

Infiltration Construction Checklist

This checklist has been designed for infiltration practices constructed in accordance with the Delaware Sediment and Stormwater Program's Green Technology BMPs Standards, Specifications and Details

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

_____ A. Facility location staked out. Extents of infiltration practice (to include pre-treatment area) delineated and access by equipment prohibited to prevent compaction of existing soils.

_____ B. Upstream drainage area stabilized or effectively diverted.

_____ C. Materials on-site and dimensions and properties checked.

_____ (1) Underdrain/discharge pipe

_____ (2) Overdrain/discharge pipe

_____ (3) Underdrain stone

_____ (4) Geotextile fabric

_____ (5) Sand

_____ (6) Supplemental storage pipe

_____ (7) Outfall pipe

_____ (8) Riser pipe

_____ (9) Observation ports

_____ D. Equipment on the site large enough to excavate infiltration area from the sides of the facility.

Project Name: _____

Construction Reviewer: _____

II. Excavation

- _____ A. Facility excavated to dimensions and at location as per the approved plan.
- _____ B. Stepwise excavation used for infiltration facilities.
- _____ C. Facility excavated from the sides so as to not compact the existing soil.
- _____ D. Groundwater not encountered during excavation.
(Note: If groundwater is encountered during the excavation process, construction of the facility must cease and the designer notified that a plan modification is necessary)
- _____ E. Sides of infiltration trench excavation vertical.
- _____ F. Bottom of excavation within design slope range.
- _____ G. Bottom of trench excavation scarified prior to placement of sand.
- _____ H. Geotextile fabric placed along the vertical sides of the trench, tuck into sand at the bottom for anchoring.

III. Structural Components

(For infiltration practices containing underdrains and/or overdrain pipe discharge components)

- _____ A. Discharge pipe installed from overdrain to discharge point.
Discharge pipe diameter: _____
Discharge pipe material: _____
- _____ B. Outlet protection provided at discharge point.
- _____ C. Underdrain pipe material according to approved plan. *(Note: If underdrain pipe material is not specified, it shall be SDR 35 minimum)*
Underdrain pipe material: _____
- _____ D. Underdrain pipe sizes according to approved plans.
Underdrain pipe diameter(s): _____
- _____ E. Underdrain pipe perforations according to approved plans.
(Note: If not specified on the plan, three rows of 5/8" diameter perforations, 6" on-center, shall be provided)
- _____ F. Underdrain piping lay flat or with positive slope toward outlet.
- _____ G. Clean-outs and/or observation ports provided at endpoints of underdrain pipes or as shown on the approved Plan.
- _____ H. Double-washed crushed aggregate, clean DE #57 stone, used for the underdrain gravel. Stone free of rock dust, fines and soil particles.
- _____ I. Depth of stone over underdrain piping checked. **Depth of stone:** _____

Project Name: _____

Construction Reviewer: _____

IV. Grading

- _____ A. Channel protection and/or level spreader provided at infiltration practice inlets as specified on the approved plan.
- _____ B. Side slopes of infiltration basin no steeper than 3:1.
- _____ C. Bottom of basin graded as per the Plan.
- _____ D. Earth spillway constructed to design elevation and dimensions.

V. Vegetation

- _____ A. Vegetation planted on the bottom and slopes of the basin as indicated on the vegetation spec on the Plan.
- _____ B. For trenches, placement of topsoil and sod over the pea gravel, if this option is specified on Plan.

VI. Erosion and Sediment Control

- _____ A. Installed matting in spillway as specified on Plan.
- _____ B. For trenches, geotextile emerges from the sides of the trench and folds over stone to protect against sediment contamination during site construction.

Bioretention Facility Construction Checklist

This checklist has been designed for bioretention facilities constructed in accordance with the Delaware Sediment and Stormwater Program's Green Technology BMPs Standards, Specifications and Details

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

Item meets standard

Item not acceptable

Item not applicable

I. Pre-Construction

_____ A. Pre-construction meeting held.

_____ B. Facility location staked out. Extents of bioretention facility delineated and access by equipment prohibited to prevent compaction of existing soils.

_____ C. Upstream drainage area stabilized or effectively diverted.

_____ D. Materials on-site and dimensions and properties checked.

_____ (1) Underdrain/discharge pipe

_____ (2) Overflow catch basin

_____ (3) Underdrain stone

_____ (4) Filter fabric (if applicable)

_____ (5) Bioretention soil media _____ Pre-2014 Mix w/Peat _____ Compost Mix

_____ (6) Plants (*Note: Plants need not be at the site at onset of construction*)

_____ E. Equipment on the site large enough to excavate bioretention trench from the sides of the facility.

Construction Project Name: _____

Reviewer: _____

II. Excavation

- _____ A. Facility excavated to dimensions and at location as per the approved plan.
- _____ B. Stepwise excavation used for infiltration bioretention facilities.
(Note: only excavate the portion of the bioretention facility that may be backfilled with bioretention soil media in the same day)
- _____ C. Facility excavated from the sides so as to not compact the existing soil.
- _____ D. Groundwater not encountered during excavation.
(Note: If groundwater is encountered during the excavation process, construction of the facility must cease and the designer notified that a plan modification is necessary)
- _____ E. Sides of excavation vertical.
- _____ F. Bottom of excavation within design slope range.
- _____ G. Sides and bottom of excavation scarified prior to placement of bioretention soil media.

III. Structural Components

(For bioretention facilities containing underdrains and/or pipe discharge components)

- _____ A. Discharge pipe installed from overflow catch basin to discharge point.
Discharge pipe diameter: _____
Discharge pipe material: _____
- _____ B. Outlet protection provided at discharge point.
- _____ C. Overflow catch basin installed at elevations as specified on the approved plan (minimum of 6" higher than design top elevation of bioretention soil media).
- _____ D. Underdrain pipe material according to approved plan.
(Note: If underdrain pipe material is not specified, it shall be SDR 35 minimum)
Underdrain pipe material: _____
- _____ E. Underdrain pipe sizes according to approved plans.
Underdrain pipe diameter(s): _____
- _____ F. Underdrain pipe perforations according to approved plans.
(Note: If not specified on the plan, three rows of 5/8" diameter perforations, 6" on-center, shall be provided)
- _____ G. Underdrain piping laid flat or with positive slope toward outlet.

Construction Project Name: _____

Reviewer: _____

III. Structural Components (continued)

- _____ H. Clean-outs and/or observation ports provided at endpoints of underdrain pipes.
- _____ I. Double-washed crushed aggregate, clean DE #57 stone, used for the underdrain gravel. Stone free of rock dust, fines and soil particles.
- _____ J. Minimum 3” of gravel over underdrain piping.
- _____ K. Filter fabric (if applicable) in accordance with approved plan specification laid between underdrain gravel layer and bioretention soil media.
Filter fabric manufacturer's product number: _____

IV. Grading

- _____ A. Channel protection and/or level spreader provided at bioretention facility inlets as specified on the approved plan.
- _____ B. Side slopes of buffer area (above design top of bioretention soil media) no steeper than 3:1.
- _____ C. Top of berm constructed to design elevation and width.
- _____ D. Earth spillway constructed to design elevation and dimensions.

V. Bioretention Soil Media

- _____ A. Bioretention soil media provided in accordance with current DNREC policy.
- _____ B. Bioretention soil media placed in lifts of one foot and spread out using an excavator from the side of the excavation to minimize compaction. Skid steer loaders or other small equipment shall not be used within the bioretention facility excavation to place the soil media.
- _____ C. Bioretention soil media placed when media is optimally moist (not wet or dry) and there is no precipitation.
- _____ D. Bioretention soil media placed within infiltration bioretention facilities during the same day that the area is excavated to prevent contamination if a runoff event should occur prior to placement of soil media.
- _____ E. Bioretention soil media allowed to settle for at least one storm event before the final lift is added.
- _____ F. Bioretention soil media depth not less than 36” unless otherwise specified on the approved plan.

Construction Project Name: _____

Reviewer: _____

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- _____ G. Topdressing of 3" double-shredded aged hardwood mulch applied if desired or required by the approved plan. *(Note: A biodegradable netting may be used to prevent wind losses until several wet-dry cycles have occurred)*

VI. Vegetation

- _____ A. Vegetation planted within the bioretention soil media according to the numbers and species on the approved bioretention planting plan.
- _____ B. Plants occupy not more than 50% of the total surface area of the bioretention soil media.
- _____ C. Individual plant spacing follows the recommendations on the plan.
- _____ D. Trees planted only around the perimeter of the facility in the native soils, not in the bioretention soil media.

VII. Erosion and Sediment Control

- _____ A. Silt fence placed around the bioretention area perimeter to prevent sediment contamination prior to full stabilization of contributory drainage area.
- _____ B. Inlet protection provided on any catch basins that discharge to the bioretention facility.

Permeable Pavement Construction Checklist

This checklist has been designed for permeable pavement practices constructed in accordance with the Delaware Sediment and Stormwater Program's Green Technology BMPs Standards, Specifications and Details

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

_____ A. Facility location staked out. Extents of infiltration practice delineated and access by equipment prohibited to prevent compaction of existing soils.

_____ B. Upstream drainage area stabilized or effectively diverted.

_____ C. Materials on-site and dimensions and properties checked.

_____ (1) Underdrain (if applicable)

_____ (2) Filter course stone (clean-washed) Stone #: _____

_____ (3) Bedding course stone (clean-washed) Stone #: _____

_____ (4) Outfall pipe

_____ (5) Observation ports

_____ (6) Joint fill stone (if applicable) Stone #: _____

_____ D. Equipment on the site large enough to excavate infiltration area from the sides of the facility.

Project Name: _____

Construction Reviewer: _____

II. Excavation

- _____ A. Facility excavated to dimensions and at location as per the approved plan.
- _____ B. Stepwise excavation used for infiltration facilities.
- _____ C. Facility excavated from the sides so as to not compact the existing soil.
- _____ D. Groundwater not encountered during excavation.
(Note: If groundwater is encountered during the excavation process, construction of the facility must cease and the designer notified that a plan modification is necessary)
- _____ E. Bottom of excavation within design slope range.
- _____ F. Native soils at the bottom of the excavation are scarified 3-4" to promote infiltration.

III. Structural Components

(For infiltration practices containing underdrain components)

- _____ A. Underdrain pipe material according to approved plan. *(Note: If underdrain pipe material is not specified, it shall be SDR 35 minimum)*
Underdrain pipe material: _____
- _____ B. Underdrain pipe sizes according to approved plans.
Underdrain pipe diameter(s): _____
- _____ C. Underdrain pipe perforations according to approved plans.
(Note: If not specified on the plan, three rows of 5/8" diameter perforations, 6" on-center, shall be provided)
- _____ D. Underdrain piping lay flat or with positive slope toward outlet.
- _____ E. Clean-outs and/or observation ports provided at endpoints of underdrain pipes or as shown on the approved Plan.
- _____ F. Closely follow the installation steps and design on the approved Sediment and Stormwater Plan.

Vegetated Roof Construction Checklist

This checklist has been designed for vegetated roof practices constructed in accordance with the Delaware Sediment and Stormwater Program's Green Technology BMPs Standards, Specifications and Details

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Construction

_____ A. Verify that the roof deck has been constructed of the correct materials and the required slope installed as per the Plan.

_____ B. Installation of the waterproofing as per the manufacturer's specifications. Type of method used: _____

_____ C. Verify that the flood test has been conducted with 2" of water over the entire membrane for at least 48 hours.

Flood test observations:

Project Name: _____

Construction Reviewer: _____

D. Note the different components in the design and verify proper installation:

- | | |
|------------------------------------|-------------|
| _____ (1) Insulation | Type: _____ |
| _____ (2) Root barrier | Type: _____ |
| _____ (3) Drainage layer | Type: _____ |
| _____ (4) Interior drainage system | Type: _____ |
| _____ (5) Filter fabric | Type: _____ |
| _____ (6) Other: _____ | |
| _____ (7) Other: _____ | |
| _____ (8) Other: _____ | |

II. Growing Media

- _____ A. Media has been mixed prior to delivery.
- _____ B. Media has been protected against compaction while applying and spreading.
- _____ C. Prior to planting, the growing media is moistened.
- _____ D. Verify that the planting plan has been implemented as per the Plan.
- _____ E. Plants must be watered immediately after planting.

Rainwater Harvesting Construction Checklist

*This checklist has been designed for rainwater harvesting
in accordance with the Delaware Sediment and Stormwater Program's
Green Technology BMPs Standards, Specifications and Details*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

_____ A. Tank location staked out.

_____ B. Assess that the rooftop collection area matches the Plan.

C. Type of harvesting practice

_____ Seasonal harvesting _____ Continuous harvesting

II. Pretreatment

_____ A. Verify that the downspouts and roof drains are routed to the pretreatment devices.

_____ B. Type of pretreatment devices:

_____ First flush _____ Filters _____ Other

Project Name: _____

Construction Reviewer: _____

III. Foundation and Tank

- _____ A. Tank system foundation properly constructed as per the Plan.
- _____ B. All pretreatment pipes are routed to the tank.
- _____ C. Piping to the reuse system is in place as per the Plan.
- _____ D. Mosquito screens are installed on all tank openings.

IV. Vegetation and Overflow System

- _____ A. Verify that the overflow and catchment systems are fully stabilized before accepting flow.
- _____ B. Installed erosion control matting, if required on the approved Plan.
- _____ C. Verify that seeding is done at a rate that will achieve 90% germination.

Rooftop Disconnection Construction Checklist

*This checklist has been designed for rooftop disconnection in accordance
with the Delaware Sediment and Stormwater Program's
Green Technology BMPs Standards, Specifications and Details*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Construction

- _____ A. Pervious area receiving the rooftop runoff is staked out and protected from compaction.
- _____ B. Grading has been installed in the pervious area as per the Plan and compaction has been reduced by using tracked vehicles.
- _____ C. Divert all stormwater from the pervious area to avoid erosion during construction and seed germination.

II. Vegetation

- _____ A. Topsoil and/or compost amendments are applied evenly over the pervious area.
- _____ B. Vegetation applied at a rate to achieve 90% germination and as per the approved Plan.
- _____ C. Seed mix specified on the approved Plan has been applied and seed tags obtained.
- _____ D. Verify that biodegradable erosion control blanket is installed over the pervious are for protection while seed germination occurs.
- _____ E. After a significant storm event, review the pervious area and inspect for erosion.

Vegetated Channels Construction Checklist

*This checklist has been designed for vegetated channels
in accordance with the Delaware Sediment and Stormwater Program's
Green Technology BMPs Standards, Specifications and Details*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

_____ A. Facility location staked out. Extents of vegetated channel (to include pre-treatment area) delineated and access by equipment prohibited to prevent compaction of existing soils.

_____ B. Upstream drainage area stabilized or effectively diverted prior to beginning construction of the channel.

_____ C. Pretreatment type

_____ (1) Grass Filter Strip

_____ (2) Gravel or Stone Diaphragm

_____ (3) Gravel or Stone Level Spreader

_____ (4) Initial Sediment Forebay

_____ (5) Check Dams, if required on the approved Plan

_____ (6) Other: _____

_____ D. Verify the equipment on the site are large enough to excavate the channel from the sides; not sitting in the bottom of the channel footprint.

Project Name: _____

Construction Reviewer: _____

II. Excavation

_____ A. Facility excavated to dimensions and at location as per the approved plan.

_____ B. Facility excavated from the sides so as to not compact the existing soil.

_____ C. Groundwater not encountered during excavation.

(Note: If groundwater is encountered during the excavation process, construction of the facility must cease and the designer notified that a plan modification is necessary)

_____ D. Outlet protection provided at discharge point.

_____ E. (If applicable) Channel Underdrain

_____ (1) Pipe Type and Size: _____

_____ (2) Type of stone: _____

_____ (3) Verify depth of stone: _____

_____ (4) Geotextile fabric type: _____

III. Grading

_____ A. Proper grading connecting the pretreatment practice to the vegetated channel as specified on the approved Plan.

_____ B. Side slopes installed as per the approved Plan.

_____ C. Bottom of channel graded as per the approved Plan.

_____ D. Installation of stone check dams, if required on the approved Plan.

IV. Vegetation

_____ A. Vegetation planted on the bottom and slopes of the channel as indicated on the approved Plan.

_____ B. Seeding applied at a rate to achieve 90% germination.

V. Erosion and Sediment Control

_____ A. Installed erosion control matting in the conveyance area as specified on the approved Plan.

Sheet Flow to Filter Strip or Open Space Construction Checklist

*This checklist has been designed for sheet flow
in accordance with the Delaware Sediment and Stormwater Program's
Green Technology BMPs Standards, Specifications and Details*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

- _____ A. Facility location staked out. Extents of filter strip delineated and access by equipment prohibited to prevent compaction of existing soils.
- _____ B. Upstream drainage area stabilized or effectively diverted prior to beginning construction of the filter strip.
- _____ C. Accessory Structures
- _____ (1) Gravel or Stone Diaphragm
- _____ (2) Gravel or Stone Level Spreader
- _____ (3) Permeable Berm
- _____ (4) Compost Soil Amendments
- _____ (5) Other: _____

Project Name: _____

Construction Reviewer: _____

II. Excavation & Grading

- _____ A. Facility excavated to dimensions and at location as per the approved plan.
- _____ B. Facility excavated from the sides so as to not compact the existing soil.
- _____ C. Proper grading connecting the accessory structures to the filter strip as specified on the approved Plan. Allow for the fine grading to be below the impervious so that the root mat does not impede flow from the impervious to the filter strip.

III. Vegetation

- _____ A. Vegetation applied at a rate to achieve 90% germination and as per the approved Plan.

IV. Erosion and Sediment Control

- _____ A. Installed erosion control matting, if required on the approved Plan.

Dry Detention Facility Construction Checklist

*For permanent structures per USDA SCS Pond Code 378 and
Delaware Sediment and Stormwater Regulations*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Materials and equipment.

- _____ Pipe and appurtenances on-site prior to construction and dimensions checked.
 - _____ 1) Material (including protective coating, if specified).
 - _____ 2) Diameter
 - _____ 3) Dimensions of pre-cast concrete outlet structure.
 - _____ 4) Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with plans.
 - _____ 5) Barrel stub for prefabricated pipe structures at proper angle for design barrel slope.
 - _____ 6) Number and dimensions of prefabricated anti-seep collars.
 - _____ 7) Watertight connectors and gaskets.
 - _____ 8) Outlet drain valve.
- _____ Appropriate compaction equipment available, including hand and small power tamps.
- _____ Project benchmark near pond site.
- _____ Equipment for temporary de-watering.

Project Name: _____

Construction Reviewer: _____

II. Subgrade preparation.

- _____ Area beneath embankment stripped of all vegetation, topsoil and organic matter.
- _____ Cut-off trench excavated a minimum of 4 FT below subgrade and minimum 4 FT below proposed pipe invert, with side slopes no steeper than 1:1.
- _____ Impervious material used to backfill cut-off trench.

III. Pipe spillway installation.

- _____ Method of installation detailed on plans.

A. Bed preparation.

- _____ Installation trench excavated with 1:1 side slopes.
- _____ Stable, uniform, dry subgrade of relatively impervious material. (*If subgrade is wet, contractor shall have defined steps before proceeding with installation.*)
- _____ Invert at proper elevation and grade.

B. Pipe placement.

- _____ Metal/Plastic pipe

- _____ 1) Watertight connectors and gaskets properly installed
- _____ 2) Anti-seep collars properly spaced and having watertight connections to pipe.
- _____ 3) Backfill placed and tamped by hand under “haunches” of pipe.
- _____ 4) Remaining backfill placed in max. 8” lifts using small power tamping equipment until 2’ cover over pipe is reached.

- _____ Concrete pipe

- _____ 1) Pipe set on blocks or concrete slab for pouring of low cradle.
- _____ 2) Pipe installed with rubber gasket joints with no spalling in gasket interface area.
- _____ 3) Excavation for lower half of anti-seep collar(s) with reinforcing steel set.
- _____ 4) Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant.
- _____ 5) Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix.
- _____ 6) Upper half of anti-seep collar(s) formed with reinforcing steel set.

Project Name: _____

Construction Reviewer: _____

Concrete pipe (continued)

____ 7) Concrete for collar of an approved mix and vibrated into place.
(Protected from freezing while curing, if necessary.)

____ 8) Forms stripped and collar inspected for honeycomb prior to backfilling.
Parge if necessary.

C. Backfilling

____ Fill placed in maximum 8" lifts.

____ Backfill taken minimum 2' above top of anti-seep collar elevation before traversing
with heavy equipment.

IV. Riser/Outlet structure installation.

A. Metal riser

____ Riser base excavated or formed on stable subgrade to design dimensions.

____ Embedded section of aluminum or aluminized pipe to be painted with zinc
chromate or equivalent on **inside and outside** surfaces.

____ Set on blocks to design elevations and plumbed.

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

____ Concrete poured so as to fill inside of riser to invert of barrel.

B. Pre-cast concrete structure

____ Dry and stable subgrade.

____ Riser base set to design elevation.

____ If more than one section, no spalling in gasket interface area; gasket or approved
caulking material placed securely.

____ Watertight and structurally sound collar or gasket joint where structure connects
to pipe spillway.

C. Poured concrete structure

____ Footing excavated or formed on stable subgrade, to design dimensions with
reinforcing steel set.

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

____ Concrete of an approved mix and vibrated into place. (Protected from freezing
while curing, if necessary.)

Project Name: _____

Construction Reviewer: _____

_____ Forms stripped and structure inspected for “honeycomb” prior to backfilling. Parge if necessary.

V. Embankment construction.

A. Fill material.

_____ Soil engineer’s test.

_____ Visual test by inspector.

B. Compaction.

_____ Soil engineer’s test.

_____ Visual test by inspector.

C. Embankment.

_____ Fill placed in max. 8” lifts and compacted with appropriate equipment.

_____ Constructed to design cross-section, side slopes and top width.

_____ Constructed to design elevation plus allowance for settlement.

VI. Impounded area construction.

_____ Excavated/graded to design contours and side slopes.

_____ Inlet pipes have adequate outfall protection.

_____ Forebay

VII. Earth emergency spillway construction.

_____ Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.

_____ Excavated to proper cross-section, side slopes and bottom width.

_____ Entrance channel, crest, and exit channel constructed to design grades and elevations.

VIII. Outlet protection.

A. End section.

_____ Securely in place and properly backfilled.

B. Endwall

_____ Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified.

_____ Endwall formed to design dimensions with reinforcing steel set as per plan.

_____ Concrete of an approved mix and vibrated into place. (Protected from freezing, if necessary.)

_____ Forms stripped and structure inspected for “honeycomb” prior to backfilling.

Project Name: _____

Construction Reviewer: _____

Parge if necessary.

C. Riprap apron/channel.

- _____ Apron/channel excavated to design cross-section with proper transition to existing ground.
- _____ Geotextile in place.
- _____ Stone sized as per plan and uniformly placed at the thickness specified.

IX. Vegetative stabilization.

- _____ Approved seed mixture or sod.
- _____ Proper surface preparation and required soil amendments.
- _____ Stabilization matting or other stabilization materials, as per plan.

X. Miscellaneous.

- _____ Toe drain.
- _____ Temporary dewatering device installed as per plan w/appropriate fabric, stone size and perforations if included.
- _____ Drain for ponds having a permanent pool.
- _____ Trash rack/anti-vortex device secured to outlet structure.
- _____ Trash protection for low flow pipes, orifices, etc.
- _____ Fencing (when required).
- _____ Access road.
- _____ Set aside area for clean-out and maintenance.

Underground Detention Facility Construction Checklist

This checklist has been designed for underground detention facilities constructed in accordance with the Delaware Sediment and Stormwater Program's Green Technology BMPs Standards, Specifications and Details

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓ **Item meets standard**
X **Item not acceptable**
N/A **Item not applicable**

I. Pre-Construction.

_____ A. Pre-construction meeting held prior to beginning the facility (as required by the Delegated Agency).

_____ B. Facility location staked out.

_____ C. Upstream drainage area stabilized or effectively diverted.

_____ D. Materials on-site and dimensions and properties checked.

_____ (1) Underground chambers and end caps

_____ (2) Manhole/Maintenance access catch basin

_____ (3) Perforated pipe outlet underdrains, if applicable

_____ (4) Filter fabric as specified on the Plan

_____ (5) Acceptable size of washed, crushed angular stone as per the Plan

_____ (6) Acceptable fill materials as per the Plan

_____ (7) Vibratory roller

_____ (8) Dewatering equipment

Project Name: _____

Construction Reviewer: _____

II. Excavation.

- _____ A. Facility excavated to dimensions and at location as per the approved plan. Excavation must be free of any standing water.
- _____ B. Stepwise excavation used for infiltration facilities by preventing any compaction in the bottom of the facility.
- _____ C. Facility excavated from the sides so as to not compact the existing soil.
- _____ D. Groundwater encountered during excavation?
(Note: If groundwater is encountered during the excavation process, construction of the facility must cease and the designer notified that a plan modification is necessary)
- _____ E. Sides of excavation vertical.
- _____ F. Bottom of excavation level.

III. Structural Components.

- _____ A. Discharge pipe installed at discharge point.
Discharge pipe diameter: _____
Discharge pipe material: _____
- _____ B. Outlet protection provided at discharge point, if applicable.
- _____ C. Outlet control structure installed at correct invert.
- _____ D. Manhole/maintenance catch basin installed at elevations as specified on the approved plan.
- _____ E. Clean-outs and/or observation ports installed as per the Plan.
- _____ F. Inlet catch basins installed at the correct inverts.
- _____ G. Washed, crushed angular stone used for the facility bed.
- _____ H. Minimum 6" of stone on the bottom of excavation or as prescribed by the design engineer. *Stone depth:* _____
- _____ I. Chambers laid out in the method shown on Plan.
- _____ J. Minimum 6" of stone on the top of the chambers or at the depth prescribed by the design engineer. Stone placed on top of the installed chambers as per the Plan.
Stone depth: _____

Project Name: _____

Construction Reviewer: _____

III. Structural Components (continued)

_____ K. Geotextile, in accordance with approved Plan, laid between chambers and stone bed.
Geotextile manufacturer's product number: _____

_____ L. Geotextile, in accordance with approved Plan, wrapped around the Storage/Filtration Chamber.
Geotextile manufacturer's product number: _____

_____ M. Geotextile, in accordance with approved Plan, laid on top of the stone bed above the chambers.
Geotextile manufacturer's product number: _____

_____ N. Approved fill, compacted on top of the geotextile above the chambers,
Depth of fill: _____

Other Unique Structural Components included:

_____ O. Underdrain pipe material according to approved Plan, if applicable.
Underdrain pipe material: _____

_____ P. Underdrain pipe sizes according to approved Plan, if applicable.
Underdrain pipe diameter(s): _____

_____ Q. Underdrain pipe perforations according to approved Plan.

_____ R. Other: _____

_____ S. Other: _____

Project Name: _____

Construction Reviewer: _____

IV. Grading for impervious finished surface

- _____ A. Pavement sub-base, compacted. *Material:* _____
- _____ B. Impervious finished surface applied and finished grade lines achieved.

Other finished surface options:

- _____ C. Fill material compacted. *Material:* _____
- _____ D. Finished surface of vegetation, 4” minimum of topsoil, amendments, mulching, and mulch anchoring as per the vegetation specifications on the Plan.

V. Erosion and Sediment Control.

- _____ A. Site stormwater diverted around the excavation of the underground detention system.
- _____ B. Inlet protection provided on any catch basins that discharge to the underground detention system.

Filtering Systems Construction Checklist

*This checklist has been designed for filtering systems constructed
in accordance with the Delaware Sediment and Stormwater Program's
Green Technology BMPs Standards, Specifications and Details*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction.

_____ A. Pre-construction meeting held prior to beginning the facility (as required by the Delegated Agency). Facility location staked out.

_____ B. Materials on-site and dimensions and properties checked.

_____ (1) Underground precast chambers.

_____ (2) Connector pipes and gaskets between chambers.

_____ (3) Outlet pipe.

_____ (4) Geotextile fabric as specified on the Plan, if applicable.

_____ (5) Clean AASHTO M-6/ASTM C-33 medium aggregate concrete sand.

_____ (6) Underdrain or perforated pipe as specified on the Plan.

_____ (7) Dewatering equipment

Project Name: _____

Construction Reviewer: _____

II. Excavation.

- _____ A. Facility excavated to dimensions and at location as per the approved plan. Excavation must be free of any standing water.
- _____ B. Stepwise excavation used for infiltration facilities by preventing any compaction in the bottom of the facility.
- _____ C. Facility excavated from the sides so as to not compact the existing soil.
- _____ D. Groundwater encountered during excavation?
(Note: If groundwater is encountered during the excavation process, construction of the facility must cease and the designer notified that a plan modification is necessary)
- _____ E. Sides of excavation vertical.
- _____ F. Bottom of excavation level.

III. Structural Components.

- _____ A. Discharge pipe installed at discharge point.
Discharge pipe diameter: _____
Discharge pipe material: _____
- _____ B. Outlet protection provided at discharge point, if applicable.
- _____ C. Outlet control structure installed at correct invert.
- _____ D. Manhole/maintenance catch basin installed at elevations as specified on the approved plan.
- _____ E. Clean-outs and/or observation ports installed as per the Plan.
- _____ F. Inlet catch basins installed at the correct inverts.
- _____ G. Washed, crushed angular stone used for the facility bed.
- _____ H. Minimum 6" of stone on the bottom of excavation or as prescribed by the design engineer. *Stone depth:* _____
- _____ I. Chambers laid out in the method shown on Plan.
- _____ J. Minimum 6" of stone on the top of the chambers or at the depth prescribed by the design engineer. Stone placed on top of the installed chambers as per the Plan.
Stone depth: _____

Project Name: _____

Construction Reviewer: _____

III. Structural Components (continued)

_____ K. Geotextile, in accordance with approved Plan, laid between chambers and stone bed.
Geotextile manufacturer's product number: _____

_____ L. Geotextile, in accordance with approved Plan, wrapped around the Storage/Filtration Chamber.
Geotextile manufacturer's product number: _____

_____ M. Geotextile, in accordance with approved Plan, laid on top of the stone bed above the chambers.
Geotextile manufacturer's product number: _____

_____ N. Approved fill, compacted on top of the geotextile above the chambers,
Depth of fill: _____

Other Unique Structural Components included:

_____ O. Underdrain pipe material according to approved Plan, if applicable.
Underdrain pipe material: _____

_____ P. Underdrain pipe sizes according to approved Plan, if applicable.
Underdrain pipe diameter(s): _____

_____ Q. Underdrain pipe perforations according to approved Plan.

_____ R. Other: _____

_____ S. Other: _____

Project Name: _____

Construction Reviewer: _____

IV. Grading for impervious finished surface

- _____ A. Pavement sub-base, compacted. *Material:* _____
- _____ B. Impervious finished surface applied and finished grade lines achieved.

Other finished surface options:

- _____ C. Fill material compacted. *Material:* _____
- _____ D. Finished surface of vegetation, 4” minimum of topsoil, amendments, mulching, and mulch anchoring as per the vegetation specifications on the Plan.

V. Erosion and Sediment Control.

- _____ A. Site stormwater diverted around the excavation of the underground detention system.
- _____ B. Inlet protection provided on any catch basins that discharge to the underground detention system.

Constructed Wetland Construction Checklist

*This checklist has been designed for a constructed wetland installed
in accordance with the Delaware Sediment and Stormwater Program's
Green Technology BMPs Standards, Specifications and Details*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

- _____ A. Wetland location staked out. Extents of the proposed wetland delineated and equipment access limited.
- _____ B. Upstream drainage area stabilized or effectively diverted during the construction of the wetland.

II. Excavation

- _____ A. Facility excavated to dimensions and at location as per the approved plan.
- _____ B. Stepwise excavation used to minimize compaction.

Project Name: _____

Construction Reviewer: _____

III. Structural Components such as weir, spillway, flashboard riser, inlet pipes, drain pipe, emergency spillway, etc. (list the components that are included on the approved Plan and verify the proper installation)

_____ A. Component: _____

Installation observations:

_____ B. Component: _____

Installation observations:

_____ C. Component: _____

Installation observations:

_____ D. Component: _____

Installation observations:

_____ E. Component: _____

Installation observations:

Project Name: _____

Construction Reviewer: _____

IV. Vegetation & Landscaping

_____ A. Vegetation planted as per the approved Plan.

_____ B. Trees and shrubs planted as per the Plan.

_____ C. Proper placement of boulders, horizontal tree stumps, peninsulas, and hummocks as per the Plan.

Detention Facility Construction Checklist

*For permanent structures per USDA SCS Pond Code 378 and
Delaware Sediment and Stormwater Regulations*

PROJECT INFORMATION

Project Name: _____

Location: _____

Contractor: _____

Construction Reviewer: _____

Date(s) / Time(s) of Inspections: _____

KEY:

✓

Item meets standard

X

Item not acceptable

N/A

Item not applicable

I. Pre-Construction

_____ A. Pre-construction meeting held.

_____ B. Facility location staked out.

_____ C. Materials on-site and dimensions and properties checked.

_____ Pipes and Appurtenances:

_____ (1) Material (including protective coating, if specified)

_____ (2) Diameter

_____ (3) Dimensions of metal riser or pre-cast concrete outlet structure

_____ (4) Required dimensions between water control structures (orifices, weirs, etc.)
are in accordance with plans

_____ (5) Barrel stub for prefabricated pipe structures at proper angle for design barrel
slope

_____ (6) Number and dimensions of prefabricated anti-seep collars

_____ (7) Watertight connectors and gaskets

_____ (8) Outlet drain valve (if applicable)

Project Name: _____

Construction Reviewer: _____

- _____ Appropriate compaction equipment available, including hand and small power tamps
- _____ Project benchmark near pond site
- _____ Equipment for temporary de-watering

II. Subgrade preparation.

- _____ Area beneath embankment stripped of all vegetation, topsoil and organic matter.
- _____ Cut-off trench excavated a minimum of 4 FT below subgrade and minimum 4 FT below proposed pipe invert, with side slopes no steeper than 1:1.
- _____ Impervious material used to backfill cut-off trench.

III. Pipe spillway installation.

- _____ Method of installation detailed on plans.

A. Bed preparation.

- _____ Installation trench excavated with 1:1 side slopes.
- _____ Stable, uniform, dry subgrade of relatively impervious material. (*If subgrade is wet, contractor shall have defined steps before proceeding with installation.*)
- _____ Invert at proper elevation and grade.

B. Pipe placement.

- _____ Metal/Plastic pipe
 - _____ 1) Watertight connectors and gaskets properly installed
 - _____ 2) Anti-seep collars properly spaced and having watertight connections to pipe.
 - _____ 3) Backfill placed and tamped by hand under “haunches” of pipe.
 - _____ 4) Remaining backfill placed in max. 8” lifts using small power tamping equipment until 2’ cover over pipe is reached.
- _____ Concrete pipe
 - _____ 1) Pipe set on blocks or concrete slab for pouring of low cradle.
 - _____ 2) Pipe installed with rubber gasket joints with no spalling in gasket interface area.
 - _____ 3) Excavation for lower half of anti-seep collar(s) with reinforcing steel set.

Project Name: _____

Construction Reviewer: _____

B. Pipe placement (Continued)

- _____ 4) Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant.
- _____ 5) Low cradle and bottom half of anti-seep collar installed as monolithic Pour and of an approved mix.
- _____ 6) Upper half of anti-seep collar(s) formed with reinforcing steel set.
- _____ 7) Concrete for collar of an approved mix and vibrated into place. (Protected from freezing while curing, if necessary.)
- _____ 8) Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.

C. Backfilling

- _____ Fill placed in maximum 8" lifts.
- _____ Backfill taken minimum 2' above top of anti-seep collar elevation before traversing with heavy equipment.

IV. Riser/Outlet structure installation.

A. Metal riser

- _____ Riser base excavated or formed on stable subgrade to design dimensions.
- _____ Embedded section of aluminum or aluminized pipe to be painted with zinc chromate or equivalent on **inside and outside** surfaces.
- _____ Set on blocks to design elevations and plumbed.
- _____ Reinforcing bars placed at right angles and projecting into sides of riser.
- _____ Concrete poured so as to fill inside of riser to invert of barrel.

B. Pre-cast concrete structure

- _____ Dry and stable subgrade.
- _____ Riser base set to design elevation.
- _____ If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely.
- _____ Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway.

Project Name: _____

Construction Reviewer: _____

C. Poured concrete structure

- _____ Footing excavated or formed on stable subgrade, to design dimensions with Reinforcing steel set.
- _____ Structure formed to design dimensions, with reinforcing steel set as per plan.
- _____ Concrete of an approved mix and vibrated into place. (Protected from freezing while curing, if necessary.)
- _____ Forms stripped and structure inspected for “honeycomb” prior to backfilling. Parge if necessary.

V. Embankment construction.

A. Fill material.

- _____ Soil engineer’s test.
- _____ Visual test by inspector.

B. Compaction.

- _____ Soil engineer’s test.
- _____ Visual test by inspector.

C. Embankment.

- _____ Fill placed in max. 8” lifts and compacted with appropriate equipment.
- _____ Constructed to design cross-section, side slopes and top width.
- _____ Constructed to design elevation plus allowance for settlement.

VI. Impounded area construction.

- _____ Excavated/graded to design contours and side slopes.
- _____ Inlet pipes have adequate outfall protection.
- _____ Forebay
- _____ Wet pond requirements.
 - _____ 1) 10 FT reverse slope bench one foot above normal pool elevation.
 - _____ 2) 10 FT wide level bench one foot below normal pool elevation.

Project Name: _____

Construction Reviewer: _____

VII. Earth emergency spillway construction.

- _____ Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.
- _____ Excavated to proper cross-section, side slopes and bottom width.
- _____ Entrance channel, crest, and exit channel constructed to design grades and elevations.

VIII. Outlet protection.

A. End section.

- _____ Securely in place and properly backfilled.

B. Endwall

- _____ Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified.
- _____ Endwall formed to design dimensions with reinforcing steel set as per plan.
- _____ Concrete of an approved mix and vibrated into place. (Protected from freezing, if necessary.)
- _____ Forms stripped and structure inspected for “honeycomb” prior to backfilling. Parge if necessary.

C. Riprap apron/channel.

- _____ Apron/channel excavated to design cross-section with proper transition to existing ground.
- _____ Filter fabric in place.
- _____ Stone sized as per plan and uniformly placed at the thickness specified.

IX. Vegetative stabilization.

- _____ Approved seed mixture or sod.
- _____ Proper surface preparation and required soil amendments.
- _____ Erosion control blanket or other stabilization materials, as per Plan.

Project Name: _____

Construction Reviewer: _____

X. Miscellaneous

- _____ Toe drain.
- _____ Temporary dewatering device installed as per plan w/appropriate fabric, stone size and perforations if included.
- _____ Drain for ponds having a permanent pool.
- _____ Trash rack/anti-vortex device secured to outlet structure.
- _____ Trash protection for low flow pipes, orifices, etc.
- _____ Fencing (when required).
- _____ Access road.
- _____ Set aside area for clean-out and maintenance.