



COUNTY OF KENOSHA

Department of Planning and Development

STORM WATER MANAGEMENT PLAN REQUIREMENTS AND CHECKLIST

A storm water management plan is designed to protect downstream water resources and property owners from water pollution, flooding and other damage caused by urban runoff after a development is complete. Storm water management plan design should, to the maximum extent practicable, adhere to the following guiding principles:

- 1) Preserve natural watershed boundaries and drainage patterns;
- 2) Reserve adequately sized and sited areas for storm water infiltration, detention and treatment early in the planning process;
- 3) Locate storm water Best Management Practices (BMP) upstream from where runoff leaves the site or enters waters of the state and outside of wetlands, floodplains, primary and secondary environmental corridors, C-2 Upland Conservancy Zoning District, 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 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 (i.e. roofs) versus more polluted runoff (i.e. streets and parking lots);
- 8) Provide for emergency overflow in all storm water BMP designs (>100-year flows);
- 9) Distribute storm water bioretention and infiltration BMPs throughout the site plan for large developments.

NOTE: Any subdivision or development that requires site plan review or other project that may result in the addition of 0.5 acres of impervious surface shall go through a mandatory planning phase prior to submitting preliminary/final storm water plans¹. Kenosha County encourages open lines of communications between Department of Planning & Development (P&D) staff and the landowner, developer and project engineer or planner throughout the planning, engineering and construction phases to facilitate an expedient and trouble-free project approval process.

- ✓ A meeting to discuss concept/sketch plans should be scheduled early in planning stage with P&D and Township planning staff (multiple meetings may be necessary).
- ✓ A pre-submittal conference will determine applicable requirements, and resolve spatial and soils issues (soil profile evaluations may be necessary) early in the site-planning phase, preventing a conflict with other permit prerequisites or the recording of land divisions.
- ✓ A meeting prior to submittal to the Land Use Committee of the preliminary plat or Certified Survey Map (CSM).
- ✓ A meeting prior to submittal to the Land Use Committee of the final plat. It is important to note that complete stormwater plan approval is required prior to application for final plat approvals.
- ✓ An in-house pre-construction meeting scheduled prior to groundbreaking with the developer, project engineer and their contractor(s) to lay out the expectations that the County and Town will have during the construction process.
- ✓ An on-site pre-construction meeting with P&D staff to finalize any last minute changes before beginning construction.

Preliminary Storm Water Management Plans must include:

- ____ 1. A **site map** in accordance with the County Stormwater and Erosion Control Site Plan Map Requirements and Checklist. Digital submittal required consistent with County Mapping Standards.

STORMWATER CHECKLIST

- ___ 2. **Drafting date** and **contact information** for the project engineer with all other mapping elements and scale consistent with the site plan map.
- ___ 3. Delineation of existing and proposed **watersheds**, subwatersheds and major flow paths within the site and draining into the site from adjacent properties.
- ___ 4. Location, type and **preliminary design** of proposed storm water BMPs.
- ___ 5. Location and type of major storm water **conveyance systems** proposed for the site.
- ___ 6. Existing and proposed storm water **discharge points**.
- ___ 7. Locations and preliminary dimensions of proposed **drainage easements**.
- ___ 8. Location of soil borings and **soil profile evaluations** with surface elevations and unique references to supplemental data sheets, as needed to determine feasibility of any proposed storm water BMP and to comply with applicable BMP technical standards (i.e. infiltration).
- ___ 9. Preliminary location of **access lanes** for maintenance of storm water BMPs.
- ___ 10. Support documentation including:
 - ___ a. Preliminary **plan narrative** describing site drainage, ultimate receiving water body for off-site discharges, major site restrictions, and how the preliminary storm water management plan will meet the technical requirements and other project objectives;
 - ___ b. Summary of watershed, subwatershed and land use **data** in acres and the preliminary results of any hydrology calculations, following approved P&D format;
 - ___ c. **Soil profile evaluation data** submitted in accordance with BMP technical standards;
 - ___ d. Proposed ownership and **maintenance** responsibilities for all proposed storm water BMPs

Final Storm Water Management Plans must include:

- ___ 1. A **site map** in accordance with the County Stormwater and Erosion Control Site Plan Map Requirements and Checklist. Digital submittal required consistent with County Mapping Standards.
- ___ 2. **Drafting date** and **contact information** for the project engineer, with the engineer's stamp and date. All other mapping elements and scale consistent with the site plan map;
- ___ 3. Location of existing and proposed storm water **discharge points**;
- ___ 4. Delineation and labeling of all proposed **impervious areas** and accompanying area computations.
- ___ 5. Final **design drawings** of all proposed storm water BMPs with unique references to support documentation and of sufficient clarity for those responsible for site grading, including:
 - ___ a. Plan views showing the **location of proposed BMPs** 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 contours and all critical design features and elevations;
 - ___ c. One detailed **cross-section** and one profile of each BMP, drawn to scale, with locations shown on the plan view, and showing all critical design features, side slopes, structures, soil profiles and elevations, including seasonal high water table and existing grade;
 - ___ d. Detailed drawings or **material specifications** for inlets or outlets.
- ___ 6. 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.
- ___ 7. Location and dimensions of proposed **drainage easements**.
- ___ 8. Location, dimensions and surfacing materials or soils data of proposed **access lanes** and delineations of easements needed to allow future maintenance of storm water BMPs. Minimum width of any access easement shall be 15 feet.
- ___ 9. Location of soil borings and **soil profile evaluations** with surface elevations and unique references to supplemental data sheets, as needed to determine feasibility of any proposed storm water BMP and to comply with applicable technical standards.

STORMWATER CHECKLIST

- ___ 10. 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 BMPs during the construction phase.
- ___ 11. Detailed **construction inspection plan**, outlining the critical elements in the plan that need to be surveyed or inspected by a representative of the project engineer, the P&D or the municipality, and the timing and notification requirements involved (**Identify who is responsible**).
- ___ 12. A final **maintenance agreement**.
- ___ 13. Support documentation must include at least the following:
 - ___ a. A **narrative** summary of the storm water plan. (May combine with erosion control plan).
 - ___ b. **Maps** of existing and proposed **watersheds**, subwatersheds, Tc/Tt flow paths, soil types, hydrologic soil groups, land uses/cover type and runoff curve numbers within the site and draining into the site from adjacent properties, with unique references to hydrology data summaries and 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 runoff volumes, as needed to meet technical requirements. All major assumptions used in developing the input parameters shall be clearly stated and cross-referenced to the maps.
 - ___ d. **Impervious** surface maps and calculations of runoff volumes and effective infiltration areas.
 - ___ e. **Hydraulic & Hydrologic data summaries** for all existing and proposed pipes, channels, grade stabilization structures and other runoff conveyance systems, and the necessary documentation to demonstrate compliance with the site drainage requirements.
 - ___ f. **BMP design data** for each proposed BMP, showing how it complies with applicable technical standards and the requirements, following approved P&D format.
 - ___ g. **Soil evaluation reports** with matching references to map features, 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, to the best of their knowledge, the submitted plans comply with the requirements these guidelines.
 - ___ i. 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 P&D may require the applicant to submit written authorization or complete other legal arrangements with the affected property owner(s).

I, the principal project engineer, do hereby certify that to the best of my knowledge this checklist is complete and accurate:

PRINT NAME: _____ DATE: _____

SIGNATURE: _____

NOTE: You must submit a complete Stormwater Plan and the appropriate fee based upon the Kenosha County Department of Planning & Development Fee Schedule. A separate fee submittal is required with each successive submittal of additional stormwater information. For all successive submittals the design engineer shall include in its response to review letters a coversheet listing individual responses to each of the comments and how each has been adequately addressed. You should be aware that once the stormwater and finished grading plan is implemented an As-Built Stormwater Facilities Review/Grading Certification and fee must be submitted for approval. You must complete the **Kenosha County Subdivision & Construction Site As-Built Requirements and Checklist** and submit to the P&D for review and approved prior to the issue of any zoning permits. I have read and understand and hereby agree to comply with the above conditions (Initial here _____).

Summary of Storm Water Management Plan Technical Requirements

Listed below is a brief summary of the specific storm water management planning requirements and performance standards that must be met on all sites to the “maximum extent practicable”. Please note that this is only a summary. It is intended to be a general guide for the project engineer. For details on any of the items listed, contact the County Land & Water Conservation Engineer.

1. Peak Discharge.

- A. Reduce the post-development peak rates of runoff during the two-, 10-, and 100-year recurrence interval storms to less than the peak rates of runoff during the same recurrence interval storms occurring under predevelopment conditions for the Towns of Brighton, Paris, Randall, Salem, and Wheatland.
- B. Reduce the post-development peak rates of runoff during the 10- and 100-year recurrence interval storms to less than the peak rates of runoff during the two- and 10-year recurrence interval storms occurring under predevelopment conditions, respectively, for the Town of Bristol.
- C. For the Town of Somers, reduce the post-development peak rate of runoff during the 100-year recurrence interval storm to less than the peak rate of runoff from the 10-year recurrence interval storm occurring under predevelopment conditions. Also, reduce the two- and ten-year post-development peak rates of runoff to less than the peak rates of runoff for the same recurrence interval storms occurring under predevelopment conditions.

2. Total Suspended Solids. By design, each storm water management plan must meet the following post-development total suspended solids (TSS) reduction targets, based on average annual rainfalls, as compared to no runoff management controls:

- A. For new land development, 80% TSS reduction;
- B. For redevelopment, 40% TSS reduction;
- C. For in-fill development prior to October 1, 2012, 40 % TSS reduction;
- D. For in-fill development after October 1, 2012, 80% TSS reduction.

3. Infiltration.

Land Use	Minimum Infiltration Volumes (%)		Maximum Required “Effective Infiltration Area”
	Option #1 Percent of Annual Predevelopment Runoff	Option #2 Percent of 2-Year, 24- hr. Storm Runoff	
Residential	90%	25%	1% of Site
Nonresidential	60%	10%	2% of Site

4. Protective Areas. A “protective area” is a vegetative buffer that must be maintained between a proposed impervious surface and the nearest water resource, measured from the “top of channel”. Storm water BMP’s may be located in the area, but cannot encroach on wetlands, floodplains or environmental corridors. Minimum widths of protective areas are shown in the table below:

STORMWATER CHECKLIST

Site Description	Protective Area Min. Width
All lakes and streams (see county GIS system)	50 lineal feet
“Outstanding” and “Exceptional resource waters”	75 lineal feet
Wetlands: <ul style="list-style-type: none"> • Highly susceptible (determined by the P&D) • Less susceptible (determined by the P&D) 	50 lineal feet 10% of average wetland width
Concentrated flow channels (>130 acre drainage)	10 lineal feet

5. Fueling and Vehicle Maintenance Areas. Must have BMPs designed, installed and maintained to reduce petroleum within runoff, such that the runoff that enters waters of the state contains no visible petroleum sheen.

NOTE: A combination of the following BMPs may be used to reduce petroleum within runoff: oil and grease separators, canopies, petroleum spill cleanup materials, or any other structural or non-structural method of preventing or treating petroleum in runoff.

6. Site Drainage

- A. *Drainage easements* must be recorded to preserve major storm water flow paths, specify maintenance responsibilities, restrict buildings/structures and prevent any grading, filling or other activities that obstruct flows. Provisions must be made for the continued maintenance of any proposed stormwater facilities. Either a legal agreement between a homeowners association and the Town involved should be executed, or the land containing the basin should be dedicated to the Town, with the Town assuming responsibility for maintenance.
- B. Site grading must ensure positive flows away from all buildings, roads, driveways/septic systems, coordinate with general drainage patterns for the area, and minimize adverse impacts on adjacent properties.
- C. *Street drainage* must prevent concentrated flows from crossing the traffic lanes. Design flow depths at the road centerline must not exceed 6 inches during the 100-year, 24-hour design storm.
- D. *Storm sewers* shall be designed in accordance with all applicable community technical standards and specifications.

7. Hydrologic and Hydraulic Considerations

- A. SEWRPC or SCS Type II regional rainfall depths and distribution curves must be used. Website is available at: <http://www.sewrpc.org/rainfallfrequency/default.shtm>
- B. NRCS SSURGO soil data shall be used to determine hydrologic soil groups.ⁱⁱ
- C. Peak flow rates and hydrographs must be developed for storms with recurrence intervals of two, 10, and 100 years under both pre- and post-development conditions.
- D. Minor stormwater drainage system must be designed for a 10-year recurrence interval storm. (The minor system consists of sideyard and backyard drainage swales, roadside swales, storm sewers, and possibly stormwater storage facilities.)

STORMWATER CHECKLIST

- E. Major storm water drainage system must be designed for a 100-year recurrence interval storm. (The major system consists of the entire street cross-section and interconnected drainage swales, watercourses and stormwater storage facilities.)
- F. An overland flow path downstream of the detention basin which will enable overflow during storms greater than the basin design storm must be provided in order to safely convey overflow to a receiving watercourse.
- G. Detention basin must be located on an outlet.
- H. Culverts must be designed for the following peak rates of runoff as called for under the County subdivision control ordinance.
 - i. Collector Streets: Peak rate of runoff from a 10-year recurrence interval storm with two feet of freeboard to the roadway elevation.
 - ii. Arterial Streets and Highways: Peak rate of runoff from a 50-year recurrence interval storm with two feet of freeboard to the roadway elevation.
 - iii. All culverts under freeways and railways must be designed for the peak rate of runoff from a 100-year recurrence interval storm, as called for under SEWRPC standards.

8. Environmental and Land Use Considerations

If any portion of the site is located in a primary environmental corridor (PEC), those lands within the PEC should either have deed restrictions placed on them requiring that the lands be maintained in permanent natural open space use, or development on those lands should be restricted to one house for every five acres of upland. County shoreland-wetland zoning regulations or State or Federal wetland regulations will apply to any activities that directly impact wetlands (e.g., filling, excavation, storm sewer construction, etc.).

9. Nonpoint Source Pollution and Construction Erosion Control Considerations

- A. If located in a watershed for which a comprehensive watershed plan has been prepared by SEWRPC, all nonpoint source pollution control measures proposed which are likely to achieve the loading reductions recommended in the plan.
- B. If located outside of a watershed with a comprehensive plan, every provision practicable should be made to minimize the contribution of nonpoint source pollutants to receiving streams, lakes, and wetlands.
- C. Proposed detention basins shall be constructed prior to the commencement of significant site grading so they can function as sediment traps. Following construction, the basin should be excavated to restore the necessary permanent pond depth.
- D. Where a wet detention basin with a permanent pond is proposed for the control of nonpoint source pollution, the basin shall have the following characteristics:
 - i. A pond length between the inlet and the outlet of at least three times the pond width.
 - ii. A 10-foot-wide essentially level terrace around the basin perimeter for safety purposes.
 - iii. A minimum 25-foot-wide vegetated buffer strip around the basin perimeter.
 - iv. Basin side slopes no steeper than one vertical on three horizontal, preferably flatter.
 - v. An average permanent pond depth of about five feet.

STORMWATER CHECKLIST

- vi. All emergency overflow spillways shall be designed as 1.5 feet below the elevation of the 10-foot-wide level berm. Where an orifice is used as an outlet, features to prevent clogging of the orifice shall be used in accordance with WDNR Storm Water Management Technical Standard No. 1001 for Wet Detention Basin
 - vii. The developer/homeowner's association shall obtain approval from the County prior to installing fountains/aerators in any wet detention basins. A submittal in accordance with WDNR Technical Standard No. 1001 for Wet Detention Basin shall be submitted for any basin in which the developer/homeowner's association wishes to place such a device.
 - viii. Erosion protection at basin inlets and outlets.
 - ix. Vehicular maintenance access to the basin.
- E. Developments that meet the eligibility requirements established in Chapter NR 151, "Runoff Management," of the Wisconsin Administrative Code shall provide construction erosion control measures consistent with Section NR 151.11.
- F. After October 1, 2004, any developments that meet the eligibility requirements established in Section NR 151.12 must provide post-construction control of stormwater runoff consistent with the requirements of Section NR 151.12 and must provide setbacks for protective areas consistent with the requirements of Section NR 151.12 (5) (d). Development in the Des Plaines River watershed, must provide controls on the peak rate of runoff from a two-year storm that are consistent with the release rate established below under Item 4 of this checklist. The following Wisconsin Department of Natural Resources (WDNR) Conservation Practice Standards should be applied in project design. These standards can be downloaded at: <http://www.dnr.state.wi.us/runoff/stormwater/techstds.htm>.
- Code 1001, "Wet Detention Basin,"
 - Code 1002, "Site Evaluation for Stormwater Infiltration,"
 - Code 1003, "Infiltration Basin," and the accompanying "Technical Note for Sizing Infiltration Basins and Bioretention Devices to Meet State of Wisconsin Stormwater Infiltration Performance Standards," and
 - Code 1004, "Bioretention for Infiltration," and the accompanying Technical Note referenced above.
 - WDNR Specification S100, "Compost," is referenced in some of the standards listed above and should also be applied.

10. Special Considerations for Development in the Des Plaines River Watershed

- A. The boundaries of the Des Plaines River watershed are shown on the attached Map #1. Peak rates of runoff within the Des Plaines River watershed from new development shall be controlled as follows:
- i. The post-development 100-year storm release rate from the site should be no more than 0.30 cfs per developed acre.
 - ii. The post-development two-year storm release rate from the site should be no more than 0.04 cfs per developed acre.
- B. Runoff from new development within the watershed should be provided with facilities to achieve those levels of control. The following initial screening criteria are to be applied to determine the potential eligibility of a development for the provision of runoff controls:
- i. The development site must be in the Des Plaines River watershed.

STORMWATER CHECKLIST

- ii. The proposed development will create additional impervious area of greater than, or equal to, 10 percent of the total site area (with wetland and primary environmental corridor areas excluded from the total site area). All new impervious surfaces, including new roads are to be included in this calculation.
- C. Except for the following exemptions, any development that meets the above criteria will be required to meet the release rates:
- i. Single residential lots that are not part of a larger development.
 - ii. Land divisions creating four or fewer residential lots.
 - iii. Non-residential development sites with land disturbing construction activity of less than one acre, unless new impervious area of 0.5 acre or more is created.

NOTE: The P&D may establish more stringent requirements than those listed based on unique site conditions, such as sensitive water resources or downstream landowner impacts.

ⁱ **Exemptions.** Land disturbing activities that meet the following criteria shall be exempt:

1. Planting, cultivating or harvesting any plant grown for human or livestock consumption or pasturing or yarding of livestock including sod farms and tree nurseries.
2. Land disturbing activities directly related to the installation and maintenance of private on-site waste disposal systems, regulated under Chapter 15 of the County Code of Ordinances.
3. Land disturbing activities conducted for a project designed, funded or implemented under the supervision of the county land & water conservation division, the USDA Natural Resources Conservation Service, or the WI Department of Agricultural Trade and Consumer Protection, if conducted according to county conservation standards.
4. Land development and land disturbing activities exempted by state or federal law, including highway construction and other projects conducted by a state agency, as defined under s. 227.01 (1), Wisconsin Statutes, or under a memorandum of understanding entered into under s. 281.33 (2), Wisconsin Statutes. To recognize an exemption under this paragraph, the P&D may require documentation of the person(s) and regulatory agency charged with enforcing erosion control and storm water management for the project.
5. Land disturbing activities required for the construction of individual one and two family residential buildings under COM. 21.125 Wis. Admin. Code. Note: The Wisconsin Uniform Dwelling Code (COM 21) includes erosion control requirements that apply statewide.
6. Nonmetallic mining activities that are covered under a nonmetallic mining reclamation permit under NR 135 Wis. Admin. Code and regulated under Chapter 13 of the County Code of Ordinances.
7. Placement of underground pipe or other utility that is plowed or bored into the ground outside areas of channelized runoff.
8. Other Exemptions. P&D may exempt a site or a portion of a site from meeting certain technical requirements or provision under unique site conditions.

ⁱⁱ The most current U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil map units on a specific project site may be determined using their Web Soil Survey

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Define the "Area of Interest" (AOI), go to Soil Data Explorer tab and click on Soil Properties and Qualities. Then, along the left side, click on Soil Qualities and Features and choose Hydrologic Soil Group > Run Report. This will always give you the most up-to-date SSURGO soil groups. The Kenosha County Interactive Mapping System also serves the following types of data: Parcels, Topography, Public Land Survey Systems, Roads, Water Bodies, Zoning, Soils, and Aerial Photography visit the Kenosha County website at: http://www.co.kenosha.wi.us/plandev/mapping/interactive_map.html.

IMPORTANT TELEPHONE NUMBERS

Kenosha County Center

Department of Planning & Development

19600 - 75th Street, Post Office Box 520

Bristol, Wisconsin 53104-0520

Division of County Development (including Sanitation & Land Conservation) ---- 857-1895

Facsimile # ----- 857-1920

Public Works Division of Highways ----- 857-1870

Administration Building Division of Land Information ----- 653-2622

Brighton, Town of ----- 878-2218

Bristol, Town of ----- 857-2368

Paris, Town of ----- 859-3006

Randall, Town of ----- 877-2165

Salem, Town of ----- 843-2313

Salem Utility District ----- 862-2371

Somers Town of ----- 859-2822

Wheatland, Town of ----- 537-4340

Wisconsin Department of Natural Resources Sturtevant Office ----- 884-2300

Wisconsin Department of Transportation Waukesha Office ----- 548-8722