	3.6 Bioretention	Sheet #	Yes/No	Comments
General				
1	Is the bioretention a standard or enhanced design configuration, and has it been correctly identified in the Compliance Data sheets ☐ Standard Design- practices with a standard underdrain design and at least18 inches of filter media depth. ☐ Enhanced Design- practices with underdrains that contain at least 24 inches of filter media depth and an infiltration sump/storage layer or practices that can infiltrate the design storm volume within 72 hours. [3.6 Bioretention, page 105]			
Siting				
2	Is the groundwater table and/or bedrock layer at least 2 feet from the bottom of the bioretention installation? A geotechnical report must be provided to confirm. [3.6.1 Bioretention Feasibility Criteria- Water Table, page 107]			
3	Is the CDA to a traditionally sized bioretention practice no more than 2.5 acres (up to 100% impervious)? Is the maximum CDA to a smaller bioretention 1.0 acre? [3.6.1 Bioretention Feasibility Criteria- CDA, page 108]			
4	Is there a minimum setback of 10 feet from a structure and waterproofing protection for foundation and basement? If setback not achieved, is an impermeable liner used along the sides of the practice? [3.6.1 Bioretention Feasibility Criteria- Setbacks, page 108]			
Soils (for Enhanced Designs only)				
5	Has the designer verified the soil permeability by completing the geotechnical requirements outlined in Appendix P? The saturated hydraulic conductivity for the native soil must exceed 0.1 feet/day to qualify for enhanced bioretention. [3.6.1 Bioretention Feasibility Criteria- Soils and Underdrains, page 108; 3.6.4 Bioretention Design Criteria- BMP Sizing, page 126]			
Utilities				

6	Have all comments from DC Water and DDOT (for PROW) regarding the proposed practice been resolved? Stormwater BMPs must comply with the DC Water Green Infrastructure Utility Protection Guidelines and the DDOT Design and Engineering Manual. [3.6.1 Bioretention Feasibility Criteria- Proximity to Utilities, page 107]			
Design				
7	If the bioretention is designed as an off-line system, does the practice divert overflow from entering the bioretention cell? [3.6.2 Bioretention Conveyance Criteria- Off-line Bioretention, page 110]			
8	If the bioretention is designed as an on-line system, does the practice incorporate an overflow structure that addresses the following? ☐ Passes storms greater than the design storm storage to a stabilized pathway ☐ Conveys runoff to a storm sewer, stream, or existing stormwater conveyance infrastructure ☐ Designed with enough freeboard between the top of wall and the overflow structure such that the practice will not be overtopped during the 15-year storm. Calculations must be provided ☐ Overflow associated with the 15-year design storm must be controlled so that velocities are non-erosive (generally less than 6 feet per second) at the outlet point [3.6.2 Bioretention Conveyance Criteria- On-line Bioretention, page 110]			
9	Does the bioretention have a pretreatment system that evenly spreads runoff across the entire width of the bioretention area? [3.6.3 Bioretention Pretreatment Criteria, page 111]			
10	Is the bioretention designed with an internal flow path geometry that ensures treatment mechanisms provided by the bioretention are not bypassed or short circuited? (i.e., Are the bioretention inlets and outlets located as far away as possible to maximize travel time?) [3.6.4 Bioretention Design Criteria- Design Geometry, page 113]			

11	If required, does the bioretention include inlet energy dissipation, such as: ☐ Downspouts to stone energy dissipaters or splash blocks ☐ Sheet flow over a depressed curb with a 3-inch drop ☐ Curb cuts allowing runoff into the bioretention area ☐ Covered drains that convey flows across sidewalks from the curb or downspouts ☐ Grates or trench drains that capture runoff from a sidewalk or plaza area ☐ Drop structures that appropriately dissipate water energy [3.6.4 Bioretention Design Criteria- Inlets and Energy Dissipation, page 113]			
12	Is the inlet designed with sufficient width and slope to avoid unintended bypass into the practice? [3.6.4 Bioretention Design Criteria- Inlets and Energy Dissipation]			
13	Is the ponding depth no more than 3 inches and no less than 18 inches? [3.6.4 Bioretention Design Criteria- Ponding Depth, page 113]			
14	Does the filter media meet the following requirements? ☐ 80-90% sand ☐ 10-20% silt and clay ☐ 10% maximum clay ☐ 3-5% organic content ☐ pH between 6.0-7.5 ☐ Cation exchange capacity (CEC) minimum of 5meq/100g or cmol+/kg ☐ Phosphorus content shall meet one of the following: o P-Index between 10 and 30; o 5 to 15mg/kg Mehlich I Extraction; o 18 to 40mg/kg Mehlich III Extraction; and ☐ Soluble salts shall be less than 500 ppm or less than 0.5 mmhos/cm. [3.6.4 Bioretention Design Criteria- Filter Media, page 114]			
15	Does the filter media meet the final media grain size distribution in Table 3-18 or have a saturated hydraulic conductivity of 2-6 inches per hour according to the test procedure ASTM D2434 when compacted (at 60% to 80% optimum moisture content) to a minimum of 86% of the maximum density as determined by AASHTO T 99 (ASTM, 2006)? [3.6.4 Bioretention Design Criteria- Complete Filter Media, page 115]			

16	Does the filter media depth meet the following? ☐ Standard bioretention design has minimum depth of 18 inches ☐ Enhanced bioretention design has minimum depth of 24 inches ☐ The depth cannot exceed 6.5 feet ☐ The maximum filter media depth does not exceed the depth on Table 3.20 *Determining Maximum Filter Media Depth* (feet) [3.6.4 Bioretention Design Criteria- Filter Media Depth, page 117]			
17	If included along the sides of the bioretention, does the geotextile fabric meet the following requirements? ☐ Comply with AASHTO M-288 Class 2 ☐ Permeability at least 10 times higher than the soil subgrade permeability [3.6.4 Bioretention Design Criteria- Geotextile, page 119]			
18	Is the underdrain a 4- or 6-inch perforated schedule 40 PVC pipe? Is the outlet sized so that the bioretention fully drains within 72 hours or less? See Appendix H - Design of Flow Control Structures - H.1 Circular Orifices for the circular orifice equation. [3.6.4 Bioretention Design Criteria- Underdrains, page 119]			
19	Is the underdrain encased in a layer of No. 57 or smaller (No. 68, 8, or 89) stone? Is the depth of the underdrain stone layer combined with the choking layer no more than 12 inches, and does not extend beyond the surface dimensions of the bioretention filter media? [3.6.4 Bioretention Design Criteria- Underdrains, page 119]			
20	Does each underdrain include a cleanout pipe (minimum 4 inches in diameter)? [3.6.4 Bioretention Design Criteria- Underdrains, page 119]			
21	Does the bioretention practice include at least one observation well consisting of a well-anchored, 4- to 6-inch diameter PVC pipe that extends to the bottom of the practice? [3.6.4 Bioretention Design Criteria- Observation Wells, page 119]			
22	If the system includes an underground storage layer for the Enhanced Design, does it infiltrate within 72 hours? Unlike the underdrain stone layer, this storage layer can be extended beyond the surface dimensions of the bioretention filter media if additional storage volume is needed. [3.6.4 Bioretention Design Criteria- Underground Storage Layer, page 120]			

23	If the system utilizes an impermeable liner for contaminated soils, does it meet the following requirements? ☐ PVC geomembrane liner or equivalent of an appropriate thickness ☐ Field seams sealed with a minimum 6-inch overlap of material at all seams [3.6.4 Bioretention Design Criteria- Impermeable Liner, page 120]			
24	Do the choking layer and underdrain stone meet the specifications outlined in Table 3-21 for washed clean stone free of fines (no more than 2% passing the No.200 sieve)? [3.6.4 Bioretention Design Criteria- Material Specifications, page 121]			
25	Engineered tree boxes that cover portions of the filter media with pervious pavers or cantilevered sidewalks must contain the following: ☐ Filter media connected beneath the surface so that stormwater and tree roots can share this space ☐ Minimum surface ponding depth of 3”, averaged over surface area of bioretention area ☐ If sand based structural soil (SBSS) is used, it must meet same phosphorus content limits as typical bioretention soil [3.6.4 Bioretention Design Criteria- Engineered Tree Boxes, page 122]			
26	Does the engineered tree box have a minimum rootable soil volume as described in Section 3.14 Tree Planting and Preservation? • Minimum 1,500 cubic feet per large tree. For shared rooting space, minimum of 1,000 cubic feet for each large tree • Minimum of 600 cubic feet per small tree. For shared rooting space, minimum of 400 cubic free per tree. [3.6.4 Bioretention Design Criteria- Engineered Tree Boxes, page 122; 3.14.2 Planting Trees, page 255]			
27	Is the total storage volume of the bioretention BMP calculated using Equation 3.5 Bioretention Storage Volume? [3.6.4 Bioretention Design Criteria- BMP Sizing, page 126]			
28	For enhanced bioretention, is the infiltration sump depth calculated using Equation 3.6 Bioretention Infiltration Sump Depth? [3.6.4 Bioretention Design Criteria- BMP Sizing, page 126]			

29	For non-underdrained designs, does the design use Equation 3.7 Bioretention Infiltration Rate Check to confirm the entire storage volume will infiltrate in 72 hours? [3.6.4 Bioretention Design Criteria- BMP Sizing, page 127]			
30	Is the top surface area of the practice no more than twice the size of the surface area of the filter media? [3.6.4 Bioretention Design Criteria- BMP Sizing, page 127]			
Landscaping				
31	Does the planting plan contain the following? ☐ Common and botanical names of plants used ☐ Size of planted materials ☐ Mature size of the plants ☐ Maintenance requirements [3.6.5 Bioretention Landscaping Criteria, page 127]			
32	If trees are to be planted, is the filter media depth at least 3 feet to support the trees? [3.6.5 Bioretention Landscaping Criteria, page 131]			
Construction				
33	Is the bioretention clearly marked on all construction and grading plans and fully protected by silt fence or construction fencing? [3.6.6 Bioretention Construction Sequence- Soil Erosion and Sediment Controls, page 132]			
34	Are all bioretention areas intended for infiltration located outside of the Limits of Disturbance during construction to prevent soil compaction? If not, does the design meet one of the following criteria? ☐ The in-situ soils are not disturbed any deeper than 2 feet above final design excavation of the bottom of the bioretention. The impacted area is excavated and tilled to a depth of 12-inches below the bottom of the bioretention. ☐ If the excavation cannot be restricted above 2 feet, infiltration tests are performed prior to the installation of the bioretention to ensure the infiltration rate is still present. If there is a loss in infiltration rate, deep tilling practices will be utilized to restore the rate. [3.6.6 Bioretention Construction Sequence- Soil Erosion and Sediment Controls, page 132]			

35	If the bioretention area is also shown as a temporary sediment trap or basin, does the plan meet the following requirements? ☐ The maximum excavation depth of trap or basin at the construction stage must be at least 1 foot higher than post construction bioretention bottom elevation ☐ The bioretention facility must contain an underdrain [3.6.6 Bioretention Construction Sequence- Soil Erosion and Sediment Controls, page 132]			
36	If the bioretention area is also shown as a temporary sediment trap or basin, are there procedures for converting the temporary sediment control practice to a permanent bioretention, including dewatering, cleanout, and stabilization? [3.6.6 Bioretention Construction Sequence- Soil Erosion and Sediment Controls, page 132]			
37	Does the plan contain the Bioretention Construction and Maintenance Inspection Checklists (Appendix L Construction Inspection Checklists and Appendix M Maintenance Inspection Checklists) or incorporate the checklists by reference? [Appendix L and Appendix M]			
Maintenance				
38	Does the SWMP include a maintenance schedule similar to Table 3.25 Typical Maintenance Tasks for Bioretention Practices in the Stormwater Management Guidebook? [3.6.7 Bioretention Maintenance Criteria, page 134]			
39	Is the bioretention facility included in the Declaration of Covenant? ☐ Is the location and extent of the bioretention facility a part of Exhibit B Site Plan? ☐ Is the maintenance of the bioretention facility a part of Exhibit C Maintenance Plan? [3.6.7 Bioretention Maintenance Criteria- Declaration of Covenants, page 136]			