



STORMWATER MANAGEMENT CHECKLIST

*This checklist must be completed and part of the Land Disturbing Permit submittal for review if the acreage disturbed is one (1) acre or more:

I. SUPPORTING DATA

Narrative describing storm water management strategy including all assumptions made in the design.

A. Drainage Area Map

- _____ Site and drainage area boundaries
- _____ Off-site drainage areas
- _____ Pre- and post-developed land uses with corresponding acreage
- _____ Pre- and post-developed time of concentration flow paths
- _____ Existing and proposed topographic features
- _____ Drainage area appropriate for BMP

B. Soils Investigation

- _____ Soils map with site and drainage area outlined
- _____ Geotechnical report with recommendations and earthwork specifications
- _____ Boring locations
- _____ Borrow area
- _____ Basin pool area
- _____ Embankment area: centerline principal spillway, emergency spillway, abutments
- _____ Boring logs with Unified Soils Classifications, soil descriptions, depth to seasonal high groundwater table, depth to bedrock, etc.
- _____ Compaction requirements specified
- _____ Additional geophysical investigation and recommendations in Karst environment

II. COMPUTATIONS

A. Hydrology

- _____ Runoff curve number determinations: pre- and post-developed conditions, with worksheets.
- _____ Time of concentration: pre- and post-developed conditions, with worksheets.
- _____ Hydrograph generation: pre- and post-developed condition for appropriate design and safety storms (SCS methods or modified rational-critical storm duration method)

B. Hydraulics

- _____ Specify assumptions and coefficients used.
- _____ Stage-storage table and curve
- _____ Riser structure and barrel
- _____ Weir/orifice control analysis for riser structure discharge openings
- _____ Weir/orifice control analysis for riser crest
- _____ Barrel: inlet/outlet control analysis

- _____ Riser/Outlet Structure flotation analysis (factor of safety = 1.25 min.).
- _____ Anti-seep collar or filter diaphragm design.
- _____ Outlet protection per VE&SCH Std.. & Spec. 3.18.
- _____ Provisions for use as a temporary sediment basin riser with clean out schedule & instructions for conversion to a permanent facility.
- _____ Emergency spillway adequacy/capacity analysis with required embankment freeboard
- _____ Stage - discharge table and curve (provide equations & cite references).
- _____ Storm drainage & hydraulic grade line calculations.
- _____ Reservoir routing of post-development hydrographs for appropriate design storms (2-yr., 10-yr., or as required by watershed conditions) & safety storms (100-yr. or as required).

C. Downstream Impacts

- _____ Danger reach study.
- _____ 100 year floodplain impacts.
- _____ "Adequate channel" calculations for receiving channel
- _____ Provide downstream hydrographs at critical study points.
- _____ Storm drainage plans for site areas not draining to BMP
- _____ Safe conveyance -MS-19
- _____ Areas compensated for in water quality performance-based criteria calculations

D. Water Quality

- _____ Impervious cover tabulation
- _____ Technology-based criteria: proper selection of BMP based on impervious cover
- _____ Performance-based criteria: pre- and post-developed pollutant load and pollutant removal requirement calculations (provide worksheets)
- _____ Water quality volume for retention basin I, II, or III permanent pool
- _____ Water quality volume for ext. detention and ext. detention enhanced with drawdown calculations
- _____ Proper surface area/depth allocations for permanent pool/shallow marsh/constructed wetland
- _____ Constructed storm water wetland/shallow marsh
- _____ Adequate drainage area and/or base flow
- _____ Adequate pool volume
- _____ Adequate surface area
- _____ Allocation of surface area to depth zones
- _____ Maximum ponding depth over pool surface specified

III. PLAN REQUIREMENTS

A. General Items

- _____ Plan view drawn at 1"=50' or less (40', 30', etc.)
- _____ North arrow
- _____ Legend
- _____ Location plan and vicinity map
- _____ Property lines
- _____ Existing & proposed contours (2' contour interval min.)
- _____ Existing features & proposed improvements (including utilities and protective measures)
- _____ Locations of test borings

- _____ Earthwork specifications
- _____ Construction sequence for SWM basin and E&S controls
- _____ Temporary erosion & sediment control measures
- _____ Conveyance of base flow during construction
- _____ Temporary and permanent stabilization requirements
- _____ Emergency spillway
- _____ Basin side slopes
- _____ Delineation of FEMA 100 year floodplain
- _____ Plans sealed by a qualified licensed professional

B. BMP Plan Views

- _____ Dimensions of basin features: perm. Pool, sediment forebay, embankment, etc.
- _____ Location of all conveyance system outfalls into basin
- _____ Proper orientation to avoid short-circuiting
- _____ Outlet protection per VE&SCH
- _____ Top of bank & basin bottom elevations
- _____ Elevations of permanent pool, water quality volume and max. design water surface elevations for all appropriate design storms and safety storms
- _____ Side slope (H:V) of basin storage area and embankment (upstream and downstream slopes)
- _____ Proper length-to-width ratio as specified in BMP design criteria
- _____ Pervious low flow channel
- _____ Sediment. forebay
- _____ Basin bottom slope
- _____ Maintenance access to sediment fore bay, riser structure, and one side of the basin ponding area
- _____ Peripheral ledge for safety
- _____ Aquatic Bench
- _____ Shoreline protection
- _____ Safety fence
- _____ Riser and barrel materials and dimensions labeled
- _____ Constructed storm water wetland/shallow marsh
- _____ Basin liner specifications
- _____ Pool depth zones identified on plan
- _____ Pool geometry -wet/dry weather flow path

C. BMP -Section Views & Related Details

1. Embankment (or dam) and Ponding Areas

- _____ Elevations of permanent pool, water quality volume and max. design water surface elevations for all appropriate design storms and safety storms
- _____ Top of dam elevations- constructed height and settled height (10% settlement).
- _____ Adequate freeboard
- _____ Top width labeled
- _____ Elevation of crest of emergency spillway
- _____ Emergency spillway w/side slopes labeled.
- _____ Emergency spillway inlet, level, and outlet sections labeled
- _____ Existing ground and proposed improvements profile along center line of embankment

- _____ Existing ground and proposed improvements profile along center line of principal spillway
- _____ Typical grading section through pond including typical side slopes with aquatic bench, safety ledge shoreline protection, etc.
- _____ Existing ground and proposed improvements along center line of emergency spillway
- _____ Dimensions of zones for zoned embankment

2. Seepage Control

- _____ Impervious lining
- _____ Phreatic line (4: 1 slope measured from the principal spillway design high water).
 - a. Anti-seep Collar
 - _____ Anti-seep collar (detail required..).
 - _____ Size (based upon 15% increase in seepage length).
 - _____ Spacing & location on barrel (at least 2' from pipe joint).
 - b. Filter Diaphragm
 - _____ Design certified by a professional geotechnical engineer.

3. Foundation Cut Off Trench or Key Trench

- _____ Materials labeled
- _____ Bottom width (4' min. or greater per geotech. report).
- _____ Side slopes labeled (1:1 max. steepness).
- _____ Depth (4' min. or as specified in geotechnical report)

4. Multi Stage Riser and Barrel System

- _____ Materials labeled
- _____ Bedding or cradle details provided
- _____ Gauge & corrugation size for metal pipes specified
- _____ Barrel diameter, inverts, and slope (%) labeled
- _____ Outlet protection per VESCH, Std. & Spec. 3.18, 3.19 w/filter cloth underlayment
- _____ Crest elevation of riser structure shown
- _____ Inverts and dimensions of control release orifices/weirs shown
- _____ Structure dimensions shown
- _____ Control orifice/weir dimensions shown
- _____ Extended detention orifice protection (detail required for construction)
- _____ Riser trash rack or screen (detail required for construction).
- _____ Riser anti-vortex device (detail required for construction).
- _____ Proper riser structure footing.
- _____ Access to riser structure interior for maintenance.
- _____ Basin drain pipe

D. Landscape Plan

- _____ Planting schedule and specifications (transport / storage / installation / maintenance)
- _____ Plant selection for planting zones 1 thru 6
- _____ Preservation measures for existing vegetation
- _____ Top soil/planting soil included in final grading

