LoCo BMP Construction Inspection Checklist:



Bioretention Facility

 Project Name \_\_\_\_\_\_\_\_\_\_\_\_\_ Project # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Dates Inspected \_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_

LOCATION of BMP (e.g., BMP 1 @ SE corner of parking lot) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

GEOGRAPHIC COORDINATES from Plans (Optional): Latitude\_\_\_\_\_\_\_\_ Longitude\_\_\_\_\_\_\_\_\_\_ (decimal °)

The following checklist provides items for the construction inspection of Bioretention Practices. This checklist does not distinguish between all the design variations and differences in construction between the family of practices: bioretention basins, micro-bioretention (or rain gardens), and urban bioretention. Similarly, the use of an infiltration sump below an underdrain, or an infiltration sump with an “upturned elbow,” and other variations between Level 1 and Level 2 bioretention may not be clearly identified in this checklist. Inspectors should review the plans carefully, and adjust these items and the timing of inspections as needed to ensure the installation fully meets the design. **Use “Notes” section at the end of this form to explain why a “No” or “N/ A” box is checked for an individual construction items or to describe additional observations related to the installation.**

**Inspections Performed By One or More of the Following:**

01 Owner/Operator or their Representative

02 Installer/Contractor

03 Geotechnical Engineer

**Prior to Construction:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inspector** | **Yes** | **No** | **N/A** | **Construction Item** | **Date Completed** |
| 0\_\_ | ☐ | ☐ | ☐ | If relying on infiltration into in situ soils (i.e., Level 2), area where bioretention facility will be constructed has not been compacted by construction equipment. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Stormwater has been diverted around the area of the bioretention practice and perimeter erosion control measures to protect the facility during construction have been installed. |  |

**Excavation:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inspector** | **Yes** | **No** | **N/A** | **Construction Item** | **Date Completed** |
| 0\_\_ | ☐ | ☐ | ☐ | Digital Photos taken during this stage. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Compare the bioretention surface and invert design elevations with the actual constructed elevations of the inflow and outlet inverts. Adjust design elevations as needed. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Area of bioretention excavation is marked and the size and location conforms to plan. |  |
| 0\_\_ | ☐ | ☐ | ☐ | If the excavation area has been used as a sediment trap, verify that the bottom elevation of the proposed stone reservoir is lower than the bottom elevation of the existing trap. |  |
| 0\_\_ | ☐ | ☐ | ☐ | For Level 2 bioretention, ensure the bottom of the excavation is scarified prior to placement of stone. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Subgrade surface is free of rocks and roots, and large voids. Any voids should be refilled with the base aggregate to create a level surface for the placement of aggregates and underdrain (if required). |  |
| 0\_\_ | ☐ | ☐ | ☐ | No groundwater seepage or standing water is present. Any standing water is dewatered. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Excavation of the bioretention practice has achieved proper grades and the required geometry and elevations without compacting the bottom of the excavation. |  |

**Filter Layer, Underdrain, and Stone Reservoir Placement:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inspector** | **Yes** | **No** | **N/A** | **Construction Item** | **Date Completed** |
| 0\_\_ | ☐ | ☐ | ☐ | Digital Photos taken during this stage. |  |
| 0\_\_ | ☐ | ☐ | ☐ | All aggregates, including the filter layer (choker stone & sand), the stone reservoir layer or infiltration sump conform to specifications as certified by the manufacturer & verified by the installer. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Underdrain size and perforations meet the specifications. |  |

**Filter Layer, Underdrain, and Stone Reservoir Placement (cont’d):**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inspector** | **Yes** | **No** | **N/A** | **Construction Item** | **Date Completed** |
| 0\_\_ | ☐ | ☐ | ☐ | For Level 2 installations: placement of filter layer and initial lift of stone reservoir layer aggregates with underdrain or infiltration sump, spread (not dumped) to avoid aggregate segregation. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Permeable geotextile liner meets minimum requirements found in Table 9.6 in Specification 9 of the BMP Clearinghouse as certified by the manufacturer and verified by the installer. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Impermeable geotextile liner (minimum 30 mil poly-liner), when required, meets project specifications as certified by the manufacturer and verified by the installer. |  |
| **03** | ☐ | ☐ | ☐ | Impermeable clay liner, when required, is placed per geotechnical engineer’s oversight. Note: clay liners must meet the minimum requirements found in Table 14.4 in Specification 14 of the Va. BMP Clearinghouse. Sign below to verify installation.**\*** |  |

**\*Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Virginia License # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- | --- | --- | --- | --- |
| 0\_\_ | ☐ | ☐ | ☐ | Sides of excavation covered with geotextile, when required, prior to placing stone reservoir aggregate; no tears or holes, or excessive wrinkles are present. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Placement of underdrain, observation wells, and underdrain fittings (45 degree wyes, cap at the upstream end, etc.) are in accordance with the approved plans. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Elevations of underdrain and outlet structure are in accordance with approved plans, or as adjusted to meet field conditions. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Placement of remaining lift of stone reservoir layer as needed to achieve the required reservoir depth. |  |

**Bioretention Soil Media Placement**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inspector** | **Yes** | **No** | **N/A** | **Construction Item** | **Date Completed** |
| 0\_\_ | ☐ | ☐ | ☐ | Digital Photos taken during this stage. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Soil media is certified by manufacturer/supplier or installer as meeting the project specifications. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Soil media is placed in 12-inch lifts to the design top elevation of the bioretention area. Elevation has been verified after settlement (2 to 4 days after initial placement). |  |
| 0\_\_ | ☐ | ☐ | ☐ | Side slopes of ponding area are feathered back at the required slope.  |  |

**Pretreatment and Plant Installation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Inspector** | **Yes** | **No** | **N/A** | **Construction Item** | **Date Completed** |
| 0\_\_ | ☐ | ☐ | ☐ | Digital Photos taken during this stage. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Placement of energy dissipators and pretreatment practices (forebays, gravel diaphragms, etc.) in accordance with the approved plans. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Riser, overflow weir, or other outflow structure is set to the proper elevation and functional. |  |
| 0\_\_ | ☐ | ☐ | ☐ | External bypass structure is built in accordance with the approved plans. |  |
| 0\_\_ | ☐ | ☐ | ☐ | Appropriate number and spacing of plants are installed in accordance with the approved plans. |  |

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| Date: | Additional Inspection Notes: |
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Note: Provide this report, along with digital photos, to the LoCo Dept. of Building & Development coincident with E&S Bond Release. “As-Built” plans of the BMP & P.E. certification must be provided to B&D prior to VSMP Permit Termination.

**BMP INSPECTION CHECKLIST INSTRUCTIONS**

**1. Checklist Basics**

 A. The person noted as the **“operator”** on the VSMP permit for the site where the BMP is constructed is ultimately responsible for the inspections being performed & completion of the checklist.

 B. There will be one (1) Construction Inspection Checklist per BMP.

✔

 C. Use dark ink (blue or black) to fill out the document.

 D. Make sure to fill out the grey information box (on the 1st page) describes the location of the BMP on the site, as well as its geographic coordinates (obtain from the approved plans).

 E. If construction of a BMP is already underway when this program begins on **August 1, 2017**, please denote all checklist items that have been completed. However, if there is insufficient information available to verify completion of a construction item, check the N/A (not applicable) box and provide a brief explanation in the **“Additional Inspection Notes”** section.

F. Each checklist is divided into phases of construction (e.g., excavation, bioretention soil media placement, etc.) with individual construction items within each phase.

 G. For the majority of the checklist items, any of the following individuals may perform inspections and fill out the document\*:

 i. The operator/owner or his representative (e.g., project engineer);

 ii. The contractor who installs the BMP; and/or,

 iii. The geotechnical engineer for the project.

\*The individual filling out the checklist must indicate so **for each construction item** (i.e., **enter designated number**).

 H. Note: A licensed Geotechnical Engineer must inspect & verify the installation of the specific checklist items below via this signature block found in the document:

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Virginia License # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 i. Bioretention Facility – Impervious clay liner (when required) must meet specifications found in the Va. BMP Clearinghouse.

 ii. Wet Pond & Extended Detention Pond –

 a. Embankment core (if required) and embankment material;

**BMP INSPECTION CHECKLIST INSTRUCTIONS (cont’d)**

 b. Design & construction of filter & drainage diaphragms (if included); &

c. Impervious clay liner (if required).

 iii. Wet & Dry Swales – Impervious clay liner (when required) must meet specifications found in the Va. BMP Clearinghouse.

G. When filling out the checklist, check **“Yes”** when construction of the item is completed per the explanation/description. Concurrently, enter the “Date Completed.”

 H. Check **“N/A”** (not applicable) if the construction item is not part of the approved design (e.g., an impervious liner is not required) or there is an approved field modification which changes or eliminates the item. When N/A is checked, always explain the reason in the **“Additional Inspection Notes”** section at the end of the checklist.

 I. Also use **“Additional Inspection Notes”** for any notes/clarification that will help verify that the BMP was properly constructed.

2. **Photos**

 A. Digital photos are required for most phases of BMP construction.

B. The photos will help to verify that each stage of construction met the standards required in the checklist.

3. **Location of BMP Checklists on Site & Checklist Updates**

 A. The checklist for a particular BMP will be updated as the different phases of the installation occur. Once the construction of a BMP has begun, attach the **up-to-date** checklist to the on- site Stormwater Pollution & Prevention Plan (SWPPP).

 B. BMP Checklists may be reviewed on site by a member of B&D’s VSMP Team (as well as the Erosion & Sediment Control Field Manager) during spot checks of the BMP installation.

4. **Construction Complete - Final Step**

 A. Once construction of the BMP is complete, submit the completed Loudoun County BMP Checklist along with all digital photos to B&D coincident with Erosion & Sediment Control Bond release.

* **Reminder** – “As-Built” plans & P.E. Certification related to BMP construction must still be provided to B&D for review prior to VSMP Permit Termination.