1 STORM WATER MANAGEMENT PERMIT INFORMATION

- Pre-application meeting with Public Works Director and Consulting Engineer to discuss project and unique site conditions. This can also be used to run preliminary storm water management ideas past us.
- Please direct any questions regarding the ordinance and/or standards to the Public Works Director or Consulting Engineer.
- Submit Storm Water Management Permit Application and first submittal of plans and/or calculations to City.
- Respond to comments from engineering department.
- The City shall have 30 business days to review the first full submittal.
- The City shall have 15 business days to review any additional submittals.
- Most projects will require a short-term maintenance and monitoring agreement to be signed and submitted to cover maintenance during the construction phase. This document is drafted by the City, but shall be open to comment and revision from the owner and/or the owner’s engineer.
- After all comments have been addressed and the short-term and long-term agreements are on file with the City, and an infiltration test has been conducted, approval of plans and calculations will be granted. The Public Works Director will sign the permit application and a copy will be mailed to owner. Permit is valid for 180 days from date of issuance unless extended by Public Works Director or property passes final inspection.
- Ground breaking may commence only once the Storm Water Management Permit is signed. Permit holder shall notify the City at least 5 business days before commencing any work. A copy of the storm water plan shall be available on the job site at all times.
- Permit holder shall notify the City of any significant modifications it intends to make to an approved storm water plan.
- Permitee shall inspect all BMP’s within 24 hours of any rain event of 0.5 inches or more, and at least once a week. Written records shall be kept of these inspections.
- Private systems are generally systems that are designed and built to serve only one property. Privately maintained systems will require a long-term storm water management agreement to be signed and filed with the county. Owner must provide proper legal description of property for recording purposes. The City will then draft the document to be signed and notarized by the owner. Once signed and notarized, return to the City to be recorded with the county.
- Close out of projects:
  - If the systems will be publicly maintained, systems must pass City inspection and be functioning as designed. Please reference our infiltration acceptance procedures.
  - If the systems will be privately maintained, a certified as-built and/or certification by an engineer registered in the state of WI must be submitted to the City within 6 months of completion of the project. Certification may be simply a memo indicating that systems were constructed per plans (with date given), no changes were made to the plans, and the system should function as intended, etc.
2 SUBMITTAL CHECKLIST

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Engineering Contact Name</th>
<th>Submitted</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Storm Water Management Permit Application
Full Plan Set:
  - Pre-development plan
  - Post-development plan
  - Grading and drainage plan
  - Erosion control plan
  - Storm sewer system

Full Drainage Report (Please submit Drainage Report in this order):
  - Project summary sheet, Submittal checklist, Plan sheet checklist, General design requirements checklist
  - Any pertinent notes or schematics
  - Pre-developed hydrographs
  - Post-developed hydrographs
  - Construction phase hydrographs as applicable
  - Wet pond summary sheets and reservoir reports
  - Outlet structure reports (and details if not in plans)
  - Water quality analysis (P8)
  - Infiltration summary sheets and infiltration calculations
  - Any offsite analysis (hydrographs, maps, outlets, etc)
  - Storm sewer analysis
  - Soil borings and infiltration test results (with mapped locations)
  - Soils Map
  - Plan view of storm sewer (if not in plan set)
  - Pre and post-developed plan view of drainage areas
  - Storm sewershed map
  - Flow path used to calculate time of concentration

Signed short-term maintenance and monitoring agreement*
Signed long-term maintenance and monitoring agreement*

*City will draft the maintenance and monitoring agreement
**3 PROJECT SUMMARY SHEET**

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Engineering Contact Name</th>
</tr>
</thead>
</table>

**If additional space is required for any of these parameters, please attach another page.**

Brief description of project and storm water practices utilized:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Please list all locations water is currently leaving the site:
Location 1: _____________________________________________________________
Location 2: _____________________________________________________________
Location 3: _____________________________________________________________
Location 4: _____________________________________________________________

Please provide rate control summaries in the tables provided for each location water is leaving the site.

<table>
<thead>
<tr>
<th>Location 1</th>
<th>2-year (cfs)</th>
<th>10-year (cfs)</th>
<th>100-year (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Pre-Developed</td>
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<tr>
<td>Post-Developed Un-routed</td>
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<tr>
<td>Post-Developed Routed</td>
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<table>
<thead>
<tr>
<th>Location 2</th>
<th>2-year (cfs)</th>
<th>10-year (cfs)</th>
<th>100-year (cfs)</th>
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<td>Pre-Developed</td>
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<td>Post-Developed Un-routed</td>
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<td>Post-Developed Routed</td>
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<tr>
<th>Location 3</th>
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<th>10-year (cfs)</th>
<th>100-year (cfs)</th>
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<td>Pre-Developed</td>
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<tr>
<td>Post-Developed Un-routed</td>
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<tr>
<td>Post-Developed Routed</td>
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<table>
<thead>
<tr>
<th>Location 4</th>
<th>2-year (cfs)</th>
<th>10-year (cfs)</th>
<th>100-year (cfs)</th>
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<tr>
<td>Pre-Developed</td>
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<tr>
<td>Post-Developed Un-routed</td>
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</tr>
<tr>
<td>Post-Developed Routed</td>
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</tbody>
</table>
Schedule and Sequencing: Include a description of the intended sequence of major activities that disturb soils for major portions of the site, such as grubbing, excavating or grading. Also describe any staging of land disturbing construction activities to limit exposed soil areas subject to erosion. Include anticipated starting and completion dates of each sequence of land disturbing activities and the anticipated date of completion of erosion runoff control measures and establishment of final cover for each sequence area.

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Descriptions of any interim and permanent stabilization practices. Also include descriptions of any structural practices to divert flow away from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from the construction site:

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Any major assumptions used in the design or developing input parameters for the hydrology model:

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4 PLAN SHEET CHECKLIST

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<thead>
<tr>
<th>Project Name</th>
<th>Engineering Contact Name</th>
</tr>
</thead>
</table>

Pre-Development Plan Sheet(s)
- 1"=100’ or larger scale
- Existing 2-foot contours
- Property lines and easements
- Existing structures, roads, other paving or impervious cover and vegetative cover
- Existing topography of site and sufficient adjacent lands to indicate site location and existing drainage patterns, water courses, pipes or structures that may affect or be affected by the proposed development
- Limits of any natural wetland and/or floodplain based on a 100-year flood
- Existing public and private utilities are shown.

Post-Development Plan Sheet(s)
- 1"=100’ or larger scale
- Final proposed topography of the site at a contour interval not greater than 2 feet.
- Any changes to lakes, streams, wetlands, channels, ditches, and other watercourses on and immediately adjacent to the site are shown.
- Locations of easements.
- Limits of any natural wetland and/or floodplain based on a 100-year flood.
- Location, elevations and dimensions of proposed structures and paved areas.
- Location and types of utilities to be installed.

Erosion Control Plan Sheet(s)
- 1"=100’ or larger scale
- Existing and proposed contours
- Location and sediment controls for temporary stockpile areas are shown.
- Areas to be sodded or seeded and mulched or otherwise stabilized with vegetation or other permeable/protective cover, describing type of final vegetative cover. Type and quantity of mulch or cover material and method of anchoring shall be indicated, as well as seeding mixtures & rates and lime & fertilizer application rates.
- Shown location of all BMP’s
- Drainage ways are stabilized
- Stabilized vehicle exits are provided where construction equipment will exit the site.
- Velocity dissipation devices at discharge locations and the length of any outfall channel.
- Temporary and permanent erosion control measures are provided and located.
- Storm inlets protected from receiving sediment.
- Smallest area disturbed at any given time.
- Applicable notes on plan sheet regarding erosion control (please request “City of River Falls Standard Notes for Grading and Erosion Control Plans” if needed).
- Disturbed slopes in excess of 4:1 are seeded and protected erosion blankets or are sodded and staked.
- Silt fence shall be installed in accordance with standard details.
- Silt fences are provided to protect adjacent property from receiving untreated runoff.
Water bodies and watercourses are protected from receiving untreated runoff.
Silt fences follow contour lines with ends flared uphill to provide storage capacity.
Silt fences are used in sheet flow areas only, not for concentrated flows.
Flow length up slope from silt fence shall is limited as follows:
- 600’ max. for slopes less than 3%.
- 300’ max. for slopes 3% to 6%.
- 150’ max. for slopes greater than 6%

Grading/Drainage Plan Sheet(s)
- 1”=50’ or larger scale
- 2-foot contours (1-foot contours in the pond areas)
- Contours for existing topography are dashed and proposed are solid. Contours are labeled.
- North arrow shown (up or to left)
- Property limits shown
- Park and wetland areas are shown
- Existing wells and drain fields are shown
- Emergency overflows labeled
- Groundwater elevations shown (or accounted for in notes section)
- Bottom, normal water level and high water level elevations are shown.
- Flow path and direction for all storm water conveyance sections
- Location, dimensions and description of all channels, pipes, structures, basins, reservoirs or other conveyances proposed to carry runoff to the nearest adequate outlet.
- The minimum building opening elevation is shown and complies with the following:
  - 2 feet above the 100-year design storm elevation.
  - At least one foot above the emergency overflow
  - At least 4 feet above the groundwater table
- Each lot shall have:
  - Proposed elevation of garage floor
  - Lowest opening elevation
  - Ground elevation at front of building.
  - Ground elevation at rear of building.
  - Proposed structure type (STD or S, SWO or LO, WO).
  - Proposed lot corner elevations.
- High points and low points labeled as needed
- Drainage directional arrows are shown
- Percent of grade is shown for all drainage swales
- Drainage flows over only one adjacent lot before proper discharge
- All rear and side yard swales shall be centered on property lines
- Drainage flows away from structures
- Minimum lot grades are 1% wherever drainage from only one lot exists
- Any retaining walls are shown
- Plan accommodates offsite drainage
- Plan matches existing grades at the development property lines with a slope not to exceed 3:1 within 10 feet of the property line.
- 15’ wide access and turn-around area for maintenance vehicles is shown on a slope no greater than 15%. Access shall encircle the pond above the 100-year high water elevation for the pond.
5 GENERAL DESIGN REQUIREMENTS CHECKLIST

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Engineering Contact Name</th>
</tr>
</thead>
</table>

Drainage Easements

- Provided for all private storm water rate control facilities
- Provided where concentrated flow from more than 1 adjacent lot is received
- Provided where emergency overland overflow location associated with:
  - Catch basins in sag vertical curves
  - Detention and retention ponds
  - Anywhere the storm sewer system cannot handle a 100-year event
- Minimum drainage easement widths shall be as follows:
  - 15’ wide for flows from 1 acre or less, or 4 lots or less
  - 20’ wide for flows from more than 1 acre or more than 4 lots
  - Three times the combination of pipe diameter plus bury depth or 20’, whichever is greater, for all other buried pipes.
- All easements shall be seeded and protected
- All easements are shown on grading plan

Swales

- Channelized storm runoff in excess of 0.5cfs discharges into a catch basin or inlet before crossing a sidewalk or curb.
- Swales are seeded and protected with wood fiber blankets or are sodded and staked where concentrated flow from more than 1 acre or 4 lots is directed.
- Velocity computations are provided for drainage swales where concentrated flow from more than 2 acres or 8 lots.
- Permanent turf reinforcement mats are installed in drainage swales where design velocities exceed 7fps.
- Minimum swale cross section for flows from 1 acre or less or 4 lots or less are a V-shaped ditch, 1.9’ deep with 4:1 side slopes up to a 15’ easement line
- Minimum swale cross section for flow from more than 1 acre or more than 4 lots shall be a ditch, 2’ deep with a 4’ bottom and 4:1 side slopes up to a 20’ easement line.
- All public drainage rear yard swales and roadside ditches shall have a min. 1% grade.
- Rear and side yard swales are centered on property lines.

Permanent Ponds

- Public pond areas are platted as outlots, Private pond areas are platted as drainage easements.
- 80% sediment removal for new development and 40% sediment removal for redevelopment.
- Not located within wellhead protection area.
- Emergency overflow spillway is provided to accommodate events greater than the 100-year event. High point elevation and direction of overflow are marked on plans.
- One foot of freeboard shall be provided above the emergency overflow.
- Access bench shall be no further than 20 feet horizontally from the normal water level.
- Inlet(s) and outlet have energy dissipation devices.
4:1 side slopes maximum above the normal water level.
> Storage below outlet for sediment accumulation.
> Inlet(s) and outlet are located at opposite ends to prevent short-circuiting of pond.
> Mean pond depth (volume/surface area) is 4 feet or greater, excluding safety bench.
> Maximum pond depth based on normal water level is 10 feet or less.
> Ponds greater than 20,000sf, 50% of surface area shall be a minimum of 5 feet deep.
> 10:1 slope starting at the pond’s normal water level and extending 15 feet from shore, 3:1 max slope thereafter.
> Length to width ratio of pond is 3 or greater.
> Control outlet is provided with skimmer to prevent plugging from floating debris.
> Trash racks installed as needed.
> No utility lines located within basin area.
> No utility boxes located in access road to pond.

Infiltration Ponds
> Pretreatment is provided for parking lot and new road construction runoff.
> 3 feet separation distance from groundwater.
> Half of measured infiltration rate is used as design infiltration rate.
> Design infiltration 0.5-5.0 in/hr, verified with 3 double ring infiltrometer tests.
> Pond has maintenance draw down device.
> 100 foot private well setback; 1,200 ft public well setback.
> 200 foot setback from 20% slopes (2 feet elevation change in 10 feet).
> Erosion protection provided at inlet.
> Drainage area is less than 50 acres for each pond.
> Maximum depth is 4 feet.
> Flat bottom with 4:1 side slopes, longitudinal slope 1% max, lateral slopes 0%.
> Pond designed to infiltrate in less than 48 hours, based on the design infiltration rate.
> Not located in floodplain.
> 1 foot of freeboard is provided above the emergency overflow.

Infiltration Trenches
> Depth is not greater than width.
> Filter fabric shall surround trench.
> 3 feet separation distance from groundwater (5 feet in industrial and commercial areas).
> At least 10 feet down slope and 100 feet up-slope of building foundations.
> Infiltration rate 0.5-5.0 in/hr.
> Location, surface area, depth, soil types and infiltration rate and volume comps are included.
> Pretreatment is provided for parking lot and new road construction runoff prior to infiltration.
> Half of measured infiltration rate is used as design infiltration rate.
> Observation wells provided.
> Emergency overflow provided.
Minor Systems (Storm Sewer, Ditches, Culverts)

- Local systems provide for containment of flows from 10-year event within parking lanes of roadway without overtopping the curb.
- Drainage report indicates inlet capacity of each CB and how much flow by passes the CB. When a system has reached its capacity and a 24-hour, 100-year storm event occurs, the maximum allowable ponding shall be:
  - 18” in a rear yard
  - 9” in a parking lot
  - 12” in a street or gutter
- Path for overflows from 100-year event is evaluated to ensure no structural damage will occur as a result of street low-point flooding.
- Open channels shall carry 10-year event within channel and 100-year event in right-of-way.
- Emergency overflows provided. Overflow should be at least one foot below the lowest opening elevation.
- Emergency overflows are analyzed for the 100-year storm as part of the design of the structure.
- Anti-seepage collars used where necessary.

Storm Sewer

- Storm sewers are reinforced concrete pipe or dual wall HDPE
- Minimum cover for storm sewer:
  - 2’ in non-pavement areas
  - 1’ in paved areas and for laterals
- Catch basins within the curb areas of City streets have 2’x3’ grates and curb inlets (Neenah R-3067)
- Drainage does not cross intersections in 10-yr event (no valley gutters).
- Mid-block CB’s on property lines.
- CB’s are not in the curb return at intersections.
- CB’s spaced 600’ max. on collectors & arterials.
- CB’s spaced 800’ max. on residential streets.
- Minimum catch basin depth shall be 3’ (measured from pavement to invert)
- All Manholes are precast reinforced concrete with offset cone tops.
- 400’ max. MH spacing for lines 15” diameter or less.
- 500’ max. MH spacing for lines 18” to 30” diameter
- MH’s provided at change in direction or grade.
- Storm sewer pipe materials only change at MH or CB
- Buried “T” connections allowed where:
  - The main is at least 2x the diameter of the lateral
  - Length of lateral measured from the “T” to the next structure is not greater than 100’
- Any outfall storm sewer draining into an existing open ditch or watercourse has a reinforced concrete head wall or end section.
- Pipes larger than 15” diameter, discharge flow direction shall be at 45 degrees or less to the flow direction of the receiving ditch or stream.
- Discharge shall be taken to rear property lines at a minimum.
6 WET POND SUMMARY SHEET

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Engineering Contact Name</th>
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Pond ID: ____________________________

Design Information

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Normal Water Elevation</td>
<td>________ ft</td>
</tr>
<tr>
<td>High Water Elevation for 100-yr Event</td>
<td>________ ft</td>
</tr>
<tr>
<td>Bottom Elevation</td>
<td>________ ft</td>
</tr>
<tr>
<td>Surface Area for:</td>
<td></td>
</tr>
<tr>
<td>100-year, 24-hour event</td>
<td>________ sf</td>
</tr>
<tr>
<td>Normal water elevation</td>
<td>________ sf</td>
</tr>
<tr>
<td>Volume of Pond for:</td>
<td></td>
</tr>
<tr>
<td>100-year, 24-hour event</td>
<td>________ ac-ft</td>
</tr>
<tr>
<td>Normal water elevation</td>
<td>________ ac-ft</td>
</tr>
<tr>
<td>Overflow Elevation</td>
<td>________ ft</td>
</tr>
<tr>
<td>Minimum Building Elevation</td>
<td>________ ft</td>
</tr>
<tr>
<td>Total Suspended Solids Removal</td>
<td>________ %</td>
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</tbody>
</table>

If TSS removal is less than 80% for this device, please explain:  __________________________

Downstream

<table>
<thead>
<tr>
<th>Downstream Major Water Body</th>
<th></th>
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<tbody>
<tr>
<td>Description of where water travels from the pond to the downstream major water body:</td>
<td>________</td>
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</tbody>
</table>
### 7 INFILTRATION SUMMARY SHEET

<table>
<thead>
<tr>
<th>Facility ID:</th>
<th>________________________________</th>
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</table>

#### Soil and Site Investigation

**Soil type(s) and location on site:**

<table>
<thead>
<tr>
<th>Design infiltration rate (between 0.5-2.5 in/hr)</th>
<th>____________ in/hr</th>
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<tbody>
<tr>
<td>Note: Shall be ½ of measured dual ring infiltrometer tests (minimum of three tests per infiltration area)</td>
<td></td>
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<tr>
<td>Distance from bottom to bedrock (3ft min)</td>
<td>____________ ft</td>
</tr>
<tr>
<td>Distance from bottom to seasonal high groundwater (3ft min)</td>
<td>____________ ft</td>
</tr>
<tr>
<td>Floodplain area</td>
<td>Y / N</td>
</tr>
<tr>
<td>Wellhead Protection Involved</td>
<td>Y / N</td>
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</table>

#### Design Information

**Volume required (using TR-55, post minus pre)**

<table>
<thead>
<tr>
<th>____________ ac-ft</th>
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Note: Connected impervious shall be modeled in a separate subcatchment from the remaining area

**Volume provided below outlet or overflow**

<table>
<thead>
<tr>
<th>____________ ac-ft</th>
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**Time required to completely infiltrate stored water (48 hrs max)**

<table>
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<tr>
<th>____________ hrs</th>
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**Bottom area**

<table>
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<th>____________ sf</th>
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**Bottom elevation**

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**Emergency overflow elevation**

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<th>____________ ft</th>
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**Top of berm elevation**

<table>
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<tr>
<th>____________ ft</th>
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**Device(s) providing treatment:**

<table>
<thead>
<tr>
<th>________________________________</th>
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</table>

**Please provide calculations and/or supporting information for all information provided on this page.**
e.g. soilborings, soils map, dual ring infiltrometer test results and locations, volume computations, etc.