective Infiltration Area - Residential
Using Chart 4, the preliminary effective infiltration area needed for the infiltration basin is ***12,197 sq. ft.*** (43,560 * x 20-acres x 1.4%).



Step 1C: Maximum Required Effective Infiltration Area – Residential

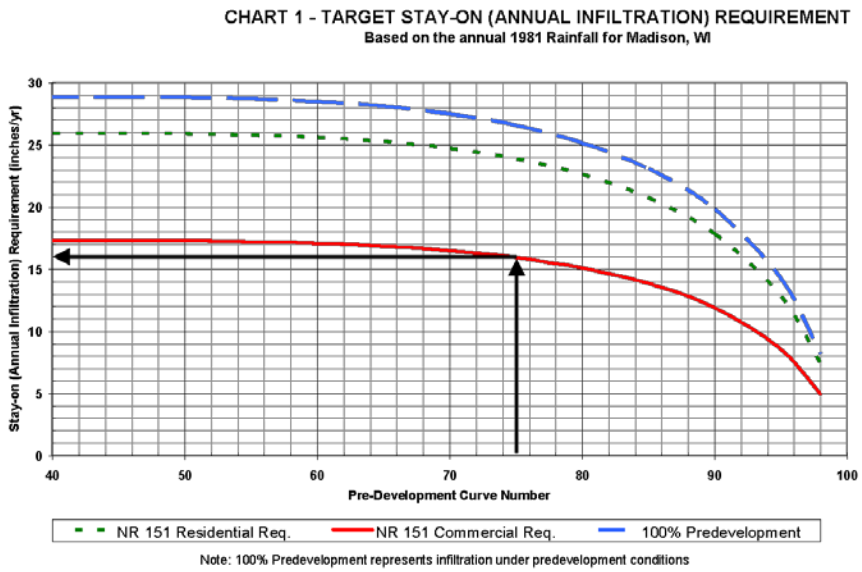
- Residential land disturbance (30-acres total)
  - Building roof: 5-acres
  - Driveway and sidewalk 2-acres
  - Street 5-acres
  - Lawn/landscaping 18-acres
- Maximum required EIA = ***13,068 sq. ft.*** (43,560 x 30-acres x 1%)

Step 1D: Determine Final Effective Infiltration Area – Residential
Using DNR Technical Standard 1003 (Infiltration Basin), the preliminary effective infiltration area of 12,197 sq. ft. needs to be adjusted (depth, slope, cell configuration) to determine the final effective infiltration area. Groundwater mounding also needs to be checked. ***The maximum EIA cap does not appear to impact the infiltration basin's size (12,197 sq. ft. < 13,068 sq. ft.).***

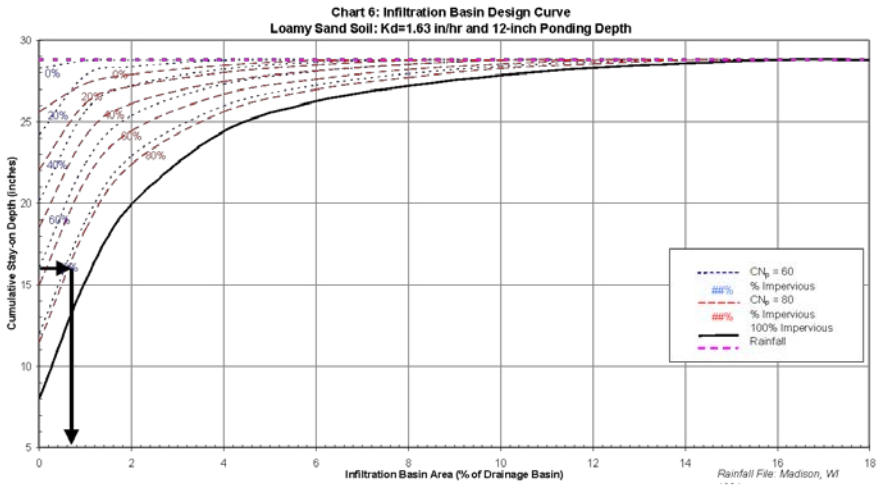
Step 2: Determine Infiltration Basin Size – Commercial Component

Step 2A: Determine Target Stay-on Depth – Commercial
Using Chart 1, the target stay-on depth is ***16-inches/year***.

EXAMPLE CALCULATIONS, CON'T



Step 2B: Determine Preliminary Effective Infiltration Area – Commercial
Using Chart 6, the preliminary effective infiltration area needed for the infiltration basin is 2,614 sq. ft. (43,560 x 10-acres x 0.6%)



Step 2C: Maximum Required Effective Infiltration Area – Commercial

- Non-residential land disturbance (20-acres total)
  - Building roof 6-acres
  - Parking lot 7-acres
  - Street 3-acres
  - Lawn/landscaping 4-acres
- Maximum required EIA = ***11,326 sq. ft.*** (43,560 x 13-acres x 2%)

Step 2D: Determine Final Effective Infiltration Area – Commercial
Using DNR Technical Standard 1003 (Infiltration Basin), the preliminary effective infiltration area of 2,614 sq. ft. needs to be adjusted (depth, slope, cell configuration) to determine the final effective infiltration area. Groundwater mounding also needs to be checked. ***The maximum EIA cap does not appear to impact the infiltration basins size (2,614 sq. ft. >11,326 sq. ft.).***

(4) *Protective areas.*

All post-construction sites are required to meet the code's protective area performance standards.

More information on wetland types and ephemeral ponds can be found on the DNR website.

The following diagrams are examples of how protective areas interact with each other when more than one type of waterbody is present.

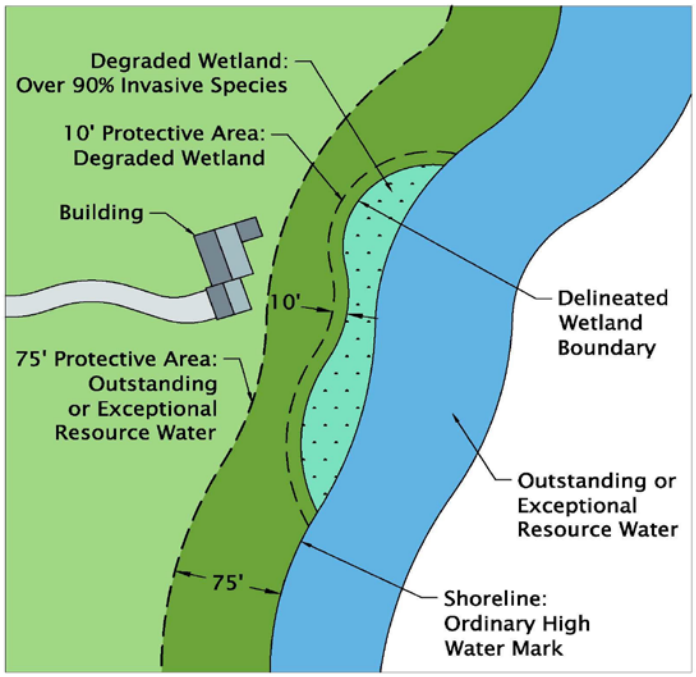


Figure 1: NR 151.125 Protective Area at Outstanding Resource Water with Degraded Wetland

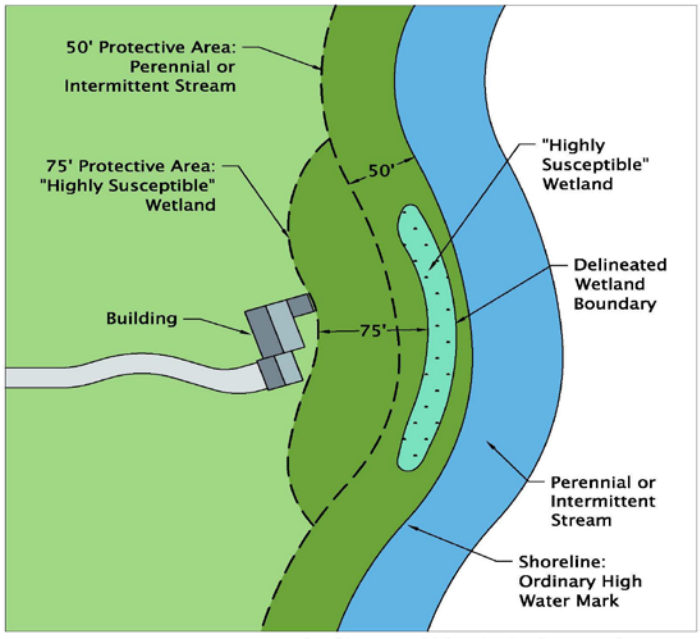


Figure 2: NR 151.125 Protective Area at "Highly Susceptible" Wetland with Perennial Stream

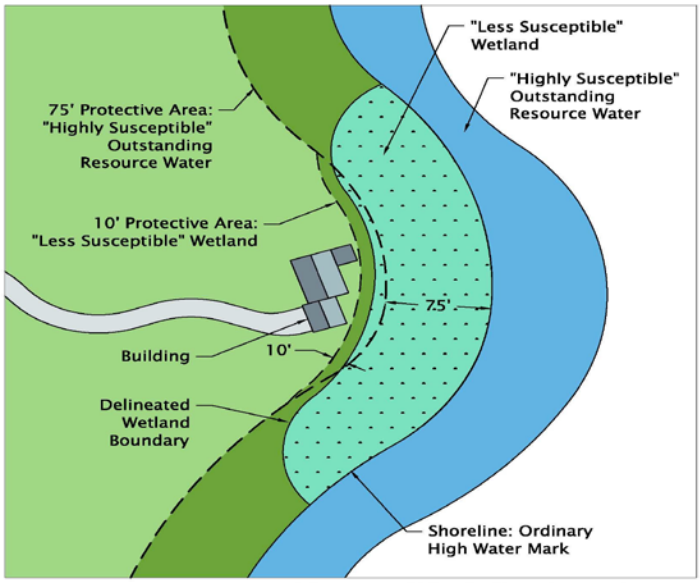


Figure 3: NR 151.125 Protective Area with "Less Susceptible" Wetland beyond Outstanding Resource Water

Source: DNR guidance document *Guidance for the Establishment of Protective Areas for Wetlands in Runoff Management Rules, Wisconsin Administrative Code NR 151*

The following diagram illustrates how to determine the average width of a less susceptible wetland.

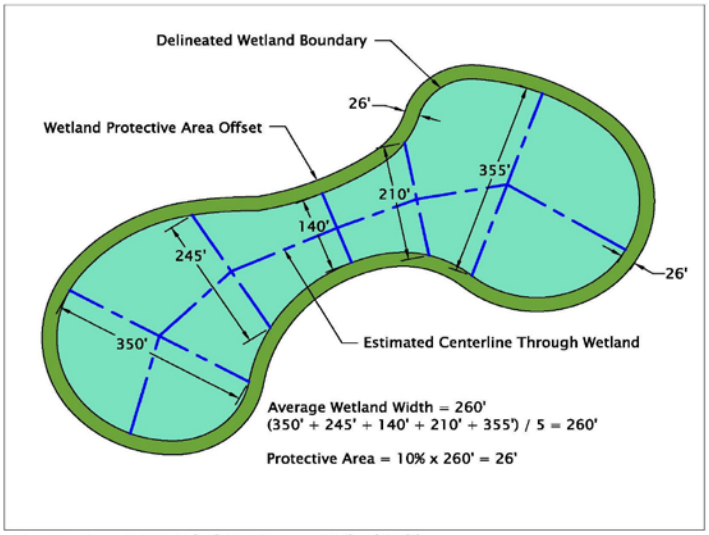


Figure 4: NR 151.125 Calculating Average Wetland Width

Source: DNR guidance document *Guidance for the Establishment of Protective Areas for Wetlands in Runoff Management Rules, Wisconsin Administrative Code NR 151*

Design clarifications.

Adjacent property owners- If a stream or channel is placed or relocated along a property line, an easement or letter of permission is required from any property owners impacted by the protective area's new location. Also, if a stormwater facility or structure is proposed within an on-site stream or channel, 100-year flood elevations shall be evaluated to determine if off-site property owners are impacted by backwater or a flood elevation

increase. An easement or letter of permission is required from any property owners impacted by the backwater.

Wetland delineations- Wetland delineations shall be performed by a DNR assured wetland delineator, professional soil scientist, professional hydrologist or other qualified individual approved by the administering authority. Delineations made by someone other than an assured delineator must receive DNR concurrence. The individual performing the delineation shall classify the wetland as a less susceptible wetland, highly susceptible wetland, other wetland, exceptional resource water or outstanding resource water.

Disturbances- Protective areas may be disturbed as part of a project, if necessary. Disturbed areas must be stabilized from erosion and restored with a self-sustaining vegetation.

Protective area vegetation- It is recommended that seeding of non-invasive vegetative cover be used in the protective areas. Vegetation that is flood and drought tolerant and can provide long-term bank stability because an extensive root system is preferable. 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".

Best management practices-

- BMPs may be located in protective areas (pond, swales, etc.)
- Other state and local regulations may apply to BMPs located in protective areas and waters of the state, including the following:
  - Navigation, dams and bridges (Ch. 30 and C 31, Wis. Stats.)
  - Wetland water quality standards (Ch. NR 103)
  - Wetlands (US Army Corps of Engineers, Section 404 regulations)
  - Shoreland management (Ch. NR 115, Ch. NR 117 and local regulations)
  - Floodplain management (Ch. NR 116 and local regulations)
- For purposes of § 325-22.C.(4)(e)[4] of the code, a vegetated protective area to filter runoff pollutants from post-construction sites is not necessary, since runoff is not entering the surface water at that location. Other practices necessary to meet the requirements of this section, such as a swale or basin, will need to be designed and implemented to reduce runoff pollutants before the runoff enters a surface water of the state.

(5) *Fueling and vehicle maintenance areas.*

All post-construction sites are required to meet the code's "no visible petroleum sheen" performance standard.

Design clarifications.

The following BMPs are recommended to meet the performance standards contained within § 325-22.C.(5) of the code:

- Enclose vehicle maintenance areas in a building or under a roof.
- Install a roof or canopy over fueling areas.
- Divert runoff away from fueling and vehicle maintenance areas.
- Keep adsorbent spill cleanup materials on-site at all times.
- Install an oil/water separator and/or biofiltration device.
- Install absorbent socks in catch basins, manholes or storm sewers downstream of

areas receiving runoff from fueling and vehicle maintenance areas.

- Post the spill response phone numbers in conspicuous on-site locations. The City of Fond du Lac illicit discharge and connection ordinance requires reporting of hazardous spills. The city's spill response phone number is 911 and the DNR's 24-hour spill response phone number is 1-800-943-0003.

(6) *Swale treatment for transportation facilities.*

Post-construction sites with 20,000 sq. ft. or more of impervious surface disturbance, post-construction sites with 1-acre or more of land disturbance, and sites located within a watershed subject to a TMDL or targeted performance standard are required to meet the code's numeric performance standards. All other post-construction sites are not required to meet these numeric performance standards. BMP design guidance is provided below in § 325-22.C.(8) for sites with less than 20,000 sq. ft. of impervious surface disturbance.

Design clarifications.

For purposes of § 325-22.C.(6)(a)[1] of the code, it is preferred that tall and dense vegetation be maintained within the swale due to its greater effectiveness at enhancing runoff pollutant removal; however, the city may have ordinances or other design criteria which dictate the allowable mowing height for grass swales.

For purposes of § 325-22.C.(6)(a)[2] of the code, check dams may be included in the swale design to slow runoff flows and improve pollutant removal. Transportation facilities with continuous features such as curb and gutter, sidewalks or parking lanes do not comply with the design requirements of § 325-22.C.(6)(a)[2] of the code; however, a limited amount of structural measures such as curb and gutter may be allowed as necessary to account for other concerns such as human safety or resource protection. Transportation facility swales are not required to comply with the pre-treatment and infiltration sections of Technical Standard 1005 (Vegetated Swale).

For purposes of § 325-22.C.(6)(b) of the code, the DNR's regional stormwater staff can determine if additional BMPs, beyond a water quality swale, are needed.

(7) *Exemptions.*

Projects that consist of only the construction of bicycle paths or pedestrian trails generally meet the exception found under § 325-22.C.(7)(b)[1] of the code as these facilities have minimal connected imperviousness.

(8) *Sites with less than 20,000 sq. ft. of impervious surface disturbance.*

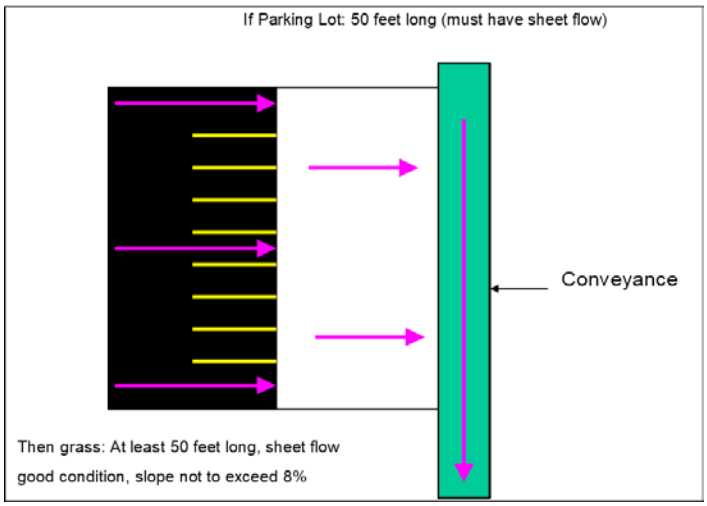
Pursuant to § 325-22.G. of the code, the city may establish stormwater management requirements that are more stringent than those set forth in this section, if the city determines that an added level of protection is needed.

Design clarifications.

For a post-construction site with less than 20,000 sq. ft. of impervious surface disturbance, the applicant shall comply with the protective area requirements in § 325-22.C.(4) of the code, the petroleum sheen requirements in § 325-22.C.(5) of the code, and one of the two

requirements provided below. It is recommended that the developer and designer contact the city early in the design process to discuss which requirement must be complied with:

1. Disconnect impervious surfaces. 90% or more of disturbed impervious surfaces must be disconnected. In order to consider an impervious surface as "disconnected", the following criteria shall be met:
   - The flow lengths shall not extend into vegetated swales, filter strips, areas of concentrated flow, or other stormwater treatment devices.
   - Rooftops from one- and two- family residential dwellings.
     - Discharge runoff over a minimum 20-foot long pervious surface that is in good condition.
   - Other impervious surfaces.
     - The source area flow length may not exceed 75-feet.
     - The pervious area must be covered with a self-sustaining vegetation in good condition and at a slope not exceeding 8%.
     - The pervious area flow length must be at least as long as the contributing impervious area flow length and there can be no additional runoff flowing into the pervious area other than the source area.
     - The pervious area must receive runoff in a sheet flow manner across an impervious area with a pervious width at least as wide as the contributing impervious source area.



Source: DNR guidance document *Modeling Post-Construction Storm Water Management Treatment*

2. Use the following best management practices and good housekeeping practices to reduce peak flow rates, improve water quality and encourage infiltration:

   - Vehicle and equipment maintenance shall be performed inside buildings, when feasible. Used fluids/batteries shall be stored and disposed of properly. Repair any vehicle leaks as soon as possible.

   - Outdoor trash bins are required for fast food restaurants, convenience stores and gas stations. Litter shall be cleaned up daily and disposed of properly.

   - Fertilizers shall be used sparingly for lawn areas. Fertilizers shall be immediately swept off streets, parking lots, driveways and sidewalks. Soil testing and compliance

with DNR Technical Standard 1100 (Turf Nutrient Management) is also encouraged.

- Stream, shoreline, swale and other erosion problems shall be repaired as part of the development project, when feasible.

- Roof downspouts, parking lots, driveways and sidewalks shall discharge stormwater runoff to lawn or other pervious areas, when feasible. Rain barrels are also encouraged at roof downspouts to store water for irrigation and watering landscaped areas (reduces municipal water invoice).

- Create depressions in lawn areas and other landscape areas to temporarily store and treat stormwater runoff from roofs, parking lots, driveways and sidewalks, when feasible. Grass swales, biofiltration devices, bioretention devices and rain gardens are also encouraged, when feasible.

- Filter baskets shall be installed in parking lot catch basins, when feasible.

- Preserve wooded areas, trees, shrubs and other native vegetation that are in good condition, when feasible.

(9) *Other design requirements.*

- Topographic surveys and plans shall be on NAVD88 vertical datum and in Fond du Lac County coordinates. Any historic data on different datum (i.e. floodplain mapping, etc.) shall be adjusted to NAVD88.

- The minimum surface slopes allowed are as follows:
  - 1% (1-foot per 100-feet) on grass areas.
  - 0.5% (6-inches per 100-feet) on asphalt areas.
  - 0.4% (4 ¾-inches per 100-feet) on concrete areas.

- Storm sewers, culverts, catch basins, manholes, and inlets which will be owned by the City of Fond du Lac, or within City of Fond du Lac right-of-way, property, or easements shall be constructed in accordance with the current edition of the City of Fond du Lac *Standard Specifications for Public Works Construction* and standard detail drawings.

- Storm sewers in new developments shall be designed for a 10-year design storm. Contact the city to discuss storm sewer design standards when discharging to existing city MS4. A copy of storm sewer design calculations, time of concentration paths, tailwater conditions and watershed maps shall be submitted.

- Incorporate tailwater conditions in storm sewer sizing calculations if the outfall does not have a free discharge at waterways, ponds, or other locations for the 10-year design storm. Provide adequate capacity to convey runoff for the 10-year design storm in storm sewers. The hydraulic grade line shall be below the rim elevation of all structures during the 100-year design storm.

- Culverts shall be designed for a 25-, 50- or 100-year design storm, depending on location. Contact the city for more specific design guidance. A copy of culvert design calculations, time of concentration paths, tailwater conditions, and watershed maps shall be submitted.

- Overland flow paths shall be designed for a 100-year design storm. Flow paths shall be provided for street low points and other depressions. The location of overland flow paths shall be shown on the plans. The maximum depth of ponding in street low points shall be 9-inches. The 9-inch depth is measured at the street centerline.

- Finished ground elevations shall be provided for buildings. The minimum finished ground elevation shall be one foot or more above the regional flood elevation and extend at least 15-feet beyond the building. The elevation of the lowest floor, excluding the basement or crawlway, shall be two-feet or more above the regional flood elevation. Minimum elevations may need to be specified for lakes, rivers, streams, ponds and overland flow paths. Additional floodplain regulations can be found in Ch. 690 of the code.

- Proposed grades shall be shown at lot corners, grade breaks, swales, berms, around the foundation of proposed structures and anywhere around the structure that the grade changes (e.g. fully or partially exposed foundation walls). Provide details of swales or berms as necessary.

- Drainage plan details shall demonstrate that property drainage is managed on-site and that the drainage plan will not create a problem for neighboring lands. A suitable drainage plan shall show existing and proposed site grades, existing vegetative cover, drainage patterns and significant land features and buildings.

- Comply with the following requirements for grading of subdivisions:
  - Provide a master grading plan as specified in § 705-33.
  - Perform mass grading of the site when street and utilities are constructed.
    - Construct grades along the right-of-way or within utility easements to final grade.
    - Construct backyard or side yard swales to final grade.
    - Construct grades at other locations along lot lines to within 3 inches of final grade.
    - Construct grades within lots to within 3 inches of final grade or as approved by the city. All grading shall be performed to provide positive drainage at all areas throughout the development.
  - Provide an individual lot grading plan as specified in § 705-33 when each lot is developed.

- A letter of permission may be required from downslope property owners if a post-development “point discharge” was “sheet flow” during the pre-development condition.

- The applicant may request a waiver or lesser design standard if site characteristics create a hardship.

Maximum Permissible Velocities for Channels			
Channel Cover	**Slope Range %**	**Erosion-resistant soils**	**Easily eroded soils**
Bermuda grass	0-5	8 fps	6 fps
	5-10	7 fps	5 fps
	>10	6 fps	4 fps
Buffalo grass, Kentucky bluegrass, Smooth brome, blue grama	0-5	7 fps	5 fps
	5-10	6 fps	4 fps
	>10	5 fps	3 fps
Grass mixture	0-5	5 fps	4 fps
	5-10	4 fps	3 fps
	Do not use on slopes steeper than 10%, except for side slopes in a combination channel.		
Lespedeza sericea, weeping love grass Ischaemum (yellow bluestem), kudzu, alfalfa, crabgrass	0-5	3.5 fps	2.5 fps
	Do not use on slopes steeper than 5%, except for side slopes in a combination channel.		
Annuals – used on mild slopes or as temporary protection until permanent covers are established, common lespedeza, Sudan grass	0-5	3.5 fps	2.5 fps
	Use on slopes steeper than 5% is not recommended.		

Source – Chow Open Channel Hydraulics

D. General considerations for on-site and off-site stormwater management measures.

All proposed land development activities should be planned, designed and implemented as follows:

- In a manner that best fits the terrain of the site, avoiding steep slopes and other environmentally sensitive areas.
- According to the unique resource conditions at, around, and downstream from a given site.
- According to the principles of low impact development. Use source controls rather than end-of-pipe treatment. Reduce, prevent and mitigate the adverse impacts of development by maintaining infiltration, reducing frequency and volume of discharges, reducing peak flows, and maintaining groundwater recharge. These goals can be accomplished by using:
  - Reduced impervious surfaces.
  - Functional grading to slow runoff and thereby lengthen the time of concentration.
  - Vegetated channels rather than paving or pipes.
  - Disconnection of impervious surfaces; drain to vegetated areas.
  - Bioretention (rain gardens, etc.) and infiltration (buffers, etc.) landscape areas.
  - Any other techniques that reduce the runoff curve number or increase the time of concentration.
  - Use wet detention basins after all source area practices and techniques have been employed.

  Overall, the goal is to design the site as an integral, living part of the environment with careful use of principles and practices that are both low-impact on runoff and simple for

people to maintain and live with.

- To maintain groundwater recharge areas and the infiltration capacity of native soils by avoiding the unnecessary filling of large, natural depressions or compaction of upper soil horizons by construction equipment.
- To maintain soil infiltration by keeping all topsoil on-site.
- To provide the protective area, shoreland, wetland and environmentally sensitive area setback along all water courses.
- According to the sequence in the "treatment train":
  - First, do source controls:
    - Reduce impervious areas to maximum extent possible.
    - Maintain undisturbed soil.
    - Maintain existing trees, shrubs and vegetation.
  - Next, do lot controls:
    - Grade lots to create long areas of overland flow rather than channels.
    - Minimize directly connected impervious areas by such practices as directing roof water to vegetated areas and draining driveways to grass rather than the street.
    - Include "rain gardens" (undrained areas that will pond water).
  - Then, do site controls:
    - Use grassed waterways and diversions rather than paved channels.
    - Maintain wetlands.
    - Use vegetated roadside ditches rather than curb and gutter.
    - Use wet detention basins. They can have pools five or more feet deep or may be designed as wetlands, but existing wetlands cannot be incorporated into stormwater facilities.
    - Use off-line detention basins.
  - Finally, do regional controls such as regional detention basins.

Area trading- BMPs may be designed to treat runoff from existing developed areas in lieu of new development, redevelopment or routine maintenance areas with the approval of the administering authority. The following conditions shall be met:

- The performance standards for water quality and peak discharge shall be met at each outfall.
- Existing developed areas have not previously been required to meet post-construction performance standards.
- Existing developed areas may not be double counted to meet both current and future post-construction performance standards.
- A letter of permission or recorded agreement may be required from off-site property owners. The letter of permission shall include acknowledgement that the off-site area is being used to meet post-construction performance standards and indicate how this will impact future redevelopment and routine maintenance of the off-site areas.

Phased developments- Consider sizing/designing/building BMPs for future development phases during initial planning efforts.

E. BMP location and credit.

When using the regional treatment option, a letter is required from the owner of the regional facility. At a minimum, the letter shall state the following:

- Regional facility complies with code requirements.
- Site can use regional facility for code compliance.
- Maintenance agreement for regional facility has been recorded at the Fond du Lac

County Register of Deeds Office.

Regional pond fee- Sites may be eligible to use a city-owned regional pond to meet the water quality performance standards for the site. Contact the city to determine if the site is within the drainage basin of a regional pond. Provide calculations showing the required pollutant reduction for the site. The pond fee is $35,000/ton of required TSS reduction.

Use the following method to calculate the required TSS reduction for sites that have previously paid regional pond fees and will be redeveloped.

- Classify the site into areas of new development after September 10, 2008, areas of proposed redevelopment, and routine maintenance areas. Further split the redevelopment areas into areas that have previously been redeveloped after September 10, 2008 and areas that have not been previously redeveloped. Areas of new development that are redeveloped later are considered new development for calculation purposes and an 80% TSS reduction is required. Provide a site map that shows each of the areas and the proposed land uses.
- Calculate the required site TSS reduction as follows:
  - Step 1: Calculate the TSS load in lbs. from new development areas. An 80% TSS reduction is required.
  - Step 2: Calculate the TSS load in lbs. from redevelopment areas that have not been previously redeveloped. A 40% TSS reduction is required.
  - Step 3: Calculate the TSS load in lbs. from the existing conditions of the redevelopment areas that have been previously redeveloped.
  - Step 4: Calculate the TSS load in lbs. from the proposed conditions of the redevelopment areas that have been previously redeveloped.
  - Step 5: If the TSS load in step 4 is greater than step 3, then take the difference and multiply by 0.4 to get the required TSS reduction. If the TSS load in step 3 is greater than step 4, no additional reduction is required.
  - Step 6: Calculate the TSS load in lbs. from routine maintenance areas with five acres or more of disturbance. A 40% TSS reduction is required.
  - Step 7: Calculate the required TSS reduction for the site by summing the results of steps 1, 2, 5, and 6.

F. Targeted performance standards.

G. Alternate requirements.

H. Agricultural production areas.

Agricultural production areas generally have large areas of impervious surfaces and are subject to large increases in impervious surfaces as farms expand; however, many agricultural production areas have practices that capture and/or attenuate peak flows even though they are not typical stormwater management facilities. This section explains situations where credit can be given to those practices.

- The plan and performance standards for sites with new impervious surfaces or cumulative addition of impervious surfaces, since September 10, 2008, are as follows:
  - < 20,000 sq. ft. impervious surface- Drainage plan, assessment of off-site impacts, and written explanation of mitigation.
  - ≥ 20,000 sq. ft. impervious surface- Engineered drainage plan meeting the requirements of §§ 325-22.C.(2) and 325-23.
- Source areas that contribute to increases in peak flow rates:

- Feed storage
- Roofs
- Driveways
- Barnyards
- Existing impervious surfaces
- Calf housing/feeding areas
- Contributing area to waste storage area (calf housing, sand storage, etc.)

Note: Crushed gravel, lime screening, paved surfaces and compacted soil are considered impervious.

- BMPs for source areas that commonly capture or mitigate stormwater runoff:

	Source Areas			
	Feed storage areas	**Existing impervious surfaces**	**Barnyards**	**Driveways**
BMPs	Pond	Pond	Pond	Pond
	Collection system (waste storage)	Collection system (waste storage)	Collection system (waste storage)	
	VTA	VTA	VTA	
	Swale	Swale		Swale
	Infiltration trench	Infiltration trench		Infiltration trench
	Ground gutter	Ground gutter		Ground gutter
	Roof			
			Sediment basin	

Note: Swales, infiltration trenches and ponds are not permitted BMPs from some surfaces (barnyards, feed storage, etc.) due to potential pollutant loading/significant discharge. Also see infiltration source area prohibitions and exemptions in the code.

- Prescriptive scenarios

  Some agricultural production areas will not be at risk of discharging pollutants or high peak flows to surface waters due to their distance to any susceptible water body. If a site meets the following scenarios, it may be considered to meet the § 325-22 performance standards:
  - Impervious areas < 20,000 sq. ft.
  - Runoff flows onto a buffer, cropland or woodland
    - 100-feet of overland flow, or
    - 1,000-feet of channelized flow, or
    - Pro-rated combination of the above.
  - A farm owns at least 35-acres of contiguous undeveloped land in the same drainage basin.
  - Impervious surface is at least 300-feet from a navigable stream or wetland.
  - Impervious surface is at least 1000-feet from a lake, pond or direct conduit to groundwater.
- Prescriptive source areas

  On agricultural sites, some impervious surfaces drain to BMPs where they are treated or stored instead of running off of the site. In those situations, credit may be given to the area that discharges to a BMP.
  - Waste storage facilities
    - For impervious areas located partially or entirely within the drainage basin of a waste storage facility, the surface area of the waste storage facility and contributing areas is considered to meet § 325-22 performance standards.

- Barnyard
  - All barnyard areas drain to a waste storage facility that meets USDA/NRCS standards.
- Feed storage
  - The portion of runoff from feed storage areas that is not leachate nor first flush that goes to a waste storage facility meeting USDA/NRCS standards is considered to meet § 325-22 performance standards.
  - The portion of runoff from feed storage areas that goes to a NRCS 635 compliant VTA for treatment in accordance with NRCS 629 Waste Treatment is considered to meet § 325-22 performance standards.
  - Other areas shall meet § 325-22 performance standards.
- Agricultural buildings
  - Ground gutters/french drains
- Existing space between barns

§ 325-23. Permitting requirements, procedures and fees.

A. Permit required.

B. Permit application and fees.

C. Review and approval of permit application.

Meetings between the permit applicant, designer, and plan reviewer are encouraged during the pre-design, design, and plan review process. The meetings are used to educate each other about regulatory requirements, environmentally sensitive areas, and design challenges. The number of meetings held is typically commensurate with the size and complexity of the project. Meetings can be face-to-face or via telephone.

One copy of the grading, erosion control and stormwater management plans are required for the initial submittal, each certified, signed and sealed as noted below along with a copy of any supporting calculations, copies of permits, etc. Provide the plans and supporting documents in the PDF file format or other approved electronic file format. Plans, along with a completed erosion control and stormwater management permit application and appropriate review fee, shall be submitted to the City of Fond du Lac Engineering Division, 4th floor of the City/County building located at 160 S. Macy Street, Fond du Lac, WI. Provide four copies of the approved plans along with the plans and supporting documents in the PDF file format or other approved electronic file format.

Site plan review is required for commercial, industrial, institutional and/or educational development, single family condominiums, multifamily development, and for other uses and development as specified by the City of Fond du Lac Zoning Code. A site plan is required for the first-time development of a property, for additions to existing buildings and other new construction and site modifications, and for parking lots and parking lot expansions. Relative to the scope of a project, such as a proposal for a minor building addition or small parking lot, a site plan may be eligible for administrative review by Planning and Engineering to streamline the process. Approval of a site plan is a prerequisite for the issuance of a building permit. Site plan review requirements can be obtained from the City of Fond du Lac Planning Division.

D. Permit requirements.

Post-construction sites where permanent stormwater BMPs will be installed or modified to meet the requirements of § 325-22 are required to have as-built drawings. As-built drawings shall be signed by a licensed professional engineer. Agricultural land uses, unless they are exceptionally large or special in some other way, are not required to have as-built drawings. Typically, agricultural land uses will not need anything more than review and acceptance by the administering authority.

Post-construction sites using off-site or regional BMPs and sites with existing on-site BMPs are required to have as-built drawings whenever as-built drawings have not been previously approved by the city.

Post-construction sites with less than 20,000 sq. ft. of impervious surface disturbance since September 10, 2008 are not typically required to have as-built drawings. Typically, sites with less than 20,000 sq. ft. of impervious surface disturbance will not need anything more than review and acceptance by the city.

Submit an annual inspection and maintenance report to the City Engineer meeting the operation and maintenance plan requirements in § 325-24.A.

E. Permit conditions.

F. Permit duration.

G. Alternate requirements.

§ 325-24. Stormwater management plan.

A. Plan requirements.

Stormwater management plan.

The stormwater management plan for post-construction sites with 20,000 sq. ft. or more of impervious surface disturbance since September 10, 2008, post-construction sites with 1-acre or more of land disturbance, and sites located within a watershed subject to a TMDL or targeted performance standard shall contain, at a minimum, the following information:

(1) Name, mailing address, e-mail address, and telephone number for the following, or their designees:
- Owner.
- Developer.
- Project engineer for practice design and certification.
- Persons responsible for installation of stormwater management practices.
- Persons responsible for maintenance of stormwater management practices, prior to the transfer, if any, of the maintenance responsibility to another party.

(2) A proper legal description of the property proposed to be developed, referenced to the U.S. Public Land Survey System, to block and lot numbers within a recorded land subdivision plat, or certified survey map.

(3) Pre-development site conditions, including all of the following:
- One or more site maps, at a scale of not less than 1-inch equals 100-feet. The site maps shall show all of the following information:

- Site location and legal property description.
- Predominant soil types and hydrologic soil groups.
- Existing cover type and condition.
- One-foot topographic contours of the site.
- Topography and drainage network, obtained by field observation, including enough of the contiguous properties to show runoff patterns onto, through and from the site. The existing elevations, shall include, at a minimum, a sufficiently tight grid pattern of elevations, existing grades at lot corners, at grade breaks, adjacent top of curbs, ground elevations at on-site and adjacent structure foundations, and elevations at least 25-feet outside the parcel along side and rear lot lines.
- Watercourses that may affect or are affected by runoff from the site.
- Flow path and direction for all stormwater conveyance sections.
- Watershed boundaries used in hydrology determinations to show compliance with performance standards.
- Lakes, streams, wetlands, channels, ditches and other watercourses on and immediately adjacent to the site.
- Limits of the 100-year floodplain.
- Location of wells and wellhead protection areas covering the project area and delineated pursuant to § NR 811.12.

- Hydrology and pollutant loading computations as needed to show compliance with performance standards. All major assumptions used in developing input parameters shall be clearly stated. The geographic areas used in making the calculations shall be clearly cross-referenced to the required maps.

(4) Post-development site conditions, including all of the following:

- Explanation of the provisions to preserve and use natural topography and land cover features to minimize changes in peak flow runoff rates and volumes to surface waters and wetlands.
- Explanation of any restrictions on stormwater management measures in the development area imposed by wellhead protection plans and ordinances.
  - Stormwater infiltration systems and ponds shall be located at least 400-feet from a well serving a community water system unless the DNR and city concur that a lesser separation distance would provide adequate protection of a well from contamination.
  - Stormwater management practices shall be located with a minimum separation distance from any well serving a non-community or private water system as listed within § NR 812.08.
- One or more site maps, at a scale of not less than 1-inch equals 100-feet and at the same scale as the pre-development map, showing all of the following:
  - Post-construction pervious areas including vegetative cover type and condition.
  - Impervious surfaces including all buildings, structures and pavement.
  - Post-construction one-foot topographic contours of the site.
  - Post-construction drainage network including enough of the contiguous properties to show runoff patterns onto, through and from the site.
  - Locations and dimensions of drainage easements.
  - Locations of maintenance easements specified in the maintenance agreement.
  - Flow path and direction for all stormwater conveyance sections.
  - Location and type of all stormwater management conveyance and treatment practices, including the on-site and off-site tributary drainage area.
  - Location and type of conveyance system that will carry runoff from the drainage and treatment practices to the nearest adequate outlet such as a curbed street, storm drain or natural drainage way.

  - Watershed boundaries used in hydrology and pollutant loading calculations and any changes to lakes, streams, wetlands, channels, ditches and other watercourses on and immediately adjacent to the site.
- Hydrology and pollutant loading computations as needed to show compliance with performance standards. The computations shall be made for each discharge point in the development and the geographic areas used in making the calculations shall be clearly cross-referenced to the required maps.
- Results of investigations of soils and groundwater required for the placement and design of stormwater management measures. When permanent infiltration systems are used, appropriate on-site testing shall be conducted to determine if seasonal groundwater elevation or top of bedrock is within 5-feet of the proposed infiltration system. Detailed drawings including cross-sections and profiles of all permanent stormwater conveyance and treatment practices.

(5) A description and installation schedule for the stormwater management practices needed to meet the performance standards in § 325-22.
(6) Cost estimates for the construction, operation and maintenance of each stormwater management practice. The cost estimate shall include proposed quantities and an estimated unit price for each of the required BMPs as appropriate.
(7) Other information requested in writing by the city to determine compliance of the proposed stormwater management measures with the provisions of the code.
(8) All site investigations, plans, designs, computations and drawings shall be certified by a licensed professional engineer to be prepared in accordance with accepted engineering practice and requirements of the code.

Operation and maintenance plan.

An operation and maintenance plan shall be developed for the life of each stormwater management practice and include the required maintenance activities and maintenance activity schedule. The operation and maintenance plan shall be provided with the stormwater management plan and shall contain, at a minimum, all of the following information:

(1) The name and address of the site.
(2) Identification of the responsible party for operation, maintenance, and documentation of the plan.
(3) A description of the type and general design features of all stormwater management practices used to meet the site performance standards. Include the design purpose (peak flow control, sediment reduction, infiltration, etc.) and how the practice achieves the design purpose.
(4) A scaled map showing the location of all existing and proposed stormwater management practices and protective areas on the site in relation to surrounding identifiable features, including the nearest public road. Access to the stormwater management practices for maintenance vehicles and activities shall be shown.
(5) A description of routine inspection and maintenance requirements. All applicable requirements in the DNR technical standards shall be addressed. At a minimum the following items shall be addressed if applicable to the site:
    - Wet detention ponds
        - Site access to pond, forebay, safety shelf, inflow points, and outlet structures.
        - Outlet structure integrity such as joints and cracks in concrete.
        - Clogging of pipes, outlet structures, orifices, and trash racks.
        - Debris and trash removal.

  - Vegetation maintenance including woody vegetation, native and wetland plantings, and invasive species.
  - Safety shelf.
  - Settlement, cracking, heaving, or erosion of side slopes and embankments.
  - Embankment maintenance and height.
  - Scour protection at inflow points and the pond outlet pipe including riprap, stilling basins, and level spreaders.
  - Emergency spillway.
  - Seepage through liner, embankments, or around pipes.
  - Flap gates or backflow preventers.
  - Removal of accumulated sediment. Removal shall comply with Ch. NR 528.
  - Weed or algae growth and removal.
  - Insect and wildlife control and repairing burrows.
  - Pond liners.
  - Aerators and fountains. No aerators or fountains are allowed without approval.
- Dry detention ponds
  - Site access to pond, inflow points, and outlet structures.
  - Outlet structure integrity such as joints and cracks in concrete.
  - Clogging of pipes, outlet structures, orifices, and trash racks.
  - Debris and trash removal.
  - Vegetation maintenance including woody vegetation, native plantings, and invasive species.
  - Settlement, cracking, heaving, or erosion of side slopes and embankments.
  - Embankment maintenance and height.
  - Scour protection at inflow points and the pond outlet pipe including riprap, stilling basins, and level spreaders.
  - Emergency spillway.
  - Seepage through embankments or around pipes.
  - Flap gates or backflow preventers.
  - Removal of accumulated sediment. Removal shall comply with Ch. NR 528. Note requirements in the local modifications to technical standards section.
  - Insect and wildlife control and repairing burrows.
- Underground detention
  - Site access to structure.
  - Outlet structure integrity such as joints and cracks in concrete.
  - Clogging of pipes, outlet structures, orifices, and trash racks.
  - Debris and trash removal.
  - Scour protection at the pond outlet pipe including riprap, stilling basins, and level spreaders.
  - Flap gates or backflow preventers.
  - Removal of accumulated sediment including depth of sediment accumulation when removal is required consistent with the stormwater management plan. Removal shall comply with Ch. NR 528.
  - Confined space requirements.
- Infiltration basins
  - Site access to basin and outlet structures.
  - Vegetation establishment and maintenance including woody vegetation, native plantings, and invasive species.
  - Pretreatment devices.
  - Level spreaders.
  - Outlet structures.

  - Drawdown devices.
  - Embankments.
  - Emergency spillway.
  - Restoration procedures.
  - Debris and trash removal.
  - Winter maintenance.
- Bioretention devices and biofilters
  - Site access to basin and outlet structures.
  - Vegetation establishment and maintenance including woody vegetation, native plantings, and invasive species.
  - Pretreatment devices.
  - Surface mulch layer.
  - Sediment build up and clogging.
  - Removal of accumulated sediment. Removal shall comply with Ch. NR 528.
  - Erosion.
  - Clean-outs and observation wells.
  - Outlet structures.
  - Engineered soil replacement.
  - Restoration procedures.
  - Debris and trash removal.
  - Winter maintenance.
- Grass swales and filter strips
  - Vegetation maintenance including woody vegetation, native plantings, and invasive species.
  - Fertilizer and pesticide usage.
  - Blockage of drainage flows and standing water.
  - Compaction mitigation.
  - Erosion.
  - Animal burrows.
  - Debris and trash removal.
- Settling devices (sumps and hydrodynamic separators), media filters, and oil skimmers
  - Structure integrity such as joints and cracks in concrete.
  - Inspection and cleaning frequency of accumulated sediment.
  - Removal of accumulated sediment and liquids containing petroleum including disposal location and depth of sediment accumulation when removal is required consistent with the stormwater management plan.
  - Manufacturer’s recommendations for maintenance of proprietary devices.
- Infiltration trenches
  - Pretreatment devices.
  - Level spreaders.
  - Inlet erosion.
  - Vegetation maintenance including woody vegetation, native plantings, and invasive species.
  - Observation pipe measurements.
  - Overflow system.
  - Removal of accumulated sediment. Removal shall comply with Ch. NR 528.
  - Restoration procedures.
  - Debris and trash removal.
  - Winter maintenance.
- Permeable pavement

- Pavement surface clogging and cleaning.
- Joint aggregate replenishment.
- Observation wells.
- Winter road maintenance.
- Prohibited activities on pavement surface.

- Rain gardens
  - Vegetation maintenance including woody vegetation, native plantings, and nuisance or invasive species.
  - Erosion.
  - Berms.
  - Soil compaction.
  - Debris and trash removal.
- Fueling and vehicle maintenance areas
  - List and describe structural and non-structural BMPs.

(6) A schedule of required inspections. Inspection frequency shall comply with the following schedules unless noted or approved otherwise:

- All components of the stormwater system shall be inspected at least semiannually in early spring and early autumn, and after major storm events. A rainstorm of one (1) inches or greater within a 24-hour period is considered a major storm.
  - Inspections done to determine the depth of accumulated sediments in wet and dry detention ponds and grass swales may be done once every 10 years.
  - Infiltration basins shall be inspected at least quarterly.
  - Infiltration trenches shall be inspected monthly from April through October during the first year of operation.
  - Permeable pavement shall be inspected at least annually.
  - Rain gardens shall be inspected three times per growing season.
- Inspections shall be performed by a qualified inspector once every three years. A qualified inspector means a landscape architect, professional hydrologist, professional engineer, or other person experienced in stormwater management design, installation and maintenance. The City Engineer shall have the right to reject any inspection report, maintenance report, compliance verification, and other materials involved in demonstrating compliance if the materials do not meet the necessary standards for accuracy and professionalism.
- At the written request of the owner of any stormwater management practice, the City Engineer may grant a temporary waiver for an inspection under this section if the City Engineer determines an inspection is not necessary to determine the condition or maintenance needs of the stormwater management practice. As a condition of granting a temporary inspection waiver, the City Engineer may require the owner to provide access to the site for an inspection by the City Engineer, or may require some basic information to be submitted by the owner, such as digital photographs of the stormwater management practice. Any temporary inspection waiver shall be provided by the City Engineer in writing and shall state the end date of the waiver, which shall not exceed two years.

(7) A minimum inspection checklist provided by the City of Fond du Lac or a site-specific form or checklist to be used to document inspections.

(8) A requirement that the responsible party shall report the results of all inspections and maintenance performed to the City Engineer in a pdf format or other electronic format approved by the City Engineer. Inspection and maintenance reports shall be provided annually, submitted to stormwaterreports@fdl.wi.gov, and shall:

- Provide the site name, site address, stormwater facility name or description, inspector name, inspection date, and weather conditions.

- Provide a condition statement for each item inspected, comparing it to the design and as-built conditions, if available.
- Provide a list of any maintenance activities performed during the inspection, if any.
- Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
- Provide a summary of additional maintenance work recommended to be completed. For each maintenance item, the report shall include a recommended timeline for completion, and recommendations for any additional site investigation, planning or engineering that may be needed, or any applicable technical specifications that may apply to the recommended maintenance work.
- Provide a summary of maintenance activities performed during the reporting year.
- Provide a statement signed and dated by the inspector verifying the information provided in the report is truthful and accurate to the best professional judgement of the inspector.

(9) A schedule of expected maintenance activities.

(10) A requirement that the responsible party complete all maintenance work recommended in the inspection reports or ordered by the City Engineer within a reasonable time frame as set by the City Engineer. All maintenance work shall comply with the applicable technical standards.

(11) A requirement that the responsible party prepare plans and obtain applicable permits if additional plan or permits are required to complete any maintenance activities.

(12) A requirement that the operation and maintenance plan shall be revised whenever the responsible party changes and that the operation and maintenance plan shall be reviewed for any revisions during any inspections by a qualified inspector. All revisions shall be submitted to the City Engineer for review and approval.

B. Alternate requirements.

§ 325-25. Maintenance agreement.

A. Maintenance agreement required.

Post-construction sites where permanent stormwater BMPs will be installed or modified to meet the requirements of § 325-22 are required to have a maintenance agreement. The applicant shall use the city's standard forms for the maintenance agreement. The city is responsible for recording the signed maintenance agreement at the Fond du Lac County Register of Deeds Office.

Sites with an existing maintenance agreement may be required to provide a new maintenance agreement if the requirements of § 325-25 are not fully met with the existing maintenance agreement.

Post-construction sites with less than 20,000 sq. ft. of impervious surface disturbance since September 10, 2008 are not typically required to have a maintenance agreement.

Sites utilizing the regional treatment option are not typically required to have a maintenance agreement; however, a maintenance agreement is required for the regional facility.

B. Agreement provisions.

C. Alternate requirements.

§ 325-26. Financial guarantee.

A. Establishment of the guarantee.

Post-construction sites where permanent stormwater BMPs will be installed or modified to meet the requirements of § 325-22 are required to have a financial guarantee. The financial guarantee includes the cost associated with stormwater BMPs, as-built drawings, project administration and contingencies. Financial guarantees shall be a cash escrow or irrevocable letter of credit unless approved otherwise.

Post-construction sites with less than 20,000 sq. ft. of impervious surface disturbance since September 10, 2008, sites using off-site or regional BMPs, and sites with existing on-site BMPs meeting the requirements of §§ 325-23, 325-24, and 325-25 are not typically required to have a financial guarantee.

B. Conditions for release.

The financial guarantee shall not be released until the applicant conducts a final inspection with a municipal representative, submits "as-built" drawings certified by a licensed professional engineer, completes punch list items and pays applicable fees.

C. Alternate requirements.

§ 325-27. Enforcement; violations and penalties.

§ 325-28. Reserved.

§ 325-29. Reserved.

Subdivision of Land

§ 705-33. Master drainage plan.

Master drainage plans for the subdivision of land shall meet the design standards in § 325-22.C.(2), § 325-22.C.(4), and § 325-22.C.(9) of the Reference Guide.

The master drainage plan shall bear the signature and certification of a professional engineer, professional land surveyor, or architect as described in Chapter A-E of the Wis. Adm. Code and required by the Department of Safety and Professional Services, shall be at a scale not greater than 100-feet per inch and at a contour interval not to exceed one-feet and include the following items:

(1) Provide a legend sufficient to convey the meaning of all lines, symbols, and abbreviations. Proposed information shall be shown differently from existing information.
(2) Show graphic scale and properly oriented north arrow.
(3) Property and right-of-way lines including dimensions and right-of-way widths, as well as interior lot numbers and dimensions.
(4) Existing and proposed public and private easements for utility, drainage, or other purposes.
(5) Existing and proposed improvements and features for the site and adjacent to the property including pavements, curb and gutter, sidewalks, and approximate location and size of future

buildings.

(6) Benchmarks used for the site. All elevations on the plans shall correspond to the NAVD88 datum.

(7) Existing topography, vegetative cover, natural and engineered drainage systems, roads, and surface waters. Lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site shall be shown. Any identified 100−year flood plains, flood fringes, and floodways shall also be shown.

(8) Location and width of all existing and proposed protective areas required by § 325-22.C.(4). When protective areas are shown on the plan, provide a note explaining the definition, purpose and requirements of protective areas.

(9) Proposed finished ground elevations of buildings.

(10) Proposed contours and grades at lot corners, grade breaks, swales, berms, around the foundation of proposed structures and anywhere around the structure that the grade changes (e.g. fully or partially exposed foundation walls). Proposed contours and grades shall match the approved grades at all adjacent sites with master grading plan or site plan approvals. Provide details of swales or berms as necessary.

(11) Emergency overland flow paths from street low points and depressions.

(12) The location of areas, that are outside of the right-of-way, and that are subject to flooding during the 100-year design storm due to storm sewer capacity and/or tailwater conditions. Provide the 100-year flood elevation at each location.

(13) The allowed impervious area for each lot. All areas shall correspond to the peak discharge calculations.

(14) Location and elevation of suspected or documented shallow bedrock, shallow groundwater, and direct conduits to groundwater and the results of all on-site soil profile elevations. Show all BMPs, proposed basement elevations, and setbacks used to reduce basement wetness due to groundwater seepage, surface water runoff, or a combination of both. Show all BMPs used to protect direct conduits to groundwater.

(15) Location and contours of all BMPs installed to meet the requirements of § 325-22.

Provide the City of Fond du Lac with a 24x36-inch size copy of the master grading plan when final approval is granted.

City of Fond du Lac
Engineering Division

Grading, Erosion Control, and Stormwater Management Submittal Requirements

The following items shall be submitted for approval of grading, erosion control, and stormwater management projects:

- Erosion control and stormwater management permit application.
- Permit fee. The permit fee for site plans is listed on the City of Fond du Lac fee schedule as "Non-Residential Drainage/EC/SWM."
- One plan set for review. Four copies of the final approved plans are required.
- Grading/erosion control/stormwater management plan review checklist.
- For sites with one acre or more of land disturbing construction activity.
    - One copy of the sediment performance standard calculations and map.
    - Erosion and sediment control cost estimate including quantities and unit prices.
- For sites subject to stormwater management performance standards.
    - One copy of the stormwater management calculations.
    - Infiltration and groundwater evaluation checklist and documentation.
    - Stormwater management cost estimate including quantities and unit prices.
    - Draft long-term stormwater management maintenance agreement.
    - Draft stormwater management operation and maintenance plan.

Subdivision, Public Street and Public Utility Plan Submittal Requirements

In addition to any relevant grading, erosion control, and stormwater management requirements the following items shall be submitted for projects involving subdivisions, new public streets or public utilities as necessary:

- Master grading plan.
- Street plan, profile and cross sections.
- Utility plans including sanitary sewer, storm sewer, water main, electrical and street lighting, and traffic signals.
- Sanitary sewer extension and water main submittal forms and supporting documentation.
- Typical sections, construction details and standard detail drawings.
- Erosion control and restoration and planting plan.
- Traffic control plan.
- Pavement marking and permanent signing plan.
- Project specifications.
- Estimated quantities.
- Proposed plat or CSM.
- Fees

City of Fond du Lac
Engineering Division
Drainage, Erosion Control and Stormwater Management Permit Application

160 S. Macy Street P.O. Box 150 Fond du Lac, WI 54936-0150
P: (920) 322-3470 F: (920) 322-3471 https://www.fdl.wi.gov/

Print or Type

Applicant / Agent

Name (Organization/Entity)			Authorized Representative	Title
Mailing Address			Phone (include area code)	Fax (include area code)
City	ST	Zip Code	E-mail address	

Owner

Name (Organization/Entity)			Authorized Representative	Title
Mailing Address			Phone (include area code)	Fax (include area code)
City	ST	Zip Code	E-mail address	

Other Contact (e.g. general contractor, developer, surveyor, builder) **Specify:**

Name (Organization/Entity)			Authorized Representative	Title
Mailing Address			Phone (include area code)	Fax (include area code)
City	ST	Zip Code	E-mail address	

Project Start Date _____ Anticipated End Date _____
(includes completed landscaping)

Project Description: _____

Check all that apply

- ☐ New building
- ☐ Building addition
- ☐ Redevelopment
- ☐ Single lot residential
- ☐ Subdivision
- ☐ Utility work
- ☐ New paving
- ☐ Grading/filling
- ☐ Grading/repaving
- ☐ Other:

Site Location _____ Address _____
Parcel Number _____ Municipality _____
Plat/CSM _____ Lot # _____
Section _____ Town _____ Range _____

Land Disturbing Activity:

Total Project Area: _____ Acres (include all parcels)
Total Area to be Disturbed (square feet): _____ Sq. Ft.
Total Impervious Before Activities (square feet): _____ Sq. Ft.
Total Impervious After Activities (square feet): _____ Sq. Ft.
Project Impervious Surface Disturbance (include new and redeveloped impervious surfaces) (square feet): _____ Sq. Ft.

Complete the applicant acknowledgement section and Erosion Control and Stormwater Management Checklist

Acknowledgement Section

Please carefully read the statements below, initial, and provide the required information and signatures.

I have reviewed Chapter 325 of the City of Fond du Lac Municipal Code regarding erosion control and stormwater management and I agree to comply with the requirements of the code and with all applicable federal, state, and local laws and regulations. I further understand that I am responsible for ensuring that all individuals working at this site understand and comply with the requirements of this code.

_____

I understand that the conditions of the permit are minimum requirements and that, upon site inspection, further measures may be required for compliance with the code. I understand that all required erosion control and stormwater management measures shall be installed and maintained as described in the permit plan. I understand that weekly inspections and inspections within 24 hours after a precipitation event of 0.5 inches or greater shall be performed and that inspection reports, along with all approved plans, shall be kept on-site and inspections entered online.

_____

☐ Erosion control / ☐ stormwater management (check all that apply) measures will be completed by:

Organization/Entity _____

Contact Name _____ Phone _____

I agree to notify the City of Fond du Lac Engineering Division prior to commencing any land disturbing activity, and following the installation of any Best Management Practices (BMPs). In addition, I agree to obtain permission in writing from the City of Fond du Lac prior to any modification of the erosion/sediment control plan and/or the stormwater management plan.

_____

I agree to maintain all BMPs and if necessary repair any damage to adjoining lands and/or drainage ways resulting from land disturbing activities at the site until final inspection approval by the City of Fond du Lac.

_____

Stormwater Management projects only

I have submitted a Long-term Stormwater Management Maintenance and Access Agreement for the site to be recorded by the City of Fond du Lac at the Fond du Lac County Register of Deeds and I agree to comply with said agreement. In addition, upon completion of site construction, I will submit accurate final construction documentation (i.e. "as-builts") to the City of Fond du Lac and submit an annual report to the City of Fond du Lac reviewing the condition of the BMP and any maintenance performed during the reporting period.

_____

Stormwater management maintenance will be performed by :

Organization/Entity _____

Contact Name _____ Phone _____

Fiscal Responsibility

I agree to pay all required municipal costs and fees as shown on the City of Fond du Lac Fee Schedule.

_____

The person responsible to pay fees is: _____

Applicant Signature

I hereby certify that I as the Applicant ☐ /Agent ☐ /Other Contact ☐ (check one) I am acting as the responsible party for all work outlined in this application. I certify that the information contained in this form, schedules, and attachments are true and accurate.

Applicant Signature _____ DATE _____

Owner Section **(To Be Valid, Application must be signed by the landowner of the property.)**

I hereby certify that I am the owner of the property which is the subject of this permit application. I understand that failure to comply with any or all of the provisions of the permit may result in a permit revocation, stop work order or forfeiture under the provisions of applicable laws. If the application and plans were not prepared by myself, I certify that I am aware of all the site plan details. I hereby grant the right-of entry for the purpose of inspecting compliance with the erosion/sediment control and stormwater management plans or for performing any work necessary to bring the site into compliance.

Owner Signature _____ DATE _____

City of Fond du Lac
Engineering Division
Grading / Erosion Control / Stormwater Management
Plan Review Checklist

Date Submitted: _____

Name/Site Address: _____ Contact Person: _____

_____

Parcel: _____ Firm: _____
Phone: _____ Email: _____
Property Owner: _____ Applicant: _____
Address: _____ Address: _____

_____ _____

Phone: _____ Fax: _____ Phone: _____ Fax: _____

General Plan Layout

No.	Completed	Identified but Not Complete	Not Applicable	Item
1	☐	☐	☐	Drainage, grading and erosion control plans signed by a Wisconsin licensed professional engineer, professional land surveyor or architect (with graphic scale, legend, north arrow, etc.).
2	☐	☐	☐	Elevation certification stamped and signed by a Wisconsin licensed professional engineer, professional land surveyor or architect: I hereby certify that the elevations shown on this drawing are a true and correct representation of the existing conditions as obtained by field survey on _____, 20_. _____. Name, Registration No.
3	☐	☐	☐	Stormwater calculations signed by a licensed Wisconsin professional engineer.
4	☐	☐	☐	Location map.
5	☐	☐	☐	Owner and engineer contact information is provided.
6	☐	☐	☐	Adjacent and surrounding streets labeled.
7	☐	☐	☐	Benchmark(s) used for the site identified. All elevations on the plans shall correspond to the NAVD88 datum.
8	☐	☐	☐	Property and right-of-way lines shown including project boundary bearings and dimensions.
9	☐	☐	☐	Existing and proposed public and private easements for utility, drainage, or other purposes identified.
10	☐	☐	☐	Existing and proposed improvements/features for the site and adjacent to the property shown (street, curb & gutter, right-of-way widths, sidewalks, existing and proposed utilities, vegetative cover, etc.)
11	☐	☐	☐	Proposed storm sewer and sanitary sewer system information shown on the plans (i.e. rim elevations, invert elevations, pipe sizes, materials, and slopes, lateral locations, etc.)
12	☐	☐	☐	Location and applicable details of pertinent features shown, such as:

No.	Completed	Identified but Not Complete	Not Applicable	Item
				☐ Existing cover types; including tree locations. ☐ Drive approach. ☐ Proposed storm sewer manholes, catch basins, culvert/outlet pipe flared end sections, & drainage swale(s). ☐ Riprap. ☐ Proposed pavement and base course types and thicknesses. ☐ Retaining wall.
13	☐	☐	☐	Existing and proposed contours shown at 1' intervals; spot elevations sufficient to adequately portray drainage patterns on and adjacent to the parcel.
14	☐	☐	☐	Minimum slope requirements met (1% on grass areas, 0.5% on asphalt areas, 0.4% on concrete areas).
15	☐	☐	☐	Delineation of wetlands, floodplain, floodway, protective areas and other water features shown (if applicable).
16	☐	☐	☐	Final stabilization measures proposed for all disturbed areas shown.
17	☐	☐	☐	Flow direction arrows included, clearly indicating the direction of drainage.
18	☐	☐	☐	Percent slope of all drainage swales shown (50' interval spot elev. helpful).
19	☐	☐	☐	Total area of the site and area to be disturbed shown and listed.
20	☐	☐	☐	Depth to groundwater (or bedrock) identified.
21	☐	☐	☐	Permits required and applied for (provide approval):
				☐ WisDOT ☐ WI DNR NOI ☐ WI DNR Chapter 30 ☐ County ☐ Other _____
22	☐	☐	☐	Note on plans: Contractor shall obtain an excavation in the right of way permit from city engineering prior to performing any work within the right of way.
23	☐	☐	☐	Note on plans: Contractor shall obtain a sidewalk permit from city engineering prior to placing any sidewalks within the public right of way.
24	☐	☐	☐	Show parking stall dimensions, aisle widths and handicap stalls. Provide spot elevations at accessible routes, curb ramps, and accessible parking spaces and access aisles.
25	☐	☐	☐	Pavement marking and permanent signing plan.

Erosion Control Plan

No.	Completed	Identified but Not Complete	Not Applicable	Item
26	☐	☐	☐	Erosion and sediment control plan:
				☐ Narrative discussing the site, design, installation, and maintenance of applicable BMPs, inspection guidance, etc.

No.	Completed	Identified but Not Complete	Not Applicable	Item
				☐ Note on plans indicating that the WI DNR Technical Standards shall be followed for the design, installation, and maintenance of all erosion and sediment control BMPs. ☐ Sediment performance standard calculations and map. ☐ Detailed construction sequence provided on the plans with approximate dates for the planned construction activities. Sequence shall discuss the timing of site stabilization. ☐ Construction details provided for all applicable erosion and sediment control, dewatering, and concrete washout BMPs. ☐ Location of trackout control practices. ☐ Location of sediment control BMPs. ☐ Location of required perimeter controls. ☐ Location of anticipated disturbed areas and the required erosion control BMPs. ☐ Location of anticipated fill areas and the required erosion control BMPs. ☐ Location of anticipated soil stockpiles and the required erosion control BMPs. ☐ For large projects, the anticipated phasing is provided. ☐ Fertilizer and seed rates and recommendations for type of planting per growing season. ☐ Notes on plans describing chemicals, cement, and building compounds and materials management.
27	☐	☐	☐	Cost estimate for installation and maintenance of BMPs.

Post-Construction Stormwater Runoff Calculations and Hydrologic Plans

No.	Completed	Identified but Not Complete	Not Applicable	Item
28	☐	☐	☐	Narrative description:
				☐ Site location and description. ☐ Existing and proposed conditions. ☐ Water quality, peak discharge, infiltration, protective area, and fueling and vehicle maintenance area analysis and design for the site. ☐ Summary of calculations and results.
29	☐	☐	☐	Hydrologic maps of the site showing predevelopment and post-development conditions (information shall include but is not limited to):
				☐ Topography of site and adjacent properties. ☐ Watershed and sub-watershed delineations, including delineation of off-site areas tributary to the proposed site. ☐ Soil types and hydrologic soil groups. ☐ Downstream system capacity (ditches or storm sewers).

No.	Completed	Identified but Not Complete	Not Applicable	Item
				☐ Site stormwater discharge location and name of receiving water. ☐ Existing and proposed contours shown at 1' intervals. ☐ Paths chosen for time of concentration (T_c). Indicate sheet, shallow concentrated, and channel flow paths.
30	☐	☐	☐	Hydrologic and hydraulic calculations:
				☐ Average annual rainfall, design storms, and precipitation distribution in accordance with the City of Fond du Lac Code. ☐ Drainage basin areas. ☐ Land use and cover description. ☐ Pre- and post-development runoff curve number calculations (weighted by cover type). ☐ Time of concentration (T_c) calculations. ☐ Peak flow calculations for existing and proposed (and pond outlet, if applicable) for 1, 2, 5, 10, and 100 year storm events. ☐ Hydraulic calculations for proposed storm sewer or ditch design. Local discharge restrictions may apply based on available conveyance capacities.
31	☐	☐	☐	Detention basin design, if applicable (other BMP design information shall be provided instead of for a detention basin, as appropriate):
				☐ Documentation that the detention facility shall safely attenuate peak discharges. ☐ Confirmation that there are no limitations for wells, wellhead protection areas, etc. ☐ Elevation-storage-outflow relationship for each detention basin. ☐ Calculations/computer model analysis of hydrograph routing through the detention facility. ☐ Hydraulic design (including calculations) of outlet structure(s)/pipe(s). ☐ Proposed 100-year ponding elevation identified and labeled (on plans) for each detention basin. ☐ Safely pass runoff in excess of the 100-year post-developed condition flow. Show pond overflow elevation(s) and details. ☐ Cross-section(s) of proposed detention basin. ☐ Documentation to show the BMP(s) to be in accordance with WDNR Technical Standards.
32	☐	☐	☐	Pollutant removal (TSS and TP) and infiltration calculations. Include drainage basin areas and land uses. Or show tributary to regional treatment system.
33	☐	☐	☐	Draft operation and maintenance (O&M) plan and draft long-term maintenance agreement.
34	☐	☐	☐	Cost estimate for construction and maintenance of stormwater management BMPs.

This checklist is intended as a guidance document for preparing private development plans within the community, and is not intended to be all-inclusive. It is intended to address the routine questions that commonly arise during the preparation of development plans. The applicant should review all applicable stormwater management regulations and codes.

City of Fond du Lac
Engineering Division
Infiltration and Groundwater Evaluation Checklist

Site/Project Name: _____

Site Address: _____

Contact Person: _____ Date Submitted: _____

Note: Evaluation required on all post-construction sites with ≥ 20,000 sq. ft. of impervious surface disturbance or > 1 ac. of land disturbance, all sites with proposed infiltration practices or wet detention ponds and all sites with a depth to bedrock of <5 ft. or depth to carbonate bedrock of <50 ft.

Source Area Prohibitions

No.	Applies	Not Applicable	Item
1	☐	☐	Storage, loading and parking areas at tier 1 industrial facilities.
2	☐	☐	Storage and loading areas at tier 2 industrial facilities.
3	☐	☐	Fueling and vehicle maintenance areas.
4	☐	☐	Agricultural production areas.

Source Area Exemptions

No.	Applies	Not Applicable	Item
5	☐	☐	Parking lots and access roads < 5,000 sq. ft. in commercial development.
6	☐	☐	Parking lots and access roads < 5,000 sq. ft. in industrial development.
7	☐	☐	Redevelopment sites and routine maintenance areas.
8	☐	☐	In-fill development < 5 acres.
9	☐	☐	Roads in commercial, industrial, and institutional land uses, and arterial residential roads.

Location of Practice Prohibitions

No.	Applies	Not Applicable	Item
10	☐	☐	Areas within 1,000 feet upgradient or within 100 feet downgradient of direct conduits to groundwater.
11	☐	☐	Areas within 400 feet of a community well or within the separation distances listed in NR 812.08 for private wells and non-community wells.
12	☐	☐	Areas where contaminants of concern are present in the soil.

Location of Practice Infiltration Rate Exemptions

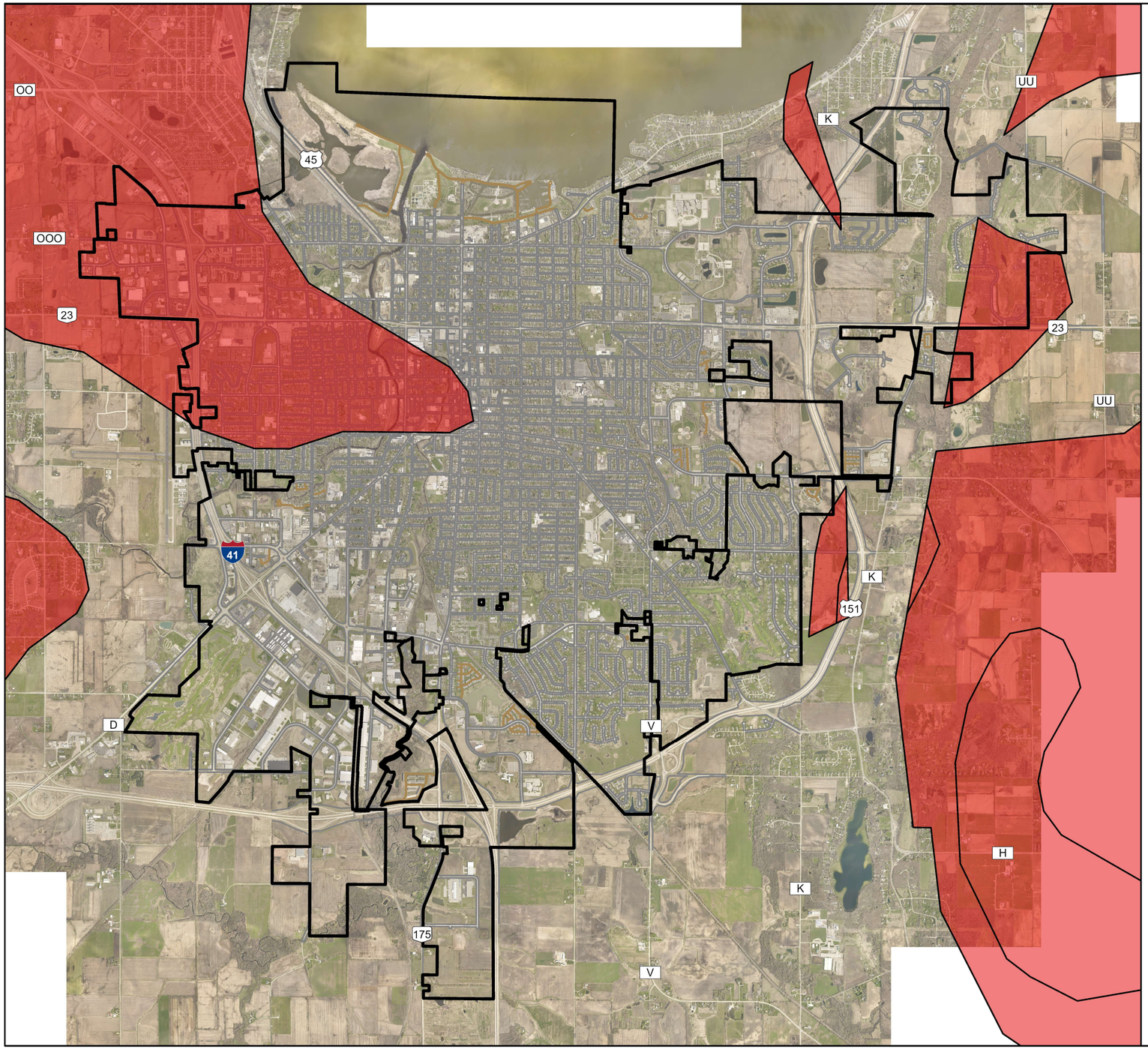
No.	Applies	Not Applicable	Item
13	☐	☐	Infiltration rate of the soil at any potential infiltration system is < 0.6 in/hr using a field test method.
14	☐	☐	Soils within 5 feet of the infiltration system bottom include one of the following: sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay or clay.

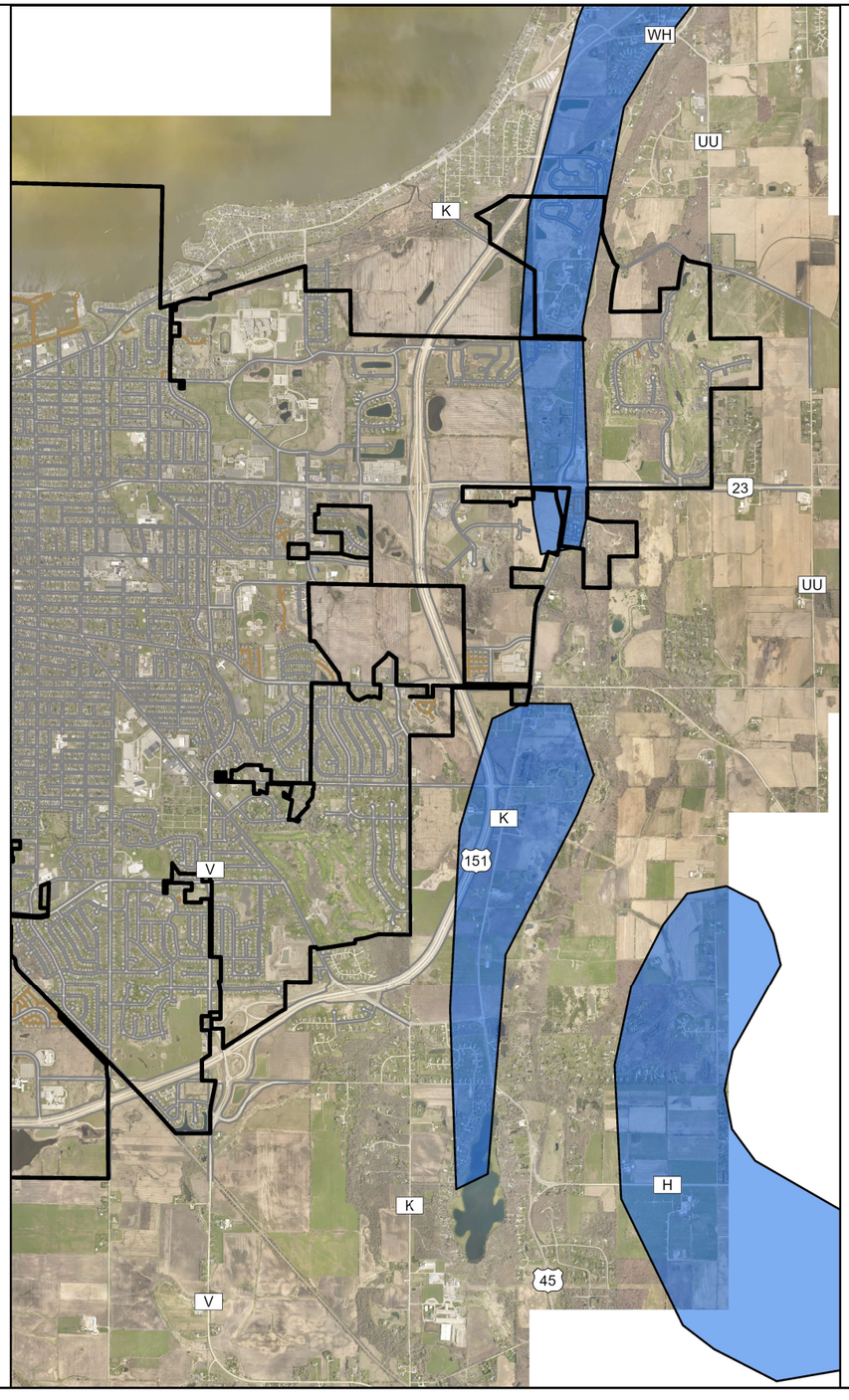
Documentation

No.	Attached	Not Applicable	Item
15	☐		Results of the step A initial field screening of the Site Evaluation for Stormwater Infiltration. Provide a narrative and/or maps.
16	☐	☐	Provide map showing the locations of all prohibited areas, exempted areas, practice location prohibition areas and practice location exemption areas (include note in the storm water narrative if applicable to entire site).
17	☐	☐	Results of the step B field verification of initial screening of the Site Evaluation for Stormwater Infiltration. Step B is required on all sites unless the entire site meets a source area prohibition or exemption or if the entire site is within a location of practice prohibition area. Provide date(s) the data was collected, a site map/plan and soil profile descriptions.
18	☐	☐	Provide soil boring logs and test pit results. Soil borings or test pits are also required *at the location* of any proposed wet detention ponds. Soils borings or test pits taken at the location of proposed parking lots, buildings, or other areas of the site are not appropriate.
19	☐	☐	Results of step C evaluation of specific infiltration areas of the Site Evaluation for Stormwater Infiltration. Provide site map, analysis of groundwater mounding potential and design infiltration rate.
20	☐	☐	Confirm that the site is not part of a wellhead protection area or that the site complies with the wellhead protection plan.

This checklist is intended as a guidance document for preparing private development plans within the community, and is not intended to be all-inclusive. It is intended to address the routine questions that commonly arise during the preparation of development plans. The applicant should review all applicable stormwater management regulations and codes.

Comments: _____





Regional Bedrock Map

This map shows locations that are expected to have carbonate bedrock at a depth of 50-feet or less and locations that are expected to have at least 35% bedrock at a depth of 5-feet or less. This map is for planning purposes only. Exact conditions need to be field verified at all locations.

Legend

- Municipal Boundary
- Carbonate Bedrock Less Than 50-ft
- Bedrock Depth Less Than 5-ft

1 IN = 4,000 FT

Drawn By: nwaldschmidt Date: 11/16/2021

City of Fond du Lac
Engineering Division

Erosion and Sediment Control (ESC) Inspection Documentation Using PermiTrack

What is PermiTrack?

- PermiTrack$_{ESC}$ is a cloud-based erosion and sediment control permit tracking application that is accessed using any computer, smartphone or other device with Internet access. It allows multiple staff at multiple locations to record inspections and view project-specific ESC inspection results.
- Field or office personnel, using a notebook or computer, can create an inspection report, save photos, view the site's ESC inspection history, and record observations that, upon entry, are automatically saved into the database.
- Once an inspection is completed, a report can be generated and emailed to individuals associated with the project (e.g., the contractor, owner, project manager, others).

What sites in the City of Fond du Lac are required to use PermiTrack?

- City managed projects that require a construction site erosion control permit.
- Any private project that requires a construction site erosion control permit from the city. Inspections for these projects can be recorded by the owner, contractor, or consultant utilizing PermiTrack$_{ESC}$ and may also be recorded by City of Fond du Lac inspection staff.

What is required?

- According to the city and state permit requirements, inspections at sites are required to occur once per week and also within 24-hours after a rainfall event of 0.5-inches or more. Inspections performed by the city on private projects do not exempt the site from the requirement to perform weekly and after rainfall inspections.
- All inspections shall be entered on the City of Fond du Lac PermiTrack site.
- The PermiTrack application is accessible at http://www.mypermitrack.com.

Who receives a login name?

- The Authorized Inspector for permitted construction sites will be issued login credentials (username and password) to become a PermiTrack$_{ESC}$ User and access the PermiTrack Site. This could include the consultant, owner, or contractor working on the site. The User can also directly add co-workers as PermiTrack$_{ESC}$ Users who will also be able to inspect any of the projects assigned to their company.

What information does the city require to create a login name?

- The contractor, developer, or consultant must supply:
  - Contact name and titles for individuals responsible for ESC inspections
  - Name of company/consultant
  - Email addresses, business address, and phone number
- Please send an email to ecinspections@fdl.wi.gov or call (920) 322-3470 to be entered into the PermiTrack System. You will receive an email with login information (username and password) from PermiTrack (the email address will appear from noreply@mypermitrack.com). Once you log into the application with those credentials, you can change the password to a user-friendly version of your choice.

How are inspections entered?

- **PermiTrack Log In -** The login address for PermiTrack: https://www.mypermitrack.com/sehsvc/login. On the login page, enter your user name and password.
- **Add Inspector -** Once logged in, click Settings in the black bar at the top of the page. Click the Users tab to view all current Users in your account. Any of them has access to all projects assigned to your company. If you would like to add additional staff, click New to add another inspector as a User. Once their User account is created, they will also be able to conduct inspections on your projects.
- **Select Project -** The Projects tab displays the PermiTrack$_{ESC}$ projects you are associated with. Click the inspection icon next to the project you would like to inspect to start a new inspection.
- **Conduct Inspection -** When recording a new inspection, enter the following information. Fields marked with an * are required:
    - **Inspector:** Select the inspector from the drop-down list.
    - **Inspection Date:** Enter the inspection date in mm/dd/yyyy format, or pick from the calendar.
    - **Inspection Time:** Enter the inspection time in hour and minutes of the day, AM or PM.
    - **Weather Trends:** Describe recent weather conditions relevant to erosion/sediment control.
    - **Last Precipitation End Date:** Enter the date of the last precipitation, in mm/dd/yyyy format, or pick the date from the calendar.
    - **Last Precipitation Amount:** Enter the recent rainfall total in inches.
    - **Source of Data:** Select the source of the precipitation data entered above.
    - **Temperature:** Record the temperature in F (Fahrenheit) at the time of the inspection.
    - **Reason for Inspection:** Select the reason this inspection is being performed.
    - **Action Required:** Select a follow-up action, if one is required.
    - **Comment:** Enter comments here; will be included on the inspection report.
    - **Inspection Document:** Click the **Add Document** button to choose and upload an inspection document file from your computer or a network location.
- **Complete Inspection Items –** The Inspection Items area of the page lists all of the BMPs associated with the project. If a BMP is required, you must record your observations and update the status.
    - **Inspected:** Indicate whether this item was inspected during the visit to the project site.
    - **BMP:** Displays the category and type of BMP from BMP library.
    - **Status:** Status of the BMP at the time of the inspection.
    - **Condition:** Select the condition from the drop-down list to indicate the effectiveness of the BMP application.
    - **Comments:** Enter your inspection comments regarding this BMP, its condition, or more detailed information. If the inspection results indicate that the site was not in compliance with city and state ESC requirements, outline the corrective actions that will be taken to bring the site into compliance.
    - **Photo:** Click the Choose File button to locate a photo from the project site. You can upload a photo from your mobile device, computer or a network location.
    - **+ Add BMP:** Use this link to add a new BMP to this inspection record. Select a Category and BMP to add it to the bottom of the inspection record for your observations.
    - **Save As field:** Select Save As Draft or as Final.
        - **Draft:** The inspection record is not complete and may be edited further before completing.
        - **Final:** The inspection record is complete and will be distributed. No further change can be made.
- **Save Inspection Record –** Click the Save button, bottom-right corner of the screen.

City of Fond du Lac
Engineering Division
As-Built / Record Drawing Plan Review Checklist

Date Submitted: _____

Name/Site Address: _____ Contact Person: _____

_____

Parcel: _____ Firm: _____
Phone: _____ Email: _____
Property Owner: _____ Applicant: _____
Address: _____ Address: _____

_____ _____

Phone: _____ Fax: _____ Phone: _____ Fax: _____

No.	Completed	Identified, but Not Complete	Not Applicable	Item
1	☐	☐	☐	Certification statement and seal of a licensed Wisconsin Engineer on record drawing set indicating, "This record drawing is accurate and complete, the stormwater management facilities are constructed per the applicable technical standards and approved stormwater management plan or subsequent approved revisions, and stormwater management is provided per the approved design computations."
2	☐	☐	☐	Certification statement and seal of a qualified licensed professional indicating, "The bioretention or biofiltration devices are constructed in accordance with the approved stormwater management plan or subsequent approved revisions and the installed engineered soil complies with the material specifications." (Bioretention and biofiltration devices only)
3	☐	☐	☐	Certification statement and seal of a landscape architect or other qualified licensed professional indicating, "I have inspected the native and wetland plantings described in the approved stormwater management plan or subsequent approved revisions and found that the plantings have a minimum coverage of 70% and match the species descriptions on the plans."
4	☐	☐	☐	Certification statement and seal of a qualified licensed professional indicating, "The topsoil installed at the stormwater management facility meets or exceeds the minimum depth required in the approved stormwater management plan or subsequent approved revisions."
5	☐	☐	☐	Certification statement and seal of a licensed Wisconsin Engineer indicating, "The tributary drainage basin of the storm water management facility reasonably conforms to the tributary drainage basin used in the approved design calculations."
6	☐	☐	☐	Location map
7	☐	☐	☐	Certifications for materials used in construction of the facility (principal outlet, control structure, PVC pipe, aggregate, wetland plantings, aerators/fountains, etc.)

No.	Completed	Identified, but Not Complete	Not Applicable	Item
8	☐	☐	☐	Benchmark used for the site identified. All elevations on the plans should correspond to NAVD 88 Datum.
9	☐	☐	☐	Graphic scale, legend, and north arrow.
10	☐	☐	☐	Profiles and/or cross-sections of the stormwater management facilities with associated details.
11	☐	☐	☐	As-built topography and/or dimensions of the stormwater management facility including:
				☐ Surface area of treatment facility. ☐ Embankment/level spreader elevation, width, and side slope. The lowest points must be represented. ☐ Safety shelf slope and width. (Wet ponds only) ☐ Average water depth of main pool and forebay. (Wet ponds only) ☐ Normal water surface elevation. (Wet ponds only) ☐ Infiltration cell and pretreatment forebay. (Infiltration basin only) ☐ Pretreatment device. (Bioretention, biofiltration, infiltration swales, infiltration trenches, and permeable pavement only) ☐ Storage layer/cell depth, area and medium type. Geotextile fabric type and location. (Bioretention, infiltration trenches, and permeable pavement only) ☐ Swale geometry and slope. (Infiltration and water quality swales only) ☐ Filter strip area and slope. (Filter strips only)
12	☐	☐	☐	Liner material or native soil meets permeability requirements
13	☐	☐	☐	The dimensions and type of material for the riser/control structure.
14	☐	☐	☐	Principal outlet and/or underdrain location, size, length, material, and invert elevations.
15	☐	☐	☐	Invert elevation, size and dimensions of any orifices or weirs.
16	☐	☐	☐	Dimensions, elevation and materials of the emergency spillway.
17	☐	☐	☐	The size, location, and type of trash rack device(s).
18	☐	☐	☐	The size, location, and type of flap gate(s) and check valves.
19	☐	☐	☐	The number, size, and location of anti-seep collars.
20	☐	☐	☐	Location and dimensions of rip-rap or other erosion protection.
21	☐	☐	☐	Landscape/wetland plantings number and location.
22	☐	☐	☐	Design and as-built elevations of the 1-, 2-, 5-, 10-, and 100-year storms as appropriate. (Detention ponds only)
23	☐	☐	☐	Design and as-built elevation-storage-outflow table. (Detention ponds only)
24	☐	☐	☐	Underground settling/storage device model number; location; surface area/dimensions; sump depth; outlet size, material and invert elevation; maintenance cleanout location; and owner approved shop drawings. (Underground settling/storage devices only)

No.	Completed	Identified, but Not Complete	Not Applicable	Item
25	☐	☐	☐	Draw down device, clean-out port and observation wells location, size, materials and invert elevations. (Infiltration basins, bioretention, biofiltration, infiltration trenches, and permeable pavement only)
26	☐	☐	☐	Permeable pavement material and aggregate type and depth. (Permeable pavement only)
27	☐	☐	☐	Catch basin/hydrodynamic device model number; location; surface area/dimensions; sump depth; outlet size, material and invert elevation; and owner approved shop drawings. (Catch basins and hydrodynamic devices only)
28	☐	☐	☐	Media filter/membrane number and model number. Structure location; dimensions; outlet size, material, and invert elevation; and owner approved shop drawings. (Media filters only)
29	☐	☐	☐	Fueling and vehicle maintenance canopy, runoff diversion, oil/water separator, absorbent sock or other BMP installation.
30	☐	☐	☐	Calculations/computer model analysis verifying BMP performance meets applicable site performance standards if the available storage or other factors do not agree with the original design.

Comments:

Long-term Stormwater Management Maintenance and Access Agreement

THIS Long-term Stormwater Management Maintenance and Access Easement Agreement, made between
[Property Owner Name],
("Owner,") whether one or more, and The City of Fond du Lac, a municipal corporation in the State of Wisconsin, hereinafter known as ("City").

LEGAL DESCRIPTION OF PROPERTY:

[Enter legal description as recorded in deed, by CSM, by recorded plat or add See attached Addendum A. Include document number of CSMs.]
Lot 1 of CSM #1, Vol. 1, Pg. 1, document number 1, located in the NE 1/4 of the SE 1/4, Section 25, Town 15 North, Range 17 East in the City of Fond du Lac, Fond du Lac County, Wisconsin as recorded in the Fond du Lac County Register of Deeds.

Name and Return Address
[Property Owner Name and Address]

Tax Parcel No. FDL-15-17-25-00-0000-00

OWNER MAINTENANCE:

Owner agrees to install and maintain stormwater management practice(s) on the subject property in accordance with approved plans and permit conditions. The Owner is responsible for satisfying the provisions of this agreement throughout the project site for the duration of the construction period and upon completion of all construction phases. Unless otherwise expressly provided herein, all representations in this agreement shall remain operative and in full force and effect on the Owner and subsequent Owners, assignees or purchasers. This agreement shall apply to the Owner, and any subsequent purchasers of the parcel or any portion thereof in perpetuity. No modifications, alteration, or amendment to this agreement shall be binding upon any party hereto until such modification, alteration, or amendment is reduced to writing and executed by the property owner and the City.

PERMANENT COMPONENTS OF THE STORMWATER SYSTEM

The stormwater system consists of the following components:

- Stormwater manholes and sewer pipe
- Culverts
- Grass swales
- Stormwater detention pond and outlet structure

INSPECTION AND MAINTENANCE

Each aspect of the stormwater system shall be regularly inspected and maintained in accordance with the approved operation and maintenance plan for the site and any subsequent revisions approved by the City. The operation and maintenance plan shall remain onsite and be available for inspection when requested by the Wisconsin Department of Natural Resources or the City. The Owner shall submit all inspection and maintenance reports and records to the City annually and upon request for the life of the system. The City may require work to be done which differs from the inspection report, if the City reasonably concludes that such work is necessary and consistent with the intent of this agreement and the operation and maintenance plan. The specified corrective actions shall be undertaken by the Owner within a reasonable time frame as set by the City.

The Owner authorizes and grants to the City, or its designee, a permanent access easement to the property to conduct inspections of the stormwater system as necessary to ascertain that the practices are being maintained and operated in accordance with the intent of the operation and maintenance plan. The City shall maintain public records of the results of the site inspections, inform the Owner of the inspection results, and specifically indicate any corrective actions required to bring the stormwater system into proper working condition. The specified corrective actions shall be undertaken within a reasonable time frame as set by the City.

DUTY TO PROVIDE MAINTENANCE

In the event the Owner fails to perform its obligations under this agreement, the City shall have the authority to inspect and enter to maintain all components of the stormwater system. In such an event, all associated costs will be assessed back as a special charge against the property pursuant to Sec. 66.0627 Wis. Stats. Said charge shall be a lien on the property and shall be collected with the real estate taxes.

The undersigned agree to the provisions set forth in this Agreement:

Dated: _____

_____
(Name)

_____
(Signature)

Dated: _____

_____
(Name)

_____
(Signature)

ACKNOWLEDGMENT

STATE OF WISCONSIN
FOND DU LAC COUNTY

Personally came before me on _____, the above-named _____ _____, To me known to be the person(s) who executed the foregoing Instrument and acknowledged the same.

_____
(Name)_____
Notary Public, State of Wisconsin
My Commission (is permanent) (expires): _____)

This document was drafted by:
[Name of Individual Preparing Document, Company Name]

Operation and Maintenance Plan
for Stormwater Management Facilities

Located at: [Site name]
Address: [Site address]

PURPOSE

This operation and maintenance plan explains the basic function of each of the stormwater practices on the site and prescribes the minimum maintenance requirements to remain compliant with the long-term stormwater management maintenance agreement for the site. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Any failure of a stormwater management practice that is caused by a lack of maintenance will subject the owner(s) to enforcement actions.

RESPONSIBLE PARTY

The responsible party shall be responsible for implementing the provisions of the operation and maintenance plan. The responsible party for the site is:
Name: [Responsible party name]
Address: [Responsible party address]
Phone Number: [Responsible party phone number]
Email: [Responsible party email]

PROTECTIVE AREAS

[Protective areas have been established for the site. Protective areas are an area of land that commences at the top of the channel of lakes, streams and rivers, or at the delineated boundary of wetlands. Impervious surfaces shall be kept out of the protective area entirely or to the maximum extent practicable.]

SYSTEM DESCRIPTION

[Provide a description of the type and general design features of all stormwater management practices used to meet the site performance standards. Include the design purpose (peak flow control, sediment reduction, infiltration, etc.) and how the practice achieves the design purpose.]

[No aerators or fountains may be installed or operated in wet detention ponds without prior approval of the City of Fond du Lac.]

SITE MAP

A scaled map showing the stormwater management practices, maintenance access locations, protective areas, and surrounding identifiable features is shown in *Appendix A*.

ROUTINE INSPECTION AND MAINTENANCE REQUIREMENTS

To ensure the proper long-term function of the stormwater management practices, the following activities must be completed:
[List all routine inspection and maintenance requirements to be completed for the site. All applicable requirements in the WDNR technical standards shall be addressed. A list of the minimum requirements can be found in the Stormwater Reference Guide. An example item is as follows:

1. All outlet structures, trash racks, and pipes must be checked to ensure that there is no blockage from debris or ice. Any blockage must be removed immediately.]

NON-ROUTINE INSPECTION AND MAINTENANCE REQUIREMENTS

[List any non-routine inspection and maintenance items to be completed for the site such as items to be completed during an initial period following the installation of the facility.]

MAINTENANCE SCHEDULE

[Provide a table or list of typical maintenance activities and the proposed frequency.]

INSPECTIONS

The stormwater facilities shall be visually observed periodically to review the condition of the facility and to recommend maintenance activities. Inspections shall be performed on the inspection checklist shown in *Appendix B*.

Inspection frequency shall comply with the following schedules unless approved otherwise:

[All components of the stormwater system shall be inspected at least semiannually in early spring and early autumn, and after major storm events. A rainstorm of one (1) inches or greater within a 24-hour period is considered a major storm.

Inspections done to determine the depth of accumulated sediments in wet and dry detention ponds may be done once every 10 years.

Infiltration basins shall be inspected at least quarterly.

Infiltration trenches shall be inspected monthly from April through October during the first year of operation.

Permeable pavement shall be inspected at least annually.

Rain gardens shall be inspected three times per growing season.]

Inspections shall be performed by a qualified inspector once every three years. A qualified inspector means a landscape architect, professional hydrologist, professional engineer, or other person experienced in stormwater management design, installation and maintenance. The City Engineer shall have the right to reject any inspection report, maintenance report, compliance verification, and other materials involved in demonstrating compliance if the materials do not meet the necessary standards for accuracy and professionalism.

At the written request of the owner of any stormwater management practice, the City Engineer may grant a temporary waiver for an inspection under this section if the City Engineer determines an inspection is not necessary to determine the condition or maintenance needs of the stormwater management practice. As a condition of granting a temporary inspection waiver, the City Engineer may require the owner to provide access to the site for an inspection by the City Engineer, or may require some basic information to be submitted by the owner, such as digital photographs of the stormwater management practice. Any temporary inspection waiver shall be provided by the City Engineer in writing and shall state the end date of the waiver, which shall not exceed two years.

INSPECTION AND MAINTENANCE REPORTS

The responsible party shall report the results of all inspections and maintenance performed to the City Engineer in a pdf format or other electronic format approved by the City Engineer. Inspection and maintenance reports shall be provided annually and shall be sent to stormwaterreports@fdl.wi.gov.

DUTY TO PERFORM MAINTENANCE

The responsible party shall complete all maintenance work recommended in the inspection reports or ordered by the City Engineer within a reasonable time frame as set by the City Engineer. All maintenance work shall comply with the applicable technical standards.

[The removal of accumulated sediment shall comply with Chapter NR 528 of the Wisconsin Department of Natural Resources Administrative Code.]

The responsible party shall prepare plans and obtain applicable permits if additional plan or permits are required to complete any maintenance activities.

OPERATION AND MAINTENANCE PLAN REVISIONS

The operation and maintenance plan shall be revised whenever the responsible party changes. The operation and maintenance plan shall be reviewed for any revisions during any inspections by a qualified inspector. All revisions shall be submitted to the City Engineer for review and approval.

Appendix A: Site Map

Appendix B: Inspection and Maintenance Checklist

City of Fond du Lac
Inspection & Maintenance Log
Wet Detention Ponds

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and semiannually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Inspections done to determine the depth of accumulated sediments may be done once every 10 years.
5. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Pond		
Bank Erosion	Repair / Restore	
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution	Contact Municipality	
Abnormal Water Levels	Contact Municipality	
Depressions, Whirlpools, Sinkholes	Contact Municipality	
Sediment Accumulation *	Dredge	
Embankment		
1. Upstream Slope		
Poor Grass Cover	Revegetate	
Erosion or Slides	Repair / Restore	
Trees/Brush Growing on Slopes	Remove	
Deficient Riprap Protection	Repair	
Animal Burrows	Contact Municipality	
Depressions or Bulges	Contact Municipality	
Longitudinal Cracks	Contact Municipality	
Transverse Cracks	Contact Municipality	

City of Fond du Lac
Inspection & Maintenance Log
Wet Detention Ponds

Inspection Item	Maintenance Action	Comments
Settlement *	Contact Municipality	
2. Crest		
Cracking	Contact Municipality	
Settlement *	Contact Municipality	
Misalignment *	Contact Municipality	
3. Downstream Slope		
Poor Grass Cover	Revegetate	
Erosion or Slides	Repair / Restore	
Trees/Brush Growing on Slopes	Remove	
Animal Burrows	Contact Municipality	
Excessive or Cloudy Seepage	Contact Municipality	
Longitudinal Cracks	Contact Municipality	
Transverse Cracks	Contact Municipality	
Depressions or Bulges	Contact Municipality	
Seeps, Leaks, or Boils	Contact Municipality	
Settlement *	Contact Municipality	
4. Emergency Spillway		
Exposed Fabric	Repair	
Overgrown Vegetation	Cut / Trim	
Erosion / Backcutting at Berm or Road	Repair (fill, armor)	
Rutting or Potholes	Repair	
Obstructions or Debris	Remove	
Inadequate Riprap / Armor	Repair	
Cracking	Contact Municipality	
Slumping / Sloughing of Embankment *	Contact Municipality	
Settlement *	Contact Municipality	

City of Fond du Lac
Inspection & Maintenance Log
Wet Detention Ponds

Inspection Item	Maintenance Action	Comments
Control Structure		
1. Inlet		
Debris in Conveyance Area	Clear / Remove	
Erosion or Undercutting	Repair (fill, armor)	
Stop-log Deterioration / Leaking	Contact Municipality	
Joint Separation *	Contact Municipality	
Cracks in Concrete *	Contact Municipality	
Deteriorated Piping *	Contact Municipality	
Displacement of Structure *	Contact Municipality	
2. Outlet		
Erosion or Backcutting	Repair (fill, armor)	
Debris in Culvert or Trash Rack	Clear / Remove	
Undermining / Scour	Contact Municipality	
Inoperable Control Valve	Contact Municipality	
Inoperable Flap Gate	Contact Municipality	
Joint Separation *	Contact Municipality	
Cracks in Concrete *	Contact Municipality	
Spillway		
Eroding or Backcutting	Repair (fill, armor)	
Overgrown Vegetation	Cut / Trim	
Obstructions with Debris	Clear / Remove	
Excessive Siltation	Remove (dredge)	
Slumping / Sloughing *	Contact Municipality	
Downstream Area		
Erosion	Contact Municipality	
Debris / Obstructions	Clear / Remove	
Bridge / Culvert Problems *	Contact Municipality	
Buildings Issues *	Contact Municipality	
Foundation Concerns *	Contact Municipality	

City of Fond du Lac
Inspection & Maintenance Log
Wet Detention Ponds

Inspection Comments: _____

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_____
_____
_____

Summary of Maintenance Completed Since Last Inspection:

_____

_____
_____

Maintenance Completed During Inspection:

_____

_____
_____

Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

_____

_____
_____

I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Dry Detention Ponds

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and semiannually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Inspections done to determine the depth of accumulated sediments may be done once every 10 years.
5. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Pond / Embankment		
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution	Contact Municipality	
Poor Grass Cover	Revegetate	
Erosion or Slides	Repair / Restore	
Trees / Brush Growing on Slopes	Remove	
Animal Burrows	Contact Municipality	
Standing Water	Contact Municipality	
Depressions or Bulges	Contact Municipality	
Longitudinal Cracks	Contact Municipality	
Transverse Cracks	Contact Municipality	
Seepage Through Embankment	Contact Municipality	
Settlement *	Contact Municipality	
Sediment Accumulation *	Regrade / Restore	
Inflow Locations		
Erosion	Repair / Restore	
Deficient Riprap Protection	Repair	

City of Fond du Lac
Inspection & Maintenance Log
Dry Detention Ponds

Inspection Item	Maintenance Action	Comments
Emergency Spillway		
Exposed Fabric	Repair	
Overgrown Vegetation	Cut / Trim	
Erosion / Backcutting at Berm or Road	Repair (fill, armor)	
Rutting or Potholes	Repair	
Obstructions or Debris	Remove	
Inadequate Riprap / Armor	Repair	
Cracking	Contact Municipality	
Slumping / Sloughing of Embankment *	Contact Municipality	
Settlement *	Contact Municipality	
Control Structure		
1. Inlet		
Debris in Conveyance Area	Clear / Remove	
Erosion or Undercutting	Repair (fill, armor)	
Stop-log Deterioration / Leaking	Contact Municipality	
Joint Separation *	Contact Municipality	
Cracks in Concrete *	Contact Municipality	
Deteriorated Piping *	Contact Municipality	
Displacement of Structure *	Contact Municipality	
2. Outlet		
Erosion or Backcutting	Repair (fill, armor)	
Debris in Culvert or Trash Rack	Clear / Remove	
Undermining / Scour	Contact Municipality	
Inoperable Control Valve	Contact Municipality	
Inoperable Flap Gate	Contact Municipality	
Joint Separation *	Contact Municipality	
Cracks in Concrete *	Contact Municipality	
Spillway		

City of Fond du Lac
Inspection & Maintenance Log
Dry Detention Ponds

Inspection Item	Maintenance Action	Comments
Eroding or Backcutting	Repair (fill, armor)	
Overgrown Vegetation	Cut / Trim	
Obstructions with Debris	Clear / Remove	
Excessive Siltation	Remove (dredge)	
Slumping / Sloughing *	Contact Municipality	
Downstream Area		
Erosion	Contact Municipality	
Debris / Obstructions	Clear / Remove	
Bridge / Culvert Problems *	Contact Municipality	
Buildings Issues *	Contact Municipality	
Foundation Concerns *	Contact Municipality	

Inspection Comments: _____

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Summary of Maintenance Completed Since Last Inspection:

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Maintenance Completed During Inspection:

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Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

_____

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_____

I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Underground Detention Ponds

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and semiannually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Inspections done to determine the depth of accumulated sediments may be done once every 10 years.
5. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Pond		
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution	Contact Municipality	
Abnormal Water Levels	Contact Municipality	
Sediment Accumulation *	Regrade / Restore	
Control Structure		
Erosion or Backcutting	Repair (fill, armor)	
Debris in Culvert or Trash Rack	Clear / Remove	
Undermining / Scour	Contact Municipality	
Inoperable Flap Gate	Contact Municipality	
Joint Separation *	Contact Municipality	
Cracks or Damage *	Contact Municipality	
Spillway		
Eroding or Backcutting	Repair (fill, armor)	
Overgrown Vegetation	Cut / Trim	
Obstructions with Debris	Clear / Remove	
Excessive Siltation	Remove (dredge)	

City of Fond du Lac
Inspection & Maintenance Log
Underground Detention Ponds

Inspection Item	Maintenance Action	Comments
Slumping / Sloughing *	Contact Municipality	
Downstream Area		
Erosion	Contact Municipality	
Debris / Obstructions	Clear / Remove	
Bridge / Culvert Problems *	Contact Municipality	
Buildings Issues *	Contact Municipality	
Foundation Concerns *	Contact Municipality	

Inspection Comments: _____

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_____

Summary of Maintenance Completed Since Last Inspection:

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_____
_____

Maintenance Completed During Inspection:

_____

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_____

Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

_____

_____
_____

I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Infiltration Basins

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and quarterly. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Pretreatment Area		
Erosion	Repair / Restore	
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution (Oil Sheen, Algae, Etc.)	Contact Municipality	
Sediment Accumulation	Remove	
Basin		
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution	Contact Municipality	
Poor Vegetative Cover	Revegetate	
Erosion or Depressions	Repair / Restore	
Trees / Brush Growing in Basin	Remove / Revegetate	
Standing Water for Prolonged Periods (Greater Than 3 Days After Rain Event)	Restore (Remove 3" of Soils, Chisel Plow, Add Topsoil & Compost)	
Animal Burrows	Contact Municipality	
Undesirable / Invasive Vegetation *	Contact Municipality	
Level Spreader Flow Uneven*	Contact Municipality	
Drawdown Device Failure *	Contact Municipality	

City of Fond du Lac
Inspection & Maintenance Log
Infiltration Basins

Inspection Item	Maintenance Action	Comments
Emergency Spillway Erosion or Depression Inadequate Riprap / Armor	 Repair / Restore Repair	
Outlet Structure Debris / Trash Accumulation High Water Levels (Near Top of Basin)	 Clean Up / Remove Contact Municipality	

Inspection Comments: _____

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_____
_____
_____

Summary of Maintenance Completed Since Last Inspection:

_____

_____
_____

Maintenance Completed During Inspection:

_____

_____
_____

Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

_____

_____
_____

I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Bioretention Devices & Biofilters

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and semiannually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Inlet / Pretreatment Areas		
Erosion	Repair / Restore	
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution (Oil Sheen, Algae, Etc.)	Contact Municipality	
Sediment Accumulation	Remove	
Basin		
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution (Oil Sheen, Algae, Etc.)	Contact Municipality	
Wilting / Dying Plants	Water and/or Replant Per Approved Plan	
Poor Vegetation Density *	Replant Per Approved Plan	
Undesirable / Invasive Vegetation *	Contact Municipality	
Erosion or Depressions	Repair / Restore	
Standing Water for Prolonged Periods (Greater Than 3 Days After Rain Event)	Restore (Remove Mulch, Scarify Soils Around Plants, Add New Mulch)	
Engineered Soil Performance / PH Testing *	Remove / Replace	
Animal Burrows	Contact Municipality	

City of Fond du Lac
Inspection & Maintenance Log
Bioretention Devices & Biofilters

Inspection Item	Maintenance Action	Comments
Voids in Mulch Area	Add Mulch to Depth of 3”	
Outlet Pipe / Standpipe Debris / Trash Accumulation	Clean Up / Remove	
High Water Levels (Near Top of Basin)	Contact Municipality	

Inspection Comments: _____

_____
_____
_____
_____

Summary of Maintenance Completed Since Last Inspection:

_____

_____
_____

Maintenance Completed During Inspection:

_____

_____
_____

Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

_____

_____
_____

I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Rain Gardens

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components a minimum of three times per growing season. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspectors shall be able to identify all of the plant species that were planted in the rain garden at all stages of life as well as common weeds and invasive plants. These individuals should also be knowledgeable about effective control methods for common weeds.
4. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Rain Garden		
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution (Oil Sheen, Algae, Etc.)	Contact Municipality	
Wilting / Dying Plants	Water and/or Replant Per Approved Plan	
Poor Vegetation Density	Replant Per Approved Plan	
Nuisance / Invasive Vegetation	Remove	
Erosion or Depressions	Repair / Restore	
Standing Water for Prolonged Periods (Greater Than 3 Days After Rain Event)	Restore (Remove Mulch, Scarify Soils Around Plants, Add New Mulch)	
Berm		
Poor Grass Cover	Revegetate	
Erosion or Slides	Repair / Restore	
Trees/Brush Growing on Slopes	Remove	
Animal Burrows	Contact Municipality	
Depressions or Bulges	Contact Municipality	
Longitudinal Cracks	Contact Municipality	
Transverse Cracks	Contact Municipality	

City of Fond du Lac
Inspection & Maintenance Log
Rain Gardens

Inspection Item	Maintenance Action	Comments
Settlement	Contact Municipality	
Seepage	Contact Municipality	

Inspection Comments: _____

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Summary of Maintenance Completed Since Last Inspection:

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Maintenance Completed During Inspection:

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Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

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I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Grass Swales & Filter Strips

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and semiannually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Inspections done to determine the depth of accumulated sediments may be done once every 10 years.
5. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Swale / Filter Strips		
Erosion / Gullies	Repair / Restore	
Poor Vegetation Density (Less Than 70% Cover)	Revegetate	
Vegetation Height (Shorter or Taller Than Design Height)	Change Mowing Practices	
Trees / Brush / Weeds Growing in Swale	Remove	
Debris / Leaves / Trash	Clean Up / Remove	
Animal Burrows	Contact Municipality	
Depressions / Potholes / Rutting	Repair / Restore	
Standing Water for Prolonged Periods (Greater Than 24 Hours After Rain Event)	Contact Municipality	
Sediment Accumulation *	Contact Municipality	

Inspection Comments: _____

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City of Fond du Lac
Inspection & Maintenance Log
Grass Swales & Filter Strips

Summary of Maintenance Completed Since Last Inspection:

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Maintenance Completed During Inspection:

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Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

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I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Settling Devices, Media Filters, & Oil Skimmers

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and semiannually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items with * should be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Maintenance of proprietary products (hydrodynamic separators, media filters, etc.) should follow the manufacturer's recommendations.
5. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Settling Devices / Media Filters		
Debris / Trash Accumulation	Clean Up / Remove	
Abnormal Water Levels	Contact Municipality	
Sediment / Floatables Accumulation	Remove and Properly Dispose	
Visible Pollution (Oil Sheen, Etc.)	Remove and Properly Dispose	
Depressions Around Structure *	Contact Municipality	
Joint Separation *	Contact Municipality	
Cracks in Concrete *	Contact Municipality	
Deteriorated Piping *	Contact Municipality	
Displacement of Structure *	Contact Municipality	
Media Filter Condition	Replace	

Inspection Comments: _____

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Summary of Maintenance Completed Since Last Inspection:

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City of Fond du Lac
Inspection & Maintenance Log
Settling Devices, Media Filters, & Oil Skimmers

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Maintenance Completed During Inspection:

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Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

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I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Infiltration Trenches

1. Facility owner responsible for inspecting, maintaining, and repairing facility components. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection shall be completed by a qualified professional every three years (or more frequently if concerns are noted).
4. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Site Name and Address:
Site Status:
Stormwater Facility Name:
Date:
Time:
Inspector:
Responsible Party for Maintenance:
Last Rainfall Date/Amount:
Weather Conditions:

Maintenance Item	Satisfactory/Unsatisfactory	Comments
Debris Cleanout (Monthly) (Additional inspections shall be made after every rainfall of 0.5 inches or more during a 24-hour period)		
Contributing drainage area clear of litter and vegetative debris		
Trench surface clean		
Inflow pipes clear		
Overflow spillway clear		
Inlet area clear		
Pretreatment Devices (Monthly During First Year, Then Annually) (Additional inspections shall be made after every rainfall of 0.5 inches or more during a 24-hour period)		
Device adequately functions (if applicable)		
Is maintenance required? (if applicable)		
Vegetation (if applicable) (Monthly During First Year, Then Monthly During Growing Season) (Additional inspections shall be made after every rainfall of 0.5 inches or more during a 24-hour period)		
Maintenance carried out in accordance with planting specifications (if applicable)		

City of Fond du Lac
Inspection & Maintenance Log
Infiltration Trenches

Maintenance Item	Satisfactory/Unsatisfactory	Comments
Inlets (Monthly During First Year, Then Annually) (Additional inspections shall be made after every rainfall of 0.5 inches or more during a 24-hour period)		
Good condition		
No evidence of erosion		
Drawdown Time (Inspect two times per year, 72 to 80 hours after a rainfall of 0.5 inches or more in a 24-hour period)		
Depth of water in observation pipe less than 10% of trench volume. (Water depth measured from bottom of the trench) **See Section VIII of technical standard for additional requirements and definition of trench failure.**		
Outlet/Overflow Spillway (if applicable) (Monthly During First Year, Then Annually) (Additional inspections shall be made after every rainfall of 0.5 inches or more during a 24 hour period)		
Good condition, no need of repair		
No evidence of erosion		
No evidence of blockages		
Aggregate Repairs (Monthly During First Year, Then Annually) (Additional inspections shall be made after every rainfall of 0.5 inches or more during a 24-hour period)		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		

Inspection Comments: _____

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Summary of Maintenance Completed Since Last Inspection:

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Maintenance Completed During Inspection:

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Maintenance Recommendations:

City of Fond du Lac
Inspection & Maintenance Log
Infiltration Trenches

Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

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I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____

City of Fond du Lac
Inspection & Maintenance Log
Permeable Pavement

Stormwater Facility Name: _____

Inspection Date: _____ Inspector: _____

Site Name: _____ Address: _____

Last Rainfall Date: _____ Last Rainfall Amount: _____

Weather Conditions: _____

1. Facility owner responsible for inspecting, maintaining, and repairing facility components after major storm events (greater than 1" in 24 hours) and annually. Comment on any deficiencies noted, list maintenance recommendations, and list maintenance actions taken and date of repair. Compare items to the design and as-built conditions, if available.
2. Provide documentation of items inspected with photographs where appropriate. Provide photographs before and after maintenance activities, if practical.
3. Inspection items should be completed by a qualified professional.
4. Submit completed reports annually to stormwaterreports@fdl.wi.gov.

Inspection Item	Maintenance Action	Comments
Pavement		
Debris / Trash Accumulation	Clean Up / Remove	
Visible Pollution	Contact Municipality	
Pavement Condition	Repair Damaged Areas	
Surface Infiltration Rates	Contact Municipality	
Standing Water in Observation Wells for Prolonged Periods (Greater Than 3 Days After Rain Event)	Contact Municipality	
Underdrain Outfall Obstructions	Clean Up / Remove	
Underdrain Outfall Erosion	Repair / Restore	
Run-on Area Cover	Revegetate	
Paver / Block Joint Aggregate	Repair / Restore	

Inspection Comments: _____

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Summary of Maintenance Completed Since Last Inspection:

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City of Fond du Lac
Inspection & Maintenance Log
Permeable Pavement

Maintenance Completed During Inspection:

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Maintenance Recommendations:
Include timeline and additional site investigation, planning or engineering required. Provide applicable technical specifications.

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I hereby certify that the information provided on the inspection and maintenance log is truthful and accurate to my best professional judgement.

Name: _____

Date: _____

Signature: _____