



**STORMWATER MANAGEMENT PERMIT**

**Department of Public Works**  
Suite 53, City Hall,  
101 North Main Street,  
Winston-Salem, N.C. 27101  
Telephone: (336) 747-7480  
Fax: (336) 748-3173

Fee Paid: _____
Date Paid: _____
Permit #: _____
Approved By: _____
Approval Date: _____
<i>(for use by stormwater division only)</i>

**APPLICATION**

**1. Project/Site Information**

Project/Site Name: \_\_\_\_\_

Project Location (Address): \_\_\_\_\_

\_\_\_\_\_

Block/Lot(s): \_\_\_\_\_

Total Site Area (ac): \_\_\_\_\_ Total Proposed Disturbed Area (ac): \_\_\_\_\_

Existing Built-Up Area, BUA (ac): \_\_\_\_\_ Proposed BUA (ac): \_\_\_\_\_ Proposed BUA (%): \_\_\_\_\_

For Subdivisions: Number of lots \_\_\_\_\_ Lot density \_\_\_\_\_

Site within a Water-Supply Watershed: Y N Low Density Development: Y N

**2. Engineer/Designer Information**

Engineer Name: \_\_\_\_\_ NC PE License #: \_\_\_\_\_

Engineers Company/Firm: \_\_\_\_\_

Engineers Company/Firm Address: \_\_\_\_\_

\_\_\_\_\_

Office Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Engineers Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### 3. Project Owner Information

Owner Name: \_\_\_\_\_

Owner Company/Firm: \_\_\_\_\_

Owner Company/Firm Address: \_\_\_\_\_

\_\_\_\_\_

Office Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Owner Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### 4. Contractor Information (if available at time of application)

Contractor Name: \_\_\_\_\_

Contractor Company/Firm: \_\_\_\_\_

Contractor Company/Firm Address: \_\_\_\_\_

\_\_\_\_\_

Office Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

### 5. Posting of Financial Security for Required Stormwater Control Structure(s)[Applicant/Owner must provide adequate financial assurance in the form of a performance bond and/or other cash security for required stormwater control structure(s) prior to issuance of SWM Permit.] Refer to sections 75-402 and 75-404 of The City of Winston-Salem's Post Construction Stormwater Management Ordinance for details.

Applicant/Owner shall file with the City of Winston-Salem one of the following (**check one**):

- Performance bond
- Irrevocable letter of credit issued by a bank
- Establishment and funding of an escrow account

Amount of Financial Security Posted: \$ \_\_\_\_\_

Date Financial Security provided to City of Winston-Salem: \_\_\_\_\_

- Not applicable [No required stormwater control structure(s)]

**6. Information Needed for SWM Concept Meeting (See section 75-203(a) of The City of Winston-Salem's Post Construction Stormwater Management Ordinance for more details)**

**Check the boxes to verify that the item has been addressed/submitted**

- Plan of the proposed development site with approximate locations of property boundaries, roads, land use, topographic features, streams, water bodies, wetlands and any feature related to stormwater
- Drainage area map showing approximate location of proposed development and pertinent drainage areas, including off-site areas draining to the proposed development
- A conceptual plan for proposed stormwater management features that would enable the site to meet stormwater quantity and quality regulations. Note that this concept plan need only indicate what the designer plans to do to manage stormwater. For simple sites, a verbal description may suffice.

**7. Submittal Requirements for Evaluation of a Downstream No Adverse Impact Study (See section 75-203(b)(2) of The City of Winston-Salem's Post Construction Stormwater Management Ordinance for more details).**

**Submit two copies of the report for review (Report to be spirally bound preferably. 3 ring binders not accepted)**

**Check the boxes to verify that the item has been addressed/included in the report**

- Cover sheet with project title; project name and address; owner's name, address, email and phone number; preparer's name, address, email and phone number; and preparer's seal, signature and date
- Table of contents (with sequential numbering of pages) showing report sections, appendices, tables and figures
- Project narrative – brief description of project, pre and post development site conditions, hydrologic and hydraulic study
- Description of the methodologies, assumptions and procedures used in preparing the analysis
- Summary of any previous hydrologic/hydraulic studies or other information which may pertain to the development of the property
- Hydrologic information (including maps and plans), data and quantities for pre and post project conditions
  - Site and watershed topography
  - Drainage areas (mapped and quantified)
  - Land uses (mapped and quantified)

- Soils types (mapped and quantified, include hydrologic types)
- Drainage paths and lengths (mapped and quantified)
- Precipitation data (most recent data from NOAA website)
- Time of concentration (Tc) calculations for existing and proposed site conditions and drainage features
- Curve Number (CN) and/or Rational C analysis and determinations for existing and proposed site conditions (also show on the SWM Plan or separate map)
- Peak flows and hydrographs (as applicable) used to analyze to a no adverse impact conclusion
- Calculations and procedures used to determine a no adverse impact conclusion regarding downstream properties and conveyances with regard to flooding, erosion and also capacity of conveyances for events up to and including the 25 year, 6 hour rainfall event
- Provide hard copy summary information, digital hydrologic and hydraulic models, and any other stormwater analysis and design calculations as appropriate for the site to satisfy ordinance requirements

Hydraulic performance analyses for off-site impacts.

- Analyze to a suitable downstream point – typically the 10% point which is defined as the point downstream where the proposed site development or redevelopment represents less than 10% of the total watershed area draining to that point. Other study analysis points may be used if approved by the Stormwater Engineer in advance of submittal, but are less common. Refer to section 75-203(b)(2) of The City of Winston-Salem’s Post Construction Stormwater Management Ordinance for more details.
- Evaluate road crossings for changes in service level due to proposed development. **Write N/A in check box if not applicable**
- Evaluate impacts to existing and/or off-site impounding structures. **Write N/A in check box if not applicable**
- Evaluate potential increases in structural flooding impacts. **Write N/A in check box if not applicable**
- Evaluate capacity of receiving conveyances such as pipes, culverts, swales etc. Provide design information and show increases in water surface elevations for receiving channels at suitable cross section intervals.
- Has the receiving natural channel or waterbody (on site and/or offsite to the 10% point) been evaluated to ensure that the downstream conveyances are not eroded and/or degraded by altered stormwater flows from the development or re-development? Mitigation measures shall be implemented where the volume of runoff from a post development 2 year, 1 hour rainfall event is 10% greater than the volume of the runoff from a predevelopment 2 year, 1 hour rainfall event. Calculations must be provided to validate no impacts. If mitigation is required detention systems are a satisfactory means to mitigate the impact. If the calculation shows detention systems are needed then the no adverse impact study no longer applies and the designer should follow the requirements of Section 8, 9, 10 and 11 of this application.

**8. Submittal requirements for the Hydrologic and Hydraulic Analysis Report/Study for Non-Exempt Sites (Sites that will incorporate a stormwater management device) Note: Upon mutual agreement with the designer, the City will review hydrologic data and analysis prior to hydraulic analysis and design.**

**Submit two copies of the report for review. (Report to be spirally bound preferably. 3 ring binders not accepted)**

**Check the boxes to verify that the item has been addressed/included in the report**

- Cover sheet with project title; project name and address; owner's name, address, email and phone number; preparer's name, address, email, and phone number; and preparer's seal, signature and date
- Table of contents (with sequential numbering of pages) showing report sections, appendices, tables and figures
- Project narrative – brief description of project, pre- and post-development site conditions, hydrologic and hydraulic study, and proposed SWM plan
- Description of the methodologies, assumptions and procedures used in preparing the analysis
- Summary of any previous hydrologic/hydraulic studies or other information which may pertain to the development of the property
- Geotechnical Engineering Analysis Report including details of subsurface exploration which shows the location of the seasonally high groundwater elevation. Borings or other approved means of subsurface exploration, shall be taken at, or as close as practicable to the immediate vicinity of each proposed stormwater management device

**8.(a) Hydrologic Section: Hydrologic information (including maps and plans), data, and quantities for pre and post-project conditions**

**Check the boxes to verify that the item has been addressed/included in this section of the report**

- Location map showing project in relation to adjacent properties, streets and nearby water features
- Site and watershed topography
- Drainage areas and site outfalls (mapped and quantified)
- Land uses (mapped and quantified)
- Soils types (mapped and quantified, include hydrologic types)
- Drainage paths and lengths (mapped and quantified)
- Precipitation data (most recent data from NOAA website)

- Time of concentration (Tc) calculations for existing and proposed site conditions and drainage features
- Curve Number (CN) and/or Rational C analysis and determinations for existing and proposed site conditions (also show on the SWM Plan or separate map)
- Peak flows and hydrographs (as applicable) to analyze and design site stormwater management features
- Calculations and procedures used to design permanent structural stormwater BMPs/controls (note: analysis and design of stormwater quality BMPs must be based on the latest version of the State of NC DWQ Stormwater BMP Practices Manual)
- Hydrologic data sheets, for both pre and post development conditions for each runoff concentration point including time of concentration calculations, rainfall intensities, runoff coefficients and curve numbers and peak discharges
- Summary table listing all runoff concentration points, corresponding drainage area, calculated peak discharges for pre and post development conditions and differences in discharges
- For sites that will have stormwater management quality devices, but for which the designer is submitting a downstream no adverse impact study to satisfy the quantity aspect of the site, a summary table for the downstream hydrologic analysis must be provided. This must include the drainage area, calculated peak discharges for pre and post development conditions and differences in discharges at the outfall(s) of the site, each downstream tributary junction and each public or major private downstream stormwater conveyance structure to the suitable downstream analysis point – typically the 10% point which is defined as the point downstream where the proposed site development or redevelopment represents less than 10% of the total watershed area draining to that point must be provided. Designer should reference and also complete section 7 of this checklist if this applies. **Write N/A in check box if not applicable**

**8.(b) Hydraulics Section – Note: vegetative conveyances should be designed and used to the maximum extent practicable)**

**Check the boxes to verify that the item has been addressed/included in this section of the report**

- Open channel design and capacity computations (for swales etc.) Note: if the development has a stormwater device designed for quantity controls for the 2, 10 and 25 year, 6 hour rainfall event, then the conveyance capacity designs must be based on the 25 year, 6 hour rainfall event. Also provide design information on type of liner to be used. Permanent diversions conveying off-site runoff around the site been developed must also meet the aforementioned design criteria.
- Design computations for all culverts, storm drains and inlets. Storm drain design shall include a labeled schematic of the storm drain network, design discharges, pipe capacities, pipe sizes, slopes and lengths, profiles, outlet velocities, upstream and downstream invert elevations and hydraulic grade line information. Note: if the development has a stormwater device designed for quantity controls for the 2, 10 and 25 year, 6 hour rainfall event, then the conveyance capacity designs must be based on the 25 year, 6 hour rainfall event. Permanent diversions conveying off-site runoff around the site been developed must also meet this design criteria.
- All supporting data, printouts, tables, nomographs, etc., which are referenced in the report

- Provide design calculations for all rip-rap aprons and include determination of rip-rap length, width, depth, D50 size and class of stone to be used. If other means of energy dissipation are used similar adequate design information is required to be provided in the report
- Provide hard copy summary information, digital hydrologic and hydraulic models, and any other stormwater analysis and design calculations as appropriate for the site to satisfy ordinance requirements

### **8.(c) Stormwater Management System Section**

#### **Check the boxes to verify that the item has been addressed/included in this section of the report**

- Description of how the overall stormwater management plan and facilities design(s) will comply with the City of Winston-Salem's post construction stormwater ordinance regarding water quality, water quantity and release rates and channel protection.

#### **Water Quality**

- Does the development or redevelopment cumulatively disturb less than one acre and is not part of a larger common plan of development or sale. (If yes then development is exempt from water quality requirements). **Write Y for yes or N for no in the check box**
- Does the development or redevelopment cumulatively disturb less than one acre but the activity is part of a larger common plan of development or sale, even though multiple, separate or distinct activities take place at different times and on different schedules. (If yes then development is not exempt from water quality requirements) **Write Y for yes or N for no in the check box**
- Is the project a low density or high density development? Low density is defined as a project that has no more than 2 dwelling units per acre or 24% built upon area for all residential development and nonresidential development. Low density projects must comply with section 75-302(a) of The City of Winston-Salem's Post Construction Stormwater Management Ordinance. High density projects must comply with section 75-302(b) of The City of Winston-Salem's Post Construction Stormwater Management Ordinance. **Write L for low density or H for high density in the check box**
- Is the structural BMP(s) designed to treat the runoff volume leaving the project site for the first 1" of rain and is the BMP an approved device contained and referenced in the latest version of the State of NC DWQ Stormwater BMP Practices Manual. Provide detailed calculations in the report. **Write Y for yes or N for no in the check box** (If No then project is not in compliance and will need to be redesigned)
- For high density projects is the first inch storage volume from the BMP(s) discharged at a flow rate equal to or less than the predevelopment discharge flow rate for the 1 year, 24 hour rainfall event? **Write Y for yes, N for no or N/A for not applicable (if it's a low density project) in the check box** (If No then project is not in compliance and will need to be redesigned)
- Does the BMP(s) comply with and meet with all of the requirements of the State of NC DWQ Stormwater BMP Practices Manual for the chapter(s) relating to that particular BMP(s), including but not limited to the Major Design Elements section of the chapter? For example, one of the criteria for a wet pond design, is designing the pond for the runoff to drawdown in no less than 48 hours but no more than 120 hours? Provide detailed calculations in the report to satisfy all applicable major design elements of the chosen BMP(s). **Write Y for yes or N for no in the check box** (If No then project is not in compliance and will need to be redesigned).
- If a wet pond is chosen as the BMP(s) to serve the development or re-development has a level spreader and filter strip been designed at the outlet from the pond? Provide design calculations for them in the report. Note: if the wet pond is designed for 90% TSS (Total Suspended Solids) removal

efficiency then the combination of the level spreader and filter strip is no longer required to be designed at the outlet and an energy dissipater device such as a rip-rap should be designed and provided at the outlet pipe. **Write Y for yes, N for no, or “90%” if pond is designed for that removal efficiency rate** (If No and the pond is designed for 85% TSS removal then project is not in compliance and will need to be redesigned to include a level spreader and filter strip or redesigned for 90% TSS removal)

- If a wet pond is chosen as the BMP(s) is the volume of the forebay equal to 20% of the total pond volume? Provide detailed calculations in the report. **Write Y for yes or N for no in the check box** (If No then project is not in compliance and will need to be redesigned).
- Is the BMP designed to have a minimum of 85% TSS (Total Suspended Solids) removed? **Write Y for yes or N for no in the check box** (If No then project is not in compliance and will need to be redesigned).
- Are all volume and surface area calculations provided? **Check the box to verify that the item has been addressed/included in this section of the report**
- Is data such as total site area and total impervious surface area provided? **Check the box to verify that the item has been addressed/included in this section of the report**
- Is there an overflow device or emergency spillway provided in the design? Verify for what storm event it is designed for and provide appropriate design data. **Check the box to verify that the item has been addressed/included in this section of the report**
- Are all built upon areas meeting the landward buffer requirements for all perennial and intermittent surface waters, as stipulated in section 75-302(2) for low density projects and section 75-302(5) for high density projects, in the City of Winston-Salem’s Post Construction Stormwater Management Ordinance? Note: the buffer widths are based on disturbed area. Therefore if the plans show less than 10 acres disturbed during the construction of the development or redevelopment then the required landward buffer width, as measured from the top of stream bank, shall be 30 feet and the undisturbed buffer width (within the landward buffer and measured from the top of creek back) shall be 15 feet. For a disturbed area of 10 to 50 acres the buffer width shall be 50 feet and 25 feet respectively, etc. **Check the box to verify that the item has been addressed/included in this section of the report**
- Is the site located within the Salem lake Water Supply Watershed? (If yes all requirements associated with the water supply watershed ordinance must be met.) **Write Y for yes or N for no in the check box**
- Is stormwater runoff conveyed in and from the development via vegetated conveyances to the maximum extent practicable? **Check the box to verify that the item has been addressed/included in this section of the report**
- Flow splitter designs or other means of bypassing flows must be provided with calculations used to determine weir wall elevations etc. (For example in the case of using a bio-retention cell to treat for the first inch of runoff and bypassing the flow above the first inch to a manifold device for quantity control). **Check the box to verify that the item has been addressed/included in this section of the report or write N/A in the box if not applicable**

### **Water Quantity**

- Does this development or redevelopment cumulatively create less than 20,000 square feet for both residential and non-residential uses? **Write Y for yes or N for no in the check box** (If yes, then development is exempt from quantity management)
- If the project is a redevelopment activity, is the proposed impervious area equal to or less than the preexisting impervious area? **Write Y for yes or N for no in the check box** (If yes, then development is exempt from quantity management.)

- Does the development or redevelopment disturb less than 3 acres and is not part of a larger common plan of development, redevelopment or sale and is less than 24% built upon area? **Write Y for yes or N for no in the check box** (If yes, then the standards for stormwater quantity shall be limited to controlling only the pre versus post development peaks for the 2 and 10 year design storms. If no, then the pre versus post development peaks for the 2, 10 and 25 year design storms must be controlled as well as managing the difference between the pre versus post development increase in the 25 year design storm volume)
- Is the BMP designed to manage the 2, 10 and 25 year storm events of minimum 6 hour duration? Provide detailed calculations in the report. **Check the box to verify that the item has been addressed/included in this section of the report**
- Is the BMP designed to limit the post development peak discharge rates to equal to or less than the pre development rates for the 2, 10 and 25 year storm events? Provide detailed calculations in the report. **Check the box to verify that the item has been addressed/included in this section of the report**
- Is the BMP designed to detain the stormwater runoff volume equal to the difference between the pre and post development volume for the 25 year storm of 6 hour duration and is the volume detained released over a period of no less than 48 hours but no longer than 120 hours? Provide detailed calculations in the report. **Check the box to verify that the item has been addressed/included in this section of the report**
- Does the development of the site increase flooding impacts to affected structures in the 100-year flood event for properties upstream and downstream of the site? **Check the box to verify that the item has been addressed/included in this section of the report**
- Description and calculations provided of measures taken to prevent discharge from any stormwater collection system or structure into any natural or surface drainage channel or feature that may cause damage to the receiving system? If designer anticipates no damage then adequate calculations must be provided to validate his/her opinion. **Check the box to verify that the item has been addressed/included in this section of the report**
- Has the receiving natural channel or water body (on site and/or off site) been evaluated to ensure that downstream conveyances are not eroded and/or degraded by altered stormwater flows from the development or redevelopment? Mitigation measures shall be implemented where the volume of runoff from a post development 2 year, 1 hour rainfall event is 10% greater than the volume of the runoff from a predevelopment 2 year, 1 hour rainfall event. Calculations must be provided to validate no impacts. Note: Detention systems shall satisfy this requirement. If no detention is provided then calculations need to be provided to validate his/her opinion. **Check the box to verify that the item has been addressed/included in this section of the report**
- Detailed reservoir routing stage storage and other calculation sheets for all required design storms provided. **Check the box to verify that the item has been addressed/included in this section of the report**
- Plotted inflow and outflow hydrographs (preferable superimposed) provided. **Check the box to verify that the item has been addressed/included in this section of the report**
- Are any water impounding structures (dams) designed in accordance with NC Dam Safety standards and if required reviewed and approved by the NC Dam Safety Engineer? **Write Y for yes or N for no in the check** (If yes, provide a copy of approval from the State)
- If retaining walls are utilized, are free body diagrams showing all forces, moments and computations provided for determining factors of safety against sliding and overturning. **Check the box to verify that the item has been addressed/included in this section of the report**

## 9. Submittal requirements for the Site/Stormwater Management Plan set

Submit two copies of the plans for review (Plan sheets should be 36" x 24")

**Check the boxes to verify that these items have been addressed/included at a minimum in the submitted proposed Site/Stormwater Management plan sets. More information may be required by the City of Winston-Salem as directed.**

- Plan sheet(s) clearly labeled as "Stormwater Management Plan(s)" on cover sheet. Plan sets must include the following sheets at a minimum: Existing site plans, proposed site plan, grading and drainage plan, utility plan, stormwater management plan, easement plan, erosion control plans, details sheets for stormwater management and other relevant drainage conveyances to the stormwater management system, drainage delineation sheets etc. Other sheets may be required by the City of Winston-Salem if necessary
- Sealed and certified plan set: All plan sheets shall be signed and sealed by a professional engineer or landscape architect, to the extent that the General Statutes, Chapter 89A, allow
- Date(s) of preparation and all revisions
- Vicinity map (upper right corner of top sheet)
- North arrow
- Appropriate scale
- Appropriate legend identifying features and layers for all plan sheets.
- Established benchmark of known elevation to which every other elevation is referenced
- Property boundary lines for the proposed development/redevelopment site, along with adjacent property lot lines and street right of way lines. Indicate if streets are private or public on the plans.
- Existing and proposed zoning and land use
- Location(s) of existing easements (temporary and permanent, public and private). **Write N/A in check box if not applicable**
- Proposed access locations/easements for future maintenance of stormwater management facilities (15-ft minimum maintenance and access easements required for and to surround all permanent stormwater BMP(s) and all conveyances to the BMP(s) and the maintenance and access easements must connect to a public right-of-way)
- Existing and proposed utilities
- Existing and proposed stormwater discharge points (surface and subsurface flows)
- Existing and proposed drainage basins, sub basins and land use boundaries. (Contributing basins that extend beyond the site boundaries may be delineated on a separate map)
- Drainage paths and lengths used to determine the time of concentration. Include items depending on method used (rational, TR55 etc.) such as upper and lower elevations, length of sheet flow,

shallow concentrated flow, channel flow, land slope, channel slope, dimensions of channel (piped and open channel), surface descriptions (paved/unpaved) etc.

- Identify and delineate drainage area and flow paths of runoff to each structural BMP/control, where applicable
- Streams, lakes, ponds, impoundments, drainage swales, conveyances, floodplains (including 100-year floodplain, floodway fringe, 50% flood fringe line (also called the “floodplain no fill line”, etc.)) wetlands, natural storage and other physical or environmentally sensitive features within or adjacent to the project area. **Write N/A in check box if not applicable**
- Delineation of all existing and proposed impervious surfaces including locations of buildings, roads, parking areas and other permanent impervious structures or ground coverings.
- Existing and proposed site topography showing existing and proposed drainage patterns, including drainage area boundaries and flow patterns (Note: utilize a contour interval appropriate for the site conditions, typically 2-ft unless specific site conditions dictate otherwise, and extend contours a minimum of 200 feet beyond the limits of the proposed development.)
- Identify and label all proposed stormwater drainage systems including but not limited to storm drainage inlets, catch basins, junction boxes etc. showing their location, details, profiles, cross-sections and other specifications as necessary to be able to construct all of the proposed major and minor stormwater management conveyance systems (Indicate type and size of conveyance, e.g. storm drainage pipe, grass swale, diversion, channel lining, storm sewer etc.) Note the conveyances must be designed for the 25 year event unless otherwise exempt.
- Roof drainage directions and roof leader locations
- Proposed limits of disturbance
- Estimated seasonal high groundwater elevation (documented in geotechnical report) in areas to be used for stormwater retention, detention or infiltration. Show this elevation in the profile view of the proposed BMP(s)
- Hydraulic data summary for all proposed pipes and/or channels. (Designed for 25 year event unless otherwise exempt)
- Construction notes, specifications and design details for any existing stormwater system components if applicable. **Write N/A in check box if not applicable**
- Recommendations from any soils engineering or engineering geology report incorporated in the plans and/or specifications if applicable. **Write N/A in check box if not applicable**
- Dates and reference number of the soils report(s) together with the names, addresses and phone numbers of the firm(s) or individual(s) who prepared the report(s). **Write N/A in check box if not applicable**
- Details of all components of the proposed stormwater management system including:
  - Plan views showing the proposed BMP(s) locations, in combination with the site plan map.
  - Detailed cross-sections and profiles for each BMP showing critical design features, side slopes, structural components, soil profiles, design elevations including temporary water quality elevations, 2, 10 and 25 year event peak elevations, spillway elevations, riser dimensions and

elevations, orifice and weir dimensions elevations and details, seasonal high water table elevations etc. Details shown on the profile can vary depending on type of BMP chosen. For instance, a wet pond will typically entail all of the aforementioned items as it can attenuate for both quality and quantity. However a bio-retention cell for example, is typically designed to provide quality control for the first inch of runoff only. Therefore the volume and peak attenuation is typically achieved by bypassing the overflow above the first inch to another BMP designed to control for quantity such as an underground manifold device. Therefore detailed profiles will be required for both the bio-cell and manifold device with applicable design elevations referenced in each profile. Details of flow splitters/bypass weirs etc. should also be provided on the plans.

- If the chosen BMP(s) requires a forebay per the State of NC DWQ Stormwater BMP Practices Manual, ensure it is shown and labeled and the surface area and volume are shown on the plan for both the forebay and the entire device. For example in the case of a wet pond the forebay volume must be 20% of the total pond volume, therefore the total pond volume as well as the forebay volume must be indicated
- Average water depth (if applicable to your chosen BMP(s))
- Permanent pool surface area (if applicable to your chosen BMP(s))
- To avoid short circuiting of a wet pond (if that is one of the BMP(s) utilized on site) ensure that the plans show that the length of flow path between the inlet and the outlet is maximized. Baffles may be required in certain designs.
- Details of inlet pipes/conveyances.
- Provide a detailed landscaping plan for the BMP(s) that clearly follow all State of NC DWQ Stormwater BMP Practices Manual specifications. Reference the chapter relating to the chosen BMP for landscaping requirements and also specifically to Chapter 6 of the Manual for landscape and soil composition specifications. Section 6.4.1 of Chapter 6 must be referenced for items that are required be shown on the landscape plan.
- No trees or shrubs must be planted within 10 feet of inlet or outlet pipes, or manmade drainage structures such as spillways or flow spreaders.
- For wet ponds, no trees must be planted on the pond shelf or on any of the pond embankment, interior or exterior.
- Show locations and specifications for sediment depth indicators where applicable.
- Proposed outfall conveyance system with size, lengths, slopes and grades.
- Show and provide specifications for all permanent energy dissipation devices on the stormwater management plans
- If a wet pond is chosen as a BMP(s) and is designed for 85% TSS removal a level spreader and vegetated filter strip combination must be provided at the outlet from the pond and detailed specifications provided for each that meets the requirements of Chapter 8 of the State of NC DWQ Stormwater BMP Practices Manual. This item is not necessary for a wet pond designed for 90% TSS removal
- Aquatic shelf dimensions (where applicable, e.g. in the case of a wet pond) and elevations, slope etc. must be referenced on the plan and profile view of the BMP
- If a bio-retention cell is chosen as a BMP to treat for water quality, clearly indicate if the cell shall be landscaped/mulched or sodded and show details as appropriate to meet the requirements of the State of NC DWQ Stormwater BMP Practices Manual. If the cell is to be sodded, then

clearly show on the plans provisions and specifications for the sign(s) to be permanently posted at the cell(s) with the words “DO NOT FERTILIZE” clearly readable on the sign(s). These signs must be large enough and located in a position where they can be easily seen and read by a landscape contractor. Indicate the locations of the postings on the stormwater management plan.

- Detailed construction and sequencing notes explaining 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 as well as detailed notes explaining the transitioning and sequencing of a BMP(s) that is used as a sediment and erosion control device to a permanent stormwater control BMP(s).
- The following statement is required on all stormwater management plans “The developer shall contact the City Stormwater Engineer when the best management practice(s) are constructed and about to become operational so an inspection to determine compliance with the approved plan can be performed”.
- The following statement is required on all stormwater management plans “Adequate drainage, erosion and sediment control measures, best management practice(s) and/or other stormwater management facilities shall be provided and maintained at all times during construction. Damages to adjacent property and/or the construction site caused by the contractor’s or property owner’s failure to provide and maintain adequate drainage and erosion/sediment control for the construction area shall be the responsibility of the property owner and/or contractor”.

- Show ownership information for site and adjacent properties
- Show existing and proposed built-upon areas and other proposed site improvements
- Note existing and proposed built-upon area in terms of total acreage and % built-upon area
- Designated water-supply watershed classification, if applicable. **Write N/A in check box if not applicable**
- Note allowable limits on BUA % (if applicable). **Write N/A in check box if not applicable**
- Show landward buffer widths from all perennial and intermittent surface waters and also indicate the undisturbed buffer widths as measured from top of bank (if applicable). **Write N/A in check box if not applicable**
- Regulatory floodways and floodplains (as applicable). Identify and label 100-year Base Flood Elevations (BFEs) where available. Show limits of both the floodway and floodplain along with BFEs where available. **Write N/A in check box if not applicable**
- Note if site drains to a 303(d) listed stream identified by the North Carolina Division of Water Quality (see NC DWQ Website for more information - <http://h2o.enr.state.nc.us/tmdl/>). **Write N/A in check box if not applicable**
- Identify and note the watershed area for any off-site runoff that flows onto the proposed development site (note: applicant must also provide watershed delineation and mapping for any off-site runoff that flows onto the proposed site). **Write N/A in check box if not applicable**
- Show and label where runoff from the developed site (including outflows from BMPs, where applicable) safely connects into downstream receiving drainage systems and/or open stream channels

- Identification of the entity responsible for long-term maintenance of permanent structural stormwater BMP(s)/control(s). Show preferably on the stormwater management sheet

## 10. Other Items Required prior to issuance of a Stormwater Management Permit

- A signed and sealed Operation and Maintenance Agreement must be provided prior to City issuance of a Stormwater Management Permit. The Agreement must also be filed and recorded with the Forsyth County Register of Deeds, in accordance with Section 75-402 of the City of Winston-Salem's Post Construction Stormwater Ordinance. Note: Typically it is advisable to wait until the plans and design have been approved before submitting the Operation and Maintenance Agreement for signatures as changes to the plans/design may impact or require changes to the Agreement. However, it can be submitted at any time if the designer chooses to do so. A copy of the standard agreement may be found on the stormwater divisions website at the following web address: <http://www.cityofws.org/Home/Departments/Stormwater/Post-Construction/Articles/PostConstruction> **Check the box to verify that you are aware that this item will need to be addressed and will be, or has already been submitted for review**
- An Operation and Maintenance Manual shall be provided by the applicant/developer for each permanent structural stormwater BMP/control, where applicable, to accompany the Operation and Maintenance Agreement, indicating what operation and maintenance actions are needed, what specific quantitative criteria will be used for determining when those actions are to be taken and, consistent with the Operation & Maintenance Agreement, who is responsible for those actions. The Plan shall also clearly indicate the steps that will be taken for restoring a stormwater control structure to design specifications if a failure occurs. The Operation and Maintenance Manual once signed and notarized, must be referenced and included as an exhibit to the Operation and Maintenance Agreement. A manual must be submitted for each BMP used in the stormwater management plan. Note: Typically it is advisable to wait until the plans and design have been approved before submitting the Operation and Maintenance Manual for approval as changes to the plans/design may impact or require changes to the Manual – e.g. elevations may change in the plan review period directly impacting changes to the manual. However, it can be submitted at any time if the designer chooses to do so but it may be subject to re-submittal if changes are required. Copies of various BMP manuals (wet pond manual, sand filter manual etc.) may be found on the stormwater divisions website at the following web address: <http://www.cityofws.org/Home/Departments/Stormwater/Post-Construction/Articles/PostConstruction> **Check the box to verify that you are aware that this item will need to be addressed and will be, or has already been submitted for review**
- All of the proposed easements that will be required to allow for maintenance and access of the stormwater management system must be reviewed and recorded prior to issuance of a stormwater management permit. The easements must be referenced as an exhibit in the Operation and Maintenance Agreement. **Check the box to verify that you are aware that this item will need to be addressed and will be, or has already been submitted for review**
- A review fee of \$220, in the form of a check, made payable to “The City of Winston-Salem” needs to be included with the application. Submittal of a package without a review fee is not complete and review will not begin until the fee is received. **Check the box to indicate that the fee has been submitted with the application**

- Variance Petition form(s) to request a variance granting permission to use land in a manner otherwise prohibited by The City of Winston-Salem's Post Construction Stormwater Management Ordinance, if applicable. See Section 75-306 of that ordinance for qualification requirements for a variance. Variance request forms may be found at the following web address: <http://www.cityofws.org/Home/Departments/Stormwater/Post-Construction/Articles/PostConstruction> **Write N/A in the check box if not applicable**

## 11. Requirements Prior to Issuance of Certificate of Occupancy

**Check the boxes to verify that the designer and owner are aware that the following items will need to be addressed prior to issuance of a certificate of occupancy by the building inspector**

- Certified as-built plans of the site and stormwater management BMPs/controls shall be submitted to the Stormwater Division for review. The as-built plans should show the final design specifications for the entire stormwater management system, including the field location, size depth and planted vegetation of all structural BMP(s) and other measures, controls, conveyances and devices as installed. Refer to Section 75-203(d) of The City of Winston-Salem's Post Construction Stormwater Management Ordinance for more details.
- Final inspection of the site and stormwater management BMPs/controls scheduled with and completed by the City Stormwater Director. This inspection shall occur before the release of any performance securities. Refer to Section 75-203(d) of The City of Winston-Salem's Post Construction Stormwater Management Ordinance for more details.
- Copies of any/all applicable local, state, and federal permits/permit applications must be submitted. (Note: this would include 404/401 permits for work in regulated waters/wetlands, State Dam Safety permits, floodplain development permits, and/or other as applicable)

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CITY OF WINSTON-SALEM Mayor: Allen Joines. City Council: Vivian H. Burke, Mayor Pro Tempore, Northeast Ward; Dan Besse, Southwest Ward; Robert C. Clark, West Ward; Derwin L. Montgomery, East Ward; Molly Leight, South Ward; Denise D. Adams, North Ward; Wanda Merschel, Northwest Ward; James Taylor Jr., Southeast Ward. City Manager: Lee Garrity