

Chapter 32
Stormwater Management and Erosion Control
(Rep. & recr. #34-05)

32.10 Storm Water Management Plan Requirements (Am. #14-18)

(a) General Storm Water Management Plan Requirements. A storm water management plan shall describe how the permit holder and other responsible parties will meet the storm water management requirements of this section and other related requirements in this ordinance. All storm water management plans and associated BMP(s) shall comply with the planning, design, implementation and maintenance requirements described in this ordinance.

(b) Guiding Principles for Storm Water Management. To satisfy the requirements of this section, a storm water management plan shall, to the maximum extent practicable, adhere to the following guiding principles:

1. Preserve natural watershed boundaries and drainage patterns;
2. Reserve adequately sized areas for storm water infiltration, detention and treatment early in the site planning process;
3. Locate storm water BMP(s) prior to runoff leaving the site or entering waters of the state, and outside of wetlands, floodplains, primary or secondary environmental corridors or isolated natural areas;
4. Minimize soil compaction and maintain pre-development groundwater recharge areas;
5. Minimize impervious surfaces and have them drain to vegetated areas for pollutant filtering and infiltration;
6. Emphasize vegetated swales, warm season and wetland plantings, and low flow velocities for storm water conveyance, treatment and infiltration, especially for transportation related projects;
7. Allow for different storm water management strategies for cleaner runoff such as roofs versus more polluted runoff found in heavily used streets and parking lots;
8. Provide for emergency overflow in all storm water BMP designs;
9. Distribute storm water bioretention and infiltration BMP(s) throughout the site plan for large land developments.

(c) Site Plan Map Requirements. A site plan map and supporting data of site conditions drawn to a scale of 1 inch equals no more than 100 feet shall delineate or display all the following applicable items:

1. Development title, graphic scale and north arrow;
2. Property location description by public land survey system (1/4 section, section, township, range, county);

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3. Location map, which may be drawn to a smaller scale than the site plan map, showing the site location within a public land survey section or subdivision, oriented the same as par. 4 below;
4. Ownership boundaries, bearings, lengths and other survey references that will accurately identify the sites location, in accordance with §236 Wis. Stats. and county mapping standards for all land divisions;
5. Lot numbers and dimensions, including outlots for all land divisions;
6. Name and complete contact information for the applicant, landowner, developer and project engineer;
7. Surveyor's certificate, signed, dated and sealed for all land divisions;
8. Sheet numbers and revision dates on every page;
9. Existing site topography at a contour interval not to exceed 2 feet, including spot elevations for physical features such as culvert (invert elevations), retaining walls, road and ditch centerlines and topographic high and low points;
10. Location and name, if applicable, of all lakes, streams, channels, ditches, and other water bodies or areas of channelized flow on or adjacent to the site;
11. Location and name, if applicable, of all wetlands and identification of source of delineation. These boundaries shall be field verified prior to approval of final land divisions, erosion control plans or stormwater management plans;
12. Boundaries of shoreland zones and the ordinary high water mark (OHWM) for any navigable water body as defined by section 22.05(142) of the Zoning Code. For final land divisions, the OHWM boundaries shall be field verified;
13. Boundaries and elevation of the 100-year floodplains, flood fringes and floodways, as defined by section 24.02 of the Floodland Zoning Code. For final land divisions, these boundaries and elevations shall be field verified;
14. Boundaries and soil symbol for each soil mapping unit and the identification of all hydric soils as defined by the USDA-Natural Resources Conservation Service;
15. Locations of all available soil borings or soil profile evaluations with unique references to supplemental data report forms;
16. Location of primary and secondary environmental corridors, as defined by the Southeastern Wisconsin Regional Planning Commission. For final land divisions, these boundaries shall be field verified;
17. Location and description of isolated natural area boundaries as defined by the Southeastern Wisconsin Regional Planning Commission, woodland areas and other vegetative cover types;
18. Location and descriptive notes for existing and proposed structures within 50 feet of the property boundaries and their proposed use, including, but not limited to buildings and foundations, roads, parking areas, fence lines, access lanes, culverts (include size and type), above ground utilities and retaining walls;

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19. Location and descriptive notes for other known existing site features including, but not limited to rock outcrops or other karst features, tile drains, buried utilities, dumps, landfills, manure or other waste storage facilities;
20. Boundaries and descriptive notes for all applicable setbacks and for “protective areas”, as specified in sub. (d)(4) of this section;
21. Location and descriptive notes for any existing or proposed easements, right-of-ways, vision corners or other known site restrictions. Road right-of ways and building setbacks shall be in compliance with all applicable administrative codes, adopted plans and ordinances;
22. Location and descriptive notes for existing and proposed public dedications of parcels or right-of-ways;
23. Location and descriptive notes for preplanned building or waste disposal sites, when limited by site features;
24. Location and documentation of any existing well and delineation of any applicable regulatory setbacks, in accordance with ch. NR 811 and 812 Wis. Admin. Code;
25. Notes describing source documents, date and measure of accuracy for all applicable mapping features noted above;
26. Other site information that the Authority determines is necessary to administer this ordinance.

(d) Specific Storm Water Management Plan Requirements and Performance Standards. All storm water management plans and associated BMP(s) shall meet the following minimum requirements to the maximum extent practicable. All requirements apply to each subwatershed or stormwater discharge point independently and cannot be averaged for the site. Runoff draining into the stormwater BMP from off-site must be accounted for hydraulically in any BMP design. For redevelopment sites where the redevelopment replaces older development that was subject to the stormwater management requirements of this Chapter on or after October 1, 2004, the responsible party shall meet the total suspended solids reduction, peak flow control, infiltration, and protective area standards applicable to the older development or meet the current requirements of this Chapter, whichever are more stringent. The applicant shall meet with the Authority prior to preparing a storm water management plan to determine the applicability of these requirements early in the site planning process.

1. Peak Discharge. To minimize downstream bank erosion and the failure of downstream conveyance systems, the calculated post-development peak storm water discharge rate shall not exceed the calculated pre-development discharge rates for the 1-year, 2-year, 10-year, and 100-year, 24-hour design storms. Modeling requirements for this provision are further described in section 32.11.

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2. Total Suspended Solids.

A. By design, each storm water management plan shall meet the following post-development total suspended solids reduction targets, based on average annual rainfalls, as compared to no runoff management controls:

- (i.) For new land development and in-fill development, 80% reduction in total suspended solids load;
- (ii.) For redevelopment, 40% reduction of total suspended solids load from parking areas and roads.

B. **Maximum Extent Practicable.** If the design standard cannot meet a total suspended solids reduction performance standard of this section, the storm water management plan shall include a written, site-specific explanation of why the total suspended solids reduction performance standard cannot be met and why the total suspended solids loads will be reduced only to the maximum extent practicable. The Authority may not require any person to exceed the applicable total suspended solids reduction performance standard to meet the requirements of maximum extent practicable.

C. **Off-site Drainage.** When designing BMPs, runoff draining to the BMP from off-site shall be taken into account in determining the treatment efficiency of the practices. Any impact on the efficiency shall be compensated for by increasing the size of the BMP accordingly.

3. Infiltration. BMP(s) shall be designed, installed, and maintained to infiltrate runoff in accordance with the following performance standards in Table 1, except as provided in subs. (D) through (I) below.

Table 1
 Post-development Infiltration Performance Standards

Percent Connected Impervious Surface	Description/Example land uses	Post-development Infiltration Volume ^a	Maximum Effective Infiltration Area
Up to 40%	Description: Low Imperviousness Example land uses: low density	90% of pre-development ^b	1% of site

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	residential parks, cemeteries		
>40% up to 80%	Description: Medium Imperviousness Example land uses: medium and high density residential, multi family residential, industrial, institutional, office park	75% of pre-development	2% of site
>80%	Description: High Imperviousness Example land uses: commercial strip malls, shopping centers, commercial downtowns	60% of pre-development	2% of site

^a All percentages are based on average annual rainfall.

^b To avoid downstream flooding and chronic wetness issues from stormwater discharges, the post development infiltration volume for low density residential developments shall not be less than 25% of the 2-year, 24 hour storm, in accordance with subsection 7. below.

- A. Modeling. Refer to section 32.11(a) for details on calculating runoff volumes and pre-development conditions.
- B. Pretreatment. Pretreatment shall be required before infiltrating parking lot and road runoff from commercial, industrial and institutional areas. The pretreatment shall be designed to protect the infiltration system from clogging prior to scheduled maintenance and to protect groundwater quality in accordance with sub. (H) of this subsection. Pretreatment options may include, but are not limited to, oil/grease separators, sedimentation or bioretention basins, filtration swales or filter strips. All designs shall comply with the technical standards in section 32.11(b).
- C. Infiltration Prohibitions. Due to potential for groundwater contamination, runoff shall not be infiltrated and will not be credited toward meeting the requirements of this subsection for the following:
- (i). Runoff from outdoor material storage areas, loading docks and parking areas for tier 1 and tier 2 industrial facilities, as identified in NR 216.21(2) Wis. Admin. Code. Parking lot runoff from tier 2 facilities may be infiltrated if the Authority determines the runoff will not contain pollutants that are likely to contaminate storm water after considering the factors set forth in NR 216.27(3)(i).

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- (ii). Runoff from outdoor material storage areas and loading docks for tier 2 industrial facilities, as identified in NR216.21(2)(b).
- (iii). Runoff from fueling and vehicle maintenance areas, not including rooftops and canopies.
- (iv). Infiltration of runoff within 1000 feet upgradient or within 100 feet downgradient of karst features.
- (v). Areas within 400 feet of a community water system well as specified in s. NR 811.12(5)(d)6., Wis. Adm. Code, or within 100 feet of a private well as specified in s. NR 812.08(4)(d), Wis. Adm. Code, for runoff infiltrated from commercial, industrial and institutional land uses or regional devices for residential development, not including rooftop runoff.
- (vi). Areas where contaminants of concern, as defined in s. NR 720.03(2), Wis. Adm. Code are present in the soil through which infiltration will occur.

D. Separation Distances Infiltration BMPs shall be located so the characteristics of the soil and separation distance between the bottom of the infiltration BMP and the elevation of the highest groundwater table or the top of the bedrock are in accordance with Table 2.

Table 2
 Infiltration BMP Separation Distances and Soil Characteristics

Source Area	Groundwater or Bedrock Separation Distance	Soil Characteristics
Industrial, commercial, and institutional parking lots and roads	5 feet or more	Filtering Layer
Residential arterial roads	5 feet or more	Filtering Layer
Roofs draining to <i>subsurface</i> infiltration practices	1 foot or more	Native or engineered soil with particles finer than course sand
Roofs draining to <i>surface</i> infiltration practices	Not applicable	Not applicable
All other impervious source	3 feet or more	Filtering Layer

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E. Infiltration Exemptions. The infiltration requirements of this subsection may be exempted by The Authority where:

The soils at the proposed bottom of an infiltration system have a measured infiltration rate of less than 0.6 inches per hour using a scientifically credible field testing method; and the Authority determines it would be impracticable to modify existing soil conditions based on soil profile evaluations extending five (5) feet below the proposed bottom of the infiltration system.

Note: USDA soil textures of sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay are generally considered unsuitable for infiltration and would require replacement or modification.

F. Alternate runoff uses. Where storage and reuse of runoff are employed, such as landscape watering, toilet flushing, laundry or irrigation, or storage on green roofs where an equivalent portion of the runoff is captured permanently by rooftop vegetation, such alternate uses shall be given equal credit toward the infiltration volume required by this section.

G. Groundwater protection.

(i). Infiltration systems designed in accordance with this subsection shall, to the extent technically and economically feasible, minimize the level of pollutants infiltrating to groundwater and shall maintain compliance with the preventive action limit at a point of standards application in accordance with Chapter NR 140 Wis. Adm. Code. However, if site-specific information indicates that compliance with a preventive action limit is not achievable, the infiltration BMP may not be installed or shall be modified to prevent infiltration to the maximum extent practicable.

(ii). The discharge from BMP(s) shall remain below the enforcement standard at the point of standards application.

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- (iii). All stormwater BMPs shall comply with the applicable provisions of Chapter NR 815 Wis. Admin. Code relating to injection wells.
- (iv). All storm water BMP(s) shall comply with the provisions of any applicable wellhead protection plan for a community water supply under Chapter NR 811 Wis. Admin. Code.

H. Maximum Extent Practicable. Where the conditions of subs. F – I limit or restrict the use of infiltration practices, the performance standards of this section shall be met to the maximum extent practicable.4. Protective Areas.

A. “Protective area” means an area of land that commences at the top of the channel of lakes, streams and rivers, or at the delineated boundary of wetlands, and that is the greatest of the following widths, as measured horizontally from the top of the channel or delineated wetland boundary to the closest impervious surface. “Protective area” does not include any area of land adjacent to any stream enclosed within a pipe or culvert, such that runoff cannot enter the enclosure at this location.

- (i). For outstanding resource waters and exceptional resource waters, 75 feet.
- (ii). For perennial and intermittent streams identified on the City of Waukesha GIS system, 50 feet. If there is a discrepancy between the City of Waukesha GIS system and the applicable United States Geological Survey 7.5-minute series topographic map, the more stringent stream identification shall apply.
- (iii). For lakes, 50 feet.
- (iv). For wetlands not subject to (v.), 50 feet.
- (v). For highly susceptible wetlands, 75 feet. Highly susceptible wetlands include the following types: calcareous fens, sedge meadows, bogs, low prairies, conifer swamps, lowland hardwood swamps, and ephemeral ponds.
- (vi). Wetland boundary delineations shall be made in accordance with Chapter NR 103 Wis. Admin. Code. This paragraph does not apply to wetlands that have been completely filled in accordance with all applicable state and federal regulations. The protective area for wetlands that have been partially filled in accordance with all applicable state and federal regulations shall be measured from the wetland boundary delineation after fill has been placed.

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(vii). For less susceptible wetlands, 10 percent of the average wetland width, but no less than 10 feet nor more than 30 feet, unless otherwise required by state or federal law or this Municipal Code. Less susceptible wetlands include degraded wetlands dominated by invasive species such as reed canary grass.

(viii.) For wetlands not subject to (v) or (vii), 50 feet.

(ix). Subd. (A)(i), (v) (viii) and (ix) do not apply to wetlands that have been completely filled in accordance with all applicable state and federal regulations. The protective area for wetlands that have been partially filled in accordance with all applicable state and federal regulations shall be measured from the wetland boundary delineation after fill has been placed. Wetland boundary delineation shall be made in accordance with Chapter NR 103.08(1m) Wis. Admin. Code. Determinations of the extent of the protective area adjacent to wetlands shall be made on the basis of the sensitivity and runoff susceptibility of the wetland in accordance with the standards and criteria in Chapter NR 103.03 Wis. Admin. Code.

(x). For concentrated flow channels with drainage areas greater than 130 acres, 10 feet.

B. Requirements. The following requirements shall be met for all land development activity located within a protective area:

(i). Impervious surfaces shall be kept out of the protective area entirely, or to the maximum extent practicable, except for structures, as authorized and defined under shoreland and floodland zoning. If there is no practical alternative to locating a nonexempt impervious surface in the protective area, the storm water management plan shall contain a written, site-specific explanation and a technical exemption may applied for under sub. (e) below. The erosion control plan shall contain a written site-specific explanation for any parts of the protective area that are disturbed during construction.

(ii). Where land disturbing activity occurs within a protective area, and where no impervious surface is present, adequate sod or self-sustaining vegetative cover of 70% or greater shall be established and maintained. The adequate sod or self-sustaining vegetative cover shall be sufficient to provide for bank stability, maintenance of fish habitat and filtering of pollutants from upslope overland flow areas under sheet flow conditions. Non-vegetative

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materials, such as rock riprap, may be employed on the bank as necessary to prevent erosion, such as on steep slopes or where high velocity flows occur.

(iii.) Best management practices such as filter strips, swales, or wet detention basins that are designed to control pollutants from non-point sources may be located in the protective area, but shall not encroach into wetlands, floodplains or primary or secondary environmental corridors.

C. **Protective Area Exemptions.** The protective area requirements of this subsection may be exempted and do not apply to the following:

(i). Structures that cross or access surface waters such as boat landings, bridges and culverts;

(ii). Structures constructed in accordance with §59.692(1v), Wis. Stats.;

(iii). Sites where runoff does not enter the surface water, including wetlands, without first being treated by a BMP to meet the total suspended solids requirement under sub. 2. above the peak discharge requirements under sub. 1. above, except to the extent that vegetative ground cover is necessary to maintain bank stability;

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

5. **Fueling and Vehicle Maintenance Areas.** Fueling and vehicle maintenance areas shall have BMP(s) designed, installed and maintained to reduce petroleum within runoff, such that the runoff that enters waters of the state contains no visible petroleum sheen, or to the maximum extent practicable.

6. **Site Drainage.** Measures shall be implemented to ensure proper site drainage, prevent property damage and protect public health and safety, including the following minimum requirements:

A. **Drainage easement.** Perpetual drainage easements or other deed restrictions shall be recorded on the property to preserve major storm

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water flow paths and permanent storm water BMP locations. Covenants in these areas shall not allow buildings or other structures and shall prevent any grading, filling or other activities that interrupt or obstruct flows in any way. Covenants shall also specify maintenance responsibilities and authorities in accordance with section 32.12.

B. Site grading. Site grading shall ensure positive flows away from all buildings, roads, driveways and septic systems, be coordinated with the general storm water drainage patterns for the area, and minimize adverse impacts on adjacent properties.

C. Street drainage. All street drainage shall be designed to prevent concentrated flows from crossing the traffic lanes to the maximum extent practicable. Design flow depths at the road centerline for on-street drainage, shall not exceed six (6) inches during the peak flows generated by the 100-year, 24 hour design storm, using planned land use conditions for the entire contributing watershed area.

D. Bridges and cross-culverts. All new or modified bridges and cross-culverts shall comply with applicable design standards and regulations, facilitate fish passage and prevent increased flooding or channel erosion upstream or downstream from the structure. Design flow depths at the road centerline for all crossings shall not exceed six (6) inches during the peak flows generated by the 100-year, 24-hour design storm, using planned land use conditions for the entire contributing watershed area. All predevelopment runoff storage areas within the flow path upstream of bridges and cross-culverts shall be preserved and designated as drainage easements, unless compensatory storage is provided and accounted for in modeling. As-built documentation shall be submitted in accordance with section 32.08 for all new or modified structures that are located within a mapped floodplain or that the Authority determines to be necessary to maintain floodplain modeling for the applicable watershed.

E. Subsurface drainage. All buildings planned for human occupation on a regular basis shall meet all of the following:

- (i) Basement floor surfaces shall be built one (1) foot above the highest groundwater table elevation, as documented in the submitted soil evaluations. On sloped sites, basements may be allowed partially below the highest groundwater table only on the upslope side if they meet the Authority drainage system standards for design, discharge, engineering oversight, and long-term maintenance. For these sites the 1-foot groundwater separation will be enforced at the further downslope point in the basement.
- (ii) Avoid hydric soils as much as possible.

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(iii) The Authority shall be notified of any drain tiles that are uncovered during construction, which the Authority may require to be restored or connected to other drainage systems.

(iv) No discharge of groundwater from tile lines, sump pumps or other means shall be allowed onto another person's land or any public space without the written approval of the owner or unit of government.

F. Open channels. All open channel drainage systems shall at a minimum be designed to carry the peak flows from a 10-year, 24-hour design storm using planned land use for the entire contributing watershed area. Side slopes shall be no steeper than 3h:1v unless otherwise approved by the Authority for unique site conditions. Open channels that carry runoff from more than 130 acres shall at a minimum be designed to carry the peak flows from a 25-year, 24-hour design storm.

G. Storm sewers. All storm sewers shall be designed in accordance with the City of Waukesha's technical standards and specifications. For sites where the Authority determines the post development stormwater discharge flow paths will be significantly different than the pre-development conditions, or where proposed storm water discharges may otherwise have a significant negative impact on one or more downstream property owners, the Authority may require the applicant to submit written authorization, record a drainage easement, or complete other legal arrangements with the affected property owner(s) prior to permit issuance. For purposes of this subsection, "significantly different" means one or more of the stormwater discharge flow paths would move to a different location than they were prior to development, and "significant negative impact" means stormwater discharge flow quantity or depth would increase a sufficient amount to cause ponding or other damage to the property.

H. Structure protection and safety. Flows generated by the 100-year, 24-hour design storm under planned land use conditions may exceed the design capacity of conveyance systems, but shall not come in contact with any buildings. For buildings designed for human occupation on a regular basis, the following additional requirements shall apply:

(i) (Am. #6-06) The lowest elevation of the structure that is exposed to the ground surface shall be a minimum of two (2) feet above the maximum water surface elevation produced by the 100-year, 24 hour design storm, including flows through any storm water BMP that may temporarily or permanently store water at a depth of greater than one (1) foot; and

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(ii) The structure shall be set back at least 40 feet horizontally from any storm water BMP that may temporarily or permanently store water at a depth of greater than one (1) foot, including any internally drained area with a significant contributing watershed and/or limited runoff storage capacity, as determined by the Authority. Setback distance shall be measured from the closest edge of water at the elevation produced by the 100-year, 24-hour design storm. The Authority may exempt existing structures and structures with no basement from this requirement if the Authority determines other site risks are minimal based on soil and site conditions.

7. Additional Requirements. The Authority may establish more stringent requirements than the minimums set forth in this section, such as addressing thermal impacts of storm water, downstream flooding, a total maximum daily load (TMDL) standard for a watershed, other applicable state or federal laws, an order of any court of competent jurisdiction, or chronic wetness conditions, if the Authority determines that an added level of protection is needed to protect:
- A. A cold water stream, outstanding water resource or exceptional water resource.
 - B. An environmentally sensitive area.
 - C. A downstream property.
 - D. Public health or safety.

(e) Storm Water Management Plan Contents. Storm water management plans shall contain the following items, if applicable:

1. Drafting date and contact information for the project engineer, with all other mapping elements and scale consistent with the site plan map;
2. Location of existing and proposed storm water discharge points;
3. Delineation and labeling of all proposed impervious areas and accompanying area computations;
4. Final design drawings of all proposed storm water BMP(s) with unique references to support documentation, prepared in accordance with minimum Authority standards and of sufficient clarity for those responsible for site grading, including:
 - A. Plan views showing the location of proposed BMP(s) in combination with the site plan map at a scale of 1 inch equals no more than 100 feet;
 - B. Additional detail plan view drawings at a scale of 1 inch equals no more than 40 lineal feet, showing proposed 2 foot contours and all critical design features and elevations;

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- C. Detailed cross-sections and profiles of each BMP showing all critical design features, side slopes, structures, soil profiles and applicable elevations, including seasonal high water table;
- D. Detailed drawings or material specifications for inlets or outlets.
- 5. Type, size, location and cross-sections of all pipes, open channels, grade stabilization structures and other proposed storm water conveyance systems, with unique references to support documentation;
- 6. Location and dimensions of proposed drainage easements;
- 7. Location, dimensions and surfacing material or soils data of proposed access lanes and delineation of easements needed to allow future maintenance of all storm water BMP(s) in accordance with section 32.12(b). The minimum width of any access easement shall be 15 feet;
- 8. Location of soil borings and soil profile evaluations with surface elevations and unique references to supplemental data sheets including highest groundwater table, as needed to determine feasibility of any proposed storm water BMP and to comply with applicable technical standards;
- 9. Detailed construction notes explaining all necessary procedures to be followed to properly implement the plan, including planting and landscaping specifications, timing and sequencing of construction and any temporary measures needed to protect BMP(s) during the construction phase;
- 10. A detailed stormwater BMP construction inspection plan, outlining the critical elements in the plan that need to be surveyed or inspected by a representative of the project engineer, or the Authority, and the timing and notification requirements involved.
- 11. A storm water BMP maintenance agreement in accordance with section 32.12;
- 12. Support documentation summarized in accordance with Authority standards, including but not limited to:
 - A. A narrative summary of the storm water management plan, briefly explaining any unique information that led to the selection of BMP(s), and how the proposed plan meets the guiding principles under sub. (b) of this section and the specific storm water planning requirements under sub. (d) of this section.
 - B. Maps of existing and proposed watersheds, subwatersheds, Tc/Tt flow paths, soil types, hydrologic soil groups, land uses/cover type and accompanying runoff curve numbers within the site and draining into the site from adjacent properties, with unique references to hydrology data summaries and a description of the ultimate receiving water body(s) for off-site discharges;
 - C. Pre-development and post-development hydrology and pollutant loading (if applicable) data for each watershed, such as peak flows and

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runoff volumes, as needed to meet the requirements of this ordinance. All major assumptions used in developing input parameters shall be clearly stated and cross-referenced to the maps under par. B. above;

D. Impervious surface maps and calculations of runoff volumes and effective infiltration areas, in accordance with sub. (d)(3) of this section.

E. Hydraulic and hydrologic data summaries for all existing and proposed pipes, open channels, grade stabilization structures and other storm water conveyance systems, and the necessary documentation to demonstrate compliance with the site drainage requirements under sub. (d)(6) of this section.

F. BMP design data for each proposed BMP, showing how it complies with applicable technical standards and the requirements of this ordinance;

G. Soil evaluation reports, following the standards in section 32.11(e), with matching references to map features showing their location and elevations;

H. A cover sheet stamped and signed by a professional engineer registered in the State of Wisconsin indicating that all plans and supporting documentation have been reviewed and approved by the engineer and certifying that they have read the requirements of this ordinance and that, to the best of their knowledge, the submitted plans comply with the requirements

I. Cost estimates for the installation of proposed storm water BMP(s), which shall serve as a basis for the financial assurance under section 32.08(c) above. The applicant may use average costs for BMP installations in the county rather than specific estimates, upon approval by the Authority.

J. For sites where changes are proposed in storm water flow paths, or where proposed storm water discharges may otherwise have a significant negative impact on downstream property owner(s), the Authority may require the applicant to submit written authorization or complete other legal arrangements with the affected property owner(s); and

13. Other items deemed necessary by the Authority to ensure compliance with the requirements of this chapter.