



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

This checklist will be used by Town of Summerville Plan Reviewers or others employed by the Town Engineer, in reviewing proposed construction activities. This checklist shows the components that must be provided by the applicant for Stormwater Construction Approvals.

The submitted information typically includes three parts: the application, the technical engineering calculations and discussions, and the construction documents (plans, details, specs, SWPPP).

I. APPLICATION FORM

- All application items should be complete and answered sufficiently.
- Signatory authority (original signatures) should be provided where requested

II. TECHNICAL REPORT/ENGINEERING CALCULATIONS

1. REPORT COMPOSITION:

- Table of Contents.
- A summary table to include at least the following:
 - a. all hydrologic results (design storms and distribution type, peak discharges, pre- and post-development, CN, Tc, PRF),
 - b. results of hydraulic calculations (road overtopping, velocities, 100-yr event analysis) calculations and methodologies,
 - c. methodology/models used,
 - d. tidal considerations,
 - e. some documentation showing that peak stages are below minimum finished floor elevation and that during the 100 year storm event ponds pass this event without overtopping (including the 1 foot freeboard) and the system would not result in an increased frequency of dwelling flooding, property damage or public access &/or utility interruption, and
 - f. results of water quality calculations.
- Report should be put together in a manner that facilitates review.
- Report prepared by licensed professional.
- One Copy to be submitted.

2. MAP(S):

- Include north arrow and scale on all maps.
- Outlined project location.
- Labeled road names.
- Nearest waterbodies, discharge points, and waters of the state.
- Location of any nearby protected areas (waters, wetlands, etc.)
- Topographic information showing runoff patterns/overland flow paths.
- Soil types.
- 100-year floodplain contours.
- Wetlands.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

3. PROJECT NARRATIVE:

- A description of the site in general, purposes of the construction activity, any issues with adjacent properties and owners, waterbodies receiving stormwater runoff, any issues with site soils, existing water quality and flooding issues, anticipated impacts (quality, downstream structures, etc.) and benefits (open space, treatment, maintenance, etc.), and reasons for waiver request.
- A summary table of existing and proposed runoff flows, volumes, and pollutant loads.
- A discussion of issues relating to other State and Federal permits needed or regulations to be followed.
- A summary of the maintenance of the stormwater system and arrangements for post-construction maintenance responsibility. Maintenance agreements and/or operating permits must be provided in the application or otherwise addressed.
- This narrative should be much more detailed for larger projects.

4. HYDROLOGIC ANALYSIS:

- Proper delineation of the site shown on maps or construction plans (preferably on 24" x 36" sheets).
- Pre- and post- development hydrologic analysis calculations for the 2-, 10-, 25-, 50-, and 100- year storm events, as necessary, at each outfall point. Analysis should be performed at the same points and with the same drainage area for both pre- and post-development conditions and correspond to the delineation. Hydrograph calculations should be provided as needed.
- Analysis performed using SCS methodology (Rational method not acceptable for Construction Approval Applications) or other if acceptable to Buildings and Codes Department.
- Use rainfall data from Chapter 3.

5. DETENTION ANALYSIS/DESIGN:

Analysis

- Pond routing using a volume based hydrograph for the 2-, 10-, 25-, 50- and 100-year SCS 24-hour rainfall event (Drain:Edge, ICPR, HEC-1, SedCAD, HYDRAFLOW, etc. perform full pond routings: TR55 does not perform a full pond routing; rational method cannot be used).
- Hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed land disturbing activity, with and without the pond (results of analysis will determine the need to modify the pond design or eliminate the pond requirement-see note in item 10).
- Inputs and outputs from analysis program.
- Summary table of the peak inflows, peak outflows, and maximum water surface elevations (WSE) for the 2, 5, 10, 25 and 100-year storm events for each pond.
- Stage-storage-discharge relationship for the outlet structure of each detention structure.
- If a rating curve for the outlet structure must be generated externally from the analysis program (Drain:Edge, HEC-1, HydroCAD), data and equations used to rate the outlet structure.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

Design

- Detail of outlet structure and cross-section of the dam, including elevations and dimensions that correspond to the calculations.
- Orifice constructability considered (do not specify orifice diameters with increments of less than ¼").
- Maximum water surface elevation (WSE) for the 100-year storm event below the embankment with 1-ft of freeboard between maximum WSE for the 100-year storm embankment.
- The volume within any structure used for water quantity control shall be drained from the structure within 72 hours.
- Bottom of all detention and retention ponds graded to have a slope of not less than 0.5% and side slopes no steeper than 3:1 unless adequately protected.
- If the pond is to be used for sediment control during construction, outlet structure should be sufficiently protected.
- Permanent maintenance access to all permanent detention structures (easements may be needed for structures surrounded by lots).
- Infiltration and underground detention systems designed in accordance with Chapter 3.
- Emergency spillways should not be built on fill slopes.
- If pond is to be used to meet water quality requirements, a forebay, designed in accordance with this manual, is required.
- Installation of a trash rack or other debris-screening device is recommended on all pond risers.

6. HYDRAULIC DESIGN:

- Design calculations for all conveyances, inlets, and outlets based on the contributing area, allowable velocities, and upstream and downstream conditions.
- Upstream and downstream analysis showing the project will not impact new and existing structures or reduce downstream system capacity.
- Check to make sure the proper design storms were used at the appropriate design points.

7. WATER QUALITY REQUIREMENTS:

- All sites which disturb one (1) acre or greater shall include best management practices (BMPs) to address water quality, along with an Operation and Maintenance Agreement that guarantees maintenance of all BMPs in perpetuity.
- All permanent water quality ponds having a permanent pool shall be designed to store and release a water quality volume (WQV) defined as the first one-half (1/2") inch of runoff (First Flush) over a 24 hour period. The "first flush" volume should be determined from the contributing watershed area (impervious and pervious) that drains to the water quality pond (s).
- Permanent water quality ponds, not having a permanent pool, shall be designed to store and release the first 1-inch (1") of runoff from the contributing watershed area over a minimum period of 24-hours.
- For areas not draining to a pond, it should be demonstrated how permanent water quality requirements will be addressed.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

- Other non-traditional stormwater controls such as Bioretention areas and constructed wetlands may be used if adequate removal efficiencies can be demonstrated.
- Pre-fabricated or proprietary treatment devices are approved on a case-by-case basis if adequate removal efficiency can be demonstrated. Provide pollutant removal efficiency data, preferably from a third-party testing company. Type of system to be used should be based on the ability to remove the pollutants of concern in that area/situation (i.e. bacteria, hydrocarbons, etc.).
- Waters of the U.S./State shall not be used for permanent water quality control. (Alternative means of treatment must be used if an existing pond is to be used for water quantity control).

8. INLET PROTECTION:

- Provided at all inlets (no hay bales).
- Buried fabric shown for filter fabric inlet protection.
- Inlet protection details provided for pre-paving and after roadways have been paved.

9. DISCHARGE POINTS:

- The post-development discharges rates should be less than pre-development discharges for each discharge point for the 2-, 10, and 25-year storm events. If not, then a detention waiver should be requested.
- Storm drainage or pond outfalls are carried to an existing drainage outfall such as a pipe, ditch, easement, etc.
- No new point discharges onto adjacent property where there was not a point discharge previously without providing the adjacent property owner's written permission.
- Level spreaders, plunge pools, etc. provided when the proposed outlet is near the property line.
- When possible, provided a 20-foot minimum buffer between the property line and the end of all pipes or energy dissipation measures installed.
- Outlets do not discharge on fill slopes.
- Discharge pipes greater than 24" require headwall with wings.
- Headwalls required in major drainage channels.
- All outlets stabilized.
- Riprap aprons sized appropriately.
- Riprap detail shows apron dimensions and stone sizes.
- Filter fabric installed beneath all riprap.

10. SLOPE AND/OR CHANNEL STABILIZATION:

- All slopes designed and stabilized properly.
- All channels and diversion ditches must be able to handle the 10-year storm event with non-erosive velocities during construction and post-construction.
- Rock check dams provided in temporary diversion.
- Installation detail for erosion control blanket (ECB) or turn reinforcement matting (TRM) if ECBs or TRMs to be used.
- Slope drains provided where concentrated flows discharge onto a fill slope.
- For all slopes steeper than 1.5:1, identification of stabilization practice (e.g., ECB, TRM).



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

Note: Measures, in addition to grassing or hydroseeding, include synthetic or vegetative matting, diversion berms, temporary slope drains, etc.

Note: If retaining walls or fill slopes are to be constructed at the downstream property line, a 10' buffer is recommended for construction and maintenance.

11. UTILITY/LINEAR LINES:

- Limits of disturbance include areas disturbed for water, sewer, gas, and electric line installation.
- Check for coverage by SCDHEC on utility company and for coordination with permit holder.

12. SEDIMENTOLOGY:

- BMPs should be properly placed (silt fence, inlet protection, construction entrance, rip-rap at outfalls, check dams etc.).
- Trapping efficiency calculations showing that all sediment basins/ traps or other BMPs are capable of achieving a sediment trapping efficiency of 80 percent for suspended solids. The efficiency shall be calculated for disturbed conditions for the 10-year 24-hour design event.
- Sediment basins provide storage for the 10-year, 24-hour storm event for disturbed conditions if 10 acres or more drain to a common point (stream, lake, property line, etc.).
- Sediment traps only used for drainage areas of less than 5 acres.
- Trapping efficiency calculations should be complete, specifying methods, assumptions, and results.
- Sediment basins and traps designed for total area draining to them.
- Drainage area map should outline the area draining to each basin/trap.
- Copies of any figures used to determine V_{15} and trapping efficiencies. The Design Aids in SCDHEC (2003) can be used for these calculations.
- Silt fence only used in areas with drainage areas of less than $\frac{1}{4}$ acre per 100 LF of fence and not used in areas with concentrated flows.
- Clean-out stake, marked at $\frac{1}{2}$ the designed sediment storage depth, provided in all sediment basins/ sediment traps.
- Construction schedule with timeline for each activity.

Note: SCDHEC (2003) and SCDHEC (2005) provide information on the design of these and other devices.

Note: The Design Aids in SCDHEC (2003) cannot be used to determine trapping efficiencies for structures in series. If the flow for the 10-year, 24-hour storm for construction conditions overtops the structure or the structure's spillway, then the Design Aids cannot be used. If multiple soil types are in the area draining to the structure, then the soil type with the smallest D_{15} for the appropriate depth should be used to determine the settling velocity, V_{15} ; an average D_{15} should not be used.

13. WATERS-OF-THE-STATE, INCLUDING WETLANDS:

- Delineation of all waters of the State (WoS) located on the site, including wetlands, shown and labeled on plans.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

- If impacts to WoS, outlined areas of impacts and labeled that no work can begin in this area until all necessary USACE permits and SCDHEC 401 certifications have been obtained.
- Double row of silt fence provided in all areas where a 50' undisturbed buffer cannot be maintained between the disturbed area and the WoS.
- Minimum 10' maintenance buffer provided between last row of silt fence and WoS; or, if buffer not provided, then statement from P.E. on plans indicating how silt fence will be installed and maintained without impacts to WoS.

Note: If there are proposed impacts to WoS, then applicant must contact the UCACE (866-329-8187) and/or S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section (803-898-4300) to determine additional requirements before submitting this application.

Note: If WoS are to be impacted, work cannot be performed in these designated areas until all necessary permits have been acquired.

Note: If USACE permit is required for construction of a permanent stormwater management structure, City final approval cannot be granted until all applicable State and Federal permits have been obtained. A preliminary approval is issued instead.

Note: A 50-foot buffer between a sediment trap/basin and waters of the State and wetland areas is recommended.

14. SPECIAL PROTECTION AREAS:

- List the nearest S.C.DHEC Water Quality Monitoring Station (WQMS) that the site's stormwater discharges drain to and the waterbody on which it is located.
- Qualitative and quantitative assessment (described in Section 3.4C of SCR100000), if nearest WQMS is listed on the most recent 303(d) List of Impaired Waters and if site's stormwater construction discharges contain the pollutant of impairment and if the site disturbs 25 or more acres.
- Evaluation of selected BMPs if nearest WQMS listed on the most recent 303(d) List of Impaired Waters and if site's stormwater construction discharges contain the pollutant of impairment and if site disturbs less than 25 acres.
- If an Approved TMDL has been developed for the nearest WQMS and if the site's stormwater construction discharges contain the pollutant of impairment, show that measures and controls on the SWPPP met assumptions and requirements of TMDL (may need to contact DHEC Watershed Manager for assistance).

15. POST-CONSTRUCTION MAINTENANCE PLAN:

- Signed agreement from a responsible party accepting ownership and maintenance of the stormwater management structures (Operating Permit).
- Description of maintenance plan to be used.
- Schedule of maintenance procedures, including time to replacement.
- Detailed or manufacturer-specific maintenance items for proprietary control devices (oil-water separators, etc.), underground detention structures, and non-traditional stormwater controls (constructed wetlands, bioretention, etc.).
- Typical maintenance items to be addressed:



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

- Grass to be mowed.
- Trees to be removed.
- Trash to be removed from within and around the pond outlet structure and outlet pipes to be cleaned, inspected, and repaired, sediment accumulation to be removed from pond(s).
- Energy dissipator to be cleaned and repaired.
- Pond bottom to be regraded to provide proper drainage towards the outlet discharge point and/or energy dissipator to be cleaned and repaired.
- Emergency spillway, if applicable, to be inspected and erosion repaired on side slopes, if present.
- The Town Engineer must be notified in writing of any changes in maintenance responsibility for the stormwater devices at the site (include this statement in agreement).
- Specific maintenance items particular to more complex structures.

16. ACCESS:

- Project layout has considered access for maintenance and inspection during and after construction.

17. DETENTION WAIVER:

- If the 2-, 10-, and 25-year post development flow rates exceed the pre-development rates, waivers from detention may be granted in accordance with Chapter 2 on a case-by-case basis.
- Justification should be provided in a separate written request and demonstrate that:
 - The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties; or
 - The imposition of peak control requirement for rates of stormwater runoff would aggravate downstream flooding.
- Waiver signed by the project's Professional Engineer.
- Waiver from water quality criteria is not allowed, however, another equivalent method or criteria will be reviewed (applicant should provide all the necessary information to make a decision).

III CONSTRUCTION PLANS

- One complete set of plans and one complete set of engineering calculations should come to the Town of Summerville Engineering Department.
- Two full size and two half size set of plans and one set of calculations once review is complete and approval is to be granted.

1. GENERAL ITEMS:

- All sheets 24" x 36".
- Engineer stamp and signature on every sheet.
- Engineering Firm's Certificate of Authorization seal on Grading plan.
- Correct Scale and North Arrow.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

- Existing and proposed contours are to be tied to a NAVD 88 datum, no **assumed** elevations (1' interval is the minimum).
- Lot Layout.
- Property lines, adjacent landowners' names, and land use conditions (locate houses, driveways, etc. onsite/offsite), critical or protected area.
- Legend.
- Existing and proposed contours for entire disturbed area and off-site areas.
- Limits of disturbed area.
- Delineation of waters of the state, including wetlands with letter from US Army Corps of Engineers, if applicable.
- Easements and any offsite easements that will be used.
- Road profiles with existing and proposed ground elevations.
- Construction sequence (include implementation of all stormwater and sediment controls in the first phase of construction).
- Locations of all temporary and permanent control measures.
- Details for all temporary and permanent control measures.
- Grassing and stabilization specifications.
- Construction entrance/exit.
- Location map.
- Individual lot erosion control plan (applicable to subdivisions).
- Revision block utilized.

2. STORMWATER/DRAINAGE SHEETS

- 24" x 36" sheet.
- Provide drainage area map for existing and proposed conditions, including pathways, outlining delineated sub basins, sub basin characteristics (watershed identifier, Curve Number, Tc, Area length, Slope), and the areas draining to all BMPs on site. Off-site drainage areas should be included.
- Labeling should be consistent with Technical report.
- Indicate high and low points for the site.
- Catch basin locations should be outside intersection curve radii, uphill of intersection.
- Easements for storm drainage.
- 10-foot wide riding surface around entire pond for Town of Summerville maintenance, install gravel if needed (e.g. clay soils).
- 20-foot wide access road to pond, dedicated with pond.
- Discharge pipes greater than 24-inch require a headwall.
- Label all storm drainage structures.
- Water surface elevation in pond/BMPs for all necessary storm events.
- Cut/Fill volumes for the site.
- Utility crossings (water, sewer, storm drainage) to have one foot of cover minimum.
- 15-inch minimum pipe size (no decreases in pipe size in the downstream direction).
- Pipes should flow freely and not rely on imposition of upstream head.
- 20% maximum pipe slope.
- Minimum fall across boxes of 0.1-feet.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

- When possible, inside top surfaces (soffit) of pipes should be lined up at pipe size changes.
- Crown elevation of inlet pipes equal or greater than crown elevation of outlet pipe.
- Steps required for boxes greater than 4.5 feet deep.
- Minimum inside box measurements are 3' x 3'.
- Label calculated design flows on each pipe.
- Hydraulic grade lines on profiles of storm pipe.
- Existing and proposed grade on profiles of storm pipe.
- Catch basins field staked to ensure proper alignment with the street and gutter.

3. DETAILS

- Reference the SCDHEC BMP Manual for some details
- Curb (rolled, barrier, expulsion).
- Typical road cross section(s) with underdrains at low points and 100 foot up hill or as directed by Town of Summerville.
- Silt fence.
- Inlet protection.
- Lot to lot sediment and erosion control.
- Headwalls.
- Rip-rap apron.
- Construction entrance.
- Swale/ditch.
- Typical detail for all BMPs (sediment traps, ponds, water quality devices, etc.).
- Catch basins, manholes, junctions, etc.

4. STANDARD NOTES:

- Notes as required by State and Federal agencies and any additional notes for compliance with Town of Summerville requirements.
- SWPPP, inspection records, and rainfall data must be kept onsite or within thirty (30) minutes of the site at all times from the commencement of construction activities to the date that final stabilization is achieved. These items are to be in a designated area that is accessible to the inspectors.
- The Town of Summerville shall not maintain Stormwater detention or retention ponds. The property owner shall maintain all stormwater detention facilities shown herein. The inspection frequencies, maintenance activities and other responsibilities as necessary to ensure the system's proper long-term functioning are defined in the Operating and Maintenance Agreement of Stormwater Facilities.
- A certified Stormwater As-built must be submitted to the Town of Summerville prior to letter of occupancy, Closeout Package, and to SCDHEC prior to receiving a Notice of Termination.
- The project/site must be built according to approved Town and SCDHEC plans unless SWPPP documents are updated by the original SWPPP preparer, otherwise permits and approvals will be invalidated.



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

- If necessary, slopes, which exceed eight (8) vertical feet should be stabilized with synthetic or vegetative mats, in addition to hydroseeding. It may be necessary to install temporary slope drains during construction. Temporary berms may be needed until the slope is brought to grade.
- Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased, except as stated below.
 - Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions stabilization measures must be initiated as soon as practicable.
 - Where construction activity on a portion of the Site is temporarily ceased, and earth-disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the Site.
- All sediment and erosion control devices shall be inspected once every calendar week. If periodic inspection or other information indicates that a BMP has been inappropriately or incorrectly installed, the Permittee must address the necessary replacement or modification required to correct the BMP within 48 hours of identification.
- Provide silt fence and/or other control devices, as may be required, to control soil erosion during utility construction. All disturbed areas shall be cleaned, graded, and stabilized with grassing immediately after the utility installation. Fill, cover, and temporary seeding at the end of each day are recommended. If water is encountered while trenching, the water should be filtered to remove sediment before being pumped back into any waters of the State.
- All erosion control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control devices may be required during construction in order to control erosion and/or offsite sedimentation. All temporary control devices shall be removed once construction is complete and the site is stabilized.
- The contractor must take necessary action to minimize the tracking of mud onto paved roadway(s) from construction areas and the generation of dust. The contractor shall daily remove mud/soil from pavement, as may be required.
- Residential subdivisions require erosion control features for infrastructure as well as for individual lot construction. Individual property owners shall follow these plans during construction or obtain approval of an individual plan in accordance with S.C Reg. 72-300 et seq. and SCR100000.
- Temporary diversion berms and/or ditches will be provided as needed during construction to protect work areas from upslope runoff and/or to divert sediment-laden water to appropriate traps or stable outlets.
- All waters of the State (WoS), including wetlands, are to be flagged or otherwise clearly marked in the field. A double row of silt fence is to be installed in all areas where a 50-



TOWN OF SUMMERVILLE PLAN REVIEW CHECKLIST

foot buffer can't be maintained between the disturbed area and all WoS. A 10-foot buffer should be maintained between the last row of silt fence and all WoS.

- Litter, construction debris, oils, fuels, and building products with significant potential for impact (such as stockpiles of freshly treated lumber) and construction chemicals that could be exposed to storm water must be prevented from becoming a pollutant source in storm water discharges.
- Initiate stabilization measures on any exposed steep slope (3H:1V or greater) where land-disturbing activities have permanently or temporarily ceased, and will not resume for a period of 7 calendar days.
- Minimize soil compaction and, unless infeasible, preserve topsoil.
- Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- Minimize the discharge of pollutants from dewatering of trenches and excavated areas. These discharges are to be routed through appropriate BMPs (sediment basin, filter bag, etc.).
- The following discharges from sites are prohibited:
 - Wastewater from washout of concrete, unless managed by an appropriate control;
 - Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
 - Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
 - Soaps or solvents used in vehicle and equipment washing.
- After construction activities begin, inspections must be conducted at a minimum of at least once every calendar week and must be conducted until final stabilization is reached on all areas of the construction site.
- If existing BMPs need to be modified or if additional BMPs are necessary to comply with the requirements of this permit and/or SC's Water Quality Standards, implementation must be completed before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as reasonably possible.
- A Pre-Construction Conference must be held for each construction site with an approved On-Site SWPPP prior to the implementation of construction activities. For non-linear projects that disturb 10 acres or more this conference must be held on-site unless the Department has approved otherwise.