



<http://www.montgomerycountymd.gov/permittingservices/>

## Stormwater Management Pond Plan Review checklist

Sediment Control Permit No. \_\_\_\_\_

---

### SUPPORTING INFORMATION (One Copy)

- \_\_\_\_\_ Pond Summary Sheet (NRCS MD-ENG-14) (**signed** copy from NRCS)
- \_\_\_\_\_ Maintenance Easement and Covenant Documents
- \_\_\_\_\_ Itemized Stormwater Management Construction Estimate.
- \_\_\_\_\_ Storm drain plans for any areas not draining directly to the pond (must show safe structural conveyance).

### STORMWATER MANAGEMENT COMPUTATIONS

#### A. HYDROLOGY

- \_\_\_\_\_ RCN determinations for CP<sub>V</sub>: ultimate development (any existing developed off-site areas considered as existing condition).
- \_\_\_\_\_ Time of Concentration (T<sub>C</sub>) for CP<sub>V</sub> computations: ultimate development (same policy on existing off-site areas as RCN determination).
- \_\_\_\_\_ For safety storm routings (10-year, 100-year), RCN and T<sub>C</sub> determinations must be based on the entire drainage area under ultimate development conditions, per zoning.
- \_\_\_\_\_ Compute channel protection volume (CP<sub>V</sub>)
- \_\_\_\_\_ Use 24-hour extended detention for Class I watersheds. Use 12-hour for Class III and Class IV watersheds.
- \_\_\_\_\_ Hydrograph and NRCS TR-20 routing for appropriate ultimate development (including off-site areas) safety storms (criteria from MD-378, Table 1).
- \_\_\_\_\_ “Safety Check” storm routing is required if any low flow openings of 6-inches or smaller in any direction are called for in the design. Low flow openings of 6-inches and smaller in any direction must be considered blocked for a separate routing of the 100-year storm. The routing must start at an opening greater than 6-inches in all directions, and the resultant water surface elevation must not overtop the embankment.

#### B. ASSORTED COMPUTATIONS

- \_\_\_\_\_ Design narrative
- \_\_\_\_\_ Written “Dam Hazard Classification” statement.
- \_\_\_\_\_ Elevation-Storage (include graph and table)
- \_\_\_\_\_ Required and provided permanent pool volume, if applicable.
- \_\_\_\_\_ Channel protection volume and discharge.
- \_\_\_\_\_ Elevation-Discharge (provide equations and cite references).

- \_\_\_ \_\_\_ \_\_\_ Check for barrel control prior to riser orifice flow.
- \_\_\_ \_\_\_ \_\_\_ Anti-seep collar design.
- \_\_\_ \_\_\_ \_\_\_ Flotation analysis (factor of safety = 1.2:1).
- \_\_\_ \_\_\_ \_\_\_ Pond drain drawdown (24 hours maximum from permanent pool).
- \_\_\_ \_\_\_ \_\_\_ Danger reach study, if required.

**GEOLOGICAL INVESTIGATION (One Copy)**

- \_\_\_ \_\_\_ \_\_\_ Geotechnical report with construction/design recommendations.
- \_\_\_ \_\_\_ \_\_\_ Minimum boring locations: borrow area; pool area; principal spillway; top of dam near one abutment or emergency spillway, if provided.
- \_\_\_ \_\_\_ \_\_\_ Boring logs with Unified Soil Classification, blow counts and soil descriptions.
- \_\_\_ \_\_\_ \_\_\_ If groundwater is within 1 foot of the proposed bottom of a dry pond, drain tile is required.

**STORMWATER MANAGEMENT PLAN**

**A. PLAN VIEW OF POND AT SCALE OF 1" = 50' OR LESS (40', 30', ETC.)**

**1. GENERAL ITEMS**

- \_\_\_ \_\_\_ \_\_\_ Existing and final contours (1' or 2' interval).
- \_\_\_ \_\_\_ \_\_\_ Existing and proposed improvements
- \_\_\_ \_\_\_ \_\_\_ Delineation of permanent, extended detention, 10- and 100-year pools. If the 10-year exits the emergency spillway, 5-year water surface elevation must be delineated.
- \_\_\_ \_\_\_ \_\_\_ Locations of test borings
- \_\_\_ \_\_\_ \_\_\_ Outflow pipe, outlet protection (detail required); outfall channel.
- \_\_\_ \_\_\_ \_\_\_ Inflow improvements (appropriate details required); storm drains carried to normal pool (wet) or pond bottom (dry), with appropriately sized rip rap outfalls transitioning to low flow channel dimensions.
- \_\_\_ \_\_\_ \_\_\_ Low Flow Channel required for all ponds: bottom width = pipe diameter; minimum of 1' depth and 2' wide flat bottom; inverts at 50-foot intervals; details required. Stabilize with grass and turf reinforcement material.
- \_\_\_ \_\_\_ \_\_\_ Emergency spillway level section and outlet channel.
- \_\_\_ \_\_\_ \_\_\_ Existing and proposed utility location/protection. Pipes and utilities not parallel to the axis of the dam shall meet all principal spillway requirements. Pipes and utilities parallel to the axis of the dam shall be constructed with no granular bedding.
- \_\_\_ \_\_\_ \_\_\_ Ponding and/or pond slopes on private property must have easements.
- \_\_\_ \_\_\_ \_\_\_ MCDPS Turf Reinforcement detail on plans.

**2. MAINTENANCE ITEMS**

- \_\_\_ \_\_\_ \_\_\_ Maintenance access from public right-of-way or publicly traveled road (e.g. private road in a townhouse project): minimum width 12-feet, no steeper than 10% (15% if mechanically stabilized). Provide MCDPS standard driveway apron at access point to facilities located in greenspace.
- \_\_\_ \_\_\_ \_\_\_ Maintenance Easement (Shall include riser structure, embankment, outfall, 100-year ponding area, access,

, adjacent property as necessary. Show easement on plan view. Minimum 10-foot clearance around the facility.

\_\_\_\_ Minimum permanent pool depth 4-feet (except wetland ponds).

\_\_\_\_ Submerged pond bank slope 3:1.

\_\_\_\_ Forebay (if required).

\_\_\_\_ Dry pond bottom sloped no flatter than 2% to a low flow channel.

\_\_\_\_ Slopes – No steeper than 3:1 anywhere around the pond (except where natural topography is preserved or for the downstream toe of a dam used as a public roadway). Slopes above the permanent pool of a wet pond no steeper than 4:1, 3:1 with safety bench\*, or 2:1 if natural topography is preserved and a safety bench\* is provided.

\*Bench must be a minimum of 15-feet wide and 1-foot above the permanent pool elevation or at the extended detention pool elevation, if provided.

**B. LANDSCAPING / MULTIPLE USE / AESTHETIC CONSIDERATIONS**

\_\_\_\_ Landscaping plan required (low maintenance vegetation on steep slopes, only approved shrubs and bedding stock on the dam, optional reforestation outside the 2-year pool, aquatic plantings, etc.) If the embankment will serve as a roadway, refer to MD-378 for planting requirements. Clearly delineate the areas of the pond that are to remain in turf grass, including the embankment setbacks and the pond access area.

\_\_\_\_ Use natural, variable looking slope shapes.

\_\_\_\_ Landscape plan prepared and sealed by a landscape architect registered in the state of Maryland.

**C. PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS**

**1. EXISTING AND PROPOSED GROUND**

\_\_\_\_ Dam side slopes labeled.

\_\_\_\_ Top width (from MD-378, minimum 10-feet)

**2. FOUNDATION CUTOFF (CORE TRENCH)**

\_\_\_\_ Bottom width (4-feet minimum)

\_\_\_\_ Side slopes (1:1 maximum slope)

\_\_\_\_ Depth (4-feet minimum)

\_\_\_\_ Material to be GC, SC, CH or CL

**3. IMPERVIOUS CORE (ZONED FILL / EMBANKMENT CORE)**

\_\_\_\_ Top width (4-feet minimum)

\_\_\_\_ Side slopes (1:1 maximum)

\_\_\_\_ Height (extend at least up to the 10-year water surface elevation)

\_\_\_\_ Material to be GC, SC, CH or CL

**4. BARREL**

\_\_\_\_ Must be concrete for diameters less than or equal to 48-inches; all concrete barrels must be labeled as meeting ASTM C-361; all barrels must be circular, with the following information provided: inside diameter, class, length, and slope.

Bedding (cradle) for concrete barrels (Detail required). Must extend at least to the spring line of the pipe, and a minimum thickness of 6-inches below the pipe.

First pipe joint to be located within four feet of the riser face, but not less than two feet.

**5. RISER OR SIMILAR STRUCTURE (SPECIFIC DETAIL REQUIRED)**

To be same material as the barrel.

To be poured or pre-cast. If pre-cast, provide standard shop drawing note. "Shop drawing must be approved by the engineer and accepted by MCDPS prior to fabrication".

Cast-in-place concrete collar (for pre-cast risers only). Detail required.

All structure dimensions.

Structural details for cast-in-place structures.

High stage trash rack (removable, hot dipped galvanized, minimum #6 rebar on 8-inch centers both ways with vertical bars on the outside), or MCDPS approved alternative.

Bolted 30-inch diameter manhole covers.

Anti-vortex device (detail needed if required)

Maintenance access.

Structural computations (signed and sealed) for cast-in-place designs.

**6. ORIFICE(S) AND TRASH RACKS (DETAIL REQUIRED)**

Dimensions

Wet or wetland ponds: non-clogging, non-hydraulically interfering inlet drawing water from at least one foot below permanent pool and 50% of total depth above pond bottom (e.g. corrosion resistant, removable hood; turned down elbow, or reverse slope pipe hidden in dam)

Dry pond: For orifice(s) ≥ 6-inches; removable, hot dipped galvanized (or MCDPS approved alternative), minimum #6 rebar trash rack with an area ≥ 6 times the protected opening area; 4:1 upstream face, maximum bar spacing = 6-inches, and vertical bars on the outside. If < 6-inches, use expanded galvanized steel grate. Orifice size <2-inches not allowed without specific permission of MCDPS.

**7. POND DRAIN (for wet ponds only)**

Ductile iron or concrete pipe.

Easily accessible, non-clogging, reseating valve

Inlet prevents uptake of sediment (removable elbow)

Extend valve stem to the top slab of the riser.

**8. ANTI-SEEP COLLARS (DETAIL REQUIRED)**

Size – 15% increase in L<sub>s</sub> using outside pipe diameter

Spacing and location on barrel

Labeled as being located at least 2-feet from a pipe joint

Material and method of connection

Phreatic line (4:1 slope): measured from the intersection of the dam and a horizontal projection of the 10-year water surface elevation.

**9. OUTFALL PROTECTION (DETAIL REQUIRED)**

Size for maximum barrel release (but not greater than 10-year storm)

Cross-section at end of the channel in accordance with receiving section

Outfall dimensions

Slope – 0%

Median rip-rap size (d<sub>50</sub>)

Thickness (2.0 x d<sub>50</sub>)

Approved filter cloth

**10. ELEVATIONS: (INCLUDES REQUIRED FREEBOARD)**

Top of dam (1-foot freeboard above 100-year pool with an emergency spillway, 2-feet without)

Crest of emergency spillway (2-feet minimum below top of settled embankment)

Crest of riser (1-foot minimum below crest of emergency spillway, if provided)

Pools: permanent, extended detention and appropriate safety storms

Inlet and outlet inverts of pipes, percent slope

**D. PROFILE SECTION OF DAM ALONG CENTERLINE**

Existing ground

Proposed grade

Top of dam (constructed and settled) - add 5% additional fill to account for settlement

Location of emergency spillway with side slopes labeled

Bottom of core trench (4-foot minimum)

Top of impervious core (zoned fill)

Barrel location

Existing and proposed utility location/protection. Pipes and utilities not parallel to the axis of the dam shall meet all principal spillway requirements. Pipes and utilities parallel to the axis of the dam shall be constructed with no granular bedding.

All excavation for pipe spillways, whether into existing or natural ground, shall have side slopes of 2:1. Foundation cutoff trench side slopes shall be 1:1 in profile and dam centerline cross section.

**E. EMERGENCY SPILLWAY PROFILE ALONG CENTERLINE**

Existing ground

Inlet, level (control) and outlet sections

Spillway crest elevation

\_\_\_\_\_ Design must be per NRCS references.

**F. MISCELLANEOUS ITEMS**

\_\_\_\_\_ Inspector Checkoff List / Sequence of Construction

\_\_\_\_\_ Soil logs on plan

\_\_\_\_\_ 100-year floodplain (MCDPS Floodplain District Permit required for pond D.A.'s  $\geq 30$  acres)

\_\_\_\_\_ MCDPS Pond Construction Specifications

\_\_\_\_\_ Sealed by P.E. (Structural P.E. also where required) with signature and date.