STORM WATER MANAGEMENT PLAN REQUIREMENTS 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;
- 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, 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 overland flow paths throughout the site to safely convey stormwater around buildings and structures. Additionally, overland flow paths to the receiving watercourse downstream of BMP's shall be analyzed to minimize adverse impacts to neighboring landowners.
- 9) Distribute storm water bioretention and infiltration BMPs throughout the site plan for large developments.

A subdivision or development that requires a site plan review, a development that involves the construction of a new road, or any other project that may result in the land disturbance of 1.0 acre or more or increases the amount of impervious surface by 0.5 acres shall go through a mandatory planning phase prior to submitting a final plat or commencing any land disturbing activity. Kenosha County encourages open communication between Department of Planning & Development (P&D) staff and the landowner, developer and project engineer 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). At this meeting(s), it will be determined if preliminary stormwater and erosion control plans will be necessary.
- ✓ The applicant may then submit complete preliminary stormwater and erosion control applications, if necessary, to P&D for review and approval.
- ✓ Upon preliminary plan approvals or at the discretion of P&D, the applicant can submit final stormwater and erosion control plans for review and approval. It should be noted that at any time during the review process, P&D may require the landowner, developer, and project engineer meet to discuss any outstanding issues or review comments in an effort to avoid an unnecessary number of project reviews in an effort to shorten the review process time. Stormwater and erosion control permits shall be issued upon approval of the final plans. A stormwater permit is required prior to final plat application or prior to any land disturbing activity.
- ✓ After the financial assurance has been secured, the applicant shall schedule a pre-construction meeting with P&D staff and required attendees (owner, developer, project engineer, and their contractors) to lay out the expectations that the County and Town will have during the construction process. Additionally, the construction schedule and any last minute changes will be finalized before beginning construction.
- ✓ After construction and once the site has been stabilized, the applicant shall verify the construction of all stormwater management facilities by submitting an as-built stormwater facilities survey and detention pond compliance report to P&D for review and approval.
- ✓ Upon approval of the as-built survey, the contractor shall remove any remaining erosion control measures.
- At the request of the owner, P&D shall complete a final inspection. If all of the requirements of the stormwater ordinance have been met, P&D shall issue a notice of termination indicating the conditions of this permit have been satisfied at which time the financial assurance will be released.

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 may be required consistent with County Mapping Standards.
2.	Drafting date and contact information for the project engineer with all other mapping elements
3.	and scale consistent with the site plan map.
3.	Delineation of existing and proposed watersheds , subwatersheds and major flow paths within the site and <u>draining to the site from adjacent properties</u> .
4.	Preliminary grading plan sufficient to show the 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. 7. 8.	Existing and proposed storm water discharge points . Locations and preliminary dimensions of proposed drainage easements .
	Location of soil borings and soil profile evaluations with surface elevations and unique references
0.	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 routes for the 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 Stor	m 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.	
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10.	Location, dimensions and surfacing materials or soils data of proposed access routes and delineations of easements needed to allow future maintenance of storm water BMPs. Minimum
	width of any access easement shall be 15 feet.
11.	Location of soil borings and soil profile evaluations with surface elevations and unique references
	to supplemental data sheets including a minimum of (2) two borings per pond footprint, as needed to
	determine feasibility of any proposed stormwater BMP and to comply with applicable technical
	standards.
12.	Detailed erosion control inspection plan 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
40	construction phase. DNR form 3400-187 may be used for field inspections.
13.	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, P&D or the municipality, and the timing and notification requirements involved (Identify who is responsible).
14.	A final maintenance agreement that includes a cost estimate for annual maintenance activities. A
'	sample maintenance agreement can be obtained from P&D.
15.	Support documentation must include at least the following:
	a. A narrative summary of the storm water 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. Calculations and design summaries necessary to meet site infiltration requirements (if
	applicable).
	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 stormwater flow paths, flow patterns, drainage
	basins, or where proposed stormwater discharges may otherwise have a significant
	negative impact on downstream property owner(s), P&D may require the applicant to
	submit written authorization or complete other legal arrangements with the affected
16	property owner(s).
16.	Any other items deemed necessary by P&D to ensure compliance with the Stormwater Ordinance.
I, the	principal project engineer, do hereby certify that to the best of my knowledge this checklist is
	lete and accurate:
רי איז	NAME.
PRINT	NAME:DATE:
SIGNA	ATLIRE:

All Stormwater Management Submittals to the Kenosha County Department of Planning and Development shall include the following:

- A completed and signed Stormwater & Erosion Control Permit Application form
- A completed and signed Stormwater Management Plan Requirements Checklist
- A completed and signed Erosion Control Plan Requirements Checklist
- A completed Site Plan Map Requirements Checklist
- Two (2) paper copies of the site map(s), and all supporting documents
- Two (2) paper copies of the Stormwater Management Plans and all supporting documents
- Two (2) paper copies of the Erosion Control Plans and all supporting documents
- Digital files (AutoCAD .dwg format, v.2004 or later) georeferenced to the State Plane Coordinate System, Wisconsin South Zone, NAD 27, NGVD-29 of all existing contours, proposed contours, and elements of the site map to determine the accuracy of the proposed stormwater plan. Additionally, any stormwater model used to calculate runoff volumes and peak flow rates such as PondPack or Hydraflow Hydrographs shall be submitted as well.
- The appropriate application fee as determined from the Kenosha County Planning and Development Fee Schedule. A separate fee is required with each successive stormwater submittal.

NOTE: For all successive submittals, the project engineer shall include in its response to review letters a cover sheet listing individual responses to each of the comments and how each has been adequately addressed. Be aware that once the stormwater and finished grading plan is implemented an As-Built Stormwater Facilities Survey, a Detention Pond Compliance Report, and fee must be submitted. The project engineer is responsible for certifying that the stormwater facilities have been constructed in a manner consistent with the Kenosha County stormwater ordinance. **No zoning permits will be issued until the As-built Plans have been approved unless financial assurance has been secured with the County.** 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. Special Considerations for Development in the Des Plaines River Watershed

- A. 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. New developments located in the Des Plaines River watershed that meet any of the following criteria shall control runoff on a per acre release rate as listed above:
 - i. 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.
 - ii. The proposed development will ultimately result in the addition of 0.5 acres or greater of impervious surfaces.
 - iii. A proposed development site with land disturbing construction activity of one acre or more.
- 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.
 - iv. Re-development sites.

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

 Total Suspended Solids. By design, each storm water management plan must meet the following postdevelopment 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 <u>after October 1</u>, 2012, 80% TSS reduction.

3. Infiltration.

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

4. <u>Protective Areas</u>. 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:

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: • Highly susceptible (determined by WDNR) • Less susceptible (determined by WDNR)	50 lineal feet 10% of average wetland width	
Concentrated flow channels (>130 acre drainage)	10 lineal feet	

5. <u>Fueling and Vehicle Maintenance Areas</u>. 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 County 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. All channels shall be designed with a minimum 1.0% gradient and be centered on lot lines wherever possible.
- 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 using planned land use conditions for the entire contributing watershed area.

D. Storm sewers shall be designed in accordance with all applicable community technical standards and specifications.

7. Hydrologic and Hydraulic Considerations

- A. SCS Type II regional rainfall distributions shall be used for stormwater management applications. Any hydrologic and hydraulic study required involving a floodplain analysis shall use the SEWRPC recommended rainfall distribution and rainfall depths instead of the Type II distribution. It is necessary to perform a critical duration analysis using various storm durations to determine the largest peak flow using the SEWRPC distribution. The 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.)
- 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. Provide overland flow paths throughout the site to safely convey stormwater around buildings and structures. Additionally, 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 outlot.
- 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 safety shelf that extends a minimum of 8 ft. from the edge of the permanent pool waterward with a slope of 10:1 or flatter.
 - ii. A pond length between the inlet and the outlet of at least three times the pond width.
 - iii. A 10-foot-wide essentially level terrace around the basin perimeter for safety purposes.
 - iv. Basin side slopes no steeper than one vertical on three horizontal, preferably flatter above the safety shelf and basin side slopes no steeper than one vertical on two horizontal, preferably flatter below the safety shelf.
 - v. An average permanent pond depth of no less than five feet.
 - vi. All emergency overflow spillways shall be designed as 1.0 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.
 - vii. A core trench and a pond liner in accordance with WDNR Technical Standard No. 1001 for Wet Detention Basins.
 - viii. An anti-seep collar to prevent a wash-out of the outlet structure discharge pipe.
 - ix. 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.
 - x. Erosion protection at basin inlets and outlets.
 - xi. Vehicular maintenance access to the basin recorded in an easement.
- E. 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 10 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.

- 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 COMM 21.125 Wisconsin Administrative Code or any accessory structures which are not regulated under COMM 21.125 or COMM 20.25 Wisconsin Administrative Code. This exemption applies to individual buildings only. Larger developments that include one and two family residential buildings such as subdivisions are not exempt from meeting the requirements of this ordinance.
- 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. 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.

¹ Exemptions. Land disturbing activities that meet the following criteria shall be exempt: