Stormwater Management Plan Submittal Checklist

Design Development phase submittal requirements are shown in ***bold***. Satisfactory completion of these items in bold, in addition to the approved Stormwater Control Design Report (see Stormwater Control Design Report Checklist for list of requirements) are required prior to moving forward to the Contract Documents project phase. The full list below, including the non-bold items, must be satisfactorily completed during the Contract Documents phase, prior to approval of the Stormwater Management Plan. The NC State review period is 30 days.

TITLE SHEET

- ☐ ***NC State project name, job number, and longitude/latitude***
- ☐ ***Design professional name, address, and phone number***
- ☐ ***Vicinity map with major roads identified and site delineated***
- ☐ ***Sheet Index***
- ☐ Professional Engineer's certification block, seal, signature, and date
- ☐ Stormwater As-built Certification block placeholder:

STORMWATER AS-BUILT CERTIFICATION

SEAL:

_____

PROFESSIONAL ENGINEER DATE

I HEREBY CERTIFY THAT THE AS-BUILT CONDITIONS HEREIN HAVE BEEN VERIFIED TO MEET ALL STATE AND LOCAL STORMWATER DESIGN STANDARDS. THE AS-BUILT CONDITIONS FULLY SATISFY THE INTENT OF THE DESIGN.

- ☐ ***SCM Design Block with SCM type, WQv Provided, Total Volume provided, and Regulatory Requirements Met:***

SCM DESIGN

SCM TYPE:

WQv PROVIDED:

TOTAL VOLUME PROVIDED:

REGULATORY REQUIREMENTS MET (Y/N):

GENERAL, ALL SHEETS

- ☐ ***Minimum 3 grid ticks with Northing/Easting on plan sheets***
- ☐ ***North arrow***
- ☐ ***Match lines are labeled and referenced.***
- ☐ Profiles, details, and cross-sections are drawn to scale.

PLAN VIEW

- ☐ ***Legend***
- ☐ ***Environmental features, including Waters of the US, wetlands, and Neuse Buffer Zones 1 and 2 are delineated and labeled.***
- ☐ ***FEMA floodplain is delineated.***
- ☐ ***Existing and proposed utilities are identified and include pipe sizes and materials.***
- ☐ ***All existing and proposed improvements including locations of buildings, SCMs, structures, impervious surfaces, storm drain infrastructure, and all grading***
- ☐ ***Existing and proposed contours with index contours clearly labeled***
- ☐ ***Limit of Disturbance***
- ☐ ***Locations of any test borings from design phase***

STORMWATER CONVEYANCE ITEMS

- ☐ ***All storm drains have headwalls inside the SCM.***
- ☐ ***Concentrated flows enter at or below any dry surface SCM bottom using a drop structure such that the entering pipe slope is 0.5% or less.***
- ☐ ***Concentrated flows enter any wet retention facility below the permanent pool surface elevation, and below the vegetative bench.***
- ☐ ***Storm drains entering a stormwater facility are watertight.***
- ☐ ***10-year velocities are called out for all proposed concentrated flow conveyances at the outfall and upon return to existing conditions.***
- ☐ ***Outflow channels are protected until the 10-year velocity is at or below 3 feet per second.***
- ☐ ***Proposed storm drains have Structure Schedules.***
- ☐ ***All existing storm drain pipes and structures within the limit of disturbance of a project are replaced unless in good condition.***
- ☐ ***All existing storm drain within the limit of disturbance of a project that connects steam tunnels, mechanical rooms, or other illicit discharge sources are redirected to the sanitary system.***

SCM ITEMS

- ☐ ***SCM maintenance access to all forebays and control structures is 8 feet wide, 3:1 side slopes, and 17% maximum grade.***
- ☐ Trash racks are shown on all riser structures.

- ☐ Limits of liner, if applicable
- ☐ Limits of vegetative bench, if applicable

DAM EMBANKMENT ITEMS

- ☐ A centerline of the SCM from the inlet through the principal spillway/embankment shows stationing to match the SCM Profile.
- ☐ A centerline of the embankment shows stationing to match the Dam Through-Section.
- ☐ A centerline of the emergency spillway shows stationing to match the Emergency Spillway Profile.
- ☐ A "No woody vegetation" zone must be delineated 15 feet from the internal and external toe of embankment and 15 feet from any control structure.
- ☐ The limits of the impervious core are shaded or hatched.

SCM PROFILE

(from inlet through embankment along riser/barrel or through weir)

- ☐ ***Existing and proposed ground surface***
- ☐ ***No slopes steeper than 3:1***
- ☐ ***Embankment top width 10' minimum; top elevations noted: constructed and settled.***
- ☐ Control structure
- ☐ Trash rack
- ☐ ***Bedding materials are shown to scale.***
- ☐ ***Outfalls are accessible for maintenance.***
- ☐ ***Design velocities are called out at outfall and where flows meet existing ground.***

DAM ITEMS

- ☐ The constructed dam height is at least 10% higher than settled dam height.
- ☐ The impervious core trench is a minimum of 2' min deep.
- ☐ The impervious core extends up to 10-year water surface elevation (WSEL).
- ☐ ***A minimum of 24" cleanout elevation is provided in forebays.***
- ☐ ***1-, 2-, 10-, and 100- WSELs are called out inside the SCM.***
- ☐ ***Permanent pool WSEL is called out, if applicable.***
- ☐ ***Control structure openings show dimensions.***
- ☐ ***Principal spillway pipe shows dimensions, slope, inverts, and material.***
- ☐ Watertight joints are specified up to the higher of the emergency spillway or the top of the riser.
- ☐ Filter diaphragm is shown, if applicable
- ☐ ***Freeboard requirements are met.***
- ☐ Liner shown, if applicable

DAM THROUGH-SECTION

- ☐ Existing and proposed ground surfaces
- ☐ Constructed and settled top of the dam elevations are called out.
- ☐ The principal spillway is shown.
- ☐ The crest elevation of the emergency spillway is shown.
- ☐ The proposed top of dam extends to existing ground on both ends, and the projected ground line is shown in the pond.
- ☐ The top of the impervious core is at or above the 10-year WSEL, with elevations called out and limits shaded or hatched.
- ☐ The bottom of impervious core trench is a minimum of 2 ft depth; the elevation is called out and limits shaded or hatched.
- ☐ The proposed 1-, 2-, 10-, and 100- year WSELs are shown.
- ☐ Freeboard requirements are met.
- ☐ Core material is specified as impervious, Unified Soil Classification MH, ML, SC, SM, CH, or CL material.
- ☐ Impervious core compaction is specified to be constructed in 8-inch lifts with a sheepsfoot roller to 95% AASHTO T-99 or equivalent.
- ☐ Geotechnical certifications are included in Engineer's Inspection Chart for materials certification and compaction, as well as for filter diaphragm items completed during the construction phase.
- ☐ A filter diaphragm is shown for all penetrations through the dam.
- ☐ Principal and Auxiliary Spillways meet NC Code 378 requirements.

FILTER DIAPHRAGM DETAIL

- ☐ Drain material is noted as ASTM C-33 (natural sand).
- ☐ The filter diaphragm extends to the normal pool WSEL (wet pond) or 10-year WSEL (dry pond).
- ☐ Filter diaphragm dimensions are shown and labeled
- ☐ A minimum of 2 ft cover is provided over the filter diaphragm.
- ☐ A pressure relief perforated drain pipe with diameter and material is shown.
- ☐ Items for inspection are listed in the Engineer's Inspection Chart.

EMERGENCY SPILLWAY PROFILE AND CROSS SECTION

- ☐ ***Existing and proposed ground surfaces***
- ☐ ***Invert elevations for inlet, control, and outlet sections***
- ☐ ***Length of inlet, control, and outlet sections***
- ☐ ***Slopes of inlet, control, and outlet sections***
- ☐ ***Velocity and discharge of the design channel at steepest section is called out.***
- ☐ ***Cross section detail of the emergency spillway with invert elevation, 100-yr WSEL, bottom***

width, existing and proposed ground surface, and side slopes labeled.

- ☐ If water passes more frequently through the emergency spillway at the 10-year storm or more frequently, the cross section is armored to the top of the embankment.
- ☐ The riprap spillway is covered with 4-inches of topsoil and sod.
- ☐ ***The outfall channel is protected, and material type and size are specified.***

CONTROL STRUCTURE DETAIL

- ☐ Control structure material is specified and is the same material as principal spillway pipe.
- ☐ The control structure is specified as cast in place or pre-cast in one piece.
- ☐ If cast in place, key-in joint reinforcement and water stop detail are included.
- ☐ If cast in place, the Engineer's Inspection Chart items are described for the Engineer to sign and date during construction.
- ☐ The control structure is accessible for maintenance.
- ☐ ***The riser are set back in the embankment to the maximum extent possible and designed to allow for inspection from top to bottom.***
- ☐ ***Riser or weir crest elevation and invert elevations of all openings are labeled.***
- ☐ ***All openings are dimensioned.***
- ☐ Concrete collars are shown and labeled.
- ☐ All holes in risers or weir walls are framed with additional reinforcing steel.
- ☐ Riser or weir base material, length, width, and thickness is shown to scale and dimensioned.
- ☐ Low flow orifice pipe diameter and type are labeled. A removable threaded cap with orifice in downstream structure is shown.
- ☐ Dewatering devices are shown and labeled.
- ☐ Trash racks are shown and labeled.

TRASH RACK DETAIL

- ☐ Galvanized aluminum and removable or lockable access is provided through the trash rack.
- ☐ Manhole rungs are under the access door to the bottom of the riser.
- ☐ Opening sizes are dimensioned.
- ☐ The trash rack has a 1:1 extension on the top opening inlet structures.
- ☐ Trash racks with a 12-18" overhang from the riser structure are preferred.

STORMWATER CONVEYANCE PROFILES

- ☐ ***Existing and proposed ground is shown along centerlines of pipe.***
- ☐ ***Structures are numbered and stationed.***
- ☐ ***Size and inverts of all pipes are provided at the structure.***
- ☐ ***Structure inverts are labeled upstream and downstream at each structure.***

- ☐ ***10- yr hydraulic grade lines shown and labeled.***
- ☐ ***All existing storm drain pipes and structures within the limit of disturbance of a project are replaced unless the existing structures are in good condition.***
- ☐ Open conveyance channels have 4:1 or flatter side slopes.
- ☐ Open conveyance profiles and cross sections are also shown.

ENGINEER'S INSPECTION CHART

- ☐ An Engineer's Inspection Chart is provided, specifying sign-off elements for the Engineer to sign and date during construction. All steps of construction when an Engineer, Geotech, or Surveyor must be contacted are stated.
- ☐ Inspection items include a minimum of liner installation, rebar placement, concrete pours, filter diaphragm installation, materials testing and core compaction.
- ☐ Geotechnical test results of concrete, soils, or media must be submitted to EHS Stormwater.
- ☐ The Design Engineer must pre-determine which construction step indicates "functional completion" of the SCM and note that the Record Drawing package must be submitted within 30 days to EHS Stormwater.
- ☐ The final survey steps for wet ponds are included in two phases: one phase when the pond bottom and forebays are at final grade, but before becoming inundated with water, and a second phase upon final completion of grading and control devices.

OPERATION AND MAINTENANCE SCHEDULE AND DETAILS

- ☐ Designed dewatering time is noted.
- ☐ Cleanout elevations are called out.
- ☐ Required maintenance and frequency are listed.
- ☐ Components of SCM requiring inspection are listed.
- ☐ Common problems and their resolution are noted.
- ☐ Specific potential areas of concern are noted.

NOTES

GENERAL STORMWATER NOTES

1. DUMPSTERS MUST NOT BE LOCATED WITHIN 50 FEET OF A STORM DRAIN INLET.
2. A WRITTEN SPILL PLAN, HELD BY THE CONTRACTOR, MUST BE IN PLACE. ANY SPILLS MUST BE REPORTED TO NC STATE STORMWATER.

NOTES FOR WOODY VEGETATION REMOVAL ON EXISTING EMBANKMENTS

1. ALL WOODY VEGETATION ON THE EMBANKMENT OR WITHIN 15 FEET OF THE TOE OF SLOPE ON EITHER SIDE OF THE EMBANKMENT SHOULD BE REMOVED.
2. WOODY VEGETATION SMALLER THAN 6" DBH CAN BE FLUSH CUT AND TREATED WITH WATERPROOF SEALANT TO PROLONG DECAY.
3. WOODY VEGETATION 6" DBH OR LARGER MUST BE REMOVED BY EXCAVATION.

4. WHERE REMOVAL BY EXCAVATION INTO THE EMBANKMENT IS REQUIRED (6"DBH AND LARGER), EXCAVATION SHOULD BE MINIMIZED AS MUCH AS POSSIBLE BUT MUST INCLUDE ALL ROOTS 1/2 INCH DIAMETER OR GREATER.
5. NEW FILL SHOULD BE PLACED IN THE EMBANKMENT IN LIFTS NO GREATER THAN 8 INCHES AND COMPACTED TO THE ASTM D698 STANDARD PROCTOR (95% DRY DENSITY). MATERIAL MUST BE UNIFIED SOIL CLASSIFICATION OF MH, ML, SC, SM, CH, OR CL MATERIAL, FREE OF STUMPS, ROOTS, RUBBISH, OR STONES.

Professional Engineer Signature Date