

Traditional Constructed Wetland Construction Checklist

This checklist has been designed for BMPs designed in accordance with the Delaware Sediment and Stormwater Program's Post Construction Stormwater BMP Standards and Specifications. Submit interim versions of this construction checklist to the approval agency weekly with the Certified Construction Reviewer report. Submit the final completed checklist with the PCVD.

PROJECT INFORMATION

Project Name/BMP Name: _____

Project Approval Number: _____ NOI number: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Supervising P.E.: _____

For each checklist item, enter in the blank the date (MM/DD/YY) the item is completed and verified by the construction reviewer. If an item is not applicable, enter "N/A" in the blank for that checklist item.

I. Pre-Construction

A. _____ Traditional constructed wetland field meeting with responsible person and person completing construction checklist.

B. _____ Traditional constructed wetland staked out.

C. _____ Pervious areas draining to the traditional constructed wetland stabilized in accordance with the approved plans.

D. _____ Pipe and appurtenances on-site and dimensions and properties checked and confirmed to be in accordance with the approved plan, if applicable.

i. _____ Discharge pipe

ii. _____ Inflow pipe

iii. _____ Watertight connectors/gaskets

iv. _____ Other; list: _____

E. _____ Materials on-site and dimensions and properties checked and confirmed to be in accordance with the approved plan, if applicable. ***Submit materials invoice or delivery tickets to approval agency as part of PCVD for the following items:***

i. _____ Clean washed riprap, minimum d50 size of 6"

ii. _____ Riser/outlet structure

iii. _____ Low flow orifice

iv. _____ Trash rack for low flow orifice

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- v. _____ Trash rack for riser/outlet structure
- vi. _____ Adjustable gate valve
- vii. _____ Impermeable poly-liner thirty mil (minimum) *if applicable*
- viii. _____ Clay pond liner, 6 inch thick *if applicable*
- ix. _____ Geotextile fabric with flow rate \geq 110 gal/min/sf
- x. _____ Anti-seep collar
- xi. _____ De-watering equipment
- xii. _____ Safety grates
- xiii. _____ Other; list: _____

II. Excavation and Grading

- A. _____ Traditional constructed wetland excavated to dimensions and at location as per the approved plan.
- B. _____ Traditional constructed wetland excavated to design bottom elevation in each zone as per the approved plan.
- C. _____ Area beneath embankment stripped of all vegetation, topsoil, and organic matter.
- D. _____ Sides of the deep pools excavated no steeper than 3:1.
- E. _____ Sides of the transition zone from the deep pools to the low marsh zone excavated no steeper than 3:1.
- F. _____ Sides of the low marsh zone excavated no steeper than 4:1.
- G. _____ Sides of the high marsh zone excavated no steeper than 4:1.
- H. _____ Sides of the floodplain excavated no steeper than 4:1.
- I. _____ Construction of the safety bench at deep pools are deeper than 4 feet.
- J. _____ Construction of minimum 10 foot wide vegetated perimeter.
- K. _____ Excavation for the riprap apron to the dimensions, bottom elevation, and location as per the approved plan.
- L. _____ Forebay provided at traditional constructed wetland major inlets as specified on the approved plan. Pretreatment types constructed:
 - i. _____ Forebay excavated to dimensions and at location as per the approved plan.
 - ii. _____ Forebay excavated to design bottom elevation.

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III. Principal spillway (outfall pipe) installation (Per Pond Code 378)

- A. _____ Trench excavated with 1:1 side slope
- B. _____ Subgrade of trench is dry, stable and uniform of relatively impervious material.
- C. _____ Pipe Placement

Metal/Plastic Pipe Only

- i. _____ Installation of watertight connectors/gaskets
- ii. _____ Installation of anti-seep collar(s) with watertight connections to the pipe
- iii. _____ Backfill placed and tamped by hand under “haunches” of pipe and remainder of backfill in max. 8” lifts using small power tamping equipment until 2’ of cover.

Concrete Pipe Only

- iv. _____ Pouring of low cradle, pipe set on blocks or concrete slab.
 - v. _____ Pipe installation with rubber gasket joints, no spauling in gasket interface area.
 - vi. _____ Excavation for anti-seep collar(s)
 - vii. _____ Construction/installation of anti-seep collar(s) with approved waterproof sealant
 - viii. _____ Anti-seep collar(s) inspected for “honeycomb”, parge if necessary.
- D. _____ Trench filled in 8” lifts
 - E. _____ Backfilled 2’ above anti-seep collar prior to traversing with heavy equipment.
 - F. _____ Photo documentation of construction of pipe spillway components taken. **Submit photo documentation to approval agency as part of PCVD.** (Photo #: _____)

IV. Riser/Outlet control structure installation (Per Pond Code 378)

- A. _____ Excavation for riser and subgrade stabilized and dry, with reinforcements as necessary.
- B. _____ Riser/outlet control structure installed at design elevation and location.
- C. _____ Installation of trash rack(s)
- D. _____ Installation of anti-vortex device
- E. _____ Installation of anti-floatation device
- F. _____ Installation of adjustable gate valve

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G. _____ Photo documentation of construction of riser/outlet control structure components taken. ***Submit photo documentation to approval agency as part of PCVD.***

(Photo #: _____)

Metal Riser

H. _____ Embedded parts of the aluminum riser painted with zinc on both the inside and outside.

I. _____ Reinforcing bars placed at right angles and projecting into sides of riser.

J. _____ Concrete poured to fill inside of riser to invert of barrel.

Pre-cast concrete structure

K. _____ Section installation with rubber gasket joints or caulk, no spauling in gasket interface area, *if necessary*.

L. _____ Installation of watertight and structurally sound collar or gasket joint at pipe spillway connection.

Poured concrete structure

M. _____ Structure formed to design dimensions, with reinforcing steel set as per plan.

N. _____ Concrete of an approved mix and vibrated into place.

O. _____ Concrete inspected for “honeycomb”, parge if necessary.

V. Embankment and Internal Berms Construction

A. _____ Embankment and berms fill place in 8”-12” lifts and compacted

B. _____ Soil engineer’s test.

C. _____ Visual test by inspector.

D. _____ Embankments and berms installed to design cross-section, side slopes and top width after settlement.

E. _____ Photo documentation of construction of embankment taken. ***Submit photo documentation to approval agency as part of PCVD.*** (Photo #: _____)

VI. Earth Emergency Spillway Construction

A. _____ Spillway structurally stabilized with riprap or located in natural grounds covered in grass.

B. _____ Emergency spillway constructed to design elevation and dimensions.

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C. _____ Photo documentation of construction of emergency spillway taken. **Submit photo documentation to approval agency as part of PCVD.** (Photo #: _____)

VII. Outlet Protection

A. _____ Outlet protection provided at discharge point and riprap stone size and dimensions confirmed.

B. _____ Placement, securement and backfilled end section
Endwall (Per Pond Code 378)

C. _____ Structure formed to design dimensions, with reinforcing steel set as per plan.

D. _____ Concrete of an approved mix and vibrated into place.

E. _____ Concrete inspected for “honeycomb”, parge if necessary.

F. _____ Photo documentation of construction of outlet protection components taken.

Submit photo documentation to approval agency as part of PCVD. (Photo #: _____)

VIII. Vegetative Stabilization

A. _____ Areas to be vegetated have completed the following items. **Submit soil test report, lime, fertilizer, planting tags and seed tickets to approval agency as part of PCVD.**

i. _____ Soil testing.

ii. _____ Side slopes scarified to a minimum depth of 3 inches prior to placing topsoil

iii. _____ Application of topsoil to a minimum depth of 4 inches.

iv. _____ Application of soil amendments including lime and fertilizer in accordance with the recommendations of the soil test or the approved plan.

v. _____ Application of seed to the soil surface using approved methods.

vi. _____ Planting installed in accordance with the approved plan.

B. _____ Application of soil stabilization matting, and permanent seeding used on side slopes in accordance with approved plan.

C. _____ Vegetative perimeter planted with grasses, trees and shrubs in accordance with the approved plans.

D. _____ Wetland seed mix established on side slopes above the normal pool elevation.

E. _____ Photo documentation of landscaping components taken. **Submit photo documentation to approval agency as part of PCVD.** (Photo #: _____)

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IX. Erosion and Sediment Control

- A. _____ Sediment prevented from entering constructed wetland by keeping it off-line or using perimeter controls as specified on the approved plan.
- B. _____ Drainage area and side slopes stabilized in accordance with the approved plan.
- C. _____ Sediment controls removed once drainage area meets final stabilization standard.

X. Maintenance Access and Areas

- A. _____ Maintenance access to the perimeter of the traditional constructed wetland and forebay has minimum width of 15 feet.
- B. _____ Profile grade of maintenance access does not exceed 10H:1V.
- C. _____ Minimum 10H:1V cross slope on maintenance access.
- D. _____ Maintenance set-aside area located and dimensioned per approved plans.
- E. _____ Depth of set-aside area does not exceed 1 foot.
- F. _____ Slope of set aside area does not exceed 5%

XI. Post Construction Verification

Owner shall submit post construction verification documents to demonstrate that the traditional constructed wetland practice has been constructed within allowable tolerances in accordance with the Approved Sediment and Stormwater Management Plan and accepted by the approving agency.

- A. _____ Constructed top bank elevation at or above design elevation confirmed after ESC controls are removed.
- B. _____ Constructed traditional constructed wetland surface area confirmed equal to or greater than 90% of the design surface area once ESC controls are removed.
- C. _____ Constructed volume of the traditional constructed wetland storage confirmed equal to or greater than 90% of the of the design.
- D. _____ Constructed elevation of all structures confirmed to be within 0.15 foot of the design elevation for:
 - i. _____ Primary spillway
 - ii. _____ Emergency spillway
 - iii. _____ Outlet pipe
 - iv. _____ Inlet pipe
 - v. _____ Riser/Outlet control structure
 - vi. _____ Embankment

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- vii. _____ Internal berms
- viii. _____ Outlet protection
- ix. _____ Other; list: _____

XII. BMP Acceptance

- A. _____ Final BMP construction review complete.
- B. _____ All BMP punch list items addressed.
- C. _____ Traditional constructed wetland is online (stabilized drainage area is entering traditional constructed wetland)
- D. _____ As-built survey.
- E. _____ PCVD submitted to approval agency for review and approval. Submit the following pieces of PCVD documentation to the approval agency:
 - Materials invoice or delivery tickets
 - Photo documentation
 - Soil test report
 - Lime, fertilizer, and seed tickets
 - As-built survey
 - Final, completed BMP Construction Checklist