

Low Impact Development Stormwater Management Planning and Design Guide

Construction Considerations
 Ideally, bioretention sites should remain outside the limit of disturbance until construction of the bioretention begins to prevent soil compaction by heavy equipment. Bioretention locations should not be used as the site of sediment basins during construction, as the concentration of fines will prevent post-construction infiltration. They should also not be used for storing materials. To prevent sediment from clogging the surface of a bioretention cell, stormwater should be diverted away from the bioretention site until the drainage area is fully stabilized. Due to the locations of many bioretention practices in the road right-of-way or tight urban spaces, considerations of traffic control and utility conflicts must be part of the plans and inspections.

- The following is a typical construction sequence to properly install a bioretention practice. The steps may be modified to reflect different bioretention applications or expected site conditions.
1. Bioretention areas should be fully protected by silt fence or construction fencing to prevent compaction by construction traffic and equipment.
 2. Installation may only begin after entire contributing drainage area has been either stabilized or flows have been safely routed around the area. The designer should check the boundaries of the contributing drainage area to ensure it conforms to original design.
 3. The pretreatment forebay should be excavated first and sealed until full construction is completed.
 4. Excavators or backhoes working adjacent to the proposed bioretention area should excavate the cell to the appropriate design depth.
 5. It may be necessary to rip the bottom soils to promote greater infiltration or excavate any sediment that may have built up during construction.
 6. There are three options at this step depending on the design:
 - a. No infiltration: Place an impermeable liner on the bed of the bioretention area with 150 mm overlap on sides. Lay the perforated underdrain pipe. Pack 50 mm diameter clear stone to 75 mm above top of underdrain, an optional 75 mm choking coarse of pea gravel, and then lay the non-woven geotextile drainage fabric over the stone and underdrain.
 - b. Partial infiltration: Place desired depth of stone for the infiltration volume on bed and then lay the perforated underdrain pipe over it. Pack 50 mm diameter clear stone to 75 mm above the top of the underdrain, an optional 75 mm choking coarse of pea gravel and then lay the non-woven geotextile drainage fabric over the stone and underdrain.
 - c. Full infiltration: Stone can be placed to provide added stormwater volume storage or the bioretention media can be added directly to the bottom of the excavation.
 7. Bioretention filter media should be obtained premixed from a vendor. Apply in 300 mm lifts until desired top elevation of bioretention area is achieved. Thoroughly wet each lift before adding the next and wait until water has drained through the soil before adding the next lift. Wait a few days to check for settlement, and add additional media as needed.

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8. Prepare planting holes for any trees and shrubs, install vegetation, and water accordingly. Install any temporary irrigation.
9. Plant landscaping materials as shown in the landscaping plan, and water them weekly in the first two months.
10. Lay down surface cover in accordance with the design (mulch, riverstone, or turf).
11. Conduct final construction inspection, checking inlet, pretreatment cell, bioretention cell and outlet elevations.

Construction Inspection
 Common construction pitfalls can be avoided by careful construction supervision that focuses on the following aspects:

- Erosion and Sediment Control**
- Bioretention locations should be blocked from construction traffic and should not be used for erosion and sediment control.
 - Proper erosion and sediment controls should be in place for the drainage area.

- Materials**
- Gravel for the underdrain should be clean and washed; no fines should be present in the material.
 - Underdrain pipe material should be perforated and of the correct size.
 - A cap should be placed on the upstream (but not the downstream) end of the underdrain.
 - Filter media should be tested to confirm that it meets specifications.
 - Mulch composition should be correct.

- Elevations**
 Elevations of the following items should be checked for accuracy:
- Depth of the gravel and invert of the underdrain
 - Inverts for inflow and outflow points
 - Filter depth after media is placed
 - Ponding depth provided between the surface of the filter bed and the overflow structure
 - Mulch depth

- Landscaping and Stabilization**
- Correct vegetation should be planted.
 - Pretreatment areas should be stabilized.
 - Drainage area should be stabilized prior to directing water to the bioretention.

- The following items should be checked after the first rainfall event, and adjustments should be made as necessary:
- Outlet protection/energy dissipation at concentrated inflow should be stable.
 - Flow should not concentrate and should spread evenly over the filter bed.

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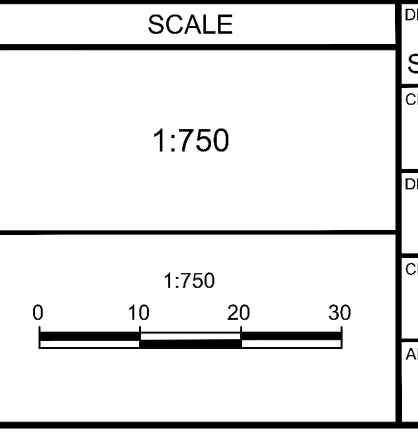
- Ponded water at the surface of the bioretention facility should drain within 24 hours of the end of the storm event. The filter media bed should fully drain within a maximum period of 72 hours.
- Excessive sediment accumulation should not be present.

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THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 122151-NLD1&2, 122151-GP1&2 AND 122151-GR1&GR2

NOTE:
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
2	REVISED PER CITY COMMENTS	MAR 30/23	DDB
1	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 16/22	DDB



DESIGN	SM / BM / DDB
CHECKED	DDB
DRAWN	SM
CHECKED	BM / DDB
APPROVED	DDB

FOR REVIEW ONLY

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LOCATION
 CITY OF OTTAWA
 405 HUNTMAR DRIVE - WAREHOUSE DEVELOPMENT

DRAWING NAME
EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 122151
 REV # 2
 DRAWING No. 122151-ESC

D07-12-22-0186

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