GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
MASTER BMP REVIEW CHECKLIST

(Complete this for project, then select and complete applicable pages that follow for specific BMPs)

DEVELOPMENT NAME: _____

DISTRICT/LANDLOT/PARCEL: _____

ENGINEER/CONSULTANT: _____

PHONE NUMBER / EMAIL: _____

BMP ID: _____

REVIEWER: _____

REVIEW DATE: _____

PERMIT # / FINAL PLAT #: _____

☐ **Initial Submittals:** Initial submittals of as-built hydrology reports and surveys must be via the online submittal process at: https://eddspermits.gwinnettcounty.com/citizenaccess/.
Initial submittals sent directly to the As-BuiltHydroReviews email address will not be reviewed.

☐ **Resubmittals Only:** Email signed and stamped documents, with a copy of these annotated comments. Email submissions to: As-BuiltHydroReviews@gwinnettcounty.com.

☐ **Drop off or Mailing**: Signed and stamped documents, with an annotated copy of these comments, may be dropped off or mailed to: Gwinnett County Department of Water Resources
DWR Central Building
684 Winder Highway, Lawrenceville, 30045
ATTN: As-built Stormwater BMP Team

☐ **Appointment**: An appointment may be scheduled with the plan reviewer, after the initial review and revision. Please email As-BuiltHydroReviews@gwinnettcounty.com to schedule an appointment.

PRIMARY DOCUMENT SUBMITTALS FOR ALL STORM WATER BEST MANAGEMENT PRACTICES:

1. ☐ Dated as-built hydrology study with professional's engineer's seal and signature, containing information listed below. This document should be able to stand on its own and contain ALL information provided in the most recent county authorized site design hydrology report, updated to reflect as-built conditions (i.e. updated calculations, maps, tables, details, etc.). _____

2. ☐ Current dated as-built survey with a land surveyor's seal and signature, containing information listed below.
Note: Surveys are used for field inspections, so should be included as full size (min. 24"x36") attachments, with key/locator map, to the report. Smaller copies of the survey are encouraged to be included within the body of the report. _____

3. ☐ Most recent County-authorized site design hydrology report _____

4. ☐ Annotated copy of this checklist _____

(Continued)

AS-BUILT REPORT:

ITEMS REQUIRED FOR AS-BUILT REPORT FOR PROJECT WITH ANY STORMWATER BMPS

5. ☐ Completed GSMM Site Development Review Tool (SDRT) Spreadsheet, updated with as-built conditions _____
6. ☐ Completed BMP tracking form(s) _____
7. ☐ On-site and off-site drainage basin area maps with impervious areas to each stormwater BMP _____
8. ☐ Pre- and post-development peak discharges for 1, 2, 5, 10, 25 and 100-yr, 24-hour storms, as applicable _____
9. ☐ All hydrographs, hydrograph recaps, and hydrograph summaries, if any, as applicable _____
10. ☐ All information required on the BMP-specific checklist in the following pages _____
11. ☐ BMP Operation and Maintenance Manual, if applicable _____
12. ☐ Gwinnett County final BMP field inspection is required. _____
13. ☐ Provide BMP Maintenance Bond, if applicable. _____
14. ☐ All additional information required on survey listed on attached checklist for the specific BMP _____

AS-BUILT BMP SURVEY:

ITEMS REQUIRED FOR AS-BUILT SURVEY FOR PROJECT WITH ANY STORMWATER BMPS

15. ☐ Contours at 2-foot elevations (minimum) and spot elevations at enough locations and quantities to describe the stormwater BMP and its relationship to surrounding area and facilities, including grading and the surrounding area where the graded area meets the existing area to remain ungraded, inlet and outlet pipes and structures, and other structures pertinent to the operation and maintenance of the BMP _____
16. ☐ Key/locator map _____
17. ☐ The locations, with respect to property lines, R/W, and easement lines, of all stormwater BMPs on and/or serving the project _____
18. ☐ All additional information required on survey listed on attached checklist for the specific BMP _____

(End of Master BMP Checklist)

FOR CHECKLISTS FOR SPECIFIC STORMWATER BMPs, SEE THE FOLLOWING PAGES

Gwinnett Water Resources

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
BIORETENTION AREA CHECKLIST

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for RR_v, WQ_v, CP_v, storage volumes, and associated orifice sizing (if applicable) _____

2. ☐ Pre-development and post-development peak discharges and the following information and calculations for the 1, 2, 5, 10, 25, and 100-year, 24-hour return frequency storms, as applicable, if used for: _____

    a. Channel protection, _____
    b. Overbank flood protection, and/or _____
    c. Extreme flood protection _____
    Including:
        a. Hydrograph recaps, hydrographs, and hydrograph summaries, _____
        b. Stage/storage table for entire facility starting at the lowest discharge invert or bottom of the bioretention facility _____
        c. Summary report with orifices, weirs, culverts, and discharge data used to develop pond routing hydrographs _____

3. ☐ On-site and off-site delineated basin area maps with impervious areas to bioretention area
    Note: Maximum 5 acres contributing drainage area per facility _____

4. ☐ Landscaping plan indicating location, names, and sizes of species used _____
    a. Native vegetation is preferred _____
    b. Three species each of trees, shrubs, and grass/herbaceous species avoid creating a monoculture. _____

5. ☐ Native soil infiltration testing data in as-built condition (minimum 0.5 in./hr.) _____

6. ☐ Data for engineered media, if used; must meet following specifications: _____
    a. Infiltration rate testing of engineered media in as-built condition, _____
    Preferred: 2 to 4 inches/hour
    Minimum: 0.5 inches/hour
    b. Soil: Phosphorus Index, maximum: 30 _____
    c. Soil: Cation Exchange Capacity (CEC), minimum: 10 milliequivalents (meq) per 100 grams of dry weight _____
    d. Soil: pH of 6-8 _____

7. ☐ Engineered media mix, if applicable _____
    a. Sand Content: 35%-60% clean, washed sand _____
    b. Topsoil Content: 20%-30% _____
    c. Organic Matter Content: 10%-25% _____
    d. Clay: 15%, maximum _____

8. ☐ Drain-down time calculations; maximum 24 to 72 hours for complete drain down _____

9. ☐ Depth to seasonal high water table (SHWT)
    Minimum separation between bottom of the bioretention area and SHWT elevation: 2 ft. _____

10. ☐ As-built dimensions and sizing calculations _____

11. ☐ Underdrain sizing calculations, if used _____

(Continued)

12. ☐ Calculations demonstrating the facility can safely pass or divert extreme storm flows _____

AS-BUILT SURVEY:

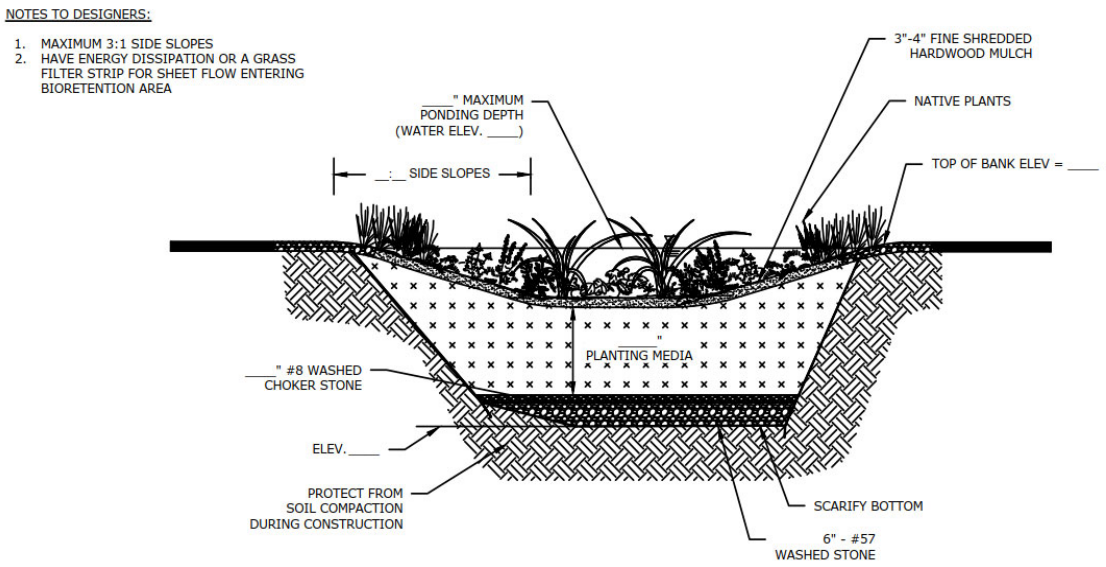
Include the following information (draw, indicate, label, dimension) on the as-built survey:

13. ☐ Contours at 2-foot elevations (minimum) and enough spot elevations to define inlet and outlet features, flow in and out of the facility, and other pertinent features of the facility _____
14. ☐ Location and type of inlet protection used to prevent scour _____
15. ☐ Side slopes (3:1 or flatter required) _____
16. ☐ Top of bank elevation _____
17. ☐ Bottom of facility elevation _____
18. ☐ Maximum ponding depth: 12 inches (9 inches preferred) _____
19. ☐ Water surface elevation _____
20. ☐ Diversion or bypass structure _____
21. ☐ Location of all forebay areas or pretreatment (e.g. check dams, weirs) for each bioretention inlet _____
22. ☐ Show, label, and dimension access easement _____
23. ☐ Setback dimensions from building foundations, roadways and water supply facilities _____
    Minimums:
    a. Building foundations: 10 feet _____
    b. Private water supply wells: 100 feet _____
    c. Public water supply reservoirs: 200 feet (measured from edge of water) _____
    d. Public water supply wells: 1,200 feet _____
24. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____
25. ☐ Location and dimensions of check dams, if used _____

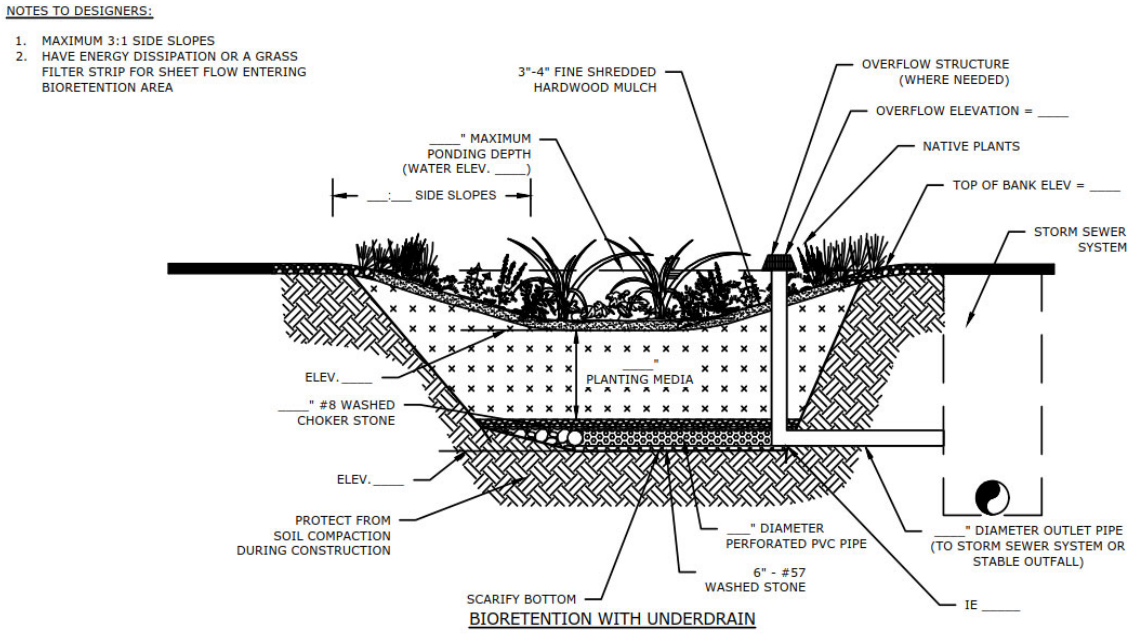
If underdrain is used:

26. ☐ Size and material of perforated underdrain pipe, if visible in outlet structure _____
27. ☐ Elevation of overflow structure (where needed) _____
28. ☐ Elevation of pipe invert leaving bioretention system facility _____
29. ☐ Diameter of outlet pipe to storm sewer or stable outfall _____
30. ☐ Include detail/section view of bioretention facility and label: _____

(*Continued*)



BIORETENTION WITHOUT UNDERDRAIN



BIORETENTION WITH UNDERDRAIN

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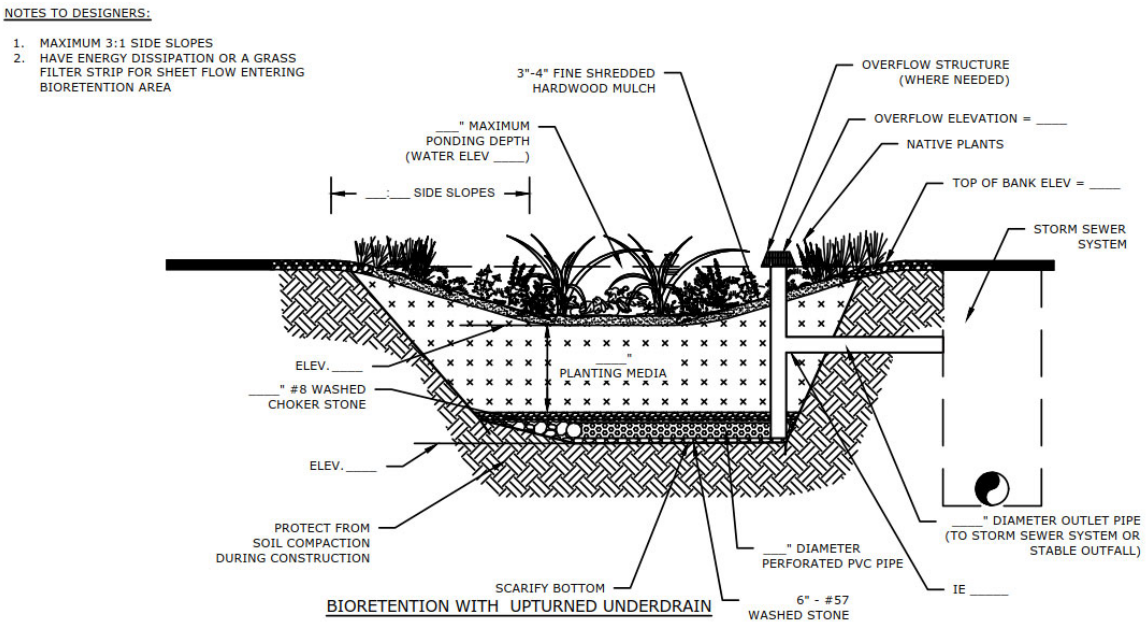


(End of Bioretention Area Checklist)

Gwinnett Water Resources

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
BIOSLOPE CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps, with impervious areas to bioslope
   Maximum contributing upstream flow: 150 feet. _____
2. ☐ Slopes
   a. Longitudinal slopes (parallel with the embankment): maximum 5% _____
   b. Embankment slopes: typical 3:1 maximum; or flatter preferred _____
   Note: When slopes steeper than 4:1 are used, additional measures may be required to ensure stabilization of vegetation along the slope. _____
   c. Slope and cross-sectional area to maintain non-erosive velocities _____
3. ☐ Landscaping plan indicating location, names, and size of species used _____
4. ☐ Engineered media mix specification _____
5. ☐ Washed stone depth (from inspection during installation) _____
6. ☐ As-built verification of infiltration rate _____
7. ☐ Depth to seasonally high water table (SHWT)
   Note: Minimum distance between the bottom of the practice and the SHWT elevation: 2 feet _____
8. ☐ Dimensions and area sizing calculations of bioslope _____
   a. Minimum width: 2 feet _____
   b. Minimum depth: 1 foot _____
9. ☐ Underdrain sizing calculations, if used _____
   c. Minimum diameter: 6 inches _____
   d. Minimum distance between bottom of practice and invert of underdrain: 6 inches _____
10. ☐ Demonstrate bioslope facility can safely pass the 25-year and 100-year events. _____

AS-BUILT SURVEY:

11. ☐ Grassed filter strip, if applicable. Minimum width: 2 feet _____
12. ☐ Indicate slopes:
    a. Longitudinal slope: maximum 5% _____
    b. Embankment slope: maximum 3:1 _____
13. ☐ Top of bank elevation _____
14. ☐ Bottom of facility elevation _____
15. ☐ Overflow, diversion, or bypass structure to safely route larger storms through or around bioslope area _____

(*Continued*)

16. ☐ Dimension setbacks from building foundations, roadways and water supply facilities _____
    Minimums:
    a. Building foundations: 10 feet _____
    b. Private water supply wells: 100 feet _____
    c. Public water supply reservoirs: 200 feet (measured from edge of water) _____
    d. Public water supply wells: 1,200 feet _____

17. ☐ Profile of underdrain with connection to structure or stable outfall: _____

18. ☐ Size and material of perforated underdrain pipe, if visible. Minimum diameter: 6 inches _____

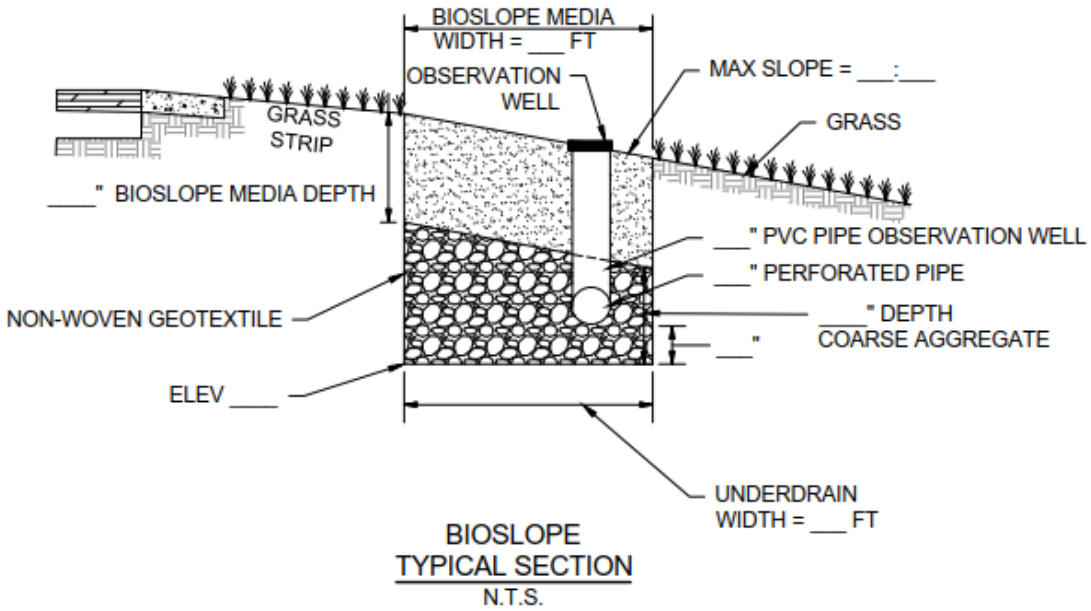
19. ☐ Elevation of underdrain pipe invert leaving bioslope _____

20. ☐ Location and diameter of observation well(s), if used _____

21. ☐ Provide detail/section view of bioslope and label: _____

NOTES TO DESIGNERS:

1. MAXIMUM SLOPE IS 3:1.
2. MINIMUM BIOSLOPE WIDTH IS 2'.
3. MINIMUM BIOSLOPE MEDIUM DEPTH IS 1',
4. MINIMUM WIDTH OF BOTTOM OF BIOSLOPE IS 2'.
5. MINIMUM DEPTH OF COARSE AGGREGATE IS 18".
6. MINIMUM DIAMETER OF PERFORATED UNDERDRAIN IS 6".
7. MINIMUM DISTANCE BETWEEN BOTTOM OF PRACTICE AND INVERT OF UNDERDRAIN PIPE IS 6".
8. MAXIMUM LONGITUDINAL SLOPE IS 5%.



BIOSLOPE
TYPICAL SECTION
N.T.S.

(End of Bioslope Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
DOWNSPOUT DISCONNECT CHECKLIST

AS-BUILT REPORT:

1. ☐ Basin area maps with impervious areas and flow path lengths to each downspout disconnect
   a. Rooftop area to downspout: 2,500 S.F. maximum _____
   b. Flow path length of contributing drainage area: 75 feet maximum _____
   c. Disconnect length (to contributing flow path length): 15 feet minimum _____

2. ☐ Pervious area slope (receiving discharge):
   Maximum: 6% (5% recommended) _____
   Minimum: 0.5% (1% recommended) _____

3. ☐ Hydrological Soil Group (HSG) soil types
   Notes: Disconnects can be used on all soil types.
   Soil amendments may be required for HSG C and HSG D soils. _____

AS-BUILT SURVEY:

4. ☐ Show contours at 2-foot elevations and spot elevations. _____

5. ☐ Identify vegetation used in downstream flow path. _____

6. ☐ Plan view with locations of all disconnected downspouts, including:
   a. Flow paths and area of roof draining to each _____
   b. Downspout disconnects in respect to property lines, road R/W, and other easements _____

7. ☐ Detail of how runoff will be conveyed as sheet flow _____

(End of Downspout Disconnects Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
DRY AND WET ENHANCED SWALES CHECKLIST

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for RR_v, WQ_v, and CP_v, storage volumes and associated orifice sizing (if applicable) _____
2. ☐ Non-erosive velocity for the 2-year storm peak, for the soil and vegetative cover _____
3. ☐ Demonstrate, if the system is online, that channels are sized to convey runoff from the overbank flood event (Qp_{25}) safely.
   a. Freeboard minimum: 6 inches _____
   b. Convey without damage to adjacent property _____
4. ☐ On-site and off-site delineated basin area maps, with impervious areas to enhanced swale
   Drainage area maximum: 5 acres; 2 acres maximum is preferred _____
5. ☐ Landscaping plan indicating location, names, and sizes of species used _____
   a. Specify appropriate grass species and wetland plants, based on specific site, soils, and hydric conditions present along the channel. _____
   b. Grass species must withstand high velocity flows at the entrance, in both wet and dry periods. See GCSMM Vol 2, p. 218 Table 4.8-1 for list of common grasses. _____
   c. For wet swales: emergent vegetation to be planted or wetland soils may be spread on the swale bottom for seed stock. See Section 5 of Appendix D of GCSMM for wetland species. _____
6. ☐ Engineered media mix specification _____
7. ☐ As-built permeability rate tests for verification of design _____
8. ☐ Filter fabric type and specification for fabric between the gravel layer and the overlying soil _____
9. ☐ Coarse aggregate depth: 6 inches minimum (From inspection during construction) _____
10. ☐ Depth to seasonal high water table (SHWT) _____
    a. Wet swale is below water table or placed in poorly drained soils _____
    b. Exfiltration not allowed in hotspot areas or over karst geology _____
11. ☐ Dimensions and area sizing calculations of enhanced swale _____
    a. Bottom width: 2 to 8 feet recommended
    b. Channel bottoms wider than 8 feet: use berms, walls, or a multi-level cross section to prevent channel braiding or uncontrolled sub-channel formation. _____
12. ☐ Provide soil media mix specification _____
    a. Depth: 30 inches minimum _____
    b. Infiltration rate (soil): 1 foot per day minimum; 1.5 feet per day maximum _____
    c. Provide as-built verification of infiltration rate _____
13. ☐ Elevation difference (head) from the inflow to the outflow: _____
    a. Dry swale: 3 to 5 feet minimum _____
    b. Wet swale: 1 foot minimum _____
14. ☐ Drain-down time: 48 hours maximum; 24 hours preferred _____

(Continued)

15. ☐ Dimensions and area sizing calculations of facility, including pretreatment/forebay _____
    Note: Required minimum 0.1 inches of runoff per impervious acre of contributing drainage area _____

16. ☐ Provide underdrain sizing calculations, if used _____
    a. Minimum diameter is 4-inch perforated PVC pipe _____
    b. Underdrain is laid longitudinally in 6-inch gravel layer _____

AS-BUILT SURVEY:

17. ☐ Provide labeled plan and profile views and labeled typical sections _____

18. ☐ Pretreatment area/Pretreatment volume: minimum 0.1 inches per impervious acre _____

19. ☐ Longitudinal slopes: Maximum 1 to 2%, recommended. Maximum 4% with special considerations.
    a. In areas of longitudinal slope greater than 2%, use 6- to 12-inch drop structures to limit the energy slope to within the recommended 1% to 2% range. _____
    b. Energy dissipation is required below drops. _____
    c. Spacing between the drops: 50 feet maximum recommended _____
    d. Depth of the storage volume at the downstream end: 18 inches maximum _____

20. ☐ Detail showing side slopes
    a. Maximum: 2:1 or flatter; preferred: 4:1 or flatter _____
    b. Where flow enters from the side, 4:1 or flatter is strongly advised.

21. ☐ Elevations for:
    a. Top of bank _____
    b. 25-year Water Surface Elevation (WSE) _____
    c. Water Quality Volume WSE _____
    d. Bottom of swale _____

22. ☐ Overflow, diversion or bypass structure _____

23. ☐ Ponding depths _____
    a. Average: 12 inches _____
    b. Maximum: 18 inches _____

24. ☐ Outlet protection required at all discharge points _____

25. ☐ Energy dissipaters at inlets _____
    Note: Enhanced swale systems that receive direct concentrated runoff may have a 6-inch drop to a pea gravel diaphragm flow spreader at the upstream end of the control. _____

26. ☐ Check dams and weir invert elevations and weir type, if applicable _____

If underdrain is used:

27. ☐ Size and material of perforated underdrain pipe, if visible. Minimum diameter: 4-inches _____

28. ☐ Elevation of underdrain pipe invert leaving enhanced swale _____

(Continued)

29. ☐ Overflow elevation _____

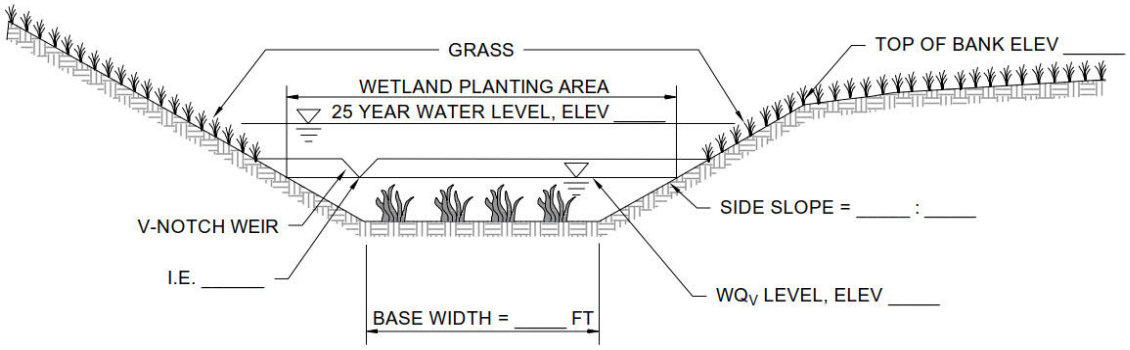
30. ☐ Profile showing underdrain discharging to drainage infrastructure or stable outfall _____

31. ☐ Profile of dry/wet enhanced swale _____

32. ☐ Detail/section view of dry/wet enhanced swale, labelled as in applicable diagram, below: _____

NOTES TO DESIGNERS:

1. MIN. 6" FREEBOARD ABOVE 25-YR STORM WATER SURFACE ELEVATION.
2. MAXIMUM SIDE SLOPE IS 2:1.
3. BASE WIDTH SHOULD BE BETWEEN 2' AND 8'.
4. MAX WQ_V PONDING DEPTH IS 18".



WET ENHANCED SWALE
TYPICAL SECTION
N.T.S.

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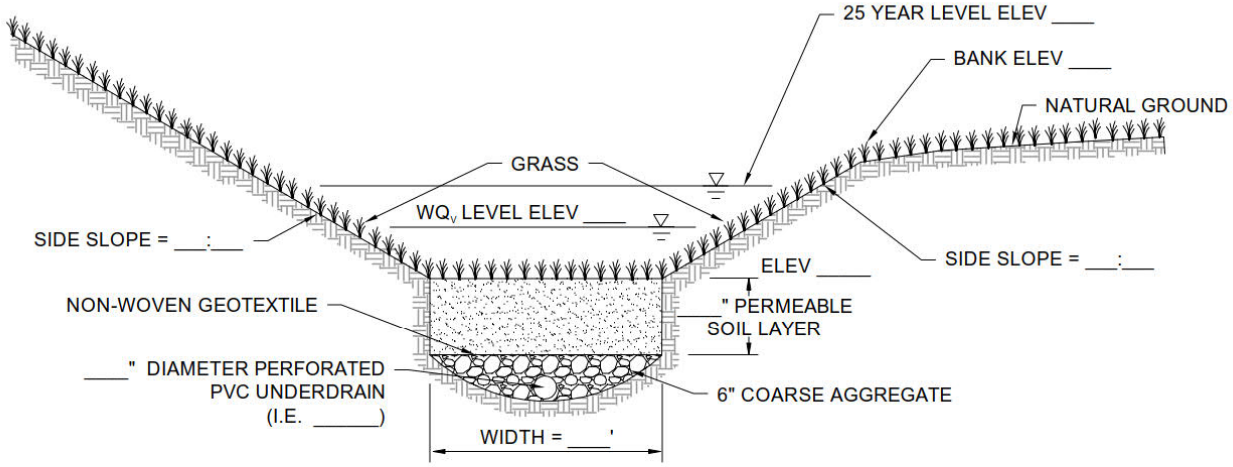


DRY ENHANCED SWALE
TYPICAL SECTION
N.T.S.

NOTES TO DESIGNERS:

1. LONGITUDINAL SLOPE MUST BE <4%.
2. MIN. 6" FREEBOARD ABOVE 25-YR STORM WATER SURFACE ELEVATION
3. MAXIMUM SIDE SLOPE IS 2:1.
4. WIDTH SHOULD BE BETWEEN 2' AND 8'.
5. MAXIMUM WQ_V PONDING DEPTH IS 18".

(End of Dry and Wet Enhanced Swales Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
DRY DETENTION BASIN CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps, with impervious areas to detention basin. _____
   Note: Minimum contributing drainage area: 10 acres per basin _____
2. ☐ Site slopes: 15% maximum _____
3. ☐ Routing and storage calculations. _____
   a. Demonstrate detention facility can safely pass the 100-yr storm. _____
   b. Storage volumes greater than 100 acre-feet are subject to the requirements of the Georgia Safe Dams Act. _____
4. ☐ Dimensions and area sizing calculations of detention facility, including pretreatment/forebay(s) _____
   Note: Forebays shall provide minimum 0.1 inches of runoff volume per impervious acre of contributing drainage area. _____
5. ☐ Depth to seasonal high water table (SHWT). The base of the detention facility shall not intersect the SHWT. _____
6. ☐ Identify if detention facility is located on karst topography or rapidly draining sandy soils.
   Note: An impermeable liner may be necessary to prevent groundwater contamination or sinkhole formation in these locations. _____

AS-BUILT SURVEY:

Include the following information (draw, indicate, label, dimension) on the as-built survey:

7. ☐ Contours at 2-foot elevations (minimum) and spot elevations _____
   Note: Spot elevations required in front of the outlet device and at the opposite end of the pond to verify positive drainage _____
8. ☐ Elevations for:
   a. Lowest point on top of embankment _____
   b. Bottom of facility _____
   c. All inverts for pipes discharging into facility _____
   d. Emergency spillway _____
   e. Water surface elevation for the 100-year storm _____
9. ☐ Limits of ponding for 100-year storm _____
10. ☐ Locate, label, and dimension top of dam's minimum width. _____
11. ☐ Freeboard from top of embankment to 100-year water surface elevation _____
    a. Earthen dams: 1.5 ft. minimum
    b. Walled dams: 1.0 ft. minimum
12. ☐ Height of basin
    a. Vegetative and rip rap embankments: 10 feet maximum preferred; 20 feet maximum. _____
    b. Geotechnical slope stability analysis recommended for embankments greater than10 feet in height _____
    c. Dam heights greater than 25-feet are subject to the requirements of the Safe Dams Act. _____

(Continued)

13. ☐ Identify material used for embankments _____
    a. Designs of non-earthen dams shall not include planned structure overtopping for emergency overflows. _____
    b. Non-earthen pond dam structures shall be constructed of monolithic wall materials.
    c. Walls shall extend from the toe of exterior fill slope into the pond's earthen embankment a distance 4 times the depth of the 100-year ponding limits. _____

14. ☐ Safety bench for embankments greater than10 feet in height and with side slopes greater than 3:1 _____
    Note: Safety bench slope: maximum 6% _____

15. ☐ Side slopes _____
    a. Side slopes: 3:1maximum (see c) _____
    b. Vegetated and rip rap embankments side slopes: 3:1 maximum (see c) _____
    c. Geotechnical slope stability analysis required for side slopes steeper than 3:1 _____

16. ☐ Outlet pipe size and material, if applicable _____
    Note: Pipe must be superior to Class V RCP in its structural characteristics, if the 100-year maximum flow velocity in a conduit through the dam is greater than 10 feet per second and the hydraulic grade line is at or above the crown for at least 10% of the conduit length. _____

17. ☐ Seepage control or anti-seep collars _____

18. ☐ Energy dissipation at inlets and outlet _____
    a. Inflow channels are to be stabilized with flared aprons, or equivalent. _____
    b. Riprap, plunge pools, pads, or other energy dissipaters at outlet _____

19. ☐ Size, location and type of pretreatment/sediment forebay(s) _____
    a. Minimum 0.1 inches of runoff per impervious acre of contributing drainage area _____
    b. Provide forebay at each inlet pipe, unless the inlet pipe discharges less than 10% of the total design storm inflow to the basin. _____

20. ☐ Profile view of outlet structure with orifice protection _____
    a. Orifices smaller than 3 inches in diameter shall have internal orifice protection such as a perforated vertical standpipe with 0.5-inch orifices or slots that are protected by wire cloth and a stone filtering jacket. _____
    b. Orifices smaller than 15 inches in diameter shall be protected by a trash rack. _____
    c. If either the Water Quality (WQ) or the Channel Protection (CP) Orifice is less than 4.0 inches, use table in Section 4.5.5.5 of GCSMM Volume 2 for proper sizing. _____

21. ☐ OCS diagram with all applicable information in the diagram _____

22. ☐ Profile view of detention facility _____

(Continued)

23. ☐ Landscaping plan indicating location, names of species, and plant size used _____
    a. Provide vegetated buffer around the dry detention basin. _____
    b. Select plants within the detention zone that can withstand both wet and dry periods. _____
    c. Plantings should not conflict with current drainage of basins. _____
    d. No trees or woody vegetation is permitted on the dam, side slopes, the downward slope of the dam, within 15 feet of the toe of the embankment, or within 25 feet of the principal spillway structure. _____
    e. Shrubs may be allowed to remain on the top of the embankment, only upon certification of the survivability of the vegetation under both wet and dry conditions. _____

24. ☐ Location of detention facility area with respect to property lines, road R/W, and easements
    a. Show, label, and dimension access easement to the R/W _____
    b. Show, label, and dimension 10 ft. BMP drainage easement outside the 100-year ponding limits. _____

25. ☐ Dimension setbacks from building foundations, roadways and water supply facilities. _____
    Minimums:
    a. Building foundations: 10 feet _____
    b. Property lines: 10 feet _____
    c. Private water supply wells: 100 feet _____
    d. Open water: 100 feet (measured from edge of water) _____
    e. Public water supply reservoirs: 200 feet (measured from edge of water) _____
    f. Public water supply wells: 1,200 feet _____

26. ☐ Dimension maintenance access.
    a. Minimum width: 15 feet _____
    b. Maximum slope: 20% _____

27. ☐ Identify and dimension walls used around the detention facility, if any. _____
    a. Wall length: 50% of basin perimeter maximum _____
    b. Fence height: 4 feet minimum_____
    c. Access gate: 12-foot wide minimum _____
    d. Wall must be contained within the easement. _____

28. ☐ Slope areas above the high-water elevations of the detention facility toward the basin for drainage. _____

39. ☐ Other _____

(End of Dry Detention Basin Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
DRYWELL CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to dry well area
   Note: Maximum contributing drainage area: 2,500 square feet per drywell _____
2. ☐ Length of flow path
   a. Pervious areas: 150 feet maximum _____
   b. Impervious areas: 75 feet maximum _____
3. ☐ Slopes of drainage area: 6% maximum _____
4. ☐ Geotechnical soil infiltration tests locations and results: 0.5 in./hour minimum _____
5. ☐ Drain-down time calculations: 24 hours maximum; 12 hours preferred _____
6. ☐ Depth to seasonal high water table (SHWT):
   Note: Minimum separation of 2 feet required between the bottom of the dry well and the elevation of the SHWT. _____
7. ☐ Dimensions and storage sizing calculations for dry well _____
8. ☐ Demonstrate facility can safely bypass and/or convey storms larger than the design storm up to the 100-year storm. _____

AS-BUILT SURVEY:

9. ☐ Detail/section view of drywell: _____
   a. ☐ Depth: Minimum: 18": maximum: 36" _____
   b. ☐ Leaf screen required upstream of dry well used to receive rooftop runoff _____
      ☐ Pea gravel diaphragm or equivalent level spreader device, if used_____
      Required for dry well to receive non-rooftop runoff _____
   c. ☐ Bottom of facility elevation. _____
   d. ☐ Washed stone depth/thickness _____
   e. ☐ Location, type, and specification of geotextile used _____
10. ☐ Overflow, diversion, or bypass structure _____
11. ☐ Observation well location _____
12. ☐ Dry well location with respect to property lines, road R/W, and -easements _____
13. ☐ Setbacks: _____

    Minimums:

a.	Building foundations:	10 feet _____
b.	Property lines:	10 feet _____
c.	Private water supply wells:	100 feet _____
d.	Public water supply wells:	1,200 feet _____
e.	Septic systems:	100 feet _____
f.	Surface waters:	100 feet _____
g.	Public water supply surface waters:	400 feet _____

(End of Drywell Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
GRASS CHANNEL CHECKLIST

AS-BUILT REPORT:

1. ☐ Peak velocity for the water quality (WQ) design storm: Maximum: 1.0 ft./sec. and non-erosive _____
2. ☐ On-site and off-site delineated basin area maps with impervious areas to grass channel _____
   Note: Drainage area: 5 acres, maximum _____
3. ☐ Map showing site slopes where grass channels are utilized _____
   a. Recommended: 1-2% _____
   b. Maximum: 4% _____
4. ☐ Geotechnical testing results at depth of the bottom of the facility: 0.5 in/hour minimum _____
5. ☐ Landscaping plan indicating location, names, and size of species used _____
   a. Grass channels shall only be used on soils that can sustain a dense grass cover with high retardance _____
   b. Grass variety required that can withstand relatively high velocity flows, survive both wet and dry periods. See GCSMM Vol 2, p. 218 Table 4.8-1 for list of common grasses. _____
6. ☐ Depth to seasonal high water table. Minimum 2 feet separation is recommended. _____
7. ☐ Dimensions and area sizing calculations of grass channel _____
   a. Bottom width: 2 to 6 feet recommended _____
   b. Minimum length: 20 feet if channel is used for pre-treatment for another BMP _____
8. ☐ Detailed cross section (for all typical sections) showing: _____
   a. Side slopes: 3:1 maximum _____
   b. Bottom width: 2 to 6 feet recommended _____
   c. Soil/type, grassing/planting _____
9. ☐ Dimensions and calculations for base width and channel slope for each typical section _____
10. ☐ Residence time. 5 minutes, minimum _____
11. ☐ Flow depth through the channel during the peak discharge for the WQ event: 4 inches minimum _____

AS-BUILT SURVEY:

12. ☐ Detail showing channel and side slopes for each typical section used _____
    a. Side slopes shall be 3:1 or flatter, prefer 4:1 _____
    b. Drop structures to dissipate energy where channel slopes are greater that 1-2% _____
    c. Length of all channels/reaches _____
13. ☐ Elevations: _____
    a. Top of bank _____
    b. Bottom of swale _____
    c. Bottom of side slopes _____

(Continued)

14. ☐ Setbacks: _____
    Minimums:
    a. Property line: 10 feet _____
    b. Building foundations: 25 feet _____
    c. Private water supply wells: 100 feet _____
    d. Septic system tank/leach field: 100 feet _____
    e. Surface waters: 100 feet _____
    f. Surface drinking water sources: 400 feet (100 feet for tributary) _____
    g. Public water supply wells: 1,200 feet _____

15. ☐ Location of grass channel with respect to property lines, road R/W, and easements _____

16. ☐ Identify check dams, drop structures, if applicable _____

OTHER COMMENTS:

17. ☐ Provide construction inspection report. _____

18. ☐ Provide maintenance plan and agreement. _____

19. ☐ Provide BMP Maintenance Bond. _____

(End of Grass Channel Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
GRAVITY OIL-GRIT SEPARATOR CHECKLIST

AS-BUILT REPORT:

1. ☐ Design criteria and specifications of the proprietary gravity separator unit, from the manufacturer _____

2. ☐ Storage volumes in the separation chamber: _____
   a. Separated oil storage volume _____
   b. Settled solids accumulation volume _____
   c. Volume required for adequate flow-through detention time for separation of oil and sediment from the stormwater flow _____

3. ☐ On-site and off-site delineated basin area maps with tributary impervious & pervious areas _____
   a. Total Drainage area: 5 acres maximum _____
   b. Impervious areas: 1 acre maximum recommended _____

4. ☐ Total wet storage: 400 cu. ft. minimum per contributing impervious acre _____

5. ☐ Minimum head: Depth of the permanent pools shall be minimum 4 feet _____

6. ☐ Site slopes across separators: 6 % maximum _____

7. ☐ Horizontal velocity through the separation chamber _____
   a. Maximum: 1-3 ft./min. _____
   b. Velocities in or exiting the device shall not exceed the entrance velocity. _____

8. ☐ Depth to seasonal high water table (SHWT) _____
   a. Provide manufacturer's instructions regarding groundwater elevation. _____
   b. Anti-flotation calculations/measures may be required when units or portions thereof are installed at or below the water table. _____

9. ☐ Structural loading for vehicular traffic, if applicable _____

AS-BUILT SURVEY:

10. ☐ Indicate slope across installation site. _____

11. ☐ Type and location of trash rack _____

12. ☐ Top and bottom of facility elevations _____

13. ☐ Maintenance right-of-way or drainage easement from public R/W
    a. Width: 20 feet minimum _____
    b. Slope: 15% maximum _____
    c. Drive path unobstructed width: Minimum 12 feet, appropriately stabilized to withstand maintenance equipment and vehicles _____
    d. Located such that maintenance vehicles and equipment can access the oil-grit separator _____

14. ☐ Elevation of overflow structure to bypass flows in excess of the design flow rate _____

15. ☐ Diameter and elevation of outlet pipe(s) to next BMP in treatment train _____

16. ☐ Detailed profile of gravity oil grit separator _____

(Continued)

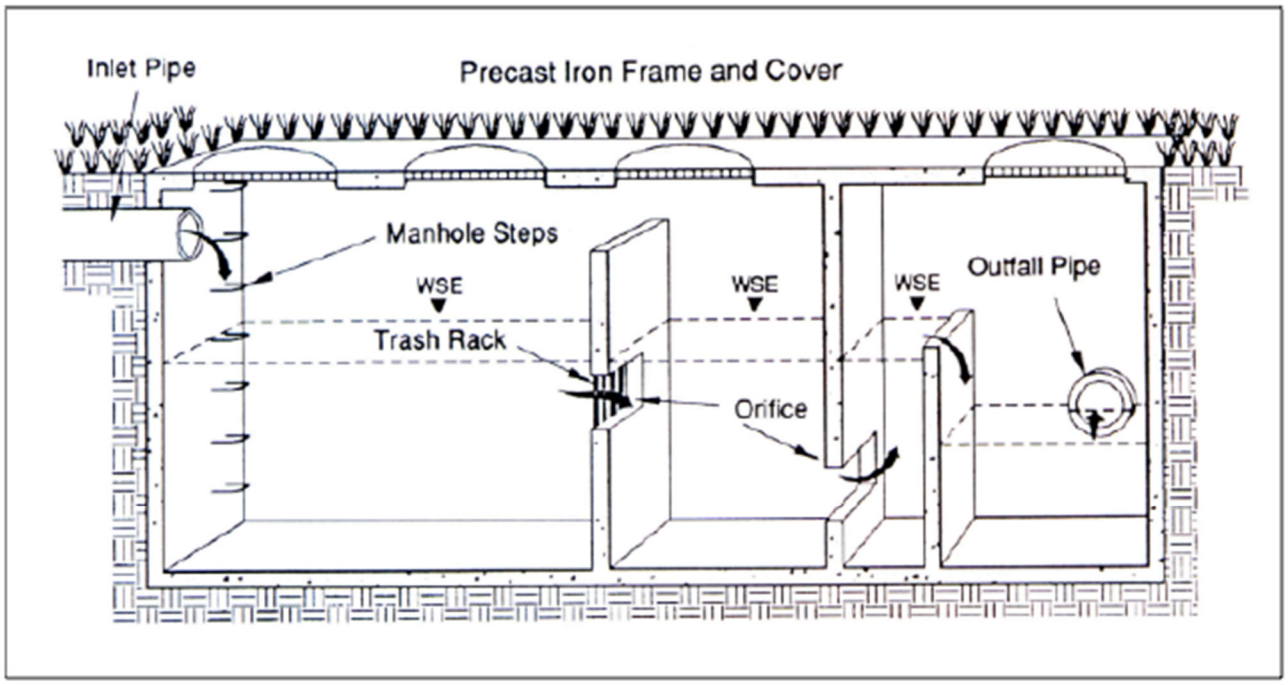


Figure 4.10-1 Schematic of an Example Gravity (Oil-Grit) Separator
(Source: NVRC, 1992[1])

(End of Gravity Oil--Grit Separator Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
GREEN ROOF CHECKLIST

AS-BUILT REPORT:

1. ☐ Drainage areas for green roof _____
   Note: No additional stormwater runoff should be allowed to "run on" to the green roof, except for walking paths or vegetation access-ways incorporated into the green roof design. _____

2. ☐ Roof slope:
   a. Roof slopes: 25%, maximum; 10% maximum recommended _____
   b. Rooftops greater than 10% slope: Supplemental measures, such as battens, may be needed to ensure stability against sliding _____

3. ☐ Structural plan designed/approved by a licensed, professional structural engineer _____

4. ☐ Landscaping plan indicating location and names of species used _____

5. ☐ Type of material and specifications used for the following green roof layers, as applicable: _____
   a. Waterproofing layer _____
   b. Physical root barrier. Chemical barriers are not allowed. _____
   c. Drainage layer _____
   d. Non-woven geotextile layer separating the drainage layer from the media layer (Permeability greater than the hydraulic conductivity of the overlying engineered growing media) _____

6. ☐ Engineered growing media mix and depth installed above the drainage layer _____
   a. Lightweight inorganic materials: 80% _____
   b. Organic matter: 15% (e.g., well-aged compost) _____
   c. Sand: 5% _____
   d. Engineered growing media depth: 4-6 inches deep: or
   e. Synthetic moisture retention materials (e.g., drainage mat with moisture storage "cups") placed directly beneath the engineered growing media layer allow a 2-inch-deep engineered growing media layer. _____
   f. Maximum water retention capacity: approximately 30% _____

7. ☐ Head: Minimum 6"-12" _____

8. ☐ Flow rate and velocity of runoff exiting the green roof system _____
   a. All flows shall exit in a safe and non-erosive manner _____
   b. Overflow structures should be capable of passing the 2-year, 24-hour design storm without inundating the roof. _____

AS-BUILT SURVEY:

9. ☐ Contours at minimum 2-foot elevations and spot elevations _____
   a. Elevations of overflow structures _____
   b. 2-year storm ponding elevation _____

10. ☐ Depth of engineered growing media used _____

11. ☐ Depth of washed stone used _____

12. ☐ Overflow or bypass structure _____
    Note: Overflow structures should be capable of passing the 2-year, 24-hour design storm without inundating the roof. _____

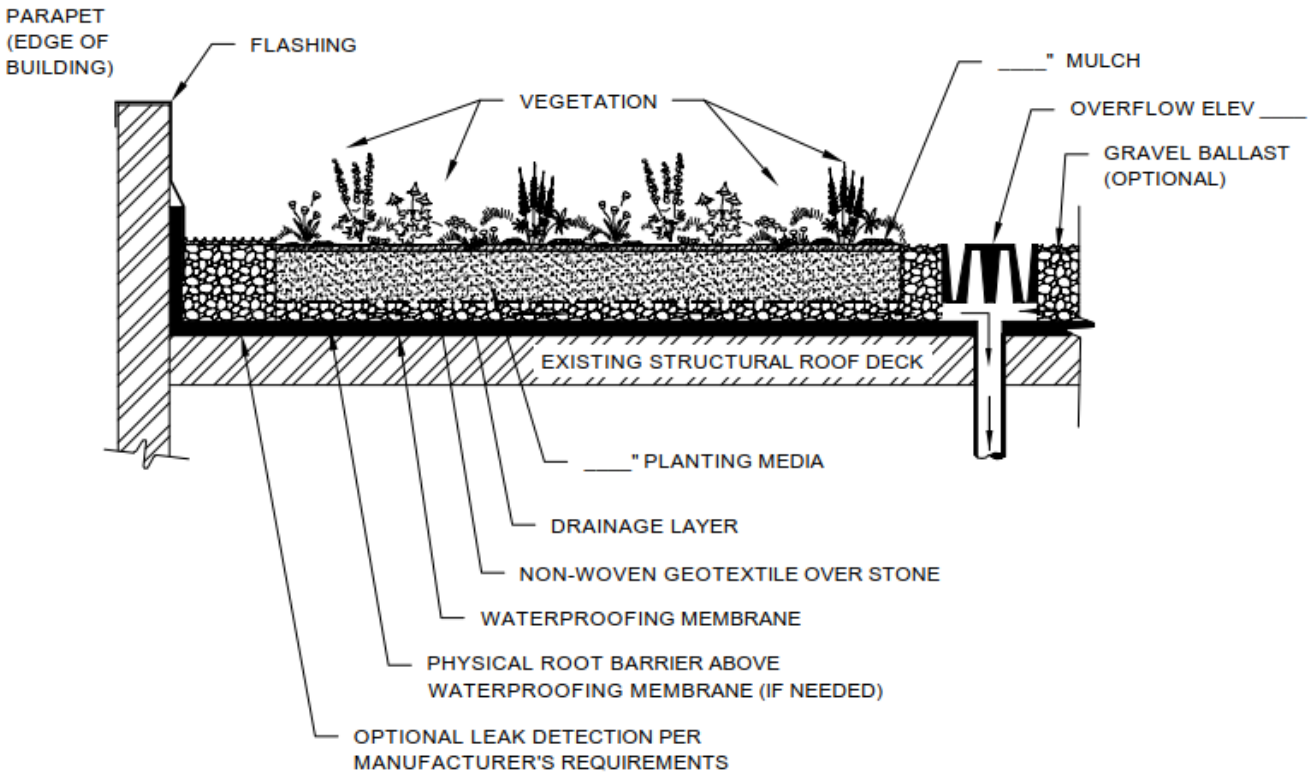
(Continued)

GREEN ROOF CHECKLIST *(Continued)*

13. ☐ Location of green roof and outflows from the system with respect to property lines _____
    Note: Stormwater runoff should not be redirected onto an adjacent owner's property. _____

14. ☐ Energy dissipation, if warranted _____

15. ☐ Diagram section view of green roof _____



GREEN ROOF WITH DRAINAGE LAYER

NOTES TO DESIGNERS:

1. SYSTEM COMPONENTS, LEAK DETECTION, TYPES OF PRODUCTS AND CONFIGURATION WILL DEPEND ON DESIGN CRITERIA AND EXISTING CONDITIONS. SYSTEM LAYERS AND INSTALLATION REQUIREMENTS WILL VARY DEPENDING ON MANUFACTURER REQUIREMENTS. REFER TO SPECIFICATIONS.
2. MINIMUM PLANTING MEDIA DEPTH IS 2" FOR EXTENSIVE ROOF SYSTEMS AND 6" FOR INTENSIVE ROOF SYSTEMS.

(End of Green Roof Checklist)

Gwinnett Water Resources

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
INFILTRATION PRACTICES CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to infiltration area
   a. Contributing drainage area: 5 acres maximum, per facility
   b. Preferred drainage areas: between 2,500 square feet and 2 acres, per facility _____

2. ☐ Landscaping plan indicating location, names, and size of species used, if applicable _____
   a. Native vegetation is preferred. _____
   b. Three species each of trees, shrubs, and grass/herbaceous species avoid creating a monoculture. _____
   c. Depth for infiltration planting beds: 36 inches, minimum _____
   d. Shallow seasonal high water table (SHWT) may require shallower depth _____

3. ☐ Location and results of geotechnical infiltration testing of underlying native soils. _____
   a. Infiltration rate: 0.5 inch/hour minimum _____
   b. Test at level of infiltration and in stratum of lowest permeability below bottom of planting bed. _____

4. ☐ Engineered media mix, if used: _____
   a. Texture: Sandy loam or loamy sand _____
   b. Sand: 85%-88% clean, washed sand _____
   c. Topsoil: 8%-12% _____
   d. Organic Matter: 3%-5% _____
   e. Clay: less than 15% _____
   f. Phosphorus Index (P-Index): less than 30 _____
   g. Cation Exchange Capacity (CEC): greater than10 milliequivalents (meq) per 100 grams of dry weight_____
   h. pH: pH of 6-8 _____
   i. The organic matter used in an infiltration basin planting bed should be well-aged compost that meets the specifications outlined in Appendix D of the GCSMM _____

5. ☐ Drain-down time calculations. 72 hours maximum after end of a rainfall event _____

6. ☐ Depth to seasonal high water table (SHWT). Minimum separation distance of 2 feet required between bottom of infiltration area and elevation of SHWT _____

7. ☐ Dimensions and area sizing calculations of pretreatment and infiltration facilities _____
   a. Infiltration practice depths: between 3-8 feet, unless shallow water table exists on site _____
   b. Trench width: 25 feet maximum _____

8. ☐ Underdrain sizing calculations, if used _____

9. ☐ Stone aggregate:
   a. Washed, bank-run gravel _____
   b. Size: 1.5 to2.5 inches _____
   c. Void ratio: approximately 40% (GADOT No.3 Stone). _____

10. ☐ Porosity value of stone used
    a. Porosity value (void space/total volume) of 0.32 should be used in calculations; or
    b. Aggregate-specific data, if available _____

11. ☐ Karst geology: Infiltration prohibited _____

(Continued)

12. ☐ Site slope _____
    a. Maximum: 6% (for preconstruction facility footprint) _____
    b. Design facility with slopes as close to flat as possible _____

13. ☐ Demonstrate infiltration facility can safely pass the 100-yr storm or provide bypass. _____

AS-BUILT SURVEY:

14. ☐ Location and diameter of observation well(s) _____
    a. Minimum of one observation well shall be installed in every infiltration practice. _____
    b. Maximum spacing: 1 observation well/100 feet of trench length _____

15. ☐ Side slopes: 3:1 maximum _____

16. ☐ Top of bank elevation _____

17. ☐ Maximum ponding depth, maximum 12 inches, 9 inches preferred, and water surface elevation _____

18. ☐ Bottom of facility elevation _____

19. ☐ Washed stone depth _____

20. ☐ Overflow, diversion, or bypass structure _____

21. ☐ Forebay areas for each infiltration inlet for pretreatment _____

22. ☐ Setbacks, minimums: _____
    a. Property line: 10 feet _____
    b. Building foundations: 10 feet _____
    c. Retaining walls: 20 feet from walls with height greater than 4 feet _____
    d. Private water supply wells: 100 feet _____
    e. Public water supply reservoirs: 100 feet (measured from edge of water) _____
    f. Septic system tank/leach field: 100 feet - _____
    g. Surface drinking water sources: 400 feet (100 feet for a tributary) _____
    h. Public water supply wells 1,200 feet _____

23. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____

24. ☐ Energy dissipation, if warranted _____

If underdrain is used:

25. ☐ Size and material _____

26. ☐ Elevation of overflow structure (where needed) _____

27. ☐ Elevation of pipe invert leaving infiltration facility _____

28. ☐ Diameter of outlet pipe to storm sewer or stable outfall _____

29. ☐ Overflow elevation, if needed _____

(End of Infiltration Practices Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
MULTI-PURPOSE DETENTION AREAS

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to the as-built multi-purpose storage area. _____

2. ☐ Stage/storage table _____

3. ☐ Emergency overflow calculations _____
   a. Emergency overflows are required for storm events larger than the design storm _____
   b. Overflow must not create adverse impacts to downstream properties or conveyance systems _____

4. ☐ Parking Lot Storage:
   Calculations/Documentation showing the storage area meets the following requirements: _____
   a. Ponding in a parking lot, except at a flow control structure:
      10-year, 24-hour storm: Maximum depth: 6 inches _____
      100-year, 24-hour storm: Maximum depth: 9 inches _____
   b. Ponding flow control structure:
      100-year, 24-hour storm: Maximum depth: 12 inches. _____
   c. Storage area slope towards the outlet: 1% minimum; 5% maximum _____
   d. Fire lanes must be free of ponding water up to the extreme storm (100-year) event. _____
   e. Ponding area is to be drained within 30 minutes after the peak inflow occurs. _____

5. ☐ Rooftop Storage:
   Calculations/documentation showing the storage area meets the following requirements: _____
   a. Roof support structure is designed to address the weight of the ponded water _____
   b. Roof sufficiently waterproofed to achieve a minimum design life of 30 years _____
   c. All rooftop detention designs must meet Georgia State Building Code and local building code requirements. _____
   d. Minimum pitch of roof area subject to ponding: 0.25 inch per foot _____

AS-BUILT SURVEY:

6. ☐ Contours at minimum 2-foot elevations and spot elevations _____
   a. Elevations of overflow structures _____
   b. Maximum ponding elevations and extents _____

7. ☐ Emergency overflow structure to safely route larger storms through storage area _____

8. ☐ Location of storage area with respect to property lines, road R/W, and easements. _____

9. ☐ Access easement to the R/W _____

10. ☐ Energy dissipation, if warranted _____)

11. ☐ Section detail/diagram with applicable information _____

(End of Multi-purpose Detention Areas Checklist)

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to filter system area _____
   a. Drainage area: 10 acres maximum _____
   b. Sites with ≤50% imperviousness or high clay/silt sediment loads must provide adequate pretreatment to prevent clogging and failure of the filter bed _____

2. ☐ Site slopes: 6% maximum (across filter location) _____

3. ☐ Head across filter: Minimum 5 to 8 feet from the inflow to the outflow for surface organic filters _____

4. ☐ Calculations for the following volumes, areas, and depths _____
   V_s – Volume within Sedimentation Basin _____
   V_w – Wet Pool Volume within Sedimentation Basin _____
   V_f – Volume within the Voids in the Filter Bed _____
   V_{temp} – Temporary Volume Stored above the Filter Bed _____
   A_s – Surface Area of the Sedimentation Basin _____
   A_f – Surface Area of the Filter Media _____
   h_s – Height of Water in the Sedimentation Basin _____
   h_f – Average Height of Water Above the Filter Media (1/2 h_{temp}) _____
   d_f – Depth of Filter Media _____

5. ☐ Total storage volume _____
   Note: Entire treatment system (including the sedimentation chamber) must temporarily hold ≥75% of the WQ_v prior to filtration. _____

6. ☐ Dimensions and storage volume of the sedimentation chamber _____
   For surface organic filters:
   c. The sedimentation chamber volume: minimum 25% of the computed WQ_v _____
   d. Length-to-width ratio: 2:1 minimum

7. ☐ Coefficient of permeability used for organic filter media. _____
   Note: A coefficient of permeability (k) of 3.5 ft/day for sand should be used, unless specific data is available for the sand used. _____

8. ☐ Drain-down time calculations _____
   e. Organic filters must be designed to drain completely within 40 hours.
   f. Organic filters should not be used on sites with a continuous flow from groundwater, sump pumps, or other sources. _____
   g. _____

9. ☐ Depth to seasonal high water table (SHWT) _____
   For a surface organic filter with exfiltration, a minimum separation distance of 2 feet is required between the bottom of the bottom of the sand filter and the elevation of the SHWT. _____

10. ☐ Landscaping plan, if planted _____
    h. Tree locations or shade: minimum15 feet from filtering area
    i. No trees or shade where leaf litter will collect and clog filtering area _____
    j. Native grasses preferred, if compatible _____

(Continued)

11. ☐ Underdrain sizing calculations
    k. Surface organic filters: 6-inch minimum _____
    b. Perimeter organic filters: 4-inch minimum _____
    c. Perforated Schedule 40 PVC underdrain pipe _____
        i. Holes 3/8-inch diameter; 6 inches on center _____
        ii. Minimum slope: 1% slope _____

12. ☐ Depth and description of media configuration used _____

13. ☐ Porosity value of stone: use 0.32, unless aggregate-specific data is provided _____

14. ☐ Infiltration shall not be used with karst geology without using a polyliner or impermeable membrane to seal bottom of earthen surface sand filter or use watertight structure. _____

15. ☐ Calculations demonstrating that the infiltration facility can safely pass or divert the 100-year storm without damage to the organic filter media or adjacent property _____

AS-BUILT SURVEY:

16. ☐ Show contours at 2-foot elevations and spot elevations (underground storage dimensions & elevations). _____

17. ☐ Observation well(s)/cleanout(s): location and diameter _____

18. ☐ Maximum ponding depth _____

19. ☐ Maximum water surface elevation _____

20. ☐ Organic media depth _____

21. ☐ Topsoil depth, if used _____

22. ☐ Overflow, diversion or bypass structure _____

23. ☐ Sedimentation chamber(s) for each infiltration inlet for pretreatment with volumes _____

24. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____

25. ☐ Energy dissipation if warranted _____

26. ☐ Size and material of perforated underdrain pipe _____

27. ☐ Detail of diversion structure or flow splitter used, if filter is used as an off-line practice _____

28. ☐ Elevation of overflow structure _____

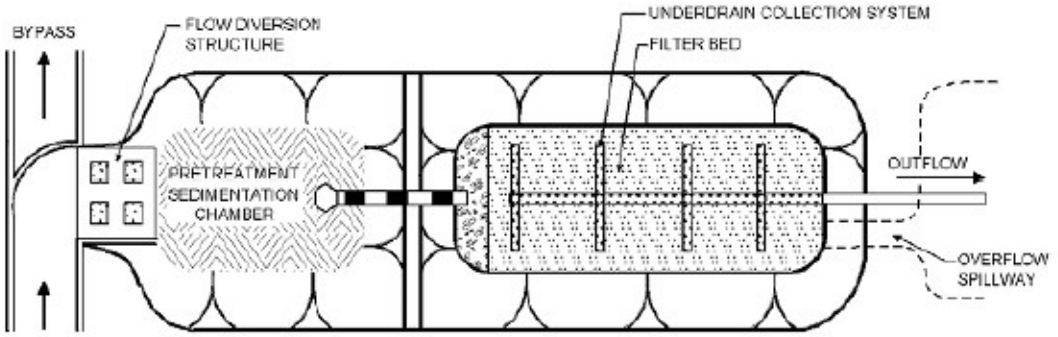
29. ☐ Elevation of pipe invert leaving filter facility _____

30. ☐ Diameter of outlet pipe to storm sewer/conveyance or downstream practice _____

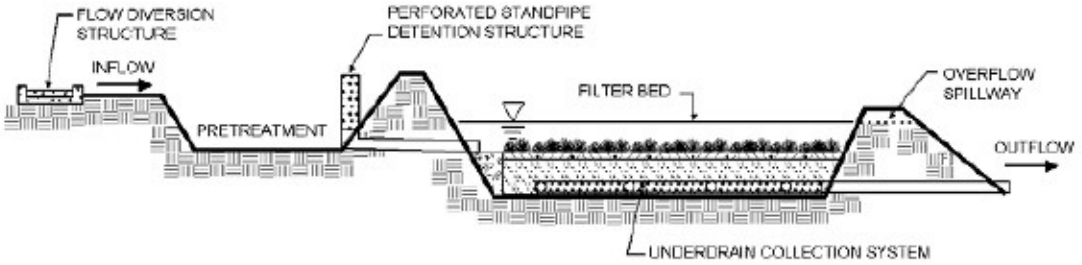
(Continued)

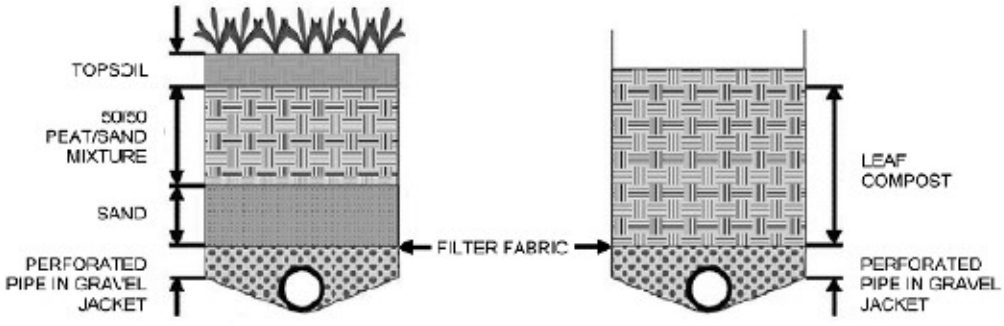
31. ☐ Overflow elevation and detail of drain protection, if warranted _____

32. ☐ Detail/section view of organic filter _____



PLAN VIEW





TYPICAL SECTIONS

(End of Organic Filter Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
PERMEABLE PAVERS CHECKLIST

AS-BUILT REPORT:

1. ☐ Compliance with Americans with Disabilities Act (ADA) _____

2. ☐ Location of and results of geotechnical soil infiltration tests: _____
   a. Infiltration rate: 0.5 inch/hour minimum
   b. Test at bottom of stone layer and/or least permeable layer beneath facility _____

3. ☐ For an infiltration practice to be installed in structural fill, adjacent to a structure, or adjacent to a retaining wall: Geotechnical report (signed and sealed) addressing, at a minimum: _____
   a. Compaction requirements and allowances for infiltration into the structural fill _____
   b. Global stability of all walls, with:
      i. Specific allowances for saturation zones
      ii. Offset distances from the infiltration practice and the wall _____
   c. Structural integrity of all structures, with:
      i. Specific allowances for saturation zones
      ii. Offset distances from the infiltration practice and the structure _____
   d. Infiltration rates required for the practice, including procedures for obtaining those infiltration rates in the structural fill _____

4. ☐ Provide calculations for drain-down time: 72 hours maximum, after end of a rainfall event _____

5. ☐ Depth to seasonal high water table (SHWT). Minimum separation distance of 2 feet required between the bottom of the infiltration area and the SHWT elevation _____

6. ☐ Dimensions and area sizing calculations _____

7. ☐ Underdrain sizing calculations, if used _____

8. ☐ Stone aggregate:
   a. Washed, bank-run gravel, 1.5-2.5 inches in diameter
   b. Void space: 40% (GADOT No.3 Stone) _____

9. ☐ Porosity value of stone: _____
   a. Use 0.32; or _____
   b. Aggregate-specific data, if available _____

10. ☐ Slope information:
    a. Subsoil of the permeable paver systems: 0% _____
    b. Surface of paver system: 0.5%, maximum _____
    c. Surface slopes of tributary area: 5 %, maximum _____

11. ☐ Demonstrate facility can safely pass the 100-yr storm _____

AS-BUILT SURVEY:

12. ☐ Contours at 2-foot elevations, minimum, and spot elevations _____
    (Include underground storage dimensions & elevations) _____

13. ☐ Elevation and type of 1" top course (sand or #10 stone) _____

14. ☐ Washed stone/gravel base course depth: 12 inches, minimum _____

(Continued)

15. ☐ Subgrade upper surface:
    a. Geotextile fabric specification, if used; or
    b. 8-inch layer of sand (ASTM C-33 concrete sand or GADOT Fine Aggregate Size No. 10), completely flat, to promote infiltration across the entire surface _____

16. ☐ Bottom of facility elevation _____

17. ☐ Overflow, diversion, or bypass structure _____

18. ☐ Setbacks, minimums:
    a. Property line: 10 feet _____
    b. Downgradient Building Foundations: 15 feet down gradient _____
    c. Retaining Walls: 20 feet from walls greater than 4 feet in height _____
    d. Drinking water wells 100 feet _____
    e. Septic system tank/leach field: 100 feet _____
    f. Surface waters: 100 feet _____
    g. Surface drinking water sources: 400 feet (100 feet for a tributary) _____

19. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____

If underdrain is used:

20. ☐ Size and material of perforated underdrain pipe _____

21. ☐ Elevation of overflow structure (where needed). _____

22. ☐ Elevation of outlet pipe inverts _____

23. ☐ Diameter of outlet pipe to storm sewer or stable outfall _____

24. ☐ Overflow elevation, if warranted _____

25. ☐ Detail/section view _____

(End of Permeable Pavers Checklist)

Gwinnett Water Resources

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
PERVIOUS CONCRETE CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas and pervious concrete area(s) _____
   a. Ratio of tributary impervious to previous concrete area: 1:1 maximum _____
   b. Pretreatment for pervious tributary area is highly recommended. _____

2. ☐ Slope information.
   a. Subsoil: 0.5% maximum _____
   b. Surface: 5% maximum, 2% maximum preferred _____
   c. Tributary site slopes: 5% maximum _____

3. ☐ Geotechnical soil testing locations and results _____
   a. Infiltration rate: 0.5 inch/hour minimum _____
   b. Minimum one test hole per 5000 square feet
   c. Minimum two borings per practice (taken within the proposed limits of the facility).
   d. Vertical test location at bottom of practice and stratum of slowest permeability beneath bed

4. ☐ Geotechnical report (signed and sealed) for any an infiltration practice in structural fill, adjacent to a structure, or adjacent to a retaining wall
   The report shall address, as a minimum, the following: _____
   a. Compaction requirements and allowances for infiltration into the structural fill _____
   b. Global stability of all walls, with specific allowances for saturation zones and offset distances from the infiltration practice and the wall _____
   c. Structural integrity of all structures, with specific allowances for saturation zones and offset distances from the infiltration practice and the structure _____
   d. Infiltration rates required for the practice, including procedures for obtaining those infiltration rates in the structural fill _____

5. ☐ Provide depth to seasonal high water table (SHWT) or bedrock
   Note: Minimum separation distance of 2 feet is required between the bottom of the gravel base course and the elevation of the SHWT or bedrock _____

6. ☐ Dimensions and sizing calculations _____
   a. Pervious concrete porosity: Use 0.18 _____
   b. Previous concrete thickness: 6 to 15 inches _____
   c. Trench width: 18 inches minimum. _____
   d. Base thickness: 12 inches minimum _____
   e. Stone porosity value: 0.4 (GADOT No.3) unless aggregate-specific data is available _____

7. ☐ Underdrain sizing calculations, if used: 4-inch minimum _____

8. ☐ Drawdown time calculations
   a. Minimum: 24-48 hours for draw down of WQ_v and CP_v; _____
   b. Larger storms: longer drawdown times, 5 days maximum, to infiltrate, bypass, or detain _____

9. ☐ Infiltration rate testing results from observation well after construction complete _____

10. ☐ Filter fabric, geotextile, geomembrane, or geogrid, specifications, if used _____

11. ☐ Demonstrate that pervious concrete system can safely pass the 100-yr storm _____

(Continued)

AS-BUILT SURVEY:

12. ☐ Contours at minimum 2-foot elevations and spot elevations _____
    Include underground reservoir dimensions & elevations _____

13. ☐ Section or profile of pervious concrete system: _____
    a. Pervious concrete layer _____
    b. Base aggregate layer _____
    c. Underdrain, if used _____

14. ☐ Overflow, diversion, or bypass structure _____

15. ☐ Show and label the location of access easement to R/W. _____

16. ☐ Setbacks, minimum: _____
    a. Property line: 10 feet _____
    b. Down-gradient building foundations: 10 feet _____
    c. Retaining walls: 20 feet from walls with height greater than 4 feet _____
    d. Septic system tank/leach field: 100 feet _____
    e. Surface waters: 100 feet _____
    f. Private water supply wells: 100 feet _____
    g. Public water supply reservoirs: 200 feet (measured from edge of water) _____
    h. Surface drinking water sources; 400 feet (100 feet for a tributary) _____
    i. Public water supply wells: 1,200 feet _____

17. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____

18. ☐ Location and profile of observation well _____
    Note: Observation well consisting of perforated PVC pipe 4-6 inches in diameter should be placed at the downstream end of the facility and protected during site construction. _____

19. ☐ Location and detail of warning sign stating: "Pervious Paving used on this site to reduce pollution. Do not resurface with non-pervious material. Call (XXX) XXX-XXXX for more information" _____

If underdrain is used:

20. ☐ Size and material _____

21. ☐ Profile of underdrain and connection to stormwater network _____

22. ☐ Elevation of overflow structure (if applicable) _____

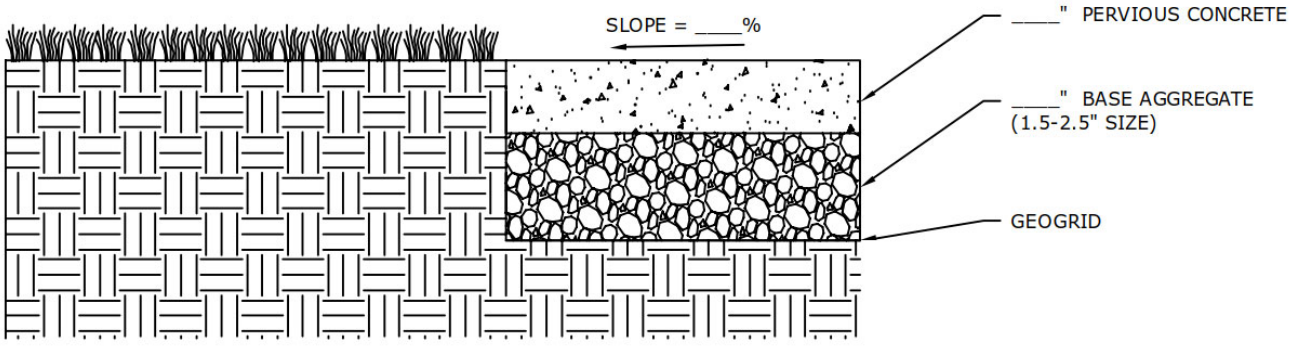
23. ☐ Elevation of pipe invert leaving the facility _____

24. ☐ Diameter of outlet pipe to storm sewer or stable outfall _____

25. ☐ Overflow elevation, if applicable _____

(Continued)

26. ☐ Detail/section view. _____



PERVIOUS CONCRETE TYPICAL INSTALLATION

(End of Pervious Concrete Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
POROUS ASPHALT CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas and porous asphalt area _____
   a. Tributary impervious area ratio to porous asphalt area: 3:1 maximum _____
   b. Pretreatment for pervious tributary area is highly recommended _____

2. ☐ Slope information _____
   a. Subsoil beneath the porous asphalt system: 0.5% maximum _____
   b. Porous surface: 0.5% maximum _____
   c. Tributary site slopes: 5% maximum _____

3. ☐ Geotechnical soil testing locations and results: _____
   a. Infiltration rate: 0.5 inch/hour minimum (if no underdrain is used). _____
   b. Minimum geotechnical testing: one test hole per 5000 square feet, _____
   c. Minimum of two borings per practice (taken within the proposed limits of the facility and at the elevation of infiltration into subsoil). _____
   d. Porous asphalt systems are not suitable on sites with hydrologic group D or most group C soils, or soils with a high (>30%) clay content. _____

4. ☐ If an infiltration practice is proposed to be installed in structural fill, adjacent to a structure, or adjacent to a retaining wall the designer shall submit a signed and sealed geotechnical report that addresses, at a minimum, the following: _____
   a. Compaction requirements and allowances for infiltration into the structural fill. _____
   b. Global stability of all walls with specific allowances for saturation zones and offset distances from the infiltration practice and the wall. _____
   c. Structural integrity of all structures, with specific allowances for saturation zones and offset distances from the infiltration practice and the structure. _____
   d. Infiltration rates required for the practice, including procedures for obtaining those infiltration rates in the structural fill. _____
   e. Post-placement infiltration tests in the structural fill prior to placement of porous pavement system, in accordance with item 3, above _____

5. ☐ Depth to seasonal high water table (SHWT) or bedrock. Minimum separation distance of 2 feet is required between bottom of the gravel base course and the elevation of the SHWT or bedrock _____

6. ☐ Dimensions and sizing calculations of the facility, including the thickness of asphalt and porosity used in calculations _____
   a. Porous asphalt thickness: 2 to 4 inches _____
   b. Trench width: 18 inches minimum. _____
   c. Base thickness: 12 inches minimum _____
   d. Stone porosity value: 0.4 (GADOT No.3 Stone) unless aggregate-specific data available _____

7. ☐ Underdrain sizing calculations, if underdrain is used _____
   a. Minimum 4-inch perforated PVC pipe required _____
   b. If discharging to a trout stream, provide calculations showing stream warming potential _____

8. ☐ Drawdown time and calculations: 24hours minimum; 72 hours maximum _____

9. ☐ As-built infiltration rate testing results as observed from observation well, after construction is complete _____

10. ☐ Specifications of filter fabric, geotextile, geomembrane, and/or geogrid, if used _____

(Continued)

POROUS ASPHALT CHECKLIST *(Continued)*

11. ☐ Demonstrate compliance with Americans with Disabilities Act (ADA). _____

AS-BUILT SURVEY:

12. ☐ Contours at minimum 2-foot elevations and spot elevations and underground reservoir dimensions & elevations. _____

13. ☐ Section or profile of porous asphalt system with depth/dimensions and sizes of system layers and underdrain (if applicable): _____
    a. Porous asphalt _____
    b. Base aggregate layer (Minimum 12 inches thick GDOT No. 3 stone) _____

14. ☐ Overflow, diversion or bypass structure/means to safely route larger storms through or around the porous asphalt system _____

15. ☐ Access easement to R/W: location and dimensions _____

16. ☐ Setbacks, minimum: _____
    a. Property line: 10 feet _____
    b. Down-gradient building foundations: 10 feet _____
    c. Retaining walls: 20 feet from walls with height greater than 4 feet _____
    d. Septic system tank/leach field: 100 feet _____
    e. Surface waters: 100 feet _____
    f. Private water supply wells: 100 feet _____
    g. Public water supply reservoirs: 200 feet (measured from edge of water) _____
    h. Surface drinking water sources; 400 feet (100 feet for a tributary) _____
    i. Public water supply wells: 1,200 feet _____

17. ☐ Elevations & dimensions of inlets, outlets, piping, & drain protection. _____

18. ☐ Location and profile of observation well. An observation well, consisting of perforated PVC pipe 4-6 inches in diameter shall be placed at the downstream end of the facility and protected during site construction. _____

19. ☐ Location of warning sign stating: "Pervious Paving used on this site to reduce pollution. Do not resurface with non-pervious material. Do not salt or sand. Call (XXX) XXX-XXXX for more information."

If underdrain is used:

20. ☐ Location, size, and material of perforated underdrain pipe, if used _____

21. ☐ Elevation of overflow structure (where warranted) _____

22. ☐ Profile of underdrain and connection to stormwater network _____

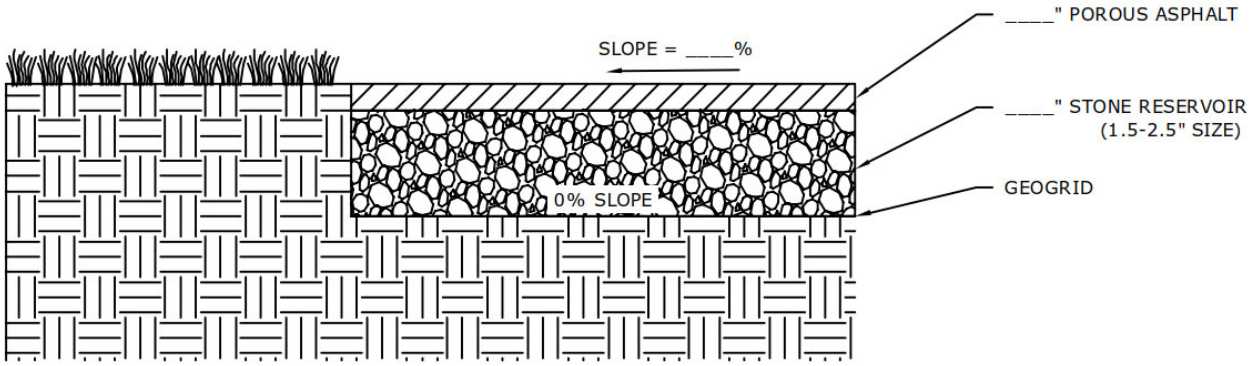
23. ☐ Location and elevation of pipe invert leaving the facility _____

24. ☐ Location, elevation, and diameter of outlet pipe to storm sewer or stable outfall _____

25. ☐ Overflow elevation and location, if warranted _____

(Continued)

26. ☐ Provide and label detail/section view _____



POROUS ASPHALT TYPICAL INSTALLATION

(End of Porous Asphalt Checklist)

AS-BUILT REPORT:

1. ☐ Size, material, and dimensions of rainwater storage tank or cistern _____
   Note: Rain barrels storing less than 100 gallons of runoff should not be used on drainage areas over 2,500 square feet. _____

2. ☐ Provide the type(s) of pretreatment used, such as: _____
   a. Leaf screens _____
   b. Roof washers _____
   c. First-flush diverters _____
   d. Other _____

3. ☐ Intended use of harvested rainwater _____
   Note. If indoor non-potable uses are intended, document that the system meets plumbing code. _____

4. ☐ Overflow calculations _____
   Note: Overflow pipe conveyance capacity equal to or greater than that of the inflow pipe _____

AS-BUILT SURVEY:

5. ☐ Layout of drainage system components leading to cistern or storage tank _____
   Recommended slope is 2% minimum. _____

6. ☐ Size, material, and dimensions of rainwater storage tank or cistern _____

7. ☐ Overflow pipe dimensions and type _____
   a. All overflow pipes should be directed away from buildings to prevent damage to foundations. _____
   b. Identify outfall stabilization, if needed. _____

8. ☐ Access easement to R/W _____

9. ☐ Pump type and location, if applicable _____

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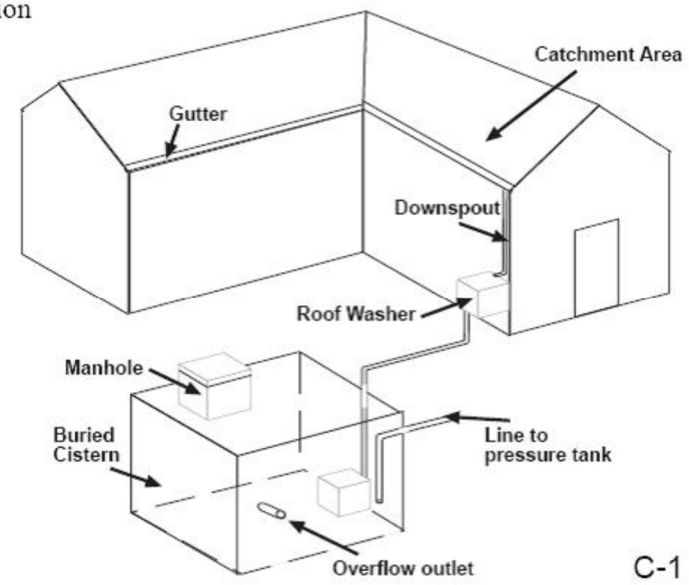


(End of Rainwater Harvesting Checklist)

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to the regenerative stormwater conveyance system (RSC) _____
   Note: Contributing drainage area: 50 acres maximum; typical 10 - 30 acres _____

2. ☐ Drainage channel slopes _____
   a. 10% maximum _____
   b. Cascades with following conditions, must be followed by three pools instead of the usual one:
      i. Vertical slope: 2H:1V maximum _____
      ii. Vertical drop of 5 feet maximum _____

3. ☐ Channel slopes greater than5%, should have a grade control structure and settling pool. _____
   a. Total length of grade control structures and pools: less than10 feet recommended _____
   b. Invert of the upstream elevation of the grade control structure: 1 foot higher than the elevation of the downstream grade control structure recommended _____
   c. Width of the grade control structure: 10 feet preferred; 8 - 20 times the depth of the grade control structure recommended _____
   d. Depth of flow over the grade control structure: 4 inches maximum _____
   e. Pool widths: greater than width of grade control structure _____

4. ☐ Drainage channel slopes: 10% maximum _____

5. ☐ Geotechnical and soil infiltration testing results from bottom elevation of RSC system _____
   a. Infiltration rate: 2 and 4 inch/hour preferred; 0.5 inch/hour, minimum _____
   b. Phosphorus Index (P-Index): less than 30. _____
   c. Cation Exchange Capacity (CEC): 10 milliequivalents (meq) per 100 grams of dry weight, minimum _____
   d. pH: 6 - 8 _____

6. ☐ Engineered media mix specifications, if applicable _____

7. As-built infiltration rate of engineered media _____

8. ☐ Drain-down time calculations: 72 hours maximum to design (ponding) levels, from the end of a storm Event _____

9. ☐ Velocity through the pools: 4 ft./s maximum _____

10. ☐ Depth to seasonally high water table (SHWT) _____
    Note: RSC systems may be installed in any soil type and where there is a shallow water table, as long as the shallow pools of an RSC system drain to the design ponding levels within 72 hours from the end of a rain event. _____

11. ☐ Dimensions and sizing calculations _____
    a. Pool widths greater than width of the grade control structures _____
    b. Flow velocity going through the RSC should be less than the maximum allowable velocity for the cobble size that was selected. _____
    Use Table 4.20-1 in the GCSMM to size the cobble stones, based on the flow velocity. _____

(Continued)

12. ☐ Demonstrate RSC system can safely pass the 100-yr storm. _____

13. ☐ Landscaping plan indicating location, names, and sizes of species used _____
    a. Native vegetation preferred _____
    b. Three species each of trees, shrubs, and grass/herbaceous species avoid creating a monoculture. _____
    c. Vegetation should be selected based on specified zone of hydric tolerance. _____
    d. Selection of trees with an understory of shrubs and herbaceous materials should be provided. _____
    e. Woody vegetation should not be specified at inflow locations. _____

AS-BUILT SURVEY:

14. ☐ Contours at 1-foot elevations and spot elevations (underground storage dimensions & elevations) _____

15. ☐ Show the following for each typical section: _____
    a. Side slopes (shall be 3:1 or flatter) _____
    b. Outlet ending with an outlet pool with a grade control structure just upstream of the outlet pool. The outlet pool elevation should match the existing grade. _____
    c. Maximum ponding depth and water surface elevation: 9 inches preferred; 12 inches maximum _____
    d. Footer boulders inserted 6 inches lower than invert of the pool _____
    e. Planting soil media depth _____
    f. Label Washed stone depth _____
    g. Label Mulch layer depth: 3 to 4 inches of triple-shredded hardwood mulch _____
    h. Sand layer. Sand layer should be a mixture of sand and wood chips with a ratio of 4:1. _____
        i. This layer should run along the length of the RSC system. _____
        ii. 1 foot of bank-run gravel should be placed below the sand layer to stabilize the sand layer. _____
        iii. A 1-foot layer of gravel should be placed on top of the sand layer to stabilize the grade control structures. _____
        iv. Width of sand bed: 14 feet maximum _____

16. ☐ Pretreatment areas size and location, if provided _____

17. ☐ Pool widths greater than width of grade control structure _____

18. ☐ Identify grade control structures _____
    Note: The width of the grade control structure should be 8-20 times its depth; 10 feet preferred. _____

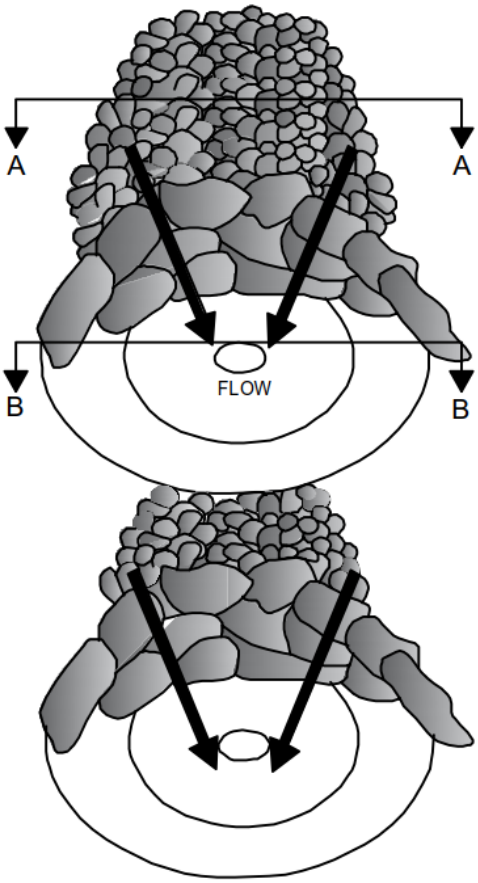
19. ☐ Setback minimums: _____
    a. Building foundations: 10 feet _____
    b. Property lines: 10 feet _____
    c. Private water supply wells: 100 feet _____
    d. Public water supply reservoirs: 200 feet (measured from edge of water) _____
    e. Public water supply wells: 1,200 feet _____

(Continued)

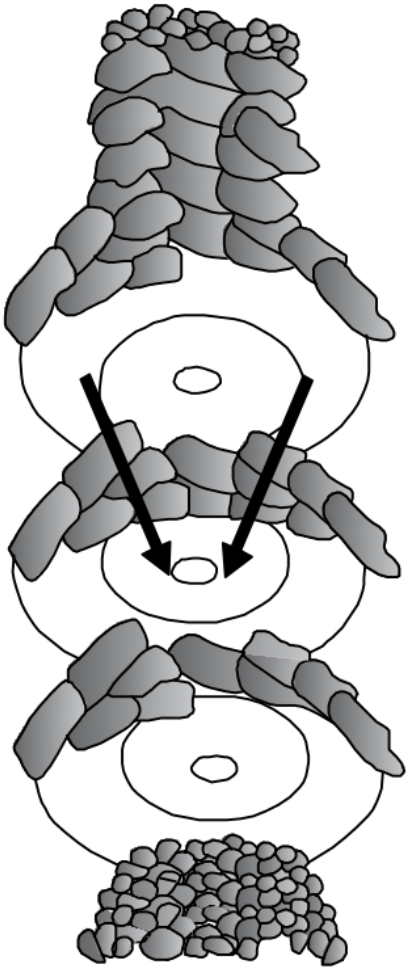
20. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____

21. ☐ Upstream and downstream elevations of grade control structures _____
    Note: The invert of the upstream elevation of the grade control structure should be 1 foot higher than the elevation of the downstream grade control structure.

22. ☐ Profile and section view of the RSC: _____



RIFFLE - POOL SEQUENCE (TYPICAL)

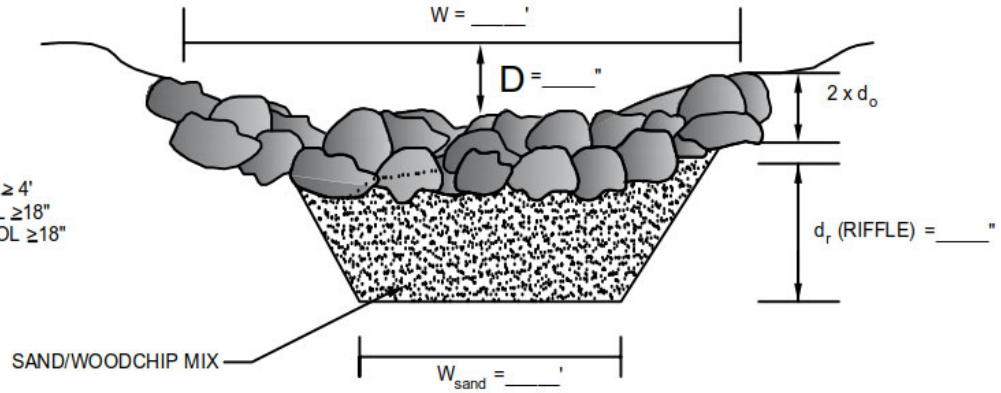


CASCADE SEQUENCE

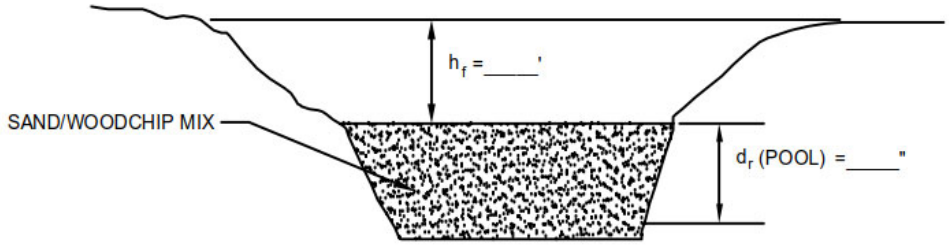
(Continued)

NOTES TO DESIGNERS:

1. W≥8'
2. WIDTH OF THE SAND ≥ 4'
3. SAND DEPTH IN POOL ≥18"
4. WATER DEPTH IN POOL ≥18"



SECTION A-A
RIFFLE POOL CROSS SECTION THROUGH COBBLE



SECTION B-B
RIFFLE POOL CROSS SECTION THROUGH POOL

REGENERATIVE STORMWATER CONVEYANCE - PLAN AND SECTIONS

(End of Regenerative Stormwater Conveyance Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
SAND FILTER CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to filter system area.
   a. Contributing drainage area for surface sand filter: 10 acres maximum _____
   b. Contributing drainage area for perimeter sand filter: 2 acres maximum _____
   c. Pretreatment required for sites:
      i. With less than 50% impervious cover, or _____
      ii. High clay/silt sediment loads (e.g. clay greater than 30%) _____

2. ☐ Site slopes across filter location: 6% maximum _____

3. ☐ Head across filter
   Elevation difference needed at a site, from the inflow to the outflow: _____
   a. Surface sand filters: 5 feet minimum _____
   b. Perimeter sand filters: 2 to 3 feet minimum _____

4. ☐ Calculations for the following volumes, areas, and depths. _____
   V_s – Volume within Sedimentation Basin _____
   V_w – Wet Pool Volume within Sedimentation Basin _____
   V_f – Volume within the Voids in the Filter Bed _____
   V_{temp} – Temporary Volume Stored above the Filter Bed _____
   A_s – Surface Area of the Sedimentation Basin _____
   A_f – Surface Area of the Filter Media _____
   h_s – Height of Water in the Sedimentation Basin _____
   h_f – Average Height of Water Above the Filter Media (1/2 h_{temp}) _____
   d_f – Depth of Filter Media _____

5. ☐ Total storage volume. The entire treatment system (including the sedimentation chamber) must temporarily hold greater than 5 % of the WQ_v, prior to filtration. _____

6. ☐ Dimensions and storage volume of sedimentation chamber _____
   For surface sand filters:
   a. Minimum: 25% of the computed WQ_v _____
   b. Length-to-width ratio: 2:1 minimum
   For perimeter sand filters:
   a. Minimum: 50% of the computed WQ_v _____
   b. Filter media 12- to 18-inch layer of clean, washed medium sand (meeting ASTM C-33 concrete sand or GDOT Fine Aggregate Size No. 10) on top of the underdrain system. _____

7. ☐ Coefficient of permeability for sand media _____
   Note: A coefficient of permeability (k) of 3.5 ft./day for sand should be used, unless specific data exists for the sand used. _____

8. ☐ Drain-down time calculations.
   a. 40 hours maximum _____
   b. Sand filters should not be used on sites with a continuous flow from groundwater, sump pumps, or other sources. ____

9. ☐ Depth to seasonal high water table (SHWT). _____
   Note: For a surface sand filter with exfiltration, a minimum separation distance of 2 feet is required between the bottom of the bottom of the sand filter and the elevation of the SHWT. _____

(Continued)

10. Landscaping plan, if planted _____
    a. Tree locations or shade: minimum 15 feet from filtering area _____
    b. No trees or shade where leaf litter will collect and clog filtering area _____
    c. Native grasses preferred, if compatible _____

11. Underdrain sizing calculations:
    a. Surface sand filters: 6-inch minimum. _____
    b. Perimeter sand filters: 4-inch minimum. _____
    d. Perforated Schedule 40 PVC underdrain pipe; holes 3/8-inch diameter; 6 inches on center _____
    e. Minimum slope: 1% _____

12. ☐ Depth of sand media: _____
    a. Filter media: clean washed medium sand (meeting ASTM C-33 concrete sand or GDOT Fine Aggregate Size No. 10) on top of the underdrain system _____
    b. Surface sand filters: 18-inch layer minimum _____
    c. Perimeter sand filters: 12 to 18-inch layer minimum _____

13. ☐ Porosity value of stone: 0.32, unless aggregate-specific data is provided _____

14. ☐ Demonstrate facility can safely pass or divert the 100-year storm without damage to the sand media or adjacent property. _____

AS-BUILT SURVEY:

15. ☐ Contours at minimum 2-foot elevations and spot elevations (underground storage dimensions & elevations) _____

16. ☐ Location and diameter of observation well(s). _____
    Note: An observation well is required to provide access for cleaning all underdrain piping _____

17. ☐ Maximum ponding depth and water surface elevation. _____
    Note: Ponding depth should be a 6-12 inches, for perimeter sand filters. _____

18. ☐ Depth of sand media _____

19. ☐ Depth of topsoil, if used _____

20. ☐ Overflow, diversion or bypass structure _____

21. ☐ Indicate all sedimentation chamber(s) for each infiltration inlet for pretreatment and label volume.
    _____

22. ☐ Elevations & dimensions for inlets, outlets, piping, & drain protection _____

23. ☐ Energy dissipation, if warranted _____

24. ☐ Size and material of perforated underdrain pipe _____

25. ☐ Detail of diversion structure or flow splitter, if filter is used as an off-line practice _____

(Continued)

26. ☐ Elevation of overflow structure _____

27. ☐ Elevation of pipe invert leaving filter facility _____

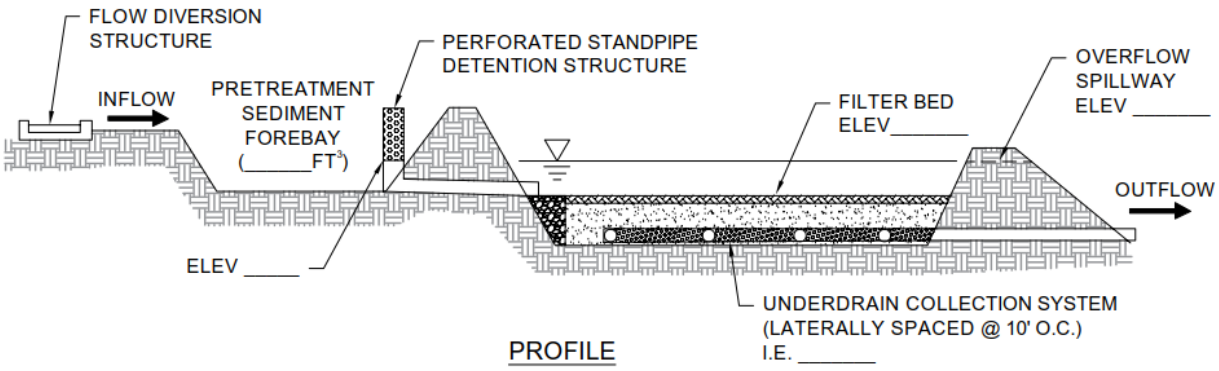
28. ☐ Diameter of outlet pipe to storm sewer/conveyance or downstream practice _____

29. ☐ Overflow elevation and detail of drain protection used, if warranted _____

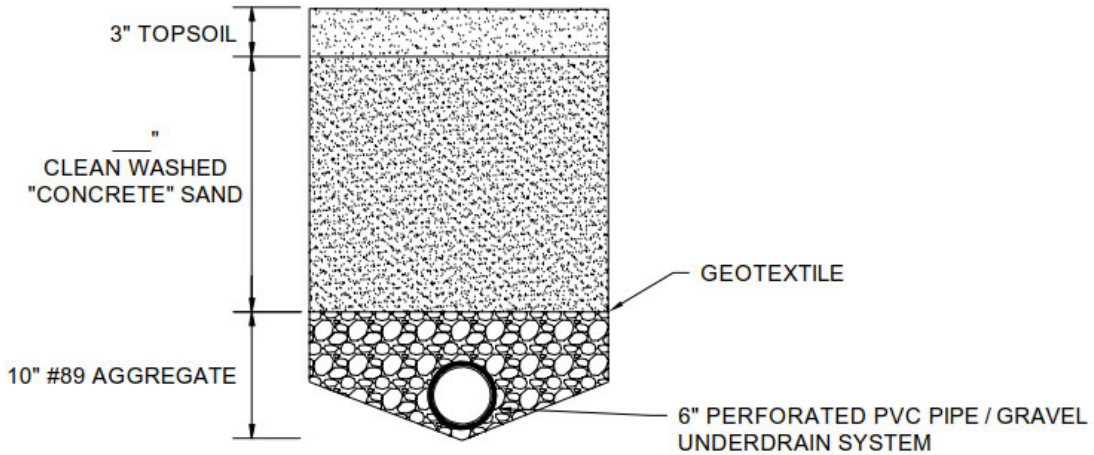
30. ☐ Detail/section and profile of sand filter: _____

NOTES TO DESIGNERS:

1. SAND DEPTH SHOULD BE MINIMUM OF 18".



PROFILE



SECTION

SAND FILTER

(End of Sand Filter Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
REFORESTATION/REVEGETATION CHECKLIST

AS-BUILT REPORT:

1. ☐ Maps showing the revegetated/reforested area _____
2. ☐ Calculations showing re-calculated WQ_v and CN number calculations used in post-developed condition _____
3. ☐ Site Slope – Maximum 25% in the disturbed pervious area to be reforested/revegetated _____
4. Conservation instrument (e.g., conservation easement, deed restriction) _____
   a. Shows that the reforested/revegetated areas will be protected in perpetuity _____
   b. Legally enforceable _____

AS-BUILT SURVEY:

5. ☐ Approved landscaping plan indicating location, names, and size of species used _____
6. ☐ Contours at minimum 2-foot elevations and spot elevations _____
7. ☐ Delineate and label areas (S.F./Acres) to be reforested/revegetated: _____
   Note: Contiguous area minimum 10,000 square to be eligible for stormwater management credits _____

(End of Reforestation/Revegetation Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
SOIL RESTORATION CHECKLIST

AS-BUILT REPORT:

1. ☐ Maps showing and labeling areas of the locations for soil restoration _____

2. ☐ Calculations showing the re-calculated RR_v, WQ_v, and CN number calculations used in post-developed condition _____

3. ☐ Site Slope in the disturbed pervious area to be restored: 10%maximum _____

4. ☐ Compost specifications, if applicable: _____
   a. Organic Matter Content: 35-65% _____
   b. Moisture Content: 40-60% _____
   c. Bulk Density: "as-is" bulk density in composts that have a moisture content of 40%-60%:
      i. 40-50 pounds per cubic foot (lb./cf.), which equates to bulk density range of
      ii. 450-800 pounds per cubic yard (lb./cy.), by dry weight _____
   d. Carbon to Nitrogen (C:N) Ratio: 25:1 maximum _____
   e. pH: pH 6 - 8 _____
   f. Cation Exchange Capacity (CEC): exceeds 50 milliequivalents (meq) per 100 grams of dry weight, minimum _____
   g. Foreign Material Content: 0.5% foreign materials (e.g., glass, plastic), maximum, by weight _____
   h. Pesticide Content: Pesticide free _____

5. ☐ Depth to seasonal high water table (SHWT): Minimum separation distance of 18-inches is recommended between the bottom of the restored pervious area and the top elevation of the SHWT _____

AS-BUILT SURVEY:

6. ☐ Contours at minimum 2-foot elevations and spot elevations _____

7. ☐ Areas of restored soil with area label (sq. ft., acres) _____

(End of Soil Restoration Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
STORMWATER PLANTERS/TREE BOX CHECKLIST

AS-BUILT REPORT:

1. ☐ On-site and off-site delineated basin area maps with impervious areas to stormwater planter area
   Note: Contributing drainage area to each facility: 2,500 square feet maximum _____

2. ☐ Flow path length within contributing drainage area:
   a. Pervious drainage areas: 150 feet maximum _____
   b. Impervious drainage areas: 75 feet maximum _____

3. ☐ Site slope: 6% maximum _____
   Planters: Level _____

4. ☐ Head across planters: 2-ft. minimum _____

5. ☐ Provide engineered media mix specifications as-built verification of infiltration rate of media. _____
   a. Infiltration rate: 1 to 2 inch/hour is preferred; 0.25 inch/hour minimum_____
   b. Texture: Sandy loam or loamy sand _____
   c. Sand: 85 -88% clean, washed sand _____
   d. Topsoil : 8 -12% _____
   e. Organic Matter: 3-5% _____
   f. Clay: less than 15% _____
   g. Phosphorus Index (P-Index): less than 30 _____
   h. Cation Exchange Capacity (CEC): greater than 10 milliequivalents (meq) per 100 grams of dry weight _____
   i. pH: pH 6 – 8 _____
   j. The organic matter used in an infiltration basin planting bed should be well-aged compost that meets the specifications outlined in Appendix D of the GCSMM. _____

6. ☐ Drain-down time calculations: 24 hours maximum after end of rainfall event _____

7. ☐ Depth to seasonal high water table (SHWT).
   a. Minimum separation distance of 2 feet is recommended between the bottom of the stormwater planter and the SHWT elevation. _____
   b. If unable to provide 2 feet separation, the planting depth can be reduced to 18", or
   c. Separation between water table and bottom of stormwater planter can be reduced to 12", with an adequately sized underdrain. _____

8. ☐ Dimensions and area sizing calculations, including pretreatment _____

9. ☐ Description of material used in construction of stormwater planter _____
   a. Acceptable materials: stone, brick, or another durable material _____
   b. Chemically treated wood should not be used _____

10. ☐ Underdrain sizing calculations: _____
    a. Diameter is 4-inch, minimum perforated PVC (AASHTO M 52) pipe _____
    b. Underdrain bedding: 6-inch layer of clean, washed stone _____
    c. Perforations: 3/8-inch, spaced 6 inches on center _____
    d. Slope: 0.5% minimum _____
    e. Clean, washed stone: No. 57 stone _____
    f. Separate stone from the planting bed by a layer of permeable filter fabric or 2 to 4-inch layer of choker stone _____

(Continued)

11. ☐ Overflow calculations _____
    a. Convey the stormwater runoff generated by larger storm events _____
    b. No damage to the practice or surrounding property _____

AS-BUILT SURVEY:

12. ☐ Waterproof liner: All stormwater planters should be equipped with a waterproof liner [30 mil (0.030 inch) polyvinylchloride (PVC) or equivalent, minimum] to prevent damage to building foundations and other adjacent impervious surfaces _____

13. ☐ Ponding depth:
    a. 6 inches, preferred _____
    b. 12 inches maximum _____

14. ☐ Water surface elevation (W.S.E.) _____

15. ☐ Freeboard: _____
    a. Between maximum ponding W.S.E. and top of the planter box _____
    b. 2 inches minimum recommended. _____

16. ☐ Planting soil media depth _____
    a. 24 inch minimum _____
    b. Shallow seasonal high water table may require adjustment _____

17. ☐ Washed #57 stone depth _____

18. ☐ Mulch layer depth 2 to 4 inches of fine shredded hardwood mulch or hardwood chips _____

19. ☐ Overflow, diversion, or bypass structure _____

20. ☐ Setback minimums:
    a. Property lines: 10 feet _____
    b. Private water supply wells: 100 feet _____
    c. Septic systems: 100 feet _____
    d. Surface waters: 100 feet _____
    e. Public water supply reservoirs: 400 feet (measured from edge of water) _____
    f. Public water supply wells: 1,200 feet _____

21. ☐ Elevations & dimensions for inlets, outlets, piping _____

22. ☐ Perforated underdrain pipe size and material _____

23. ☐ Elevation and diameter of pipe invert leaving stormwater planter to stormwater system _____

24. ☐ Energy dissipation, if warranted _____

25. ☐ Detail/section view of stormwater planter _____

(Continued)

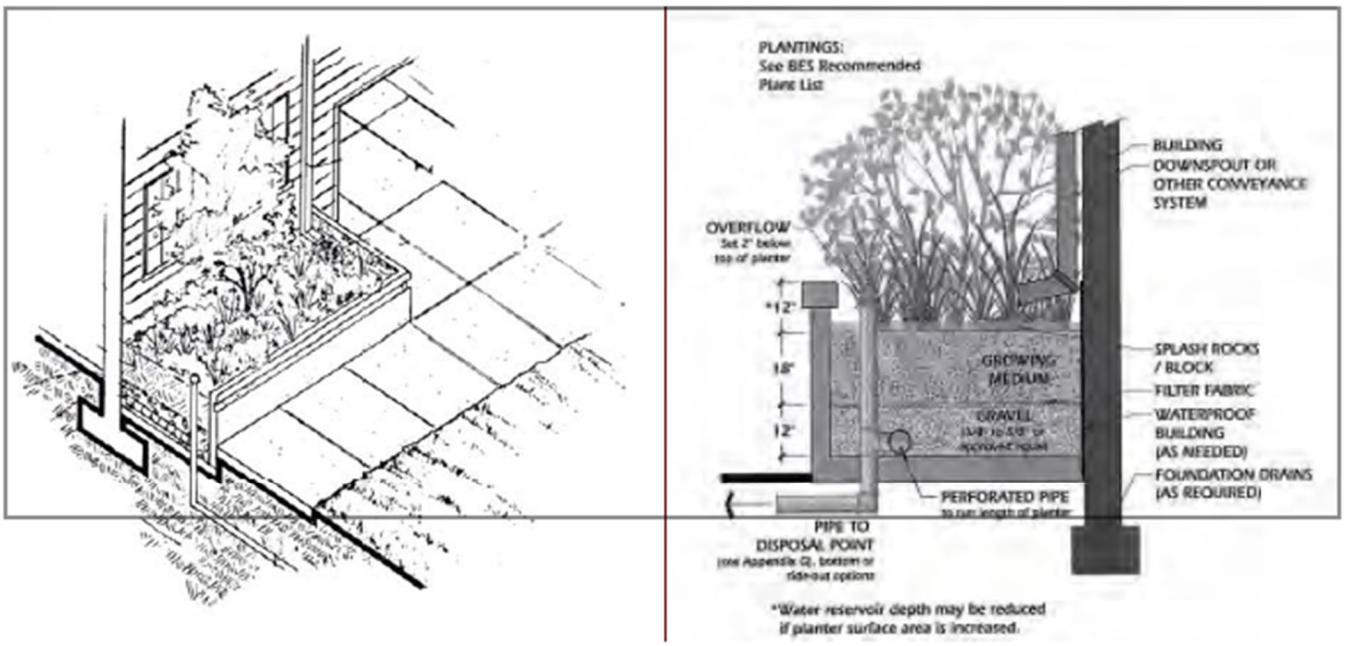


Figure 4.24-2: Stormwater Planters
(Source: City of Portland, OR, 2004)

(End of Stormwater Planters and Tree Boxes Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
STORMWATER PONDS CHECKLIST

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for WQ_v, CP_v, and orifice sizes _____
2. ☐ Pre- and post-development peak discharges for the 1, 2, 5, 10, 25 and 100-yr, 24-hour storms _____
   a. Hydrographs, hydrograph recaps, and hydrograph summaries _____
   b. Stage/storage table for the entire pond, starting at pond's bottom _____
   c. Pond summary report with orifices, weirs, culverts, and discharge data used to develop pond routing hydrographs _____
3. ☐ On-site and off-site delineated basin area maps with impervious areas to stormwater pond _____
4. ☐ Tributary Site Slopes: 15% maximum _____
5. ☐ Routing and storage calculations _____
   a. Demonstrate detention facility can safely pass the 100-yr storm _____
   b. Storage volumes greater that 100 acre-feet are subject to the requirements of the Georgia Safe Dams Act. _____
   c. Routing should begin at normal water surface elevation. _____
6. ☐ Dimensions and area sizing calculations of detention facility _____
   a. Length-to-width ratio for the permanent pool shape: _____
      i. Greater than 3:1 preferred, to avoid short-circuiting _____
      ii. Minimum: 1.5:1 _____
   b. Permanent pool depth: _____
      i. Maximum: 8 feet, generally preferred, to avoid stratification and anoxic conditions
      ii. Minimum: 3 - 4 feet _____
7. ☐ Pretreatment/forebay dimensions and area sizing calculations _____
   a. Volume: 0.1 inches of runoff per impervious acre of contributing drainage area, minimum _____
   b. Depth: 4 - 6 feet _____
   c. Vertical sediment depth marker should be placed in forebays to measure sediment deposition _____
   d. Forebay at each inlet pipe, unless the inlet pipe discharges less than 10% of the total design storm inflow to the pond _____
8. ☐ Depth to seasonal high water table (SHWT) _____
   Note: If used on a site with an underlying water supply aquifer, or when treating a hot spot, a minimum separation distance of 2 feet between the bottom of the pond and the elevation of the SHWT is required. _____
9. ☐ Karst topography or rapidly draining sandy soils: _____
   Note: If detention facility is located on one or both of these features, an impermeable liner is necessary to prevent groundwater contamination and sinkhole formation. _____
10. ☐ Stream or any other navigable waters of the U.S., including wetlands: _____
    Note: If the stormwater pond is located within such a feature, include the Section 404 permit under the Clean Water Act, and any other applicable federal or state permit. _____
11. ☐ Identify any fish species stocked in the pond. _____

(Continued)

AS-BUILT SURVEY:

12. ☐ Spot elevations, including in front of the outlet device and at the opposite end of the pond, to verify positive drainage _____

13. ☐ Elevations for:
    a. Lowest point on top of embankment _____
    b. Bottom of facility _____
    c. All inverts for pipes discharging into or discharging from facility _____
    d. Emergency spillway _____
    e. Water surface elevation for the 100-year storm _____
    f. Safety bench inside and outside breaks in grade, if applicable _____

14. ☐ Freeboard from top of embankment of wall to 100-year water surface elevation
    a. Earthen dams: 1.5 feet minimum _____
    b. Walled ponds: 1 foot minimum _____

15. ☐ Ponding Limits for the 100-year storm _____

16. ☐ Dimension 10-foot BMP drainage easement outside of the 100-year ponding limits _____

17. ☐ Locate and dimension top of dam's minimum width. _____

18. ☐ Safety and aquatic benches _____
    a. The perimeter of all deep pool areas (4 feet or deeper) should be surrounded by two benches: safety and aquatic.
    b. Safety bench: For larger ponds, the safety bench extends approximately 15 feet outward from the normal water edge to the toe of the pond side-slope. Safety bench maximum slope: 6%.
    c. An aquatic bench extends inward from the normal pool edge (15 feet on average) and has a maximum depth of 18 inches below the normal pool water surface elevation.

19. ☐ Height of basin _____
    a. Vegetative and rip rap embankments should be <20 feet in height; <10 feet is preferred. _____
    b. A geotechnical slope stability analysis is recommended for embankments over 10 feet in height. _____

20. ☐ Identify material used for embankments. _____
    a. Designs of non-earthen dams shall not include planned structure overtopping for emergency overflows. _____
    b. Non-earthen pond dam structures shall be constructed of monolithic wall materials. _____
    c. Walls shall extend from the toe of exterior fill slope into the pond's earthen embankment a distance 4 times the depth of the 100-year ponding limits. _____

21. ☐ Safety bench required for embankments: _____
    a. Greater than 10 feet in height _____
    b. Having side slopes steeper than 4:1 _____
    c. For large basins, safety bench shall extend no less than 15 feet outward from the normal water edge to the toe of the basin side slope. _____
    d. Slope of the safety bench: 6% maximum _____

(Continued)

22. ☐ Side slopes: maximum 3:1 _____

23. ☐ Size, material, and slope of outlet pipe. _____
    Note: If the 100-year maximum flow velocity in a conduit through the dam is ≥10 feet per second and the hydraulic grade line is at or above the crown for at least 10% of the conduit length, the pipe must be superior to Class V RCP in its structural characteristics. _____

24. ☐ Seepage control or anti-seep collars _____

25. ☐ Energy dissipation at inlets and outlet: _____
    a. Inflow channels are to be stabilized with flared aprons, or equivalent. _____
    b. Riprap, plunge pools, pads, or other energy dissipaters are to be placed at the end of the outlet to prevent scouring and erosion. _____

26. ☐ Size, location, and type of pretreatment/sediment forebay(s) _____
    Note: Forebays should contain a fixed vertical sediment depth marker. _____

27. ☐ Profile view of outlet structure _____
    a. Orifices smaller than 3 inches in diameter shall have internal orifice protection, such as a perforated vertical standpipe with 0.5-inch orifices or slots that are protected by wire-cloth and stone filtering jacket. _____
    b. Orifices smaller than 15 inches in diameter shall be protected by a trash rack. _____
    c. If either the Water Quality (WQ) or the Channel Protection (CP) Orifice is less than 4.0 inches, use table in Section 4.5.5.5 of GCSMM Volume 2 for proper sizing. _____

28. ☐ OCS diagram and with complete applicable information in the diagram _____

29. ☐ Profile view of detention facility _____

30. ☐ Landscaping plan indicating location, names, and sizes of species used _____
    a. Vegetated buffer around the detention basin with selected plants within the detention zone that can withstand both wet and dry periods _____
    b. Plantings should not conflict with current drainage of basins. _____
    c. No trees or woody vegetation are permitted on the dam, side slopes, the downward slope of the dam, within 15 feet of the toe of the embankment, or within 25 feet of the principal spillway structure. _____
    d. Shrubs may be allowed to remain on the top of the embankment, only upon certification of the survivability of the vegetation, under both wet and dry conditions. _____

31. ☐ Pond buffer: 25 feet minimum outward from the maximum water surface elevation of the pond _____

32. ☐ Each pond must have a bottom drainpipe with an adjustable valve that can completely or partially drain the pond within 24 hours. _____

33. ☐ Pond drain should be sized one pipe size larger than the calculated design diameter. _____
    a. Drain valve is typically a hand-wheel activated knife or gate valve. _____
    b. Valve controls should be located inside of the riser, at a point where they will not normally be inundated and can be operated in a safe manner. _____

(Continued)

34. ☐ Location of detention facility area in respect to property lines, road R/W, and easements. _____
    a. Show and dimension: access easement to the R/W _____
    b. Show and dimension: 10 ft.-wide BMP drainage easement outside the 100-year ponding limits _____

35. ☐ Setback minimums: _____
    a. Property lines: 10 feet _____
    b. Septic system tank/leach field: 50 feet _____
    c. Private water supply wells: 100 feet _____
    d. Well down-gradient from a hot spot land use: 250 feet _____

36. ☐ Maintenance access _____
    a. Minimum width: 15 feet _____
    b. Maximum slope: 20% _____

37. ☐ Identify walls used around the detention facility, if any. _____
    a. No more than 50% of the basin perimeter may be a wall of any type _____
    b. Fence height: 4-feet minimum _____
    c. Access gate: 12-foot wide minimum required for maintenance purposes _____
    d. Wall must be contained within the easement _____

38. ☐ Areas above the normal high-water elevations of the stormwater pond are to be sloped toward the basin to allow drainage _____

39. ☐ Operation and Maintenance Manual _____

40. ☐ BMP Maintenance Bond _____

(Continued)

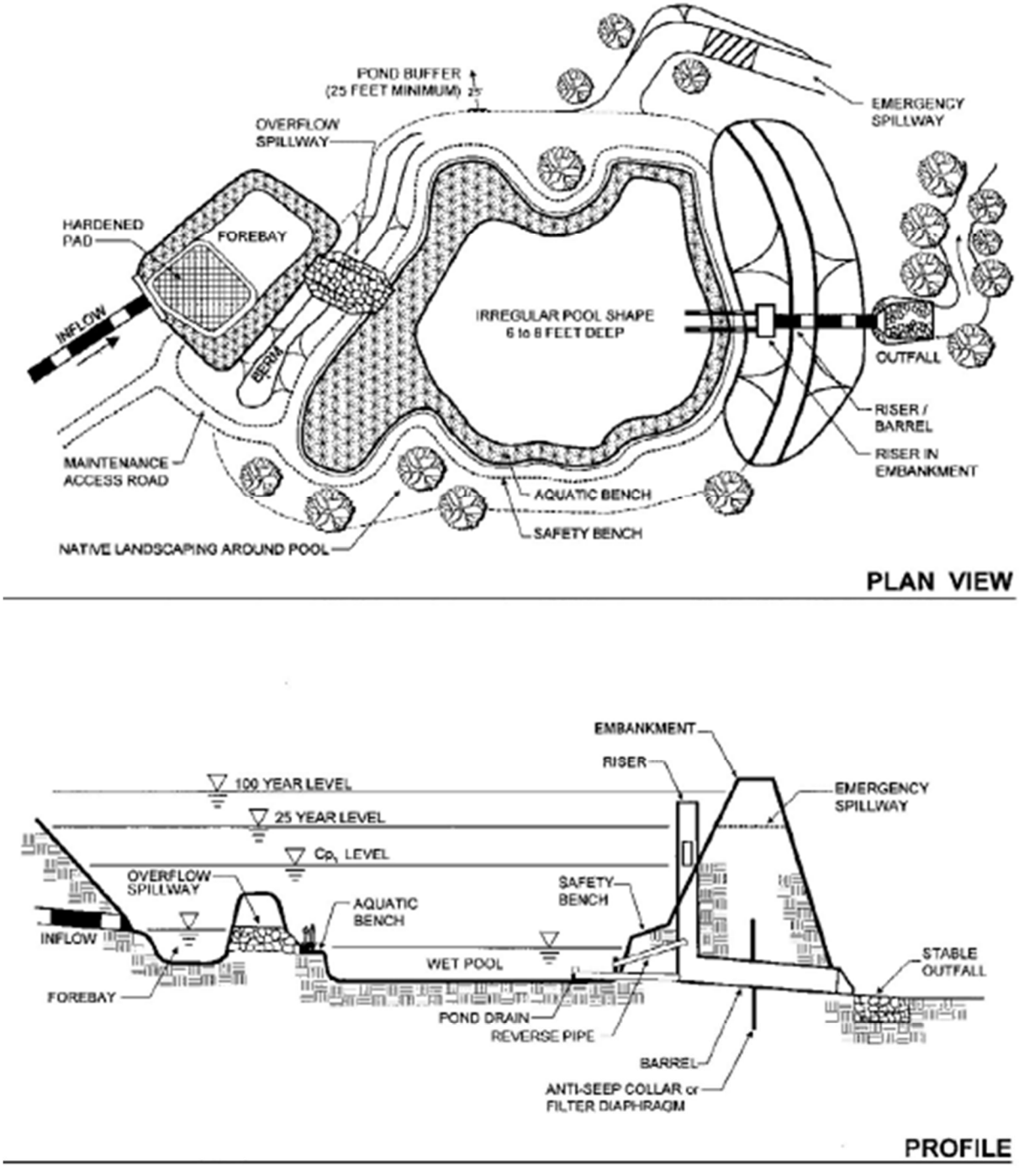


Figure 4.25-2 Schematic of Wet Pond

(Source: Center for Watershed Protection)

(Continued)

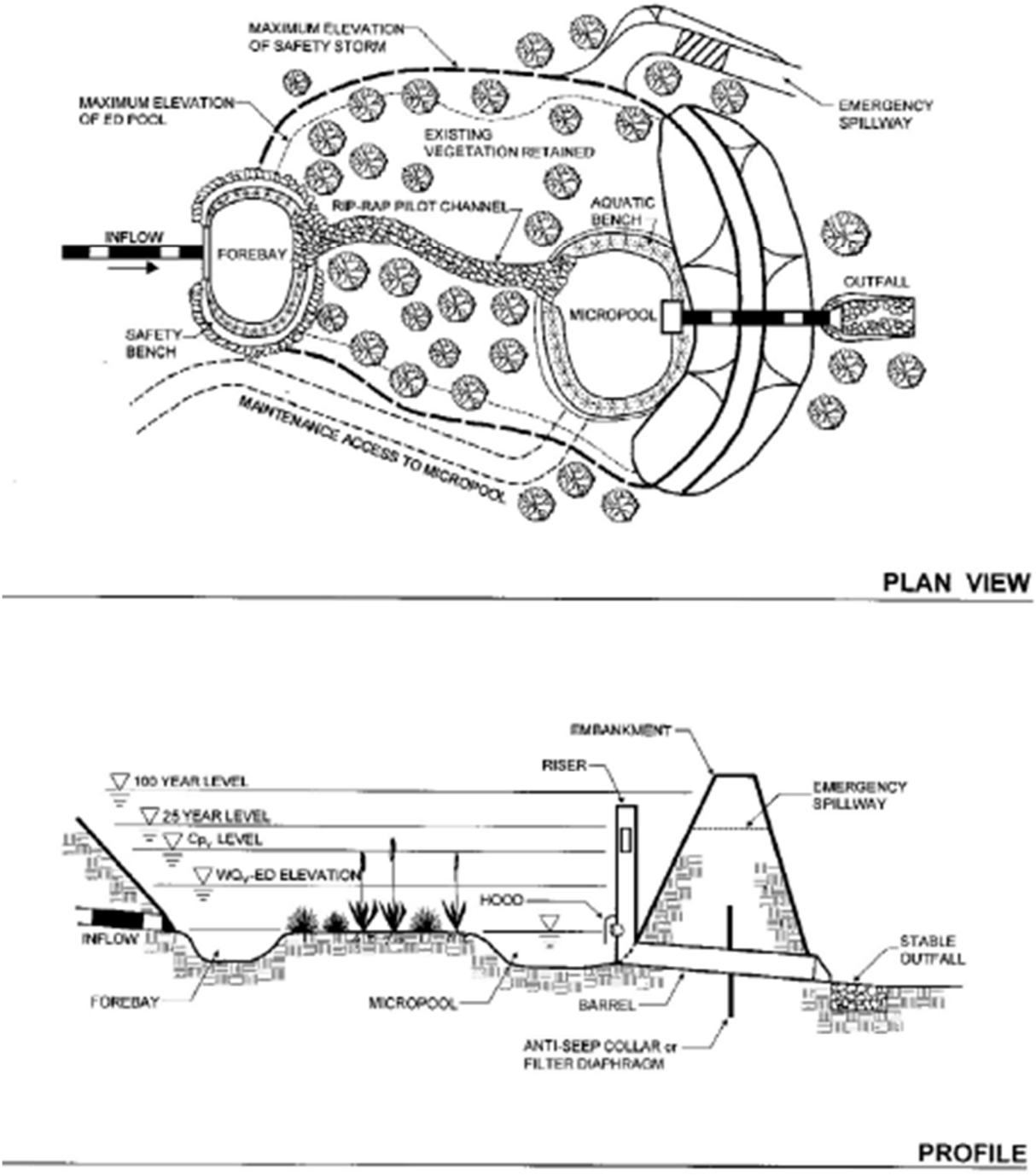


Figure 4.25-3 Schematic of Wet Extended Detention Pond

(Source: Center for Watershed Protection)

(End of Stormwater Ponds Checklist)

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for WQ_v, and CP_v, storage volumes and associated orifice sizing, if applicable _____

2. ☐ Pre-development and post-development peak discharges for the 1, 2, 5, 10, 25, and 100-year, 24-hour return frequency storms, if used for channel protection, overbank flood protection, and/or extreme flood protection _____

3. ☐ On-site and off-site delineated basin area maps with impervious areas to wetlands _____
   a. Wetlands: 25 acres minimum and a positive water balance needed to maintain wetland conditions. _____
   b. Pocket wetlands: 5 acres minimum _____

4. ☐ Site Slope: _____
   a. Level 1 wetlands: 8% slope maximum across the wetland site _____
   b. Level 2 wetlands: 0%+/- slope (i.e., shall be generally flat; less than 4%) _____

5. ☐ Head across wetlands (elevation difference from the inflow to the outflow): _____
   a. Wetlands: 3 to 5 feet _____
   b. Pocket wetland: 2 to 3 feet _____

6. ☐ Summary report:
   a. Stage/storage table _____
      i. Starting at the required routing elevation _____
      ii. Orifices, weirs, culverts, and discharge data used to develop routing hydrographs _____
   b. Demonstrate detention facility can safely pass the 100-yr storm. _____
   c. Storage volumes greater than 100 acre-feet are subject to the requirements of the Georgia Safe Dams Act. _____
   d. Water balance must be performed to demonstrate that a stormwater wetland can withstand a 30-day drought at summer evaporation rates without completely drawing down. _____

7. ☐ Dimensions and area sizing calculations of wetlands, including pretreatment/forebay(s) _____
   a. Volume: 0.1 inches minimum runoff per impervious acre of contributing drainage area _____
   b. Forebay depth: 4 to 6 feet _____
   c. Pretreatment storage volume is part of the total WQ_v requirement and may be subtracted from WQ_v for wetland storage sizing _____

8. ☐ Depth to seasonal high water table (SHWT) _____
   a. Pocket wetlands are typically below the water table _____
   b. Excavation below the water table to create a stormwater wetland is acceptable, but any storage volume below the water table should not be counted when determining the total storage volume provided by the stormwater wetland. _____
   c. If used on a site with an underlying water supply aquifer or when treating a hotspot, a 2 feet separation distance between the bottom of the wetland and the elevation of the SHWT is recommended. _____

9. ☐ Karst topography or rapidly draining sand soils: _____
   Note: If wetland is located on either feature, an impermeable liner may be necessary to prevent groundwater contamination or sinkhole formation. _____

(Continued)

10. ☐ Provide any permits obtained. _____
    Note: Stormwater wetlands cannot be located within navigable waters of the U.S., including wetlands, without obtaining a Section 404 permit under the Clean Water Act, and any other applicable State permit. _____

AS-BUILT SURVEY:

11. ☐ Contours at 2-foot elevations and spot elevations _____
12. ☐ Lowest elevation in front of outlet device and opposite end of wetland, to verify positive drainage _____
13. ☐ Top of wall/dam's lowest elevation, to verify freeboard _____
14. ☐ Top of the dam's minimum width (location and dimension) _____
15. ☐ Forebay area for each wetland inlet, with volume label _____
16. ☐ 100-year storm event ponding elevation and limits of ponding _____
17. ☐ Access easement _____
18. ☐ 10 ft. BMP drainage easement outside the 100-yr. ponding limits of the wetlands _____
19. ☐ Outlet control details showing pertinent elevations & dimensions for inlets, outlets, piping, & drain protection _____
20. ☐ Elevations for:
    a. Top of embankment _____
    b. Bottom of facility _____
    c. Emergency spillway _____
    d. Water surface elevations:
        i. 25-year storm _____
        ii. 100-year storm _____
21. ☐ Freeboard from top of embankment to 100-year water surface elevation: 1 foot minimum _____
22. ☐ Safety bench _____
23. ☐ Side slopes: 3:1 maximum _____
24. ☐ Size and material of outlet pipe _____
    Note: If the 100-year maximum flow velocity in a conduit through the dam is greater than10 feet per second and the hydraulic grade line is at or above the crown for at least 10% of the conduit length, the pipe must be superior to Class V RCP in its structural characteristics. _____
25. ☐ Seepage control or anti-seep collars _____

(Continued)

26. ☐ Energy dissipation at inlets and outlet _____
    a. Inflow channels stabilized with flared aprons, or equivalent _____
    b. Riprap, plunge pools, pads, or other energy dissipaters at outlet to prevent scouring and erosion _____

27. ☐ Location and storage volume of pretreatment/sediment forebay(s) _____
    a. Location of sediment depth marker. _____
    b. Forebay at each inlet, unless the inlet provides less than 10% of the total design storm inflow to the wetland facility _____

28. ☐ Show profile view of outlet structure. _____
    a. Orifices <3 inches in diameter shall have internal orifice protection such as a perforated vertical standpipe with 0.5-inch orifices or slots that are protected by wire cloth and a stone filtering jacket. _____
    b. Orifices <15 inches in diameter shall be protected by a trash rack. _____
    c. The principal spillway opening should not permit access by small children, and end-walls above pipe outfalls greater than 48 inches in diameter should be fenced to prevent a hazard. _____

29. ☐ Wetland drain _____
    a. Each wetland must have a bottom drainpipe with an adjustable valve that can completely or partially drain the wetland within 24 hours. _____
    b. Wetland drain sized one pipe size greater than the calculated design diameter _____

30. ☐ Label the following zones:
    a. Deepwater zone _____
    b. Low marsh zone _____
    c. High marsh zone _____
    d. Semi-wet zone _____

31. Landscaping plan indicating location, names, and planting size of species used _____
    a. Minimum elements of plan:
        i. Delineation of landscaping zones _____
        ii. Selection of corresponding plant species _____
        iii. Planting plan _____
        iv. Sequence for preparing wetland bed (including soil amendments, if needed) _____
        v. Sources of plant material _____
    b. No trees or woody vegetation permitted on the dam, side slopes, the downward slope of the dam, within 15 feet of the toe of the embankment, or within 25 feet of the principal spillway structure. _____

32. ☐ Utilities: All utilities shall be located outside of the wetland site. _____

33. ☐ Setbacks, minimums: _____

a. Property lines:	10 feet	_____
b. Septic system tank/leach field:	50 feet	_____
c. private water supply wells:	100 feet	_____
d. Well downgradient from a hot spot land use:	250 feet	_____
e. Airports:	5 miles	_____

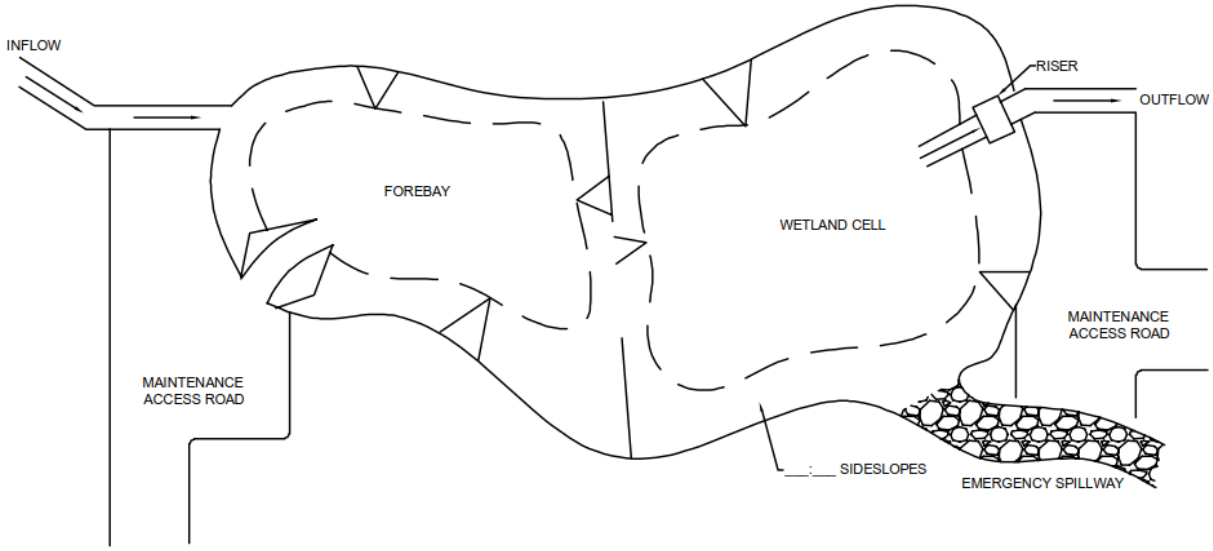
(Continued)

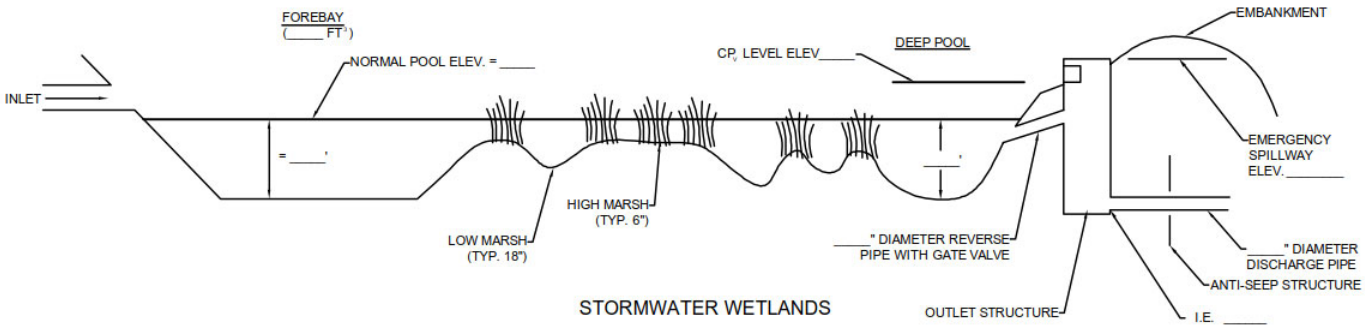
34. ☐ Maintenance access or easement to wetlands from a public or private road, appropriately stabilized to withstand maintenance equipment and vehicles. _____
    a. Width: 15 feet minimum _____
    b. Slope: 15% maximum _____
    c. Maintenance access must extend to the forebay, safety bench, riser, and outlet and, to the extent feasible, be designed to allow vehicles to turn around. _____

35. ☐ Provide and label plan and profile views of wetland. _____

NOTES TO DESIGNERS

1. FOREBAY SHOULD BE AT LEAST 10% OF THE WQ^{v}.
2. PROVIDE A MINIMUM OF 1.0' OF FREEBOARD BETWEEN EMERGENCY SPILLWAY AND TOP OF EMBANKMENT.
3. PROVIDE A MINIMUM OF 0.1' BETWEEN 100 YR. LEVEL AND EMERGENCY SPILLWAY.





(End of Stormwater Wetlands Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
SUBMERGED GRAVEL WETLANDS CHECKLIST

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for WQ_v, storage volumes, and associated orifice sizing (if applicable) _____

2. ☐ On-site and off-site delineated basin area maps with impervious areas to wetlands _____
   a. Minimum: 1 acre recommended, to ensure submerged flow conditions _____
   b. Maximum: 5 acres _____

3. ☐ Site slope: local slope should be generally flat (less than 4%) _____

4. ☐ Head across wetlands (elevation difference from the inflow to the outflow: 2 - 5 feet, generally _____

5. ☐ Dimensions and sizing calculations of wetlands, including pretreatment/forebay. _____
   a. Minimum 0.1 inches of runoff per impervious acre of impervious area of the WQ_v _____
   b. This volume may be subtracted from the WQ_v for wetland storage sizing. _____

6. ☐ Depth to seasonally high water table (SHWT) _____
   Note: If used on a site with an underlying water supply aquifer or when treating a hotspot, a separation distance between the bottom of the wetland and the elevation of the seasonally high-water table of 2 feet is recommended. _____

7. Karst topography or rapidly draining sand soils: _____
   Note: If wetland is located on either feature, an impermeable liner may be necessary to prevent groundwater contamination or sinkhole formation. _____

8. Provide copy of any permits obtained. _____
   Note: Stormwater wetlands cannot be located within navigable waters of the U.S., including wetlands, without obtaining a Section 404 permit under the Clean Water Act, and any other applicable State permit. _____

AS-BUILT SURVEY:

9. ☐ Contours at minimum 1-foot elevations and enough spot elevations to define the facility _____

10. ☐ Easement limits: _____
    a. Ensure enough access for maintenance and inspections _____
    b. Width: 20 feet minimum _____

11. ☐ Maintenance access or easement to wetlands from a public or private road appropriately stabilized to withstand maintenance equipment and vehicles. _____
    a. Driveway path width: 12 feet minimum _____
    b. Slope: 15% maximum _____

12. ☐ Cross section or profile and label freeboard: _____
    a. Measured from the top of the water surface elevation for the water quality volume, to the lowest point of the ground surface elevation, not counting the outlet weir _____
    b. Minimum: 6 inches _____

13. ☐ Location and storage volume of pretreatment/sediment forebay _____
    Note: Location of sediment depth marker in forebay _____

(Continued)

14. ☐ Profile showing and labelling following: _____
    a. Perforated underdrain: 4 - 6-inch diameter preferred _____
    b. Profile view of outlet configuration _____
    c. Gravel depth and stone type _____
        i. 18 - 48 inches thick minimum _____
        ii. 4 feet maximum _____
        iii. Clean washed, uniformly graded material _____
        iv. Porosity: 40% _____

15. ☐ Landscaping plan indicating location, names of species, and planting sizes _____
    a. Native (local) wetland plant stock is recommended for establishing vegetation. _____
    b. A minimum of three types of wetland species should be provided to avoid monoculture. _____
    c. Mulch or topsoil may be placed on top of the rock media to establish vegetation. _____
    Note: Using rock media to establish the wetland may require specific planting stock. _____

16. ☐ Location and diameter of observation well(s) _____
    a. 6-inch diameter perforated pipe _____
    b. Extend 6 inches above grade _____

17. ☐ Show the location of wetlands area in respect to property lines, utilities, road R/W, and easements. _____
    a. All utilities shall be located outside of the wetland site. _____
    b. Provide access easement from R/W to wetland. _____

18. ☐ Setback minimums: _____

a.	Property lines:	10 feet _____
b.	Building foundations:	10 feet _____
c.	Septic system tank/leach field:	50 feet _____
d.	Private water supply wells:	100 feet _____
e.	Public water supply wells:	1,200 feet _____

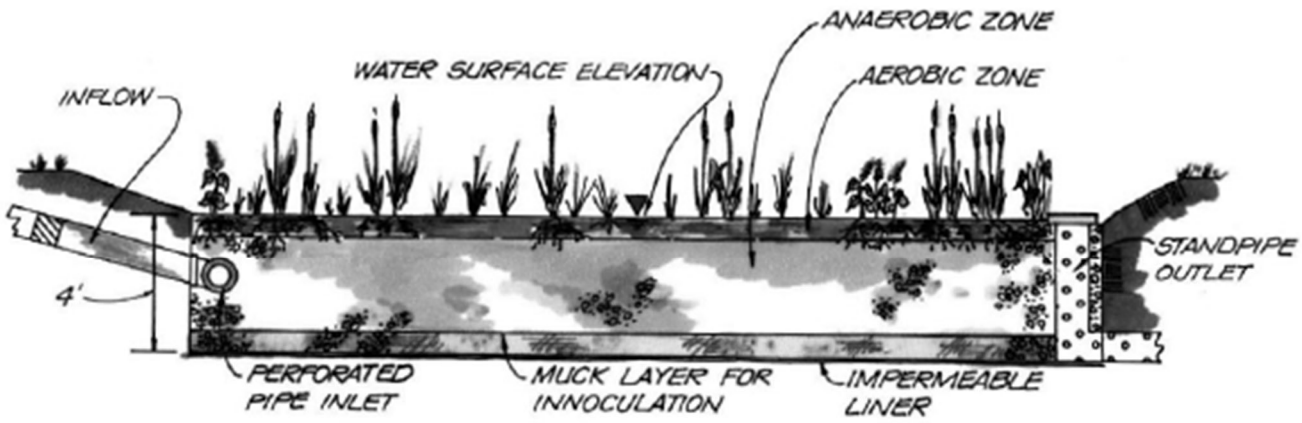


Figure 4.27-1 Schematic of Submerged Gravel Wetland System
(Source: Center for Watershed Protection; Roux Associates Inc.)

(End of Submerged Gravel Wetlands Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
UNDERGROUND DETENTION CHECKLIST

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for CP_v, storage volumes, and associated orifice sizing, if applicable _____
   Note: Underground detention cannot be used to meet water quality goals. _____

2. ☐ Pre-development and post-development peak discharges for the 1, 2, 5, 10, 25, and 100-year, 24-hour return frequency storms, if used for channel protection, overbank flood protection, and/or extreme flood protection: _____
   a. All hydrographs, hydrograph recaps, and hydrograph summaries _____
   b. Stage/storage table for entire detention facility, starting at the lowest discharge invert or bottom of the detention facility _____
   c. Pond summary report with orifices, weirs, culverts, and discharge data used to develop pond routing hydrographs _____

3. ☐ On-site and off-site delineated basin area maps with impervious areas to each underground detention facility _____
   Note: 25-acre maximum contributing drainage area to a single underground detention vault or tank _____

4. ☐ Site slopes: 15% maximum _____

5. ☐ Head across detention facility: 4 - 8 feet, minimum _____

6. ☐ Detention facility length, width, and depth _____
   a. Detention Tanks: 36 inches minimum pipe diameter for underground detention tanks _____
   b. Depth from finished grade to the vault invert:20 feet maximum _____

7. ☐ Depth to seasonal high water table. Minimum separation: 2 feet _____

8. ☐ Detention vaults: material and construction methods _____
   a. Minimum: 3,000 psi structural reinforced concrete for underground detention vaults _____
   b. Water stops must be provided on all construction joints. _____
   c. Cast-in-place wall sections must be designed as retaining walls. _____

9. ☐ Demonstrate detention facility can safely pass or divert the 100-yr storm without damage to adjacent buildings or property. _____

10. ☐ Demonstrate underground detention vaults and tanks meet structural requirements for overburden support and traffic loading, if applicable. _____

AS-BUILT SURVEY:

11. ☐ Contours at minimum 2-foot elevations and spot elevations _____

12. ☐ Underground storage dimensions & elevations _____

13. ☐ Show and label access easement to the R/W _____

14. ☐ Dimension 10 ft. BMP drainage easement outside the 100-year ponding limits _____

(Continued)

15. ☐ Sedimentation chamber(s) and volume for each detention inlet for pretreatment _____
    Note: A separate sediment sump or vault chamber sized to 0.1 inches times the impervious acres of contributing drainage should be provided at the inlet for underground detention systems that are in a treatment train with off-line water quality treatment BMPs. _____

16. ☐ Outlet control details showing pertinent elevations & dimensions for inlets, outlets, piping, & drain protection _____
    a. Channel protection (CP) orifice: _____
        i. Diameter: 3 inches minimum _____
        ii. Adequately protected from clogging by an acceptable external trash rack _____
        iii. Orifice diameter may be reduced to 1 inch, if:
            1. Internal orifice protection is used, i.e., an over-perforated vertical standpipe with 0.5-inch orifices, or _____
            2. Slots that are protected by wire-cloth and a stone filtering jacket _____
    b. Provide all weir and orifice sizes and inverts _____

17. ☐ Overflow, diversion, or bypass structure _____

18. ☐ Energy dissipation, if warranted _____

19. ☐ Provide OCS diagram and fill out applicable information in the diagram: _____

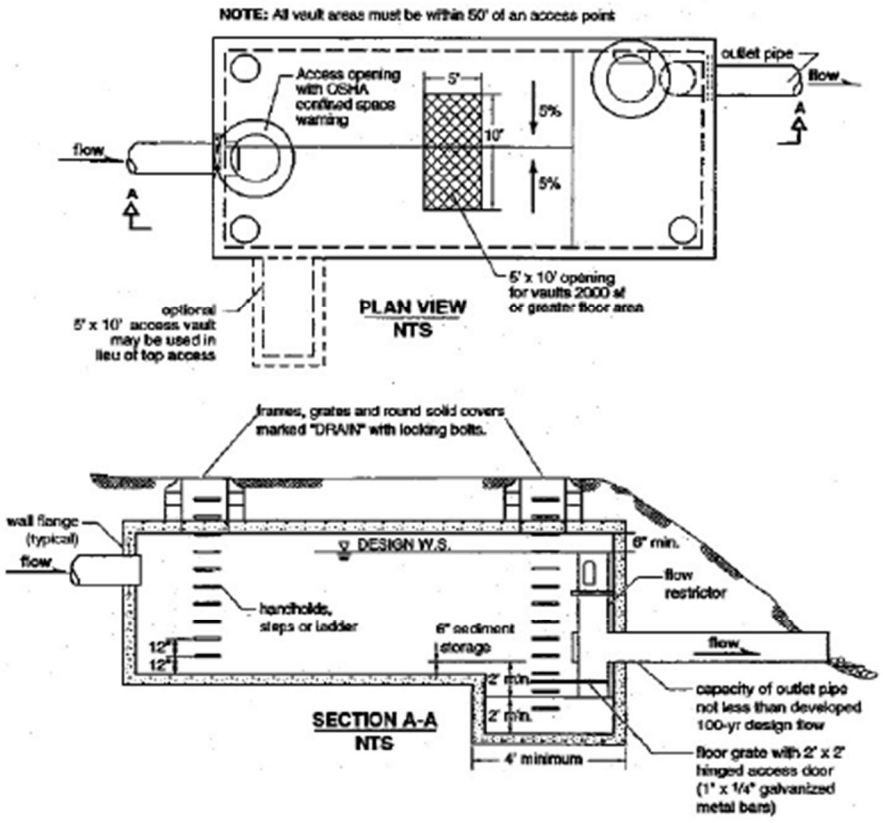


Figure 4.28-2 Example Underground Detention Tank System

(Source: WDE, 2000)

(End of Underground Detention Checklist)

GWINNETT COUNTY
STORM WATER MANAGEMENT
REVIEW CHECKLISTS - AS-BUILT HYDROLOGY REPORT/AS-BUILT SURVEY
VEGETATED FILTER STRIP CHECKLIST

AS-BUILT REPORT:

1. ☐ As-built adjusted calculations for RR_v, WQ_v, and CP_v, , if applicable _____
2. ☐ Calculations of maximum discharge loading per foot. Sheet flow depths 2 inches maximum _____
3. ☐ Length of filter strip calculations _____
4. ☐ On-site and off-site delineated basin area maps with impervious areas to vegetated filter strip.
   a. Preferred maximum: 2 acres _____
   b. Maximum: 5 acres _____
5. ☐ Map showing site slopes where filter strips are utilized _____
   a. Longitudinal slopes: 2 - 6% _____
   b. Slope and cross-sectional area to maintain non-erosive velocities _____
6. ☐ Landscaping plan indicating location and names of species used _____
   a. Filter strips shall not be used on soils that cannot sustain dense grass cover with high retardance.
   b. Grass can withstand high velocity flows at the entrance, and both wet and dry periods. See Appendix D of GCSMM for list of appropriate grasses.
7. ☐ Depth to seasonal high water table (SHWT).
   Note: Minimum separation distance of 2 feet is required between the bottom of the practice and the elevation of the seasonally high-water table. _____
8. ☐ Dimensions and area sizing calculations _____
   a. Width: 2 feet minimum _____
   b. Length:
      i. Preferred minimum: 25 feet _____
      ii. Minimum: 15 feet _____
   c. Strip length: 100 ft. maximum _____
9. ☐ Demonstrate vegetated filter strip facility can safely pass the 100-year storm. _____

AS-BUILT SURVEY:

10. ☐ Contours at minimum 2-foot elevations and enough spot elevations to define the facility _____
11. ☐ Longitudinal and side slopes _____
12. ☐ Overflow, diversion, or bypass structure _____

Filter without Berm

13. ☐ Filter strip sized (parallel to flow path) for a contact time of 5 minutes, minimum _____

Filter Strips with Berm

14. ☐ Outlet pipes sized to ensure that the area within berm area drains within 24 hours _____
15. ☐ Grasses resistant to frequent inundation specified within the shallow ponding limits _____

(Continued)

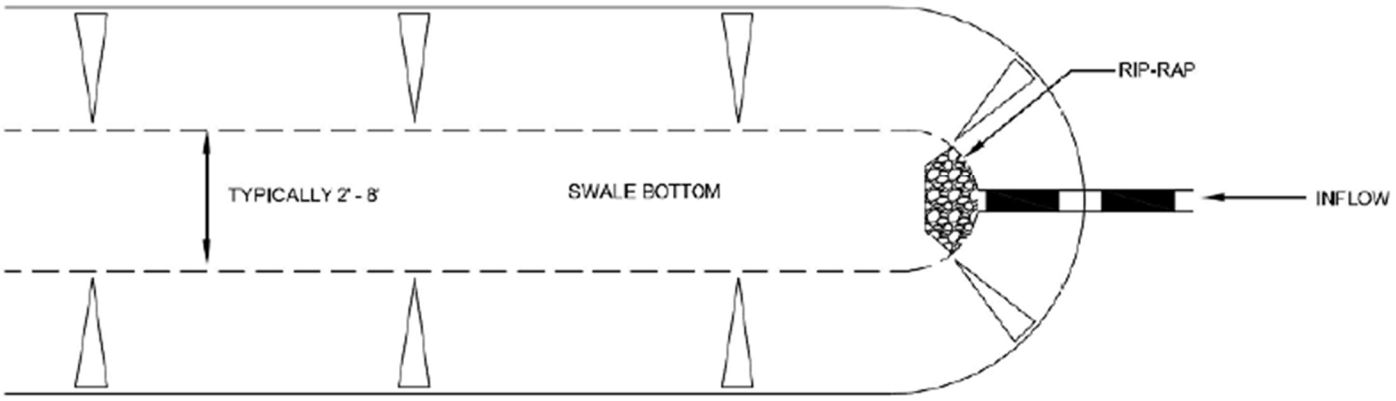
16. ☐ Berm material: _____
    a. Composed of sand, gravel, and sandy loam to encourage grass cover _____
    b. Sand: ASTM C-33 fine aggregate concrete sand 0.02”-0.04” _____
    c. Gravel: AASHTO M-43 ½” to 1” _____

17. ☐ Filter strip sized to contain the WQv within the wedge of water backed up behind the berm _____

18. ☐ Berm height: 12 inches maximum _____

19. ☐ Profile /section view of vegetated filter strip _____

PLAN VIEW



PROFILE

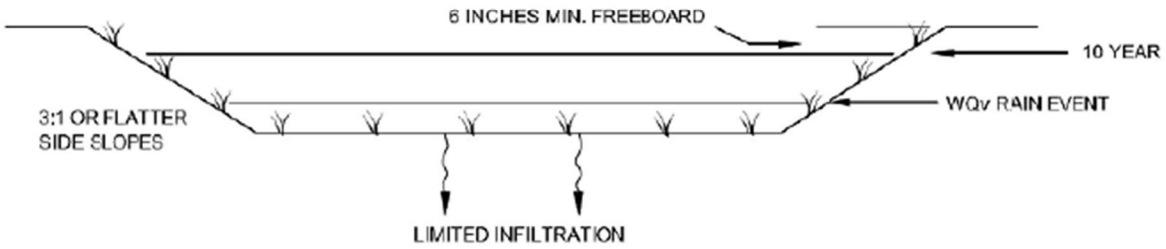


Figure 4.29-1 Typical Vegetated Filter Strip

(End of Vegetative Filter Strip Checklist)