



5.3.10 Disconnection of Impervious Areas

Description

The disconnection of impervious areas can be achieved by directing runoff from roof leaders, roads, driveways, and other paved surfaces toward vegetated areas rather than conveying runoff to conventional stormwater management measures (see Figure 5.3.10-1). Disconnecting impervious areas allows for the filtering and possibly infiltration of runoff onsite, reduces burdens on conventional storm sewer systems, can be a low-cost retrofit or reduce piping costs on new construction projects, and can reduce downstream erosion by dispersing runoff near the source. This section describes the management of impervious areas directed to a vegetated surface that is **not** covered under another BMP section of the manual (i.e., rooftops managed by bioretention areas are covered elsewhere).



Figure 5.3.10-1. Roof leaders from a residence sheet flow across turf and, eventually, to a meadow area, which filters and absorbs stormwater runoff.

Disconnection of impervious areas differs from vegetated filter strips (Section 5.3.6) in the application of the BMP. Vegetated filter strips are designed to treat runoff from planned impervious areas in accordance with the specifications in Section 5.3.6. Disconnection of impervious areas, while achieving similar stormwater management goals, is applied with different location and capture area limitations. Disconnection of impervious areas is typically implemented as a retrofit on existing projects to promote disconnection from municipal infrastructure.





BMP Functions Table

BMP	Applicability	Volume Reduction	Water Quality	Peak Rate Reduction	Recharge	Runoff Temperature Mitigation	Heat Island	Habitat Creation	Maintenance Burden	Cost
Disconnection of Impervious Area	U/S/R	H	L	H	H	H	H	L	L	M

KEY: U = Urban; S = Suburban; R = Rural; H = High; M = Medium; L = Low

Key Design Features

- Roof leaders, roads, driveways, and other paved surfaces are disconnected from traditional storm sewer systems by dispersing runoff at the source onto a sufficiently sized vegetated area.
- The vegetated area receiving stormwater flows must be graded to promote overland sheet flow. Grading should move water away from all structures. Disconnection of impervious surfaces must never cause basement seepage or compromise building foundations.
- Dispersing stormwater flows limits pollutant mobility and maximizes onsite infiltration.
- Roof leaders usually are discharged to an energy dissipating measure, such as a splash block, before sheet flowing onto a pervious area (see Figure 5.3.10-2).
- Roads, driveways, paths, or other paved surfaces may be dispersed into the landscape through sheet flow by eliminating curbs or through cuts in the curb. If curb cuts are used, an energy dissipating device, such as a cobble splash block, may be necessary.
- Disconnections are encouraged on relatively permeable soils (Hydrologic Soil Groups A and B).



Figure 5.3.10-2. An energy dissipating splash block receives downspout runoff.





Applications

- Residential
- Commercial
- Industrial
- Institutional
- Urban and suburban settings
- Especially applicable for roof leaders, paved pathways, and limited areas of impervious surfaces such as parking lots

Advantages

- Reduces the volume of runoff and allows for increased infiltration and filtration of stormwater runoff through vegetation.
- Peak runoff rates are reduced.
- Pollutants are captured and retained by filtering through plants and soil.
- Increased time of concentration, reduced runoff volume, and slowing of the rapid conveyance of pollutants.
- Reduces flows to traditional storm sewer systems.
- A low-cost retrofit or can provide cost savings on new projects.
- Can reduce downstream erosion by dispersing runoff near the source.

Disadvantages

- Improper design has the potential to cause basement seepage, yard ponding, or erosion.
- Specific site characteristics including land use, soil, and topography influence implementation.
- Requires nearby areas to be designed to receive stormwater runoff.
- Not as applicable in densely developed areas.

Applications

Disconnection of impervious area can be applied to any impervious area, within a certain size limit of drainage area, adjacent to a pervious area with an adequate size and slope.





Disconnection of Roof Leaders



Figure 5.3.10-3. Roof runoff may be disconnected to a receiving vegetated area.





Disconnection of Paths



Figures 5.3.10-4a and b. Paths can be disconnected by sheet flowing onto a vegetated area of an adequate size and slope.





Disconnection of Parking Lots



Figure 5.3.10-5. A parking lot is disconnected by directing flow through curb cuts to a vegetated area that includes a filter strip.

Applicable Protocols and Specifications

While disconnection of impervious areas may not specifically require these considerations, the heavy reliance on runoff storage, infiltration, and BMPs indicates that the following Protocols and Specifications (see Appendices A and F) apply and must be addressed:

- Protocol 1 Setbacks from Structures
- Protocol 5 Planting Guidelines

Design Considerations for Disconnection of Impervious Areas

The key design components for disconnection of impervious areas discussed below allow design flexibility to ensure maximum performance from this versatile BMP.





1. Location and Capture Area

For a roof area to be considered disconnected, the following must be met:

- Roof area cannot be considered a designated hot area (this may be applicable to industrial roofs with material deposition concerns, etc.).
- The drainage area to each disconnected discharge must be 500 square feet or less.
- The roof leader must have an energy dissipating device, such as a splash block, at the point of discharge.
- The vegetated surface receiving the discharge must provide a continuous flow path of 75 feet or greater.
- The vegetated surface receiving the discharge must have an average slope of 5 percent or less.
- Roof leaders must be at a distance of at least 10 feet from impervious surfaces to discourage “reconnection.”

For other impervious surfaces to be considered disconnected, the following must be met:

- Runoff cannot come from a designated hot area.
- The contributing impervious drainage area must be 1,000 square feet or less.
- The contributing impervious drainage area must not have a flow path exceeding 75 feet in length.
- The vegetated surface receiving the discharge must be equal to or greater than the contributing impervious drainage area length.
- The vegetated surface receiving the discharge must be continuous.

2. Entrance/Flow Conditions

Runoff from disconnected impervious surfaces will be directed to the receiving vegetated area, through roof leaders, curb cuts, sheet flow, or a level-spreading device. All discharge points must be designed to produce flow that will not cause scour or erosion at the soil surface. Splash blocks, cobble strips, or another energy dissipater should be used where runoff is discharged on the receiving vegetated area to minimize entrance velocities. A gravel level spreader as described in BMP 5.3.6, Vegetated Filter Strips may be applicable.

3. Management of Sediment, Trash, and Debris

- Roof leaders, curb cuts, and other points of discharge onto receiving vegetated areas should be checked regularly and cleared of accumulated debris to ensure positive flow onto vegetated surface.





- Discharge points and receiving vegetated areas should be inspected regularly for signs of scour, erosion, or ponding. If improper grading is discovered, it must be repaired to promote positive sheet flow across the receiving vegetated area.
- Caution should be used when disconnecting impervious areas with high sediment loads. Such areas should include an initial measure to trap and remove sediment. A filter strip may address this concern.
- All entry points and structural components should be inspected and maintained in accordance with Chapter 8 of this manual.

4. Storage and Stay-on-Volume

Only impervious areas and receiving vegetated areas that meet all of the requirements listed in the Location and Capture Area section above will be considered as meeting 100 percent of the SOV using the disconnected impervious BMP.

Disconnected impervious areas that meet all of the requirements listed in the Location and Capture Area section above may be removed from the impervious area for calculation of the SOV. Runoff from these areas must still be considered for storm conveyance and peak rate mitigation purposes (see item 6, Overflow and Peak Rate below).

5. Area and Dimensions

See item 1, Location and Capture Area above.

6. Overflow and Peak Rate

The disconnection of impervious surfaces to a vegetated surface meeting the requirements listed above in item 1, Location and Capture Area can be excluded from volume management calculations for SOV but must be considered for peak rate control.

For the purposes of peak rate calculations, these areas can be considered to have a Curve Number value equivalent to “Lawn in Good Condition” for the soil type that receives the disconnected runoff. There is no additional adjustment to the weighted Curve Number value.

Construction Considerations

Existing sites can achieve the disconnection of impervious surfaces by modifying roof leaders, introducing curb cuts in existing curbs, removing curbs, or modifying existing storm sewer systems to discharge to vegetated areas that meet the minimum requirements listed in the Location and Capture Area section above.





For new construction, the design process should emphasize the disconnection of impervious surfaces wherever possible, since it is a low-cost stormwater management technique that limits the need for relatively expensive structures and piping.

Operations and Maintenance

Managing runoff by disconnecting impervious surfaces is a low-maintenance stormwater management technique. Roof gutters, downspouts, splash blocks, curb cuts, and other discharge points onto vegetated surfaces must be checked regularly for debris and be cleaned. The receiving vegetated surface should be checked for erosion and scour and for the health of the vegetation, and it should be regraded and replanted as necessary.

