Filtering Practices, Bioretention/Micro-Bioretention, Bioswale, Rain Garden Checklist Items

Site location/address _____

_____

Contractor/address/contact info _____

_____

Permit data_____

Certifying engineer/company/address/contact info_____

_____

Date work started_____

Date work completed/final inspection_____

The certifying professional must be a licensed Professional Engineer (PE), Landscape Architect, or Land Surveyor licensed in Maryland.

The following checklist provides a basic outline of items typically observed and documented during the course of bioretention type facility construction. It is not intended to distinguish between all potential design variants and construction methods within this family of practices. Inspection staff should review the approved plans and details carefully and follow those documents to ensure that the intent of the design is met. Questions regarding any portion of the plans or specifications should be referred to the design engineer or plan review authority, and all correspondence and/or changes/deviations from the approved plans and specifications documented and included as part of the final "as-built" submittal. Any revisions required by the approving authority must be documented as well. The standards for design of these practices are based on the 2000 Maryland Stormwater Design Manual Volumes I and II. However, it should be noted that local requirements may be more restrictive than the State design manual. The inspection procedures and processes may be found in the 2018 Maryland SWM BMP Inspection Guidance Manual.

All items must be checked when completed. Any items labeled "Certification of …" must be checked, dated and initialed by the certifying inspector/engineer.

	Pre-Construction Meeting	**Date**
	Review schedule for construction and verify inspection schedule and requirements.	
	Review plans, details, and specifications. Note any features that are non-standard.	
	Document pre-construction meeting between installation contractor(s), approving jurisdiction representative, field inspection personnel, and any other concerned parties. Distribute minutes of pre-construction meeting to all concerned parties.	
	Review and identify critical stages of construction that must be inspected prior to proceeding to the next step in the construction sequence. Identify specific points of	

	contact who are in a position to review and authorize modifications to materials or design during construction.	
	Excavation	**Date**
	Verify all areas of the contributing drainage areas have been fully stabilized, OR that erosion control measures are in place and runoff is completely diverted around proposed practice. Photos required.	
	Verify that area of practice has not been exposed to construction traffic or other impacts prior to construction. Refer any areas of concern to design engineer for comment or direction.	
	Verify limits of facility excavation are marked and conform to location on approved plans.	
	If the excavated area has been used as a sediment trap, verify that the lower limit of stone elevation is lower than bottom elevation of existing trap.	
	If required by design, verify that bottom of facility is scarified prior to placement of stone. Photo required.	
	Verify subgrade is free of rocks, roots, and is relatively flat/plane/level. Photo required.	
	Verify no groundwater intrusion is present. If groundwater is encountered, advise design engineer of existing conditions and document any changes to design as a result of groundwater presence. If water is from a source other than groundwater, de-water excavation via an appropriate BMP and remove any accumulated sediment. Photo required.	
	Verify facility has been excavated to proper depth(s) and dimensions. *Constructed dimensions* _____ Photos required.	
	Verify sides of excavation are covered with specified geotextile, no holes or tears, no protruding roots or rocks, no excessive wrinkles present. Material ticket and photos required.	

Certification of Excavation Inspection: Inspector certifies that the excavation has been completed in accordance with the items listed above.
Inspector/engineers signature: _____ Date: _____

	Filter Layer, Underdrain, and Stone Reservoir Placement	**Date**
	Verify all aggregates meet specifications as certified by supplier. Delivery ticket and photos required.	
	Verify that underdrain size, pipe material and perforations meet design specifications (if applicable) Verify installation is consistent with design. Material tickets and photos required.	
	Observe and document any pipe/underdrain connections to public storm drain system. Photos required.	
	Verify placement of aggregate layers, verify thicknesses, aggregate type and placement method (spread, not dumped) Photos required. Material tickets for aggregates required.	
	Verify placement of underdrains, observation wells and cleanouts. Verify depth and location is per plan. Verify materials are per specification. Photos required. Material tickets required.	

	Verify placement and aggregate type for top layer of reservoir. Photos required. Material tickets required.	

Certification of Filter Layers and Underdrain/Monitoring Well Installation Inspection: Inspector certifies that the filter layers and underdrains/monitoring wells/cleanouts have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

	Bioretention/Planting Soil Placement	**Date**
	Verify that soil media meets project specifications (Suppliers certification or independent laboratory analysis) Material tickets or laboratory report required.	
	Verify soil media is placed in lifts no greater than 12". Verify top of soil elevation after 2-4 days of settling in place. Photos required.	

Certification of Soil Media Placement Inspection: Inspector certifies that soil media and media installation have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

	Pretreatment and Plant Installation	**Date**
	Verify that any energy dissipation devices and pretreatment practices (forebays, level spreaders, etc.) are installed as per plan. Photos required.	
	Verify that planting stock is delivered in good condition (not wilted; no obvious signs of damage, pests, or disease). Check that tickets match the plant species, quantities, and sizes delivered. Remove any weeds before planting. Photos required. Delivery tickets required.	
	Verify that vegetation is planted when received or no later than 1-2 days after delivery.	
	If unable to plant immediately, verify that plants are stored in a cool and shaded location with roots covered and moist.	
	Verify that plants are installed per plan (spacing, species, location, and quantity). This includes ensuring that trees will not block maintenance access and are not located near pipes. Ensure woody vegetation is not placed on any embankment or within fifteen feet of any embankment. Photos required.	
	Verify ponding depth after final mulch placement and planting. Photo required.	
	Verify that plants are not installed in frozen or waterlogged soil or during a drought or in extreme temperatures.	
	Verify mulch meets project specifications and is installed at proper depth and wetted thoroughly during installation. Photos required. Delivery tickets required.	

Certification of Pretreatment, Mulch and Plant Installation: Inspector certifies that plant stock, planting plan, and mulch installation have been completed in accordance with the items listed above.
Inspector/Engineer signature: _____ Date: _____

Comments (Deviations, Substitutions, Clarifications, Etc.)	Date

All items checked have been inspected by me (or by an individual under my direct supervision) and have been found to have been completed in a manner consistent with the approved plans and specifications as well as standard construction practices. Any deviations have been noted above.

Signature: _____ Date: _____

Certifying Professional's License Number or Seal: _____

Submerged Gravel Wetland Checklist Items

Site location/address_____

_____

Contractor/address/contact info_____

_____

Permit data_____

Certifying engineer/company/address/contact info_____

_____

Date work started_____

Date work completed/final inspection_____

The certifying professional must be a Professional Engineer (PE), Landscape Architect, or Professional Land Surveyor licensed in the State of Maryland.

All items must be checked when completed. Any items labeled "Certification of …" must be checked, dated and initialed by the certifying inspector/engineer.

	Pre-Construction Meeting	**Date**
	Review schedule for construction and verify inspection schedule and requirements.	
	Review plans for any conflicts with E&SC implementation.	
	Review material requirements and specs with owner and contractor to ensure proper materials are ordered.	
	Document pre-construction meeting between installation contractor(s), approving jurisdiction representative, field inspection personnel, and any other concerned parties. Provide copies of meeting minutes to all concerned parties.	

	Excavation	**Date**
	Verify limits of facility excavation are marked and conform to location on approved plans.	
	If the excavated area has been used as a sediment trap, verify that the lower limit of stone elevation is lower than bottom elevation of existing trap.	
	If facility is intended to treat "hotspot" runoff, ensure that excavation does not intercept groundwater table. Photo required.	
	Verify subgrade is free of rocks, roots, and is relatively flat/plane/level. Photo required.	

	Excavation	Date
	Verify and ensure excavation is protected from sediment laden runoff prior to liner or stone placement.	
	Verify facility has been excavated to proper depth(s) and dimensions. *Constructed dimensions* _____ Photos required.	
	Verify installation of liner if required (refer to approved plans for liner material and installation protocols/specifications)	
	Verify sides of excavation are covered with specified geotextile, no holes or tears, no protruding roots or rocks, no excessive wrinkles present. Material ticket and photos required.	

Certification of Excavation Inspection: Inspector certifies that the excavation has been completed in accordance with the items listed above.
Inspector/engineers signature: _____ Date: _____

	Gravel Bed, Underdrain, and Pea Gravel Placement	Date
	Verify all aggregates meet specifications as certified by supplier. Delivery ticket and photos required.	
	Verify underdrain size, pipe material, and perforations and any wrapping material (hardware cloth, etc.) meet design specifications. Photos required. Material tickets required.	
	Verify placement of underdrains, observation wells, perforated inlet pipe (if called for) and cleanouts. Verify depth and location is per plan. Verify materials are per specification. Photos required. Material tickets required.	
	Verify placement of aggregate layers, verify thicknesses, aggregate type and placement method (spread, not dumped) Photos required. Material tickets for aggregates required.	
	Verify placement and aggregate type for top layer of reservoir. Photos required. Material tickets required.	
	Verify that all connections are watertight, particularly water elevation controls.	

Certification of Gravel Bed, Underdrain, and Pea Gravel Inspection: Inspector certifies that the filter layers and underdrains/monitoring wells/cleanouts have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

	Submerged Gravel Wetland Planting Soil Placement	Date
	Verify that soil media meets project specifications (Suppliers certification or independent laboratory analysis) Material tickets or laboratory report required.	
	Verify soil media is placed in lifts no greater than 12”. Verify top of soil elevation after 2-4 days of settling in place. Photos required.	
	Verify that pea gravel window is free of planting soil and able to convey flow into gravel bed w/o restriction. Photos required.	

Certification of Wetland Planting Soil Placement: Inspector certifies that soil media and media installation have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

	Pretreatment, Check Dam and Plant Installation	**Date**
	Verify that any energy dissipation devices and pretreatment practices (forebays, level spreaders, etc.) are installed as per plan. Photos required.	
	Verify that planting stock is delivered in good condition (not wilted; no obvious signs of damage, pests, or disease) and maintained in good condition prior to planting. Check that tickets match the plant species, quantities, and sizes delivered. Remove any weeds before planting. Photos required. Delivery tickets required.	
	Verify that plants are installed per plan (pacing, species, location, and quantity). This includes ensuring that trees will not block maintenance access and are not located near pipes and principal spillways. Ensure woody vegetation is not placed on any embankment or within fifteen feet of any embankment that is designed and constructed according to the Natural Resources Conservation Service (NRCS) 378 Standards and Specifications for Small Pond Design (MD-378). Photos required.	

Certification of Pretreatment, Check Dam and Plant Installation: Inspector certifies that plant stock, planting plan, and plant installation have been completed in accordance with the items listed above.
Inspector/Engineer signature: _____ Date: _____

Comments (Deviations, Substitutions, Clarifications, Etc.)	**Date**

All items checked have been inspected by me (or by an individual under my direct supervision) and have been found to have been completed in a manner consistent with the approved plans and specifications as well as standard construction practices. Any deviations have been noted above.

Signature: _____ Date: _____

Certifying Professional's License Number or Seal: _____

Infiltration Practice Checklist items

(Dry Swales, Infiltration Trenches, Infiltration Basins, etc.)

Site location/address_____

Contractor/address/contact info_____

_____

Permit data_____

Certifying engineer/company/address/contact info_____

_____

Date work started_____

Date work completed/final inspection_____

The certifying professional must be a licensed Professional Engineer (PE), Landscape Architect, or Land Surveyor.

The following list of checklist items provides a basic outline of items typically observed and documented during the course of infiltration practice construction. It is not intended to distinguish between all potential design variants and construction methods within this family of practices. Inspection staff should review the approved plans and details carefully and follow those documents to ensure that the intent of the design is met. Questions regarding any portion of the plans or specifications should be referred to the design engineer, and all correspondence and/or changes/deviations from the approved plans and specifications documented and included as part of the final "as-built" submittal. The standard for design of these practices are based on the 2000 Maryland Stormwater Design Manual Volumes I and II. The inspection procedures and processes may be found in the 2018 Maryland SWM BMP Inspection Guidance Manual.

All items must be checked when completed. Any items labeled "Certification of …" must be checked, dated and initialed by the certifying inspector/engineer.

	Pre-Construction Meeting	**Date**
	Review schedule for construction and verify inspection schedule and requirements	
	Document pre-construction meeting between installation contractor(s), approving jurisdiction representative, field inspection personnel, and any other concerned parties. Provide copies of meeting minutes to all concerned parties.	

	Excavation	Date
	Verify all pervious areas of the contributing drainage areas have been fully stabilized, OR that erosion control measures are in place and runoff is completely diverted around proposed practice. Photos required.	
	Verify that area of practice has not been exposed to construction traffic or other impacts prior to construction.	
	Verify limits of facility excavation are marked and conform to location on approved plans.	
	Verify sides of excavation have not been "sealed" or "slicked" by excavation equipment. Scarify sides if necessary prior to fabric placement. Photo required.	
	Verify that bottom of facility is scarified prior to placement of sand layer. Photo required.	
	Verify subgrade is free of rocks, roots, and is relatively flat/plane/level. Photo required.	
	Verify no groundwater intrusion is present. If groundwater is encountered, advise design engineer of existing conditions and document any changes to design as a result of groundwater presence. If water is from a source other than groundwater, de-water excavation via an appropriate BMP and remove any accumulated sediment. Photo required.	
	Verify facility has been excavated to proper depth(s) and dimensions. *Constructed dimensions* _____ Photos required.	
	Verify sides of excavation are covered with specified geotextile, no holes or tears, no protruding roots or rocks, no excessive wrinkles present. Material ticket and photos required.	

Certification of Excavation Inspection: Inspector certifies that the excavation has been completed in accordance with the items listed above.
Inspector/engineers signature: _____ Date: _____

	Filter layer, Monitoring Well, and Stone Reservoir Placement	Date
	Verify all aggregates meet specifications as certified by supplier. Delivery tickets and photos required.	
	Monitoring well pipe material and perforations meet design specifications. Photos required. Material tickets required.	
	Verify placement of aggregate layers, verify thicknesses, aggregate type and placement method (placed, not dumped) Photos required. Material tickets for aggregates required.	
	Verify placement of observation well(s). Verify depth and location is per plan. Verify materials are per specification. Photos required. Material tickets required.	
	Verify placement and aggregate type for top layer of reservoir. Photos required. Material tickets required.	

Certification of Filter Layers/Monitoring Well Installation Inspection: Inspector certifies that the filter layers and monitoring wells have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

Comments (Deviations, Substitutions, Clarifications, Etc.)	Date

All items checked have been inspected by me (or by an individual under my direct supervision) and have been found to have been completed in a manner consistent with the approved plans and specifications as well as standard construction practices. Any deviations have been noted above.

Signature: _____ Date: _____

Certifying Professional's License Number or Seal: _____

Permeable Pavement/Reinforced Turf Inspection Checklist Items

Site location/address_____

_____

Contractor/address/contact info_____

_____

Permit data_____

Certifying engineer/company/address/contact info_____

_____

Date work started_____

Date work completed/final inspection_____

The certifying professional must be a Professional Engineer (PE), Landscape Architect, or Land Surveyor licensed in the State of Maryland.

The following list of checklist items provides a basic outline of items typically observed and documented during the course of permeable pavement or reinforced turf system construction. It is not intended to distinguish between all potential design variants and construction methods within this family of practices. Inspection staff should review the approved plans and details carefully and follow those documents to ensure that the intent of the design is met. Questions regarding any portion of the plans or specifications should be referred to the design engineer, and all correspondence and/or changes/deviations from the approved plans and specifications documented and included as part of the final "as-built" submittal. The standard for design of these practices are based on the 2000 Maryland Stormwater Design Manual Volumes I and II. The inspection procedures and processes may be found in the 2019 Maryland SWM BMP Inspection Guidance Manual.

All items must be checked when completed. Any items labeled "Certification of …" must be checked, dated and initialed by the certifying inspector/engineer.

	Pre-Construction Meeting	**Date**
	Determine when permeable pavement installation is to be done in project construction sequence- before or after building construction, and determine measures for protection and cleaning of permeable surfaces.	
	Review schedule for construction, verify the certification(s) of the installer and verify inspection schedule and requirements.	
	Document pre-construction meeting between installation contractor(s), approving jurisdiction representative, field inspection personnel, and any other concerned parties. Provide copies of meeting minutes to all concerned parties.	

	Excavation	Date
	Verify all of the contributing drainage areas have been fully stabilized, OR that erosion control measures are in place and runoff is completely diverted around proposed practice. Photos required.	
	Verify that area of practice has not been exposed to construction traffic or other impacts prior to construction.	
	Verify limits of facility excavation are marked and conform to location on approved plans. Photo required.	
	Verify dimensions of excavation are consistent with design. Record and document.	
	If required by design, verify that bottom of facility is scarified prior to placement of stone. Photo required.	
	Verify subgrade is free of rocks, roots, and is relatively flat/plane/level. Photo required.	
	Verify subgrade soils are level (no slope or fall), and soil properties are consistent with design assumptions. Photos required. Soil analysis documentation may be required by certifying engineer or approving jurisdiction.	
	Verify no groundwater intrusion is present. If groundwater is encountered, advise design engineer of existing conditions and document any changes to design as a result of groundwater presence. If water is from a source other than groundwater, de-water excavation via an appropriate BMP and remove any accumulated sediment. Photo required.	
	Verify facility has been excavated to proper depth(s) and dimensions. *Constructed dimensions* _____ Photos required.	
	Verify sides of excavation are covered with specified geotextile, no holes or tears, no protruding roots or rocks, no excessive wrinkles present. Material ticket and photos required.	

Certification of Excavation Inspection: Inspector certifies that the excavation has been completed in accordance with the items listed above.
Inspector/engineers signature: _____ Date: _____

	Filter Layer, Underdrain, and Stone Reservoir Placement	Date
	Verify all aggregates meet specifications as certified by supplier. Delivery tickets and photos required.	
	Underdrain size, pipe material and perforations meet design specifications (if applicable)	
	Observe and document any pipe/underdrain connections to public storm drain system. Photos required.	
	Verify placement of aggregate layers, verify thicknesses, aggregate type and placement method (spread, not dumped) Photos required. Material tickets for aggregates required.	
	Verify placement of underdrains, observation wells and cleanouts. Verify depth and location is per plan. Verify materials are per specification. Photos required. Material tickets required.	

	Verify that any flow barriers required are installed as per plan. Photos required.	
	Verify impermeable liner installation (if required). Photos required. Material tickets required.	

Certification of Filter Layers and Underdrain/Monitoring Well Installation Inspection: Inspector certifies that the filter layers and underdrains/monitoring wells/cleanouts have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

	Permeable Pavers, Reinforced Turf or Pervious Pavement(Pervious Concrete/Bituminous Concrete) Installation	**Date**
	Permeable pavement surface installation is complete. Photos required.	
	Material tickets provided for all pavement components.	
	Permeable pavement surface is protected from contamination until site is fully stabilized. Photos required.	

Certification of Pervious Pavement Placement Inspection: Contractor and/or manufacturer certify that permeable pavement has been placed in accordance with manufacturers specifications (ICPI Tech Spec #18 for interlocking concrete pavers or ACI 522.1-13 for pervious concrete).
Installers representative signature: _____ Date: _____

Comments (Deviations, Substitutions, Clarifications, Etc.)	**Date**

All items checked have been inspected by me (or by an individual under my direct supervision) and have been found to have been completed in a manner consistent with the approved plans and specifications as well as standard construction practices. Any deviations have been noted above.

Signature: _____ Date: _____

Certifying Professional's License Number or Seal: _____

Installer/Contractor's Certification (Required)

___Permeable Interlocking Pavers: Attach a copy of ICPI Certification

___Pervious Concrete: NRMCA Certification* Number: _____

**NRMCA Certification must be either Installer or Craftsman certification.*

Rooftop/Non-Rooftop Disconnection Checklist Items
(Sheet Flow to Buffer, Sheet Flow to Conservation Area, etc.)

Site location/address _____

_____

Contractor/address/contact info_____

_____

Permit data_____

Certifying engineer/company/address/contact info_____

_____

Date work started_____

Date work completed/final inspection_____

The certifying professional must be a licensed Professional Engineer (PE), Landscape Architect, or Land Surveyor.

The following list of checklist items provides a basic outline of items typically observed and documented during the course of rooftop/non-rooftop disconnection construction. It is not intended to distinguish between all potential design variants and construction methods within this family of practices. Inspection staff should review the approved plans and details carefully and follow those documents to ensure that the intent of the design is met. Questions regarding any portion of the plans or specifications should be referred to the design engineer, and all correspondence and/or changes/deviations from the approved plans and specifications documented and included as part of the final "as-built" submittal. The standard for design of these practices are based on the 2000 Maryland Stormwater Design Manual Volumes I and II. The inspection procedures and processes may be found in the 2019 Maryland SWM BMP Inspection Guidance Manual.

All items must be checked when completed. Any items labeled "Certification of …" must be checked, dated and initialed by the certifying inspector/engineer.

	Pre-Construction Meeting	**Date**
	Review schedule for construction and verify inspection schedule and requirements.	
	Document pre-construction meeting between installation contractor(s), approving jurisdiction representative, field inspection personnel, and any other concerned parties. Distribute meeting minutes to all concerned parties.	

	Construction	Date
	Verify downspout runoff has been temporarily diverted to a stabilized conveyance. Photo required.	
	Verify that area of practice has not been exposed to construction traffic or other impacts prior to construction.	
	Verify that area(s) receiving runoff has been tilled to a depth of _____ to de-compact soils. Photo required.	
	If required, verify that any pretreatment or energy dissipation devices have been installed in accordance with the approved plans. Photos, material tickets required.	
	If required, verify that soil amendments have been incorporated into drainage area as specified. Photo required. Material tickets required.	
	Downspouts or other conveyance devices have been installed and proper drainage away from building foundation has been provided. Photos required.	

Certification of Construction Inspection: Inspector certifies that the installation has been completed in accordance with the items listed above.
Inspector/engineers signature: _____ Date: _____

	Final Stabilization	Date
	Disconnection flow path is completely stabilized with adequate mulch/turf cover per the approved plan. Photo required.	
	Downspout(s) are directed to new conveyance path. Photo required.	

Certification of Final Stabilization Inspection: Inspector certifies the successful completion of the stabilization steps have been completed in accordance with the items listed above.
Inspector/Engineers signature: _____ Date: _____

Comments (Deviations, Substitutions, Clarifications, Etc.)	Date

All items checked have been inspected by me (or by an individual under my direct supervision) and have been found to have been completed in a manner consistent with the approved plans and specifications as well as standard construction practices. Any deviations have been noted above.

Signature: _____ Date: _____

Certifying Professional's License Number or Seal: _____

Excellent Engineers, Inc.
Anytown, USA

Date

SWM Approval Shop
Local approving authority
Somewhere, Maryland

RE: Stormwater Management Facility As-Built certification
Orderly Manor lot 316
1222 Square Circle
Somewhere, MD
Permit#/SWM#/preferred ID

Dear _____:

We have inspected the rainwater harvesting system at the above referenced address and determined that it has been constructed in a manner consistent with the County approved plans dated _____(Engineers/approval stamp on approved plans). The approved rainwater harvesting system is comprised of a **(insert description of structure including size/dimensions and material)** that captures stormwater runoff for this project.

Based on the as-built conditions of the site, the rainwater harvesting system captures **(insert total area of roof draining to rainwater harvesting system).** Therefore the facility meets the requirements of the County's stormwater ordinance. For reference, the as-built drawings are attached showing the sizing of the facility. As required, the attached as-built package includes, but is not limited to, the following information: inner dimensions of the facility (LxWxH); dimensions of any internal chambers (i.e. clearwell); pump specifications; prescreening devices and first flush diverters; sizes and inverts for all orifices, weirs, and inflow/outfall pipes. Therefore, it is our professional opinion that the facility was installed in accordance with the County approved plan and that the facility is functioning as designed. If you have any questions regarding the above referenced facility, please do not hesitate to contact this office.

Sincerely,

Joe Engineer, PE

Attachments:

1. As-built drawing package